FIRE DEPARTMENT • CITY OF NEW YORK

STUDY MATERIAL FOR

THE CERTIFICATE OF LICENSE EXAMINATION

W-16

CERTIFICATES OF LICENSE FOR THE INSTALLATION, ALTERATION, TESTING AND REPAIR OF LIQUID MOTOR FUEL STORAGE TANK AND DISPENSING SYSTEMS. (Citywide)

All applicants are required to apply and pay for an exam online before arriving at the FDNY. It can take about 30 minutes to complete.

Simplified instructions for online application and payment can be found here:

http://www1.nyc.gov/assets/fdny/downloads/pdf/business/fdny-business-cof-individuals-short.pdf

Create an Account and Log in to:

http://fires.fdnycloud.org/CitizenAccess

This book is provided to the public for free by the FDNY.

*Note: W-16 C of L is NOT authorized to supervise the installation, alteration, testing and repair of non-motor fuel storage tank and dispensing systems. The installation, alteration, testing and repair of non-motor fuel storage tank and dispensing systems must be under the supervision of a W-94 C of F holder.

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EXAM SPECIFIC INFORMATION FOR
W-16 CERTIFICATE OF license
NOTICE OF EXAMINATION

Save time and submit application online!

All applicants are required to apply and pay for an exam online before arriving at the FDNY. It can take about 30 minutes to complete.

Simplified instructions for online application and payment can be found here:

http://www1.nyc.gov/assets/fdny/downloads/pdf/business/fdny-business-cof-individuals-short.pdf

Create an Account and Log in to:

http://fires.fdnycloud.org/CitizenAccess

REQUIREMENTS FOR CERTIFICATE OF FITNESS APPLICATION

General requirements:
Review the General Notice of Exam:
http://www1.nyc.gov/assets/fdny/downloads/pdf/business/general-notice-of-exam-cof.pdf

Special requirements for the: W-16 Certificate of License

(1) The applicants must demonstrate all the following qualifications:
   a. High school diploma or its equivalent;
   b. A minimum of three (3) years work experience in the installation, alteration, testing or repair of automotive or marine liquid motor fuel storage and dispensing systems in the five (5) year period prior to the date of filing of the W-16 C of L application. Such experience shall have been obtained working under the general supervision of a W-16 C of L holder.
   c. Liability insurance of not less than $500,000, naming the City of New York and the Fire Department as additional insured's and rated by AM best A or A-;
   d. Qualified staff and sufficient equipment and facilities to competently and safely perform the business or activity requiring the certificate of license;

(2) The applicant must apply for qualification review and obtain pre-approval before taking the computer based exam:

Applicants may not take the computer based test until obtaining the approval. Applicants must submit the required application documents by mail or in person to: New York City Fire Department, Attention: C of F Unit, Bureau of Fire Prevention, 9 MetroTech Center - 1st Floor, Brooklyn, New York, 11201-3857, Attn: COL Review. If there are any questions, please contact (718) 999-1988.

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Applicants will be notified whether they qualify or if additional documents are required.

The required documents for pre-approval:

a. Valid high school diploma or GED.
b. Completed and signed W-16 application form

http://www1.nyc.gov/assets/fdny/downloads/pdf/business/certificate-of-license-application.pdf

c. Any documentation that can verify the certification or experience indicated in the W-16 application form above. The W-2 forms (wage and tax statement) and a resume and a letter of recommendation may be a supporting document for work experience.
d. Recommendation letter(s) signed by the previous/current employer(s) who possesses a W-16 Certificate of License. All the recommendation letters must include:
   (i) Length of time employed
   (ii) Job duties in the previous/current company
   (iii) W-16 Certificate of License name and license number

   Valid W-16 C of L holder list could be found on the FDNY website:

http://www1.nyc.gov/assets/fdny/downloads/pdf/business/approved-companies-motor-fueled-installer.pdf

e. A copy of ACORD summary of an insurance policy not less than $500,000. The FDNY must be co-named on the insurance policy. The issuance policy must be issued by an approved insurance company that is licensed to do business in New York State and has an A. M. Best rating of A- or better.

APPLICATION FEE:

Pay the **$145** application fee in person by one of the following methods:

- Cash
- Credit card (*American Express, Discover, MasterCard, or Visa*)
- Debit card (*MasterCard or Visa*)
- Personal or company check or money order (*made payable to the New York City Fire Department)*

A convenience fee of 2.00% will be applied to all credit card payments.

For fee waivers submit: ***(Only government employees who will use their C of F for their work- related responsibilities are eligible for fee waivers.)***

- A letter requesting fee waiver on the Agency's official letterhead stating applicant full name, exam type and address of premises; ***AND***
- Copy of identification card issued by the agency

REQUIREMENTS FOR ALTERNATIVE ISSUANCE PROCEDURE (AIP)

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The W-16 Certificate of License cannot be obtained by the alternative issuance procedure.

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--W-16 SAMPLE RECOMMENDATION LETTER--

COMPANY NAME
BUSINESS ADDRESS

Date: _____

Fire Department
Bureau of Fire Prevention
9 Metro Tech Center
Brooklyn, NY 11201-3857

To whom it may concern:

I am pleased to recommend (Applicant's name) to apply for the W-16 Certificate of License for INSTALLATION, ALTERATION, TESTING AND REPAIR OF LIQUID MOTOR FUEL STORAGE TANK AND DISPENSING SYSTEMS**.**

The applicant has been worked under the supervision of (name of a W-16 C of L holder) with the license number: (W-16 holder's license number) and have performed the duties related to installation, alteration, testing or repair of automotive or marine liquid motor fuel storage and dispensing systems for (months, years)

After the applicant receives the W-16 C of L, the applicant will be employed in the company: (Company title and company address).

Applicant is of GOOD CHARACTER and is PHYSICALLY ABLE to perform the functions required by the holder of the Certificate of License.

_____ _____ _____

(Printed name of W-16 C of L holder) (W-16 C of L's title) (Signature of W-16 C of F holder)

NOTE: ***The recommendation letter should be on employer's letterhead. If not on employer's letterhead, signature must be notarized.***

SAMPLE

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EXAM INFORMATION

The computer based test will consist of **100** multiple-choice questions, administered on a "touch screen" computer monitor. It is a time-limited exam. Based on the amount of the questions, applicants will have 153 minutes to complete the test. The test will appraise the applicant's familiarity with the law, rules and regulations established for the installation, alteration, testing and repairing of various kinds of gasoline, diesel fuel oil (for motor vehicles) and other volatile flammable oil equipment including above-ground tanks for diesel motor fuel storage; the various methods and problems of installation; the principles and parts of all related equipment; and the care and safety that should be exercised by both the installer and the occupant when the latter assumes operation.

Applicant must attain a score of at least 70% on the computer based test in order to receive the W 16 Certificate of Qualification for the COL.

If all the requirements are met and pass the computer based test a W-16 Certificate of License will be issued the same day.

If fail, to retake the W-16 C of L exam, applicants will need to:

- Schedule an appointment
- submit a new A-20 form
- Pay $145 fee*

*The application fee may be waived once if the applicant obtains a failure mark between 65% and 69%. This opportunity is available only ninety (90) days after the initial failure. Applicants must surrender the **Failure Notice** at the time of the second test. *It is the applicants responsibility to safeguard the Failure Notice.* No second opportunity test will be given without the Failure Notice.

Call (718) 999-2473 for additional information and forms.

Please always check for the latest revised booklet at FDNY website before you take the exam.

http://www1.nyc.gov/assets/fdny/downloads/pdf/business/cof-w16-noe-study-materials.pdf

EXAM SITE: FDNY Headquarters, 9 MetroTech Center, Brooklyn, NY. Enter through the **Flatbush Avenue entrance (between Myrtle Avenue and Tech Place)**.

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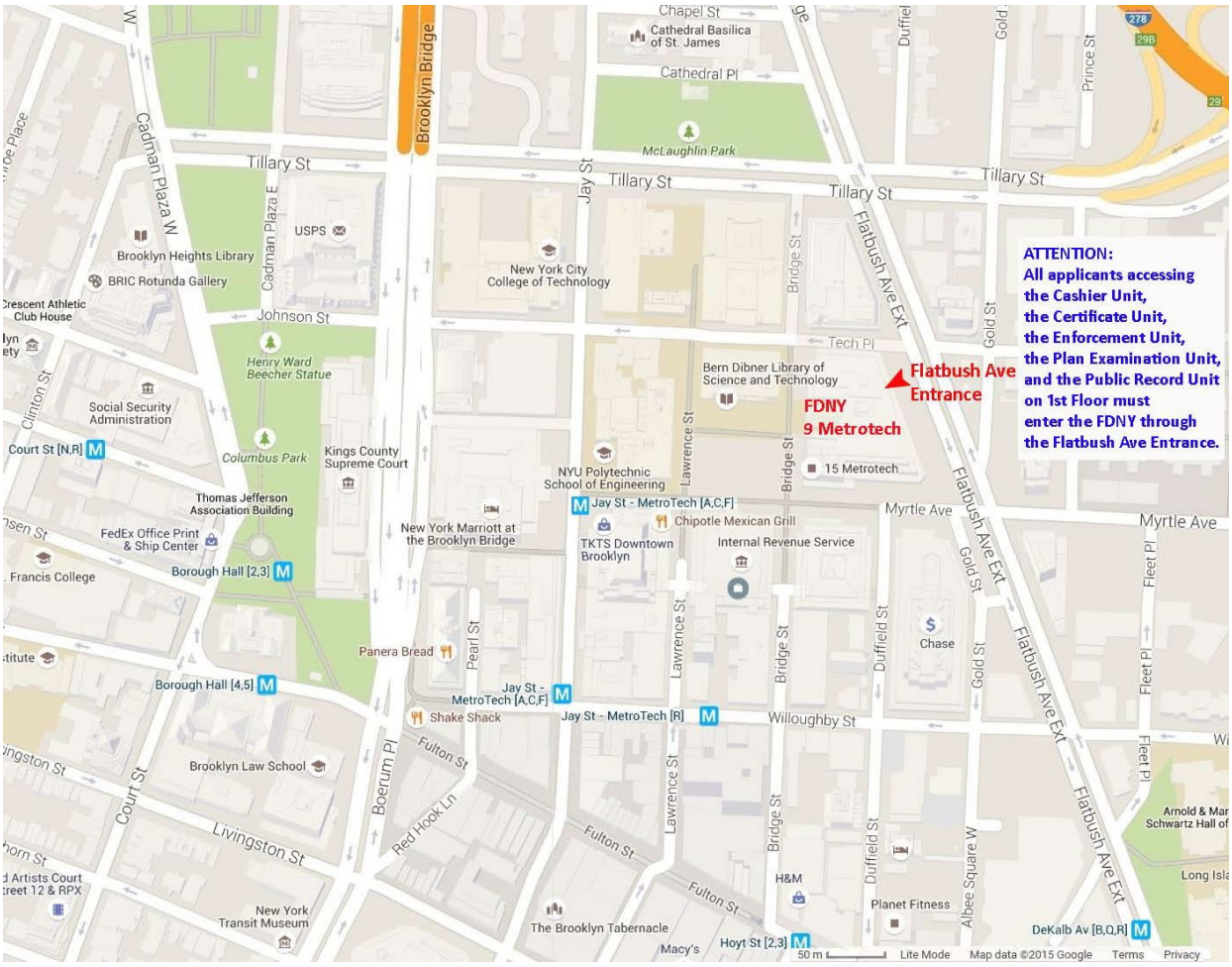

RENEWAL REQUIREMENTS

General renewal requirements:
Review the General Notice of Exam:
https://www1.nyc.gov/assets/fdny/downloads/pdf/business/general-notice-of-exam-cof.pdf

Special renewal requirements for the W-16 Certificate of License:
This Certificate of License must be renewed every ***TWO YEARS***. The renewal fee is **$30**. FDNY also reserves the right to require the applicants to take a re-examination upon submission of renewal applications.

You will receive a courtesy notice of renewal 90 days via email before the expiration date. However, it is your responsibility to renew your Certificate. It is very important to renew your Certificate of License before it expires. Renewals submitted 90 days (up to one year) after the expiration date will incur a $25 penalty in addition to the renewal fee. Certificates expired over one year past expiration date will not be renewed. New exams will be required.

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Read the Quick Renewal Guide for FLSD, Expeditors or Fee Exempt Applicants to learn the procedure:
http://www1.nyc.gov/assets/fdny/downloads/pdf/business/cof-renewal-short.pdf

QUESTIONS?

FDNY Business Support Team: For questions, call 311 and ask for the FDNY Customer Service Center or send an email to FDNY.BusinessSupport@fdny.nyc.gov

STUDY MATERIAL AND TEST DESCRIPTION

About the Study Material

This study material will help you prepare for the examination for the Certificate of License for motor fuel storage and dispensing system. This study material consists of 9 parts. The exam covers the entire booklet and any tables. **It will not be provided to you during the test. It is critical that you read and understand this booklet to help increase your chance of passing this exam.** The study material does not contain all of the information you need to know for motor fuel storage and dispensing system. It is your responsibility to become familiar with all applicable rules and regulations of the City of New York, even if they are not covered in this study material. You need to be familiar with the National Fire Protection Association (NFPA) 30, 30A and 2022 Fire Code Chapter 23, Chapter 27, and Fire Rule Chapter 22, Fire Rule Section §4834-01, and the New York City Building Code §26-229 and the regulations of the New York State Department of Environmental Conservation, as set forth in 6 NYCRR Parts 612, 613 and 614 which regulate the motor fuel storage and dispensing system in order to adequately prepare for the exam.

2022 FIRE CODE ENACTED

The amended New York City Fire Code, to be known as the 2022 Fire Code, takes effect on April 15, 2022. **It may not have been updated in this study material and the exam will be mainly based on this booklet, not the 2022 Fire Code. However, as the Certificate of Fitness holder, it is your responsibility to become familiar with the applicable sections of the new 2022 Fire Code.**

Design and installation provisions.

The design and installation provisions of the 2022 Fire Code shall apply to:

- Facilities established and conditions arising on or after 04/15/2022.
- Facilities and conditions not lawfully existing prior to 04/15/2022.

The facilities and conditions lawfully existing prior to the 04/15/2022 can be continued in compliance with the requirements of the former Fire Code/Fire Rule except as otherwise provided in the New Fire Code 102.5.

Operational and maintenance provisions.

The operational and maintenance provisions of the 2022 Fire Code, including permit and certification requirements, shall apply to all facilities, operations, conditions, uses and occupancies, regardless of when they were established or arose.

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Whenever this code is amended or a rule is promulgated to require a permit or certificate for a facility, operation, condition, use or occupancy, and no permit or certificate was previously required therefor pursuant to this code or the rules, such facility, operation, condition, use or occupancy may be continued without such permit or certificate until 04/15/2023, except as may otherwise be provided by such amendment or rule.

The 2022 Fire Code can be obtained via the following website:
http://www1.nyc.gov/site/fdny/codes/fire-code/fire-code.page

The 2014/2022 New York City Fire Code Cross-Reference Table can be referred to the following website:
http://www1.nyc.gov/assets/fdny/downloads/pdf/codes/fire-code-cross-reference.pdf

About the Test

All questions on the Certificate of License examination are of the multiple choice type with four alternative answers to each question. Only one answer is most correct for each question. If you do not answer a question, or if you mark more than one alternative your answer will be scored as incorrect. A score of 70% is required on the examination in order to qualify for the Certificate of License. Read each question carefully before marking your answer. There is no penalty for guessing.

SAMPLE QUESTIONS

The following questions represent the "format" of the exam questions, not the content of the real exam.

1. Which of the following are allowed to be used while taking a Certificate of License examination at 9 Metro Tech Center?

I. cellular phone
II. study material booklet
III. reference material provided by the FDNY
IV. mp3 player

A. III only
B. I, II, and III
C. II and IV
D. I only

Only reference material provided by the FDNY is allowed to be used during Certificate of License examinations. Therefore, the correct answer would be A. You would touch "A" on the computer terminal screen.

2. If the screen on your computer terminal freezes during your examination, who should you ask for help?

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A. the person next to you
B. the firefighters in the testing room
C. the examiner in the testing room
D. the computer help desk

If you have a computer related question, you should ask the examiner in the testing room. Therefore, the correct answer would be C. You would touch “C” on the computer terminal screen.

3. If you do not know the answer to a question while taking an examination, who should you ask for help?
A. the person next to you
B. the firefighters in the testing room
C. the examiner in the testing room
D. you should not ask about test questions since FDNY staff can not assist applicants

You should not ask about examination questions or answers since FDNY staff cannot assist applicants with their tests. Therefore, the correct answer would be D. You would touch "D" on the computer terminal screen.

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FIRE STATISTICS AND FACTS

According to the *Fires at U.S. Service Stations* report published by *the Fire Analysis and Research Division* of *the National Fire Protection Association (NFPA)* in April, 2011, an estimated 5,020 fires and explosions occurred at public service stations per year from 2004-2008. That means that, on average, one in every 13 service stations experienced a fire. These fires caused an annual average of two civilian deaths, 48 civilian injuries and $20 million in property damage.

Fires in these occupancies represent a variety of incidents, including structure fires, vehicle fires, outdoor fires and other fires. The majority of incidents are vehicle fires (61%), but the majority of the property damage (59%), results from structure fires. In structure fires, heating equipment was the leading cause, followed by **electrical distribution** and **lighting equipment**. The top three leading items first ignited in structure fires at service stations are flammable or combustible liquids, gases, and associated piping or filter (22%); rubbish, trash, or waste (18%) and electrical cable or insulation (13%).

The leading factors contributing to the ignition of different fires:
Structure Fires:
(1) Electrical failures or malfunctions
(2) Abandoned materials
Vehicle Fires:
(1) Mechanical failures or malfunctions
(2) Electrical failure or malfunction
(3) A flammable liquid or gas being spilled
Outdoor and unclassified fires:
(1) Abandoned or discarded materials or products
(2) electrical failures or malfunctions

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PART 1. DOCUMENTS, PERMIT, AND CERTIFICATE OF LICENSE

1.1 Design and Installation Documents

(FC 105.3.9)

Design and installation documents shall be submitted to the department for review and approval prior to the installation, alteration, repair or construction of automotive liquid motor fuel-dispensing facilities. As-built drawings are required to depict modified installations after the station is built or reconstructed

The installation or alteration of a liquid motor fuel storage and dispensing system shall not be approved by the department unless the design and installation documents demonstrate that the proposed work complies with the regulations of the United States Environmental Protection Agency, as set forth in 40 CFR Part 280, and the regulations of the New York State Department of Environmental Conservation, as set forth in 6 NYCRR Parts 612, 613 and 614.

The commissioner may require that the applicant for a permit or renewal thereof demonstrate, by submission of a certificate of occupancy or other authorization or approval issued by the Department of Buildings, that the building, structure or premises or portion thereof used for the manufacture, storage, handling or use of flammable or combustible liquids, are designed, constructed and occupied in accordance with the certificate of occupancy, the construction codes and the Electrical Code. No permit shall be issued when work requires the approval of the Commissioner of Buildings in connection with a material, operation or facility unless proof is submitted to the department that such work has been approved by the Commissioner of Buildings.

1.2 Permit

A permit is required:

1. To store, handle or use amounts of gasoline and other petroleum-based Class I liquids other than paints, varnishes and lacquers, in excess of 2½ gallons, except that a permit is not required for the storage or use of gasoline or other petroleum-based Class I liquids in the fuel tank of a motor vehicle, aircraft, or watercraft.
2. To store, handle or use amounts of Class II or Class III liquids with a flash point of 300°F or less, other than paints, varnishes and lacquers, in excess of 10 gallons, except that a permit is not required for the storage or use of Class II or Class III liquids with a flash point of 300°F or less in the fuel tank of a motor vehicle, aircraft, or watercraft.

FDNY Site-specific permit authorizes the permit holder to store or handle motor fuels at a specific premises or location. A site-specific permit is valid for 12 months only. Every permit or renewal shall require an inspection and shall expire after twelve months. FDNY permits are not transferable, and any change in occupancy, operation, tenancy or ownership requires that a new permit be issued. The Certificate of License holder is responsible for making sure that all fire safety regulations and procedures are obeyed on

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the premises. **Permits shall be readily available on the premise for inspection by Fire Department representatives.**

1.3 Action and Time Periods on Application

(FC105.2.4)

Normally, the completed permit/documentation applications should be notified (either approved or denial) by the commissioner no latter than 40 calendar days from the submission. Except that on or before the fortieth day, the commissioner may, for good cause, extend such time for an additional 40 calendar days.

When a permit application has been denied or preliminarily denied and is thereafter revised and resubmitted to meet the stated grounds for denial, the revised completed application shall be approved or denied or preliminarily denied in accordance with the foregoing procedures and time periods.

New regulations for stage II vapor recovery.

The New York State Department of Environmental Conservation (NYSDEC) has repealed the requirements for the stage II vapor collection systems. Existing installations with such systems which choose to decommission a stage II vapor collection system must have a W-16 Certificate of License holder to do the work and provide the FDNY with proper documentation when completed. The sample documentation is provided in the Appendix A. Contact Bulk Fuel Safety Unit (Tel: 718-999-2460) for additional information and forms.

1.4 Certificate of License and Certificate of Fitness

(FC2201.7; FC2201.8)

A certificate holder shall be responsible for:

1. The safe manufacturing, storage, handling, use, operation, maintenance, inspection, testing, repair and/or supervision of the material, operation or facility for which the certificate is required, in accordance with this code, the rules, and any other applicable laws, rules and regulations.
2. Notifying the department of any explosion, fire, reportable leak or other release of hazardous material, or other emergency related to the duties of his or her certificate.
3. Keeping such certificate upon his or her person or otherwise readily available for inspection by any representative of the department, at all times while conducting or supervising the material, operation or facility for which the certificate is required.

1.4.1 W-16 Certificate of License

Persons who install, alter, test or repair any automotive or marine liquid motor fuel storage and dispensing systems shall hold a certificate of license or shall be employed by and perform such duties under the general supervision of a person holding such certificate.

1.4.2 P-15 Certificate of Fitness

This study material is provided to the public for free by the FDNY.

The dispensing of liquid motor fuel at motor fuel dispensing facilities shall be conducted by or under the supervision of a P15 C of F holder, who shall be responsible to ensure that dispensing operations are conducted and the facility is maintained in accordance with this chapter, as follows:

1. Dispensing operations shall be conducted by or under the personal supervision of a P15 C of F holder at self service automotive liquid motor fuel-dispensing facilities.
2. Dispensing operations shall be conducted by or under the personal supervision of a P15 C of F holder at fleet automotive liquid motor fuel-dispensing facilities.
3. Dispensing operations shall be conducted by or under the personal supervision of a P15 C of F holder at full service automotive liquid motor fuel-dispensing facilities.

1.5 Approval and Inspections

The application, installation and tests of underground storage tanks in the motor fuel station that need to be involved with Fire Department:

Application

Step 1. Plan Approval (New York City Building Department)
Submit to the New York City Building Department plans for a work permit.

Step 2. Plan Approval (New York City Fire Department)
The above plans once approved by the DOB are submitted to the Fire Department, Technology Management for review and approval.

Appointments

Once the plans are approved by the FDNY, certain appointments should be scheduled with the Bulk Fuel Unit of the Bureau of Fire Prevention.

The following 6 inspectional appointments need to be scheduled with the Bulk Fuel Unit of the Bureau of Fire Department and a representative of the Fire Department:

1. *B*ase slab placement,
2. Backfill bed placement,
3. Hydrostatical test for the tanks and piping,
4. Top slap placement,
5. After paving test (only required for the discharging system)
6. Fire suppression system test, emergency shut down test, and leak detection system functionality test.

→If there is no outstanding violation, the first FDNY site-specific permit will be issued after the approval of final inspection and an A111 letter of approval will be issued. A site-specific permit is valid for 12 months only. Every permit or renewal shall require an inspection and shall expire after twelve months.

Periodic Tests

Leak detection functionality test, fire extinguishing system test, and precision test must be performed periodically at the owner's risk, before a representative of the Fire

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Department: at least once every 2 years for a leak detection functionality test and at least once every 5 years for a fire extinguishing system test and precision test.

Emergency Situation

All emergency repairs or tests, contractors must notify the Bulk Fuel Safety Unit of Fire Department.

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1.6 Related Regulations

The installation, maintenance, and removal of motor fuel storage and dispensing system are required to comply with the following regulations:

- Motor Fuel-Dispensing Facilities and Repair Garages **[2022 FC Chapter 23 and Fire Rule Chapter 22]**
- Flammable and Combustible Liquids **[2022 FC Chapter 57]**
- Installation of Storage Tanks and Piping for Liquids Having Flashpoints of 100 Degrees Fahrenheit or Higher **[Fire Rule Section 4834-01(l)(2)]**
- Flammable and Combustible Liquids Code **[NFPA 30, 2003 edition]**
- Code for Motor Fuel Dispensing Facilities and Repair Garages **[NFPA 30A, 2003 edition]**
- Petroleum Bulk Storage Regulations **[6 NYCRR Parts 612, 613 and 614]**
- Safety Requirements During Excavation Operations **[NYC DOB §26-229]**
- Safety and Health Regulations for Construction **[OSHA 29 CFR 1926.650 to 29 CFR 1926.652]**

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PART 2. DEFINITIONS

AUTOMOTIVE LIQUID MOTOR FUEL-DISPENSING FACILITY. Any building, structure or premises upon which or wherein, liquid motor fuel is stored and dispensed from a liquid motor fuel storage and dispensing system into the fuel tanks of motor vehicles or motorcycles.

BULK PLANT OR TERMINAL. Any premises upon which flammable or combustible liquids are received from marine vessel, pipeline, tank car or cargo tank and are stored or blended in bulk for the purpose of distributing such liquids by marine vessel, pipeline, tank car, cargo tank or container.

BULK TRANSFER. The loading or unloading of flammable or combustible liquids from or between marine vessels, pipelines, tank cars, cargo tanks or storage tanks.

P15 C OF F HOLDER. A person holding a certificate of fitness for the supervision of an automotive liquid motor fuel-dispensing facility, marine liquid motor fuel-dispensing facility or automotive CNG motor fuel-dispensing facility.

COMBUSTIBLE LIQUID. For purposes of transportation, a combustible liquid, as defined in the regulations of the United States Department of Transportation, as set forth in 49 CFR Section 173.120. For all other purposes, a liquid, other than a compressed gas or cryogenic fluid, having a closed cup flash point at or above 100°F (38°C), classified as follows: (e.g. diesel)

Class II. Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).

Class IIIA. Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).

Class IIIB. Liquids having closed cup flash points at or above 200°F (93°C).

DISPENSING DEVICE, OVERHEAD TYPE. A dispensing device mounted above a dispensing area, typically within a canopy structure, and characterized by the use of an overhead hose reel.

FLAMMABLE AND COMBUSTIBLE LIQUID STORAGE SYSTEM. A flammable or combustible liquid storage tank and all devices, equipment and systems associated with such tank, including the tank, piping, valves, fill connection, vent lines, pumps and any other ancillary equipment, except liquid motor fuel storage and dispensing systems and flammable and combustible liquid storage systems at a bulk plant or terminal used for bulk transfer operations.

FLAMMABLE LIQUID. For purposes of transportation, a flammable liquid defined in the regulations of the United States Department of Transportation, as set forth in 49 CFR Section 173.120. For all other purposes, a liquid, other than a compressed gas or cryogenic fluid, having a closed cup flash point below 100°F (38°C), classified as follows:

Class IA. Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C). Examples: Ethyl, Ether, Propylene.

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Class IB. Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C). Examples: Acetone, Benzene, Gasoline, Methanol, Toluene, Jet fuel.

Class IC. Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C). Examples: Propyl, Alcohol, Turpentine.

FLAMMABLE LIQUID MOTOR FUEL. Gasoline or other flammable liquids used as fuel in the operation of motor vehicles, motorcycles, watercraft and aircraft.

FLASH POINT. The minimum temperature in degrees Fahrenheit at which a liquid will give off sufficient vapors to form an ignitable mixture with air near the surface or in the container, but will not sustain combustion. The flash point of a liquid shall be determined by appropriate test procedure and apparatus as specified in ASTM D 56, ASTM D 93 or ASTM D 3278.

FLEET AUTOMOTIVE LIQUID MOTOR FUEL-DISPENSING FACILITY. An automotive liquid motor fuel-dispensing facility wherein liquid motor fuel is stored and/or dispensed into the fuel tank of motor vehicles or motorcycles owned or operated by or on behalf of the owner of the facility, and where dispensing operations are conducted by persons employed by or otherwise working for the owner of the facility.

FULL SERVICE AUTOMOTIVE LIQUID MOTOR FUEL-DISPENSING FACILITY. An automotive liquid motor fuel-dispensing facility wherein liquid motor fuel is dispensed into the fuel tank of motor vehicles or motorcycles by a P15 C of F holder or, when under the personal supervision of a P15 C of F holder, by persons employed by or otherwise working for the owner of the facility.

GENERAL SUPERVISION. Supervision by the holder of any department certificate who is responsible for performing the duties of the certificate holder but need not be personally present on the premises at all times.

LIQUID MOTOR FUEL. Gasoline, diesel fuel or other flammable or combustible liquids used as fuel in the operation of motor vehicles, motorcycles, watercraft and aircraft.

LIQUID MOTOR FUEL STORAGE AND DISPENSING SYSTEM. A liquid motor fuel storage tank and all motor fuel storage and dispensing equipment associated with such tank, including the tank, piping, valves, fill connection catchment basins, vent lines, pumps, dispensing devices and any other ancillary equipment.

MOTOR VEHICLE. A vehicle or other conveyance having more than 2 running wheels and using liquid motor fuel or flammable gas as fuel for generating motive power, except such vehicles as have a storage tank with a maximum capacity for less than 2 gallons (7.6 L) of liquid motor fuel or flammable gas that generates energy that is equivalent to the energy generated by 2 gallons (7.6 L) of gasoline.

PERSONAL SUPERVISION. Supervision by the holder of any department certificate who is required to be personally present on the premises, or other proximate location acceptable to the department, while performing the duties for which the certificate is required.

PROCESS TRANSFER. The transfer of flammable or combustible liquids between cargo tanks or tank cars and containers, tanks piping and other equipment that is to be used in process operations.

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PROCESSING VESSEL. A tank or other container used in manufacturing or other process operation that involves the use of a flammable or combustible liquid supplied from other than a cargo tank, tank car or pipeline.

SELF-SERVICE AUTOMOTIVE LIQUID MOTOR FUEL-DISPENSING FACILITY. An automotive liquid motor fuel-dispensing facility where liquid motor fuel is dispensed from a liquid motor fuel storage and dispensing system into the fuel tank of motor vehicles or motorcycles by customers of the facility.

STAGE I VAPOR RECOVERY. Stage I Vapor Recovery refers to the control of vapors during the transfer of gasoline from the cargo tank to the gasoline dispensing facility. Stage I Vapor Recovery systems control emissions during delivery and storage of gasoline at the gasoline dispensing facility. During gasoline delivery, emissions are controlled by diverting the displaced gasoline vapor from the storage tank into the tanker compartment of the vehicle unloading gasoline. The captured vapor is then transported back to the terminal for processing by condensation, adsorption or incineration.

STAGE II VAPOR RECOVERY. The New York State Department of Environmental Conservation (NYSDEC) has repealed the requirements for the stage II vapor collection systems. Existing installations with such systems which choose to decommission a stage II vapor collection system must have a W-16 Certificate of License holder to do the work and provide the FDNY with proper documentation when completed. The sample documentation is provided in the Appendix A. Contact Bulk Fuel Safety Unit for additional information and forms.

SUBSTANTIALLY MODIFIED FACILITY. Any existing facility which has been modified in one or more of the following ways:

(a) one or more new stationary tanks has been added;

(b) an existing stationary tank has been replaced, reconditioned or permanently closed; or

(c) a leaking storage tank has been replaced, repaired or permanently closed.

TANK, PROTECTED ABOVEGROUND. An atmospheric aboveground tank listed in accordance with UL 2085 or equivalent standard that is provided with integral secondary containment, protection from physical damage, and an insulation system intended to reduce the heat transferred to the primary tank when the tank is exposed to a high intensity liquid pool fire.

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PART 3. GENERAL REQUIREMENTS

3.1 Piping, Valves, Fittings and Ancillary Equipment

3.1.1 Materials and testing
(FC2206.6.2.7; FC2206.6.2.8; FC2206.6.3.1; FC2206.6.3.3; FC3403.6.2.1; FC3403.6.3; FC3403.6.12; Rule 2206-01(c)))
Piping system components shall be designed and manufactured in accordance with NFPA 30, Chapter 3. Low-melting-point materials, such as aluminum, copper or brass, that soften on fire exposure, such as nonmetallic materials, and nonductile material, such as cast iron, shall be acceptable for use underground only in accordance with ANSI B31.9. Piping system components must be constructed of Schedule 40 steel or a higher Schedule steel. Approved nonmetallic piping, such as fiberglass-reinforced plastic or other equivalent corrosion-resistant material, may be installed underground. Underground tank piping must be installed underground, except for the vertical riser of the vent.

Unless tested in accordance with the applicable section of ANSI B31.9, piping, before being covered, enclosed or placed in use, shall be hydrostatically tested to 150% of the maximum anticipated operating pressure of the system, but not less than 15 psig at the highest point of the system or precision tested. This test shall be maintained for a sufficient time period to complete visual inspection of joints and connections. For a minimum of 60 minutes, there shall be no leakage or permanent distortion. Piping system tests shall be conducted at the owner's risk by his or her representative before a representative of the department. Care shall be exercised to ensure that these pressures are not applied to vented storage tanks. Such storage tanks shall be tested independently from the piping.

Existing piping shall be tested in accordance with the requirements, upon a determination by the commissioner that such piping may be leaking. Piping that could contain flammable or combustible liquid vapors shall not be tested pneumatically, except that vapor-recovery piping may be tested pneumatically using an inert gas. Such tests shall be conducted at the owner's risk by his or her representative.

Upon completion of the installation of a motor fuel dispenser or motor fuel-dispensing pump, such dispenser and pump shall be tested for proper operation by a certificate of license holder. All readily accessible piping shall be inspected for any evidence of leaks. An affidavit executed by such installer attesting to compliance with this requirement shall be submitted to the Bulk Fuel Safety Unit of the Bureau of Fire Prevention.

Piping, fittings, components and joint compounds shall be mutually compatible, and compatible with diesel fuel and other commonly-used combustible liquid motor fuels, including the additives commonly used in such combustible motor fuels. Joint compounds shall be listed and approved.

3.1.2 Protections
(FC2206.6.1; FC3403.6.4)

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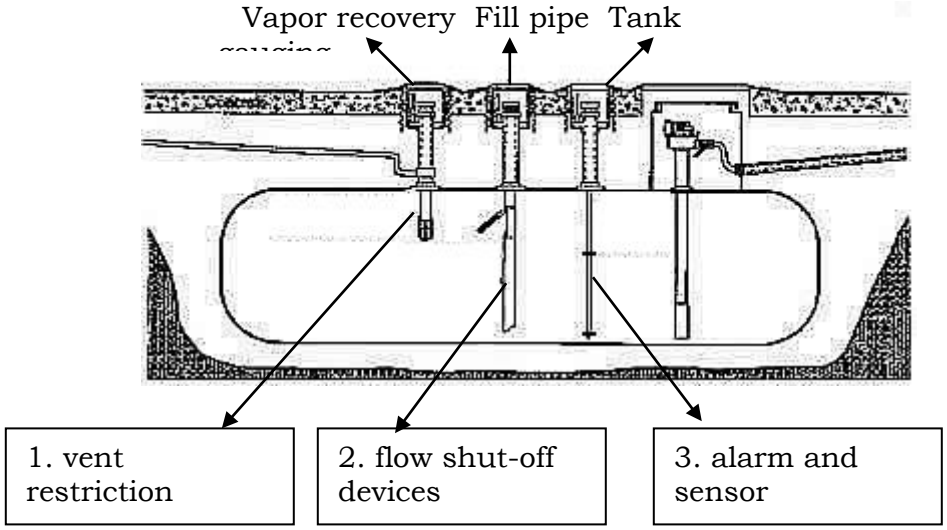
Posts or other approved means shall be provided to protect piping, valves, fittings or ancillary equipment subject to vehicular damage. Where subject to external corrosion, piping, related fluid-handling components and supports for both underground and aboveground applications shall be fabricated from noncorrosive materials, coated or otherwise provided with corrosion protection. Dissimilar metallic parts that promote galvanic action shall not be joined. Piping shall be located such that it is protected from physical damage and designed to accommodate settlement, vibration, expansion or contraction.

Piping systems shall be substantially supported and protected from physical damage and designed to accommodate settlement, vibration, expansion, contraction or exposure to fire. The supports shall be constructed of steel, concrete or other approved noncombustible material.

3.1.3 Overfill and backflow prevention
(FC2306.6.2.3; FC2306.6.2.4; FC2306.6.2.6; FC5704.2.9.4; FC5704.2.9.6.6; FC5704.2.9.6.8; FC5704.2.11.4; FC 5703.6.6; DEC613.3(c)(4); DEC613.3(c)(6))
The size of the spill containment boxes should be based on the amount of fluid stored in the hose volume and not less than 15-gallon capacity and an approved overfill prevention system to automatically prevent overflow.

Overfill protection shall be provided for storage tanks. Tanks shall not be filled in excess of 95% of their capacity. An approved overfill prevention system shall be provided for each tank. During tank-filling operations, the system shall automatically shut off the flow of liquid to the tank when the quantity of liquid in the tank reaches 95% of tank capacity. For rigid hose liquid-delivery systems, an approved means shall be provided to empty the fill hose into the tank after the automatic shutoff device is activated. A durable sign shall be conspicuously posted on or immediately adjacent to the fill point for the tank, setting forth the filling procedure and the tank calibration chart. For aboveground tanks, the filling procedure shall require the person filling the tank to determine the gallonage required to fill it to 90 %of capacity before commencing the fill operation.

Three types of overfill prevention devices are commonly used: vent restriction devices, low shut-off devices, and alarms as shown below.



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Vent restriction devices are installed at the base of the vapor recovery riser pipe and extend into the top of the tank. As the liquid level approaches the top of the tank, a float rises and obstructs the vapor recovery vent. This creates a vacuum in the cargo tank compartment, dramatically slowing product flow. This alerts the driver to shut-off the flow from the tanker. This type of device is called a negative pressure overfill prevention.

<table>
<tr><td colspan="3">The flow shut-off devices:</td></tr>
<tr><td> </td><td> </td><td> </td></tr>
<tr><td colspan="3">It will automatically shut off the flow of liquid to the tank when the liquid level reaches 95% of the tank capacity</td></tr>
</table>

The sensor and alarm:

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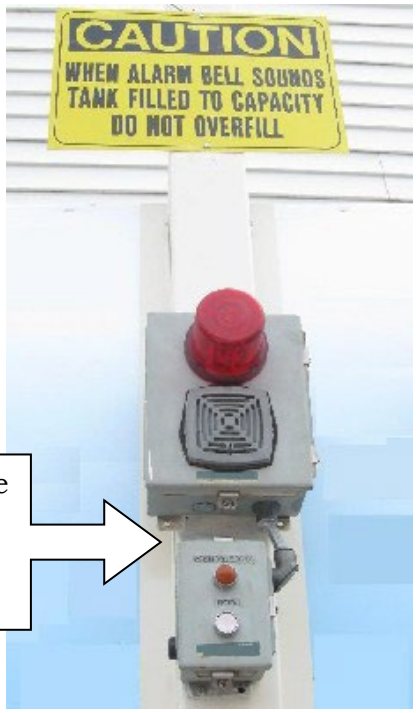
The sensor of the liquid level. It triggers the alarm.



Overfill alarm warms the truckman to stop transferring the motor fuel.

(1) Valves and backflow protection

Piping systems shall contain a sufficient number of manual control valves and check valves to operate the system properly and to protect the facility under both normal and emergency conditions. Piping systems in connection with pumps shall contain a sufficient number of such valves to control properly the flow of liquids in normal operation and in the event of physical damage or fire exposure.

Connections to pipelines or piping by which tank cars, cargo tanks, or marine vessels or other equipment discharge liquids into storage tanks shall be provided with check valves or block valves for automatic protection against backflow where the piping arrangement is such that backflow from the system is possible. All fill pipes leading to a pump-filled petroleum tank must be equipped with a properly functioning check valve or equivalent device which provides automatic protection against backflow. A check valve is required only when the piping arrangement of the fill pipe in such that backflow from the receiving tank is possible. Where loading and unloading is done through a common pipe system, a check valve is not required. However, a block valve shall be provided which is located so as to be readily accessible or remotely operable.

Manual drainage-control valves shall be located at approved locations remote from the tanks, diked area, drainage system and impounding basin to ensure their operation in a fire condition.

(2) Siphon prevention

Approved antisiphon devices shall be installed in each external pipe connected to the protected aboveground tank when the pipe extends below the level of the top of the tank.

3.1.4 Connections, joints and bends

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(FC2206.6.2.2; FC3403.6.7; FC3403.6.9.1; FC3403.6.10; FC3404.2.7.5.1; FC3404.2.7.5.6 FC3404.2.9.6.7)

Connections for tank openings below the liquid level shall be liquid tight. Joints shall be liquid tight and shall be welded, flanged or threaded except that listed flexible connectors are allowed. Threaded or flanged joints shall fit tightly by using approved methods and materials for the type of joint. Joints in piping systems used for Class I liquids (e.g. gasoline) shall be welded when located in concealed spaces within buildings or structures. Nonmetallic joints shall be subject to the approval of the commissioner and shall be installed in accordance with the manufacturer's instructions. Pipe joints that are dependent on the friction characteristics or resiliency of combustible materials for liquid tightness of piping shall not be used in buildings or structures. Piping shall be secured to prevent disengagement at the fitting.

(1) Connections for aboveground tanks.
Aboveground tanks with connections located below normal liquid level shall be provided with internal or external isolation valves located as close as practical to the shell of the tank. Except for liquids whose chemical characteristics are incompatible with steel, such valves, when external, and their connections to the tank shall be of steel.

The fill-pipe for aboveground tanks shall be provided with a means for making a direct connection to the cargo tank's fuel-delivery hose so that liquid motor fuel is not exposed to the open air during the filling operation. Operator safety equipment for the filling operation shall be provided in accordance with OSHA regulations. Where any portion of the fill-pipe exterior to the tank extends below the level of the top of the tank, a check valve, a dry break coupling and a quick closing valve shall be installed at the fill connection. The check valve must be installed in the fill pipe not more than 12 inches from the fill hose connection. Tank fill connections from a remote location are prohibited.

(2) Joints for underground tanks.
A flexible connectors on an underground storage tank's suction, vent, and fill lines can protect the tank system from loads applied during settling. Flexible joints shall be listed and approved and shall be installed on underground liquid, vapor and vent piping at all of the following locations:

1. Where piping connects to underground tanks.
2. Where piping ends at pump islands and vent risers.
3. At points where differential movement in the piping can occur.

Fiberglass-reinforced plastic piping is not required to be provided with flexible joints in locations where both of the following conditions are present:

1. Piping does not exceed 4 inches in diameter.
2. Piping has a straight run of not less than 4 feet on one side of the connection when such connections result in a change of direction. In lieu of the minimum 4-foot straight run length, approved and listed flexible joints are allowed to be used under dispensers and suction pumps, at submerged pumps and tanks, and where vents extend aboveground.

(3) Bends.

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The bending of pipe and tubing shall be performed in accordance with ANSI B31.9.

3.1.5 Tank vents and opening
(FC2206.6.2.1; FC2206.6.2.9;FC2206.6.2.10; FC2206.6.2.11; FC3404.2.7.3; FC3404.2.7.3.2; FC3404.2.7.4; FC3404.2.7.5.4; FC3404.2.7.5.7; FC3404.2.9.6.2; FC3404.2.9.6.3)

(1)Vent pipes
Vent pipes shall be installed such that they will drain toward the tank without sags or traps in which liquid can collect. Each tank shall be provided with a separate unobstructed vent line, without any trap or device that causes excessive back pressure, and shall be maintained unobstructed at all times. Vent lines from tanks shall not be used for purposes other than venting unless approved.

The lower end of the vent pipe shall not extend more than 1 inch through the top of the storage tank. Cross-connection between a vent pipe and fill pipe is prohibited.

Where a battery of storage tanks designed to hold identical material is installed, vent pipes may be run into a main header. Vent shall be at least 1 1/4 inch in diameter for storage tanks not exceeding 1,100 gallon capacity and at least 2 inches in diameter for storage tanks of 1,100 gallons or more. Vent pipes shall be provided with an approved weatherproof hood having a free area of at least the pipe size area. Vent pipes shall terminate outside the building in a non-hazardous location, at least 2 feet from any building opening and not less than 2 feet nor more than 12 feet above the fill pipe terminal unless otherwise permitted by the Commissioner.

If the vent pipe terminal is not visible from the fill pipe terminal location, a one inch tell-tale line shall be connected to the tank and shall parallel the fill pipe and terminate at the fill terminal with an unthreaded end. Such telltale lines shall be provided with a check valve set to prevent flow of surface water to the storage tank.

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Vent pipe outlets shall be located such that the vapors are released at a safe point outdoors and not less than 15 feet above the adjacent ground level. Vapors shall be discharged upward or horizontally away from adjacent walls to assist in vapor dispersion. Vent outlets shall be located such that flammable or combustible vapors will not be trapped by eaves or other obstructions and shall be at least 10 feet from building openings or lot lines. Tank openings for aboveground tanks shall be through the top only. There shall be no openings except those necessary to inspect, fill, empty and vent the tank.

Posts that protect piping, valves, fittings or ancillary equipment subject to vehicular damage.

Tank vent piping shall not be manifolded unless required for special purposes such as vapor recovery, vapor conservation or air pollution control.

(a)Aboveground tanks. For aboveground tanks, manifolded vent pipes shall be adequately sized to prevent system pressure limits from being exceeded when manifolded tanks are subject to the same fire exposure.
(b) Underground tanks. For underground tanks, manifolded vent pipes shall be sized to prevent system pressure limits from being exceeded when manifolded tanks are filled simultaneously.

(2) Tank openings for vapor recovery
Tank openings provided for purposes of vapor recovery shall be protected against vapor release by means of a spring-loaded check valve or dry-break connections, or other approved device, unless the opening is a pipe connected to a vapor processing system. Openings designed for combined fill and vapor recovery shall also be protected against

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vapor release unless connection of the liquid delivery line to the fill pipe simultaneously connects the vapor recovery line. Connections shall be vapor tight.

Filling, emptying and vapor recovery connections to tanks shall be located outdoors at a location free from sources of ignition and not less than 10 feet away from building openings or lot lines. Such openings shall be provided with a liquid-tight cap which shall be closed when not in use and properly identified.

(3) Special devices
(a) Pressure relief devices.
Where liquid motor fuel may become trapped between shutoff valves and/or check valves, affected piping sections shall be provided with pressure-relief devices that will discharge the pressure generated by thermal expansion back into the tank.

(b) Manual gauging.
Openings for manual gauging, if independent of the fill pipe, shall be provided with a liquid-tight cap or cover. Covers shall be kept closed when not gauging. Openings for manual gauging shall not be permitted for tanks installed indoors.

3.1.6 Filling pipes
(Rule 4834(d)(1)f)
The filling pipe shall be at least 2 inches and not larger than 4 inches nominal inside diameter, and shall be laid at a descending grade to the tank, terminating within 6 inches of the bottom of the tank. The intake of a filling pipe shall be located outside of any building and not less than 10 feet from any door, subway grating or basement opening, and in a heavy metal box, which shall be sunk flush with the sidewalk at the curb level, or at some other location offering equal facilities for the filling of the tank and fitted with a heavy metal cover, which shall be liquid tight and kept closed when not in use. The filling pipe shall be closed at the intake by a cock or valve fitted with a coupling for attaching to the tank truck, and with a liquid tight cap or plug to close the opening when not in use. The filling pipe shall be provided with a screen made of one thickness of 20-mesh brass wire gauze, placed immediately below the filling cock or valve. Where a storage system for flammable liquids and a storage system for diesel motor fuel oil and/or fuel oil are to be used on the same premises, the terminal of the diesel motor fuel oil and/or fuel oil fill pipe shall be provided with a left handed thread and the fill pipe fitting shall be of a different size than that required for the fill pipe to tanks containing flammable liquids.

3.2 Labeling and Signage

3.2.1 Color coding and symbols of fill ports
(DEC613.3(b)(2), DEC613.3(b)(3))

The owner or operator must permanently mark all fill ports to identify the product inside the tank. These markings must be consistent with the color and symbol code of the American Petroleum Institute which follows. The colors to be used are:

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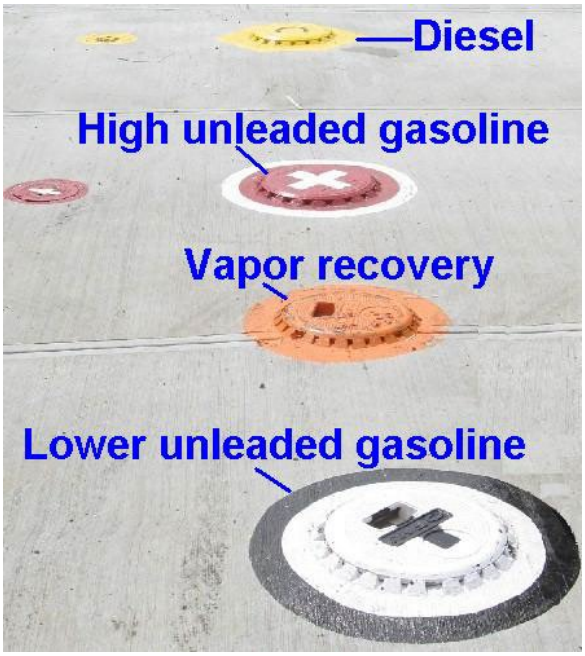
(i)	High gasoline	Red
(ii)	Middle gasoline	Blue
(iii)	Lower gasoline	White
(iv)	High unleaded gasoline	Red w/white cross
(v)	Middle unleaded gasoline	Blue w/white cross
(vi)	Lower unleaded gasoline	White w/black cross
(vii)	Vapor recovery	Orange
(viii)	Diesel	Yellow
(ix)	#1 fuel oil	Purple w/yellow bar
(x)	#2 fuel oil	Green
(xi)	Kerosene	Brown

The symbols to be used are:

(i) a circle for gasoline products and vapor recovery lines;
(ii) hexagon for other distillates; and
(iii) a border must be painted around fuel products containing extenders such as alcohol. The border will be black around a white symbol and white around all other colors.



3.2.2 Warning signs
(FC2204.2.3; FC2204.2.6)
(1) Control area sign.
A durable metal sign that reads as follows shall be posted in plain view within the control area:

Emergency Procedures:
Shut off product pumps.
Direct vehicle occupants to exit vehicles and leave area immediately.
Keep all persons away from the area.
Manually activate fire extinguishing system.
Notify the Fire Department (Call 911).

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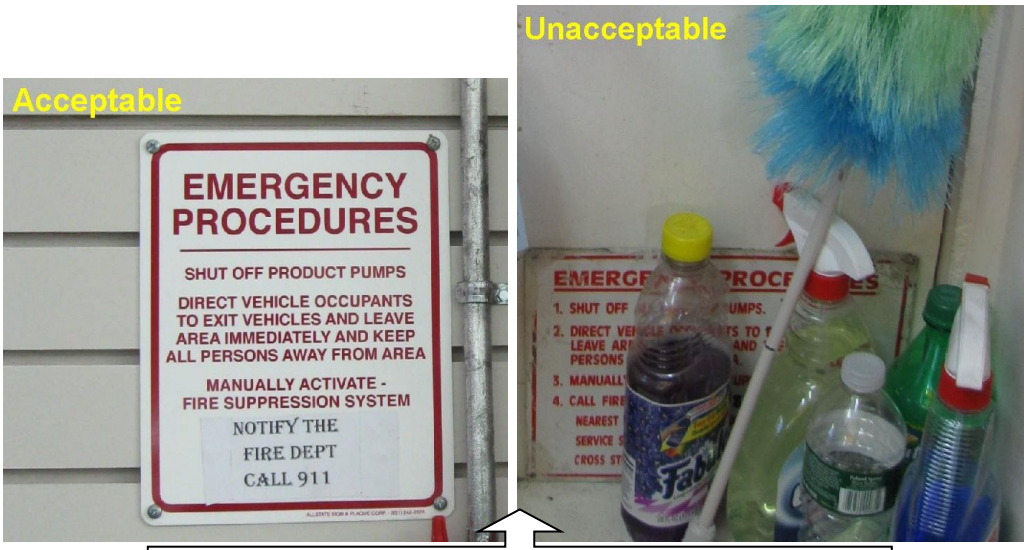

The view of the sign should not be obstructed.

(2) Dispensing area signs and instructions.
Durable warning signs shall be conspicuously posted on or immediately adjacent to each dispenser in the fuel-dispensing area and shall state the following:

1. It is illegal and dangerous to fill unapproved containers with fuel.
2. Smoking is prohibited.
3. The engine shall be shut off during the refueling process.
4. Portable containers shall not be filled while located inside the trunk, passenger compartment, or truck bed of a vehicle.
5. It is unlawful for customers to fill portable containers. See attendant for assistance.

Dispenser operating instructions shall be conspicuously posted in approved locations on every dispenser and shall indicate the location of the emergency controls.

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PART 4. UNDERGROUND LIQUID MOTOR FUEL STORAGE TANK

4.1 Tank Contents and Capacity Limitations

(FC2206.2.1.3#4; FC2206.2.3.2; FC3404.1.2.2)

Individual underground storage tanks shall not exceed a capacity of 12,000 gallons. The aggregate capacity at a facility in both aboveground and underground tanks shall not exceed 40,000 gallons. Underground tanks shall not store petroleum products containing mixtures of a nonpetroleum nature, such as ethanol or methanol blends, without evidence of compatibility such as a manufacturer's letter stating the compatibility.

4.2 Design and Constructions of the Tanks

4.2.1 General requirements

(FC2206.2.1.3)

The manufacture of the tanks and all related equipments must be UL certificated and tanks must be designed and constructed in accordance with the following:

1. Tanks shall be completely double-walled and constructed of steel, fiberglass-reinforced plastic or a combination of both materials. The secondary tank shall be capable of containing any leakage from the primary tank.
2. Tanks shall be designed and constructed to withstand 1.5 times the maximum operating loads and stresses, regardless of the amount of liquid motor fuel contained in the tank. Such capabilities shall be established by buoyancy calculations and load and stress analyses.
3. Tanks shall be designed and constructed to withstand a pressure of 15 psig or 1½ times the maximum anticipated static head pressure, whichever is greater, for the primary tank and 5 psig for the secondary tank.

4.2.2 Cathodically protected steel tanks

(DEC614.3(e) Rule 2206-01(c))

Cathodically protected steel tanks used for underground storage of petroleum must meet or exceed the design regulated by the New York State Department of Environmental Conservation 614.3(e) and manufacturing standards. Such steel tanks must be cathodically protected with sacrificial anodes or an impressed current cathodic protection system designed in accordance with the applicable National Association of Corrosion Engineers (NACE) standard or other approved standard(e.g. API RP 1632; ULC-S603.1M; STI-P3; NACE RP-0169; NACE RP-0285; UL 1746 or STI RP 892). The cathodic protection system must be designed to provide a minimum of 30 years of protection. Cathodic protection systems shall be designed by a trained person knowledgeable of the requirements of the United States Environmental Protection Agency for such systems. Such person shall first inspect the site and test the site for soil resistivity and the presence of stray currents. A qualified engineer or corrosion specialist must personally supervise the installation of the cathodic protection system where this is necessary to assure that the system has been installed as designed. Each cathodic protection system must have a monitor which enables the owner or operator to check on the adequacy of cathodic protection. Tanks which are protected by sacrificial anodes must be electrically insulated from the piping system with di-electric fittings, bushings, washers, sleeves or

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gaskets which are chemically stable when exposed to petroleum, petroleum additives, or corrosive soils.
Cathodic protection systems shall be inspected and tested in the presence of a representative of the Fire Department at the time of installation in compliance with the applicable National Association of Corrosion Engineers standard and the following procedures:

(A) All piping shall be subjected to a holiday test and tanks and associated piping shall be subjected to an electrical continuity test. Any holiday located during a spark test shall be repaired as per coating specifications before the tank or piping excavation is backfilled.
(B) Upon completion of the underground motor fuel storage tank installation, the following information and documentation shall be submitted to the Fire Department:
    (1) An "as-built" drawing showing number, size (weight) and location of all anodes and test stations.
    (2) An affidavit in a form satisfactory to the Fire Department, executed by the person who designed and supervised the installation of the cathodic protection system, setting forth the type of cathodic protection system installed, a description of the system and its location, the date of final inspection of the installed system, and such person's certification that the system has been installed and is functioning properly and that the system is designed to provide corrosion protection for at least 30 years.

If steel piping is installed underground, it is also required to have Cathodic protection.

Cathodic protection system

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4.2.3 Coatings

(DEC614.3(e);Rule 2206-01(d))

Tanks must be factory-coated with coal tar-based epoxy or other coating which will provide equivalent protection and corrosion resistance. The coating must have a minimum finished thickness of 0.01 inch on the shell and 0.015 inch on the head. The coating must be electrically tested for short circuits or coating faults. Defects and any inadequacies in the coating must be repaired. The application of the coating must be in strict accordance with the instructions of the supplier of the coating material.

Coatings steel underground storage tanks and piping at motor fuel dispensing facilities shall be designed and installed in compliance with the following requirements:

(1) Types of coatings.

Steel tanks shall be factory-coated with a dielectric material acceptable to the Fire Department. The coating's coefficient of thermal expansion must be compatible with steel so that stresses due to temperature changes do not affect the soundness of the coating and the permanent bond which exists between the coating and the steel. The coating must be of sufficient density and strength so that it will not crack, wear, soften or disbond under normal service conditions. The coating must be stable under adverse underground electrolytic conditions and shall be chemically resistant to the products stored. The coating shall have been factory inspected for air pockets, cracks, blisters and electrically tested with a holiday detector at a minimum of 10,000 volts for coating defects such as pinholes.

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(2) Site inspection.
All coated tanks shall be inspected on site for coating defects prior to installation. An affidavit attesting to the integrity of the tank coating shall be submitted by a certificate of license holder upon the request of the Fire Department.

4.3 Location
(FC3404.2.11.2; FC3404.2.11.3)

The underground shall be in compliance with the following requirements:

1. Tanks shall be installed so that the external forces exerted from building foundations and support loads are not transmitted to the tanks. The distance from any part of a tank to the nearest wall of any basement, pit, cellar or any property line shall not be less than 3 feet. Tanks shall not be placed less than 20 feet from a subway wall.
2. Tanks shall be installed so that the highest point of the tank is not less than 2 feet below the level of the lowest cellar floor of any building within a radius of 10 feet from the tank. No tank shall be located under a sidewalk or beyond the property line.
3. A minimum distance of 1 foot, shell to shell, shall be maintained between underground tanks.
4. Manufacturer's installation instructions.

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It is recommended to have at least minimum distance of 18”
between the tank and the excavation wall.

Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks shall be set on firm foundations and surrounded with at least 6 inches of noncorrosive inert material, in accordance with the manufacturer's installation instructions.

4.4 Leak Detection

(FC2205.2.3; FC2206.7.7; FC3404.2.7.10; FC3404.2.11.5)

Underground liquid motor fuel storage and dispensing systems shall be provided with a leak detection system in accordance with the following:

1. Leak detection systems shall be listed and approved.
2. Leak detection systems shall be tested at the time of installation at the owner’s risk by his or her representative before a representative of the department.
3. The leak detection system shall provide continuous monitoring of the tank's interstitial space.

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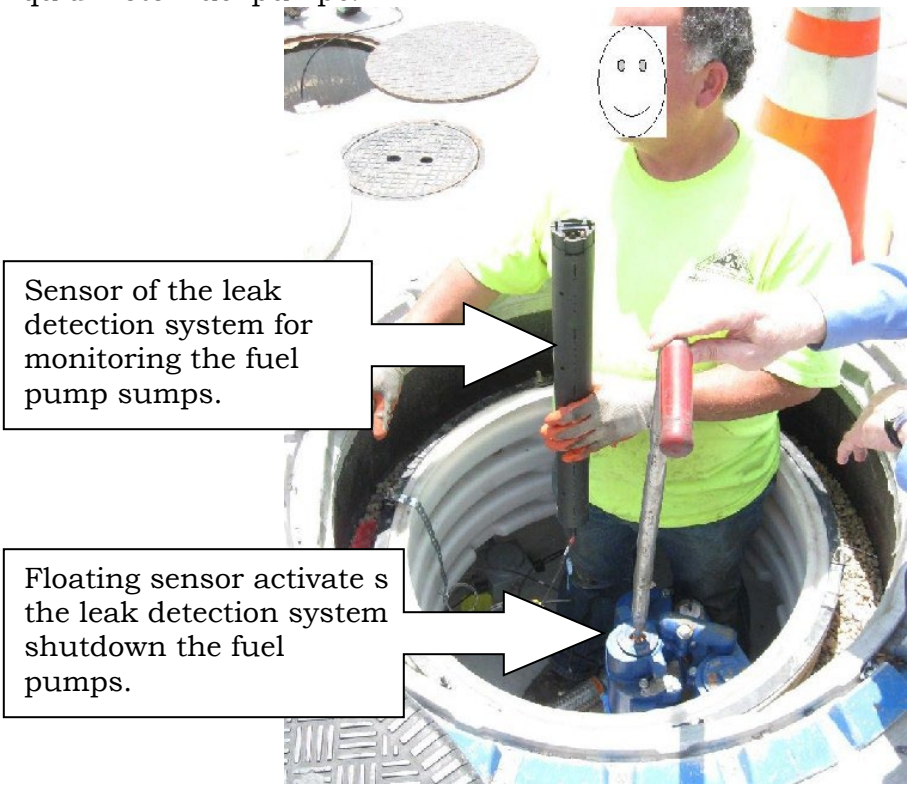
(Leak/Overfill detection panel)

4. The leak detection system shall provide continuous monitoring of liquid motor fuel pump sumps. Activation of the leak detection system shall cause shutdown of the liquid motor fuel pumps.



5. The leak detection system shall provide continuous monitoring of dispenser pans whenever such pans are provided. Activation of the leak detection system shall cause shutdown of the affected dispenser or liquid motor fuel pump supplying such dispenser.

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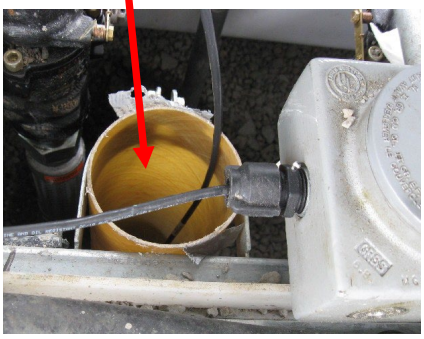
Monitor of dispenser pans.



6. The leak detection system shall provide the continuous monitoring of the inventory and the notification to prevent overfilling of tanks.
7. Primary discharge piping shall be provided with an automatic line leak detector. Activation of such leak detector shall cause shutdown of the liquid motor fuel pump or significantly restrict the product flow.
8. The leak detection system shall have an alarm panel in a supervised location on the premises; trigger both an audible and visible local alarm; be capable of producing hardcopy printouts of all tests and/or leak notification reports; operate on low voltage; and be intrinsically safe for a liquid motor fuel environment.

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Underground storage tank systems shall be provided with an approved method of leak detection from any component of the system that is designed and installed in accordance with NFPA 30. Leak detection systems shall be tested at the time of installation at the owner's risk by his or her representative before a representative of the department. The leak detection system shall be inspected daily for proper operation and tested at least once every 2 years by a person holding a certificate of license. Such test shall confirm that all leak detection equipment and associated alarms are in good working order. Daily inventory records shall be maintained for underground storage tank systems.

A consistent or accidental loss of liquid, or other indication of a leak from a tank system, shall be reported immediately to the department and other authorities having jurisdiction. Leaking tanks shall be promptly emptied, repaired and returned to service, sealed in place or removed.

4.5 Installation of Underground Tank and Piping Systems

4.5.1 Safety requirements during excavation operations
(NYC DOB 26-229; FC2206.9.7; FC2206.10; OSHA part 1926.650 to 1926.652*)*
Excavating is recognized as one of the most hazardous construction operations. OSHA part 1926.650 to 1926.652 and the following requirements regulated by New York City Building Department (NYC DOB)shall apply to the conduct of all excavation operations, whether for construction purposes or otherwise:

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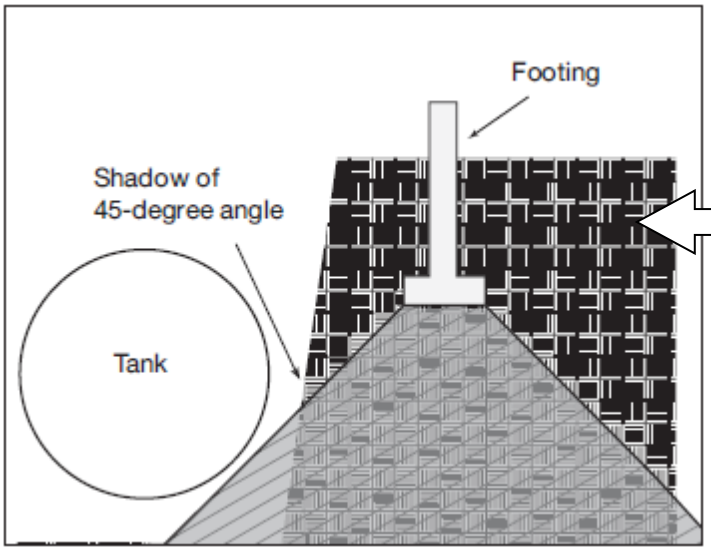
(1) Protection of persons and adjoining property.
Any person causing an excavation to be made shall provide adequate fencing on all open sides of the excavation, with suitable means of exit therefrom, and shall also provide such sheet piling, bracing and other supports as may be necessary to prevent the sides of the excavation from caving in before permanent supports are provided. Such person shall be afforded a license to enter and inspect adjoining property, and to perform such work thereon as may be necessary for such purpose; otherwise, the duty of providing safe support for any adjoining property, shall devolve upon the owner thereof, who shall be afforded a similar license with respect to the property where the excavation is to be made.

(2) Protection of adjoining buildings.
Whenever the safety of any adjoining building is or may be affected by an excavation, it shall be the duty of the person causing such excavation to be made to provide safe support for such building regardless of the depth of its foundations, provided such person is afforded a license to enter and inspect the adjoining building and property, and to perform such work thereon as may be necessary for such purpose; otherwise, such duty shall devolve upon the owner of the adjoining building, who shall be afforded a similar license with respect to the property where the excavation is to be made.

(a) Such person shall support the vertical load of the adjoining structure by proper foundations, underpinning, or other equivalent means where the level of the foundations of the adjoining structure is at or above the level of the bottom of the new excavation.
(b) Where the existing adjoining structure is below the level of the new construction, provision shall be made to support any increased vertical or lateral load on the existing adjoining structure caused by the new construction.
(c) Where the new construction will result in a decrease in the frost protection for an existing foundation below the minimums requirements, the existing foundation shall be modified as necessary to restore the required frost protection.



Care must be taken to avoid undermining the foundations of existing structure. In order to prevent the downward force from the existing structure will not transmit to the tanks, installer should :
(1) determine the depth of burial need for the tank; and
(2) determine the line that would fall into the ground from a 45° angle downward from the corner(s) of footing of the foundation that is closet to the tank. Make sure that the tanks do not fall within the shadow of the 45° angle line drawn from the foundation's footing.

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(3) Support of party walls.
Whenever an adjoining party wall is intended to be used by the person causing an excavation to be made, and such party wall is in good condition and sufficient for the uses of the existing and proposed buildings, it shall be the duty of such person to protect such party wall and support it by proper foundations, so that it shall be and remain practically as safe as it was before the excavation was commenced.

(4) Owner responsibility.
The responsibility of affording any license referred to this section, shall rest upon the owner of the property involved; and in case any tenant of such owner fails or refuses to permit the owner to afford such license, such failure or refusal shall be a cause to the owner for dispossessing such tenant through appropriate legal proceedings for recovering possession of real property.

4.5.2 Pouring concrete and backfilling

The pouring of concrete for the base and top slab, the backfilling of tank and piping, and the construction of the top slab support shall be witnessed by a representative of the department at time of installation.

The backfill material surrounding an underground storage tank is a critical part of a proper tank installation. The backfill materials must be manufacture approved. The object of backfill is to construct a uniform, homogenous envelope of firm, aggregate material around the tank. The material is to be washed, free-flowing, and free of ice, snow and debris. Good backfill material is hardness or stability when exposed to water or loads. The backfill material must not contain any foreign material, such as rocks, brick, clay, wood, native soil, etc. Materials like soft limestone, sandstone or shale should not be used as backfill because they break down over time. Sharp objects must not contact the tank at any time. Common backfill material includes Pea Gravel and Stone or Gravel Crushings. Pea Gravel should be a natural, rounded aggregate, clean and free flowing, with particle size not less than 1/8 inch or more than ¾ inch diameter. Stone or gravel crushings should be clean and free flowing with angular particle size not less than 1/8 inch or more than ½ inch diameter.

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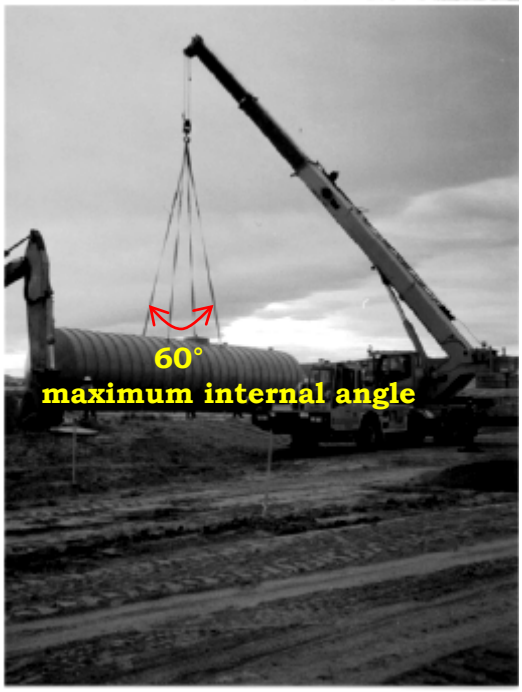
It is recommended to envelop the tanks with a permeable geotexile or filter fabric, allow the passage of water in and out of the excavation but prevents the migration and mixing of in situ soil and the backfill material. The fabric can help preserve the integrity of the backfill envelope that surrounds and supports the tank.



4.5.3 Preparation for installation

Do not release the ratchet straps securing the tank to the truck or flat bed trailer, etc. until the lifting equipment is secured to the tank's lifting lug(s). Do not use a sling around the tank's belly to lift it. Failure to do so could result in death or serious injury. Underground tanks should be lifted with steel rope by the top lugs.

Use a spreader bar for lifting a tank that has two or more lifting lugs. Use a lifting cable instead of a spreader bar if the angle between the cable and the tank top exceeds 60 degrees.

The ground level to the top of the tank should not exceed 7 feet.

4.5.4 Installation of underground tank and piping systems

(FC2206.10; NFPA30 22.5.2; manufacturer's manual)

The installation of tank and piping systems shall be in accordance with the following:

1. Tanks shall be located so that the forces from building foundations and support loads are not transmitted to the tanks. The distance from any part of a tank to the nearest wall of any basement, pit, cellar or any property line shall not be less than 3 feet. Tanks shall not be placed less than 20 feet from a subway wall.
2. Tanks shall be installed so that the highest point of the tank is not less than 2 feet below the level of the lowest cellar floor of any building within a radius of 10 feet from the tank. No tank shall be located under a sidewalk or beyond the property line of the automotive liquid motor fuel-dispensing facility.
3. Tanks shall be placed on a 12-inch thick base slab approved by the Department of Buildings, or installed in such other manner as may be approved by the Commissioner of Buildings, and secured against flotation. The system used for anchoring the tank shall not damage the tank or its coating.

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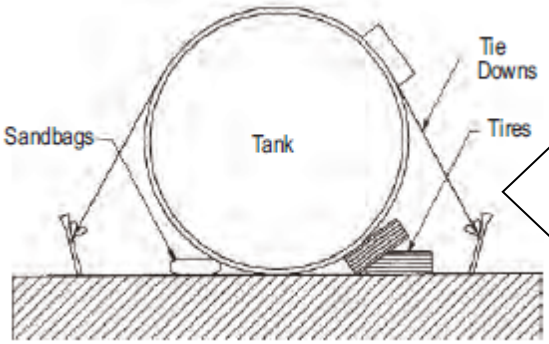
The orange line indicate the 12" height.

The concrete used for the base slab is recommended to have a minimum compressive strength of 2500 psi at 28 days.



1. Anchor the tank with ropes to prevent buoyancy and reduce top slab settlement.
2. Block a tank with rubber tires or sandbags to prevent rolling.

4. Tanks shall be placed on a bed of approved backfill material in accordance with manufacturer's specifications. The backfill material shall evenly and completely support the bottom quadrant of the tank. The backfill material shall be carefully placed along the bottom, under the sides and under the end caps or heads of the tank, by shoveling and tamping. Backfilling shall then be completed in 12-inch lifts placed uniformly around the tank. Provision shall be made, consistent with site conditions, to prevent the migration of backfill.

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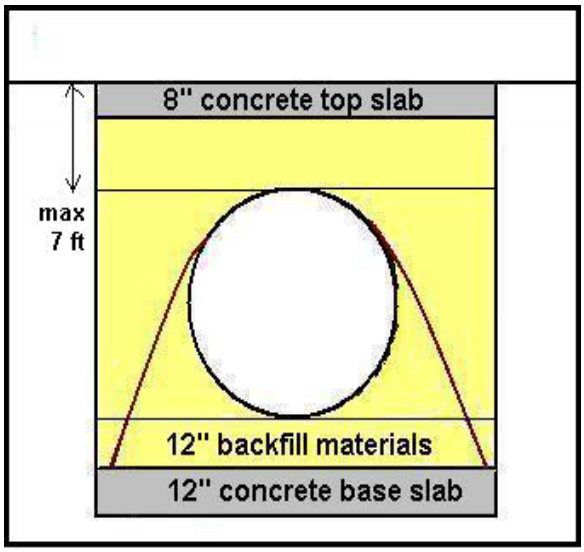

5. Tanks shall be covered with at least 12 inches of compacted backfill on top with a reinforced concrete slab not less than 8 inches thick, which shall extend not less than 12 inches beyond the horizontal outlines of the tank. If the tanks are subjected to traffic, they should protected by at least 18 inches of compacted backfill and at least 8 inches thick top concrete slab. The recommended maximum burial depth is 7 feet. The slab and its support shall be of a design approved by the New York City Department of Buildings. The concrete used for the top slab is recommended to have a minimum compressive strength of 3500 psi at 28 days.
6. Fill, suction and discharge piping shall be encased in 4 inches of concrete or covered by a minimum of 18 inches of manufacturer-approved backfill, or covered by 4 inches of manufacturer-approved backfill and an 8-inch reinforced concrete slab.
7. Not more than 40,000 gallons of liquid motor fuel shall be stored at any facility, including liquid motor fuel stored in aboveground tanks.
8. Tanks containing identical products may discharge liquid motor fuel into a common line, provided that the total aggregate capacity of any group of such tanks discharging into a common line does not exceed 12,000 gallons.
9. Tank connections shall be designed and located so as to:
   9.1. Minimize the maneuvering necessary to position a cargo tank to make the delivery.
   9.2. Minimize obstructing a public right of way or motorists' view of roadways, or impeding the movement of motor vehicles or pedestrians, during deliveries.
   9.3. Provide connections by means of approved liquid and vapor-tight connections.
10. Tanks installed underground inside a building or structure shall be provided with an approved liquid level-indicating device. Liquid-level indicating devices shall be designed and constructed to prevent the escape of liquid or vapor and shall be approved.
11. Test wells shall be prohibited in tanks located underground inside a building or structure. Unused tank openings shall be permanently sealed at the tank to prevent removal of plugs or covers.
12. Secondary containment piping shall be required on all nonmetallic product-carrying pipes except direct fill lines, suction lines or siphon lines containing only one check valve located at the highest point of the line.
13. Underground piping shall have a slope of not less than 1/8 inch per foot pitched toward the tank and shall be installed so as to facilitate initial and periodic testing.
14. Flexible joints shall be installed.

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15. Each underground motor fuel storage tank shall be provided with a separate unobstructed vent line without any trap or device that causes excessive back pressure.
16. Vent piping shall be installed not less than 12 inches below the finished surface measured from the point where the piping rises vertically and shall slope toward the tank.
17. Vent outlets shall discharge outdoors and upward. The discharge point shall be no less than 15 feet above the adjacent ground level and no less than 10 feet from the nearest building opening.
18. An approved overfill prevention device shall be provided to prevent overfilling. When installed in diesel fuel tanks, such overfill prevention device shall be designed to withstand the pressure generated by the cargo tank discharge pump and shall automatically shut off the flow into the tank when the tank is not more than 95% full.
19. Each tank fill connection shall be provided with a catchment basin with a capacity of at least 15 gallons. The catchment basins must be approved by FDNY. The contents of the catchment basin shall be automatically drained into the tank without overfilling the tank after the transfer from the cargo tank is completed provided.
20. Where the discharging piping leak detector required by Fire Department does not cause shutdown of the liquid motor fuel pump, secondary containment piping shall be provided.

4.6 Monitoring, Inspection and Testing

(DEC 613.5(b);DEC 614.5; FC2206.9; FC3404.2.11.7,Rule 2206-02)

4.6.1 Monitoring at new underground storage tanks

(a) General requirement.

All new tanks must have one of the following leak monitoring systems:

(1) a double-walled tank with monitoring of the interstitial (annular) space;
(2) an in-tank monitoring system; or
(3) an observation well or wells.

(b) Monitoring of double-walled tanks.

If a double-walled tank is used, the interstitial space must be monitored for tightness using pressure monitoring, vacuum monitoring, electronic monitoring, manual sampling once per week or an equivalent method. In other words, tank interstitial space leak monitoring must monitor the space between the inner and outer tanks of a double wall tank system for leakage.

(c) In-tank monitoring systems.

If an in-tank monitoring system is used, it must consist of in-tank equipment which provides continuous monitoring of any leakage from the tank of 0.2 gallons per hour or larger.

(d) Observation wells.

(1) If an observation (monitoring) well or series of wells are used, they must consist of slotted or screened wells at least four inches in diameter. The well must be

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installed down-gradient in the groundwater or at a sump within the secondary containment system and to an elevation at least 24 inches below the bottom of the tank. The well must be installed within the backfill surrounding the tank. At least one well is required at each facility. The well must be monitored for traces of petroleum at least once per week as required in section 613.5(b)(3) of this Title.

(2) An observation well may be used as a vapor or odor well if the site is uncontaminated. If the well becomes contaminated with petroleum, it must either be purged free of odors or monitored for petroleum contamination through another method capable of detecting 1/64 of an inch of petroleum floating on the water surface or other method acceptable to the Department.

(3) Wells must be protected from damage if located in a traffic area.

(4) Wells must be sealed or capped so as to preclude liquid from entering the well from the surface and clearly marked as monitoring wells to prevent accidental delivery of product.

4.6.2 Periodic Maintenance Requirements.

Underground storage tanks at liquid motor fuel dispensing facilities shall be maintained in accordance with the following procedures:

(1) Overfill prevention devices.

The overfill prevention devices shall be **inspected** for proper operation at least once every **2 years** by a person holding a W-16 **certificate of license**.

(2) Cathodic protection systems.

Tanks and piping systems provided with cathodic protection systems shall be inspected, tested and otherwise maintained to ensure continuous corrosion protection. Cathodic protection systems shall be inspected for proper operation by a trained person knowledgeable of the requirements of the United States Environmental Protection Agency for such systems. Cathodic protection systems other than impressed current cathodic protection systems shall **be inspected within 6 months of installation** and **at least once a year** thereafter. Impressed current cathodic protection systems shall be inspected at least once **every 60 days by the authorized person** (e.g NACE certificated person).

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(3) Leak detection systems.
Leak detection systems is recommended be inspected for proper operation **at least once per shift** by **a P-15 certificate of fitness holder** responsible for the supervision of the motor fuel-dispensing facility. **A log book should be kept within control area.**

4.6.3 Initial tank test
All new underground and aboveground tanks shall be only hydrostatically tested at 15 psig, or 1½ times the maximum anticipated static head pressure, whichever is greater, for the inner tank, and pneumatically or hydrostatically at 5 psig for the annular space (secondary containment tank) before installation. Based on manufacturer's manual, the test air should be introduced via a valved manifold with pressure gauge. Do not overpressurize the tank. Position the pressure gauges so that the pressure readings can be clearly read at all times. The pressure gauge must have a pressure-relief valve and a vacuum gage must not be used in place of a pressure gauge. Failure to follow this warning could result in death or serious injury.

When a pneumatic test is allowed, an inert gas shall be used. Test pressure shall be maintained for a sufficient time to complete visual inspection, but not less than 1 hour. A tank shall be deemed to have passed the test if it shows no evidence of leakage or permanent deformation.

4.6.4 Initial piping test
After backfill of the tanks, primary piping shall be tested hydrostatically to 1½ times the maximum anticipated operating pressure, but not less than 15 psig. If there is any discharge lines, they must be tested at not less than 50 psig. Secondary containment piping (annular space) shall be tested pneumatically at 5 psig. After backfill and pouring of the top slab, discharge piping shall be tested hydrostatically at 1½ times the maximum anticipated pressure, but not less than 50 psig. Secondary containment piping (annular space) shall be tested pneumatically at 5 psig. When a pneumatic test is allowed, an inert gas shall be used. Hydrostatic test pressure shall be maintained for sufficient time to complete visual inspection but not less than 1 hour. The test shall show that there is no evidence of leakage. Test pressure for aboveground tank piping shall be at 1½ times the maximum anticipated operating pressure but not less than 100 psig.

4.6.5 Leak detection functionality test
(Rule 2206-02)
Leak detection systems monitoring underground liquid motor fuel storage systems shall be tested to confirm that all leak detection equipment and associated alarms are in good working order. The leak detection system functionality test shall be conducted by a W-16 Certificate of License holder for liquid motor fuel storage and dispensing systems, or a person employed and supervised by such Certificate of License holder. This test shall be scheduled with the Bulk Fuel Safety Unit of the Bureau of Fire Prevention. The individual conducting the test shall remain on the premises while such test is being conducted and until the system has been returned to normal operation in accordance with the FDNY requirements. The Fire Department may require individuals performing such leak detection test to be trained and/or certified by the manufacturer to conduct such test.

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Upon request, satisfactory proof shall be submitted to the Fire Department of the individual's training/certification for such leak detection system.

The areas surrounding the dispensers, tanks or other equipment or systems tested shall be cordoned off by portable barricades or signs, rope or tape to prevent unauthorized persons or motor vehicles from entering the area. The test must not be conducted if the fire extinguishing system required to protect the dispensers is out-of-service or not in good working order. All sources of ignition in the test area shall be eliminated from the area in which a leak detection system functionality test is to be conducted. Signs reading "NO SMOKING - NO OPEN FLAMES" shall be conspicuously posted in such area. A portable fire extinguisher having at least a 40-B:C rating shall be readily available for use.

All electrical equipment used for testing shall be of a type listed as intrinsically safe or suitable for use in hazardous locations. Interlocks shall be provided to ensure that grounding is made prior to electrical contact. Power to electrical equipment shall not be turned on until all electrical connections are made. Connection to power source shall be the final connection made.

Testing Requirements:
Leak detection system functionality tests shall be conducted in accordance with the manufacturer's instructions and the following standards and procedures:

(1) Testing of probes.
Leak detection probes shall be removed from their installed location, and manually tested by exposing such probes to liquid motor fuel. Probes capable of discriminating liquid motor fuel from water shall also be exposed to water. Leak detection probes which cannot be removed from their installed location may be tested by a method recommended by the manufacturer and acceptable to the Fire Department.

(2) Testing of discharge line leak detectors.
Discharge line leak detectors shall be tested by withdrawing liquid motor fuel from the impact valve port. Liquid motor fuel shall be withdrawn at a rate equal to the minimum rate that the line leak detector is required to activate.

(3) Dispensing of fuel for testing purposes.
The liquid motor fuel to be used for testing purposes shall be dispensed from the liquid motor fuel storage system into **a metal vessel**. Such liquid motor fuel shall be withdrawn through the storage system dispenser. Liquid motor fuel withdrawn from the storage system shall be returned to the storage system through the fill connection.

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The calibration can is allowed to be used for testing purpose. Testing can should be testified by Department of Consumer Affairs.

The fuel used for testing must NOT be dispensing into a non-mentallic can

(4) Standard for successful test.

A leak detection system test shall be deemed successful if:

(A) each tank-interstitial leak detection probe in the system, when exposed to liquid motor fuel and, if designed for such purpose, water, causes the activation of the audible and visible alarm.

(B) each pump sump leak detection probe in the system, when exposed to liquid motor fuel and, if designed for such purpose, water, causes:
(1) the activation of the audible and visible alarm, and
(2) the shutdown of the particular liquid motor fuel pump.

(C) each dispenser pan leak detection probe in the system, when exposed to liquid motor fuel and, if designed for such purpose, water, causes:
(1) the activation of the audible and visible alarm, and
(2) the shutdown of the affected dispenser or the particular liquid motor fuel pump or pumps.

(D) each electronic line leak detector in the system, upon detection of liquid motor fuel leak, causes:
(1) the activation of the audible and visible alarm, and

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(2) the shutdown of the particular liquid motor fuel pump or a significant restriction of liquid motor fuel flow.

(E) each mechanical line leak detector in the system, upon detection of a liquid motor fuel leak, causes the shutdown of the liquid motor fuel pump or the stopping of liquid motor fuel flow **at any rate exceeding 3 gallons per hour**.

(5) Restoration of system.
Upon successful completion of a leak detection system functionality test, liquid motor fuel storage and dispensing system, including the leak detection system, shall be returned to normal operation and checked to ensure that it is in good working order.

4.6.6 Fire extinguishing system test
The test shall be in accordance with procedures prescribed by the commissioner.

4.6.7 Emergency tank and piping system test
The commissioner may require that a tank and piping system be precision tested or pressure tested to determine the condition of the tank or piping. Such tests shall be conducted at the owner's risk by his or her representative. Storage systems that may contain liquid motor fuel or combustible vapor shall not be tested pneumatically.

4.6.8 Periodic tank and piping test
Any existing underground single-walled liquid motor fuel storage tanks previously approved by the department or any existing underground tanks that is not provided with an approved leak detection system must be precision tested at least once every 5 years.

Inspection and testing shall be conducted at the owner's risk by his or her representative before a representative of the department.

Overfill prevention devices shall be inspected and tested for proper operation at least once every 2 years by a W-16 Certificate of License holder.

Prior to being placed into services, initial tank test and initial piping test must be performed. Leak detection functionality test, overfill prevention devices, fire extinguishing system test and emergency tank and piping system test must be performed before starting operation. Leak detection functionality test, fire extinguishing system test, and precision test must be performed periodically at the owner's risk, before a representative of the Fire Department: at least **once every 2 years for leak detection functionality test** and at least **once every 5 years for fire extinguishing system test and precision test**.

Records of such inspection shall be maintained on the premises for a minimum of 5 years.

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PART 5. ABOVEGROUND LIQUID MOTOR FUEL STORAGE TANK

5.1 Contents and Tank Capacities Limitation

(FC 2306.2.2; FC2306.2.3)

1. No flammable liquid motor fuel is allowed to be stored in aboveground tanks. Only diesel motor fuel is allowed to be stored in the aboveground tanks of private dispensing facilities.
2. It is unlawful to store liquid motor fuel in aboveground tanks within any building or structure.
3. Combustible liquid motor fuel must not be stored in aboveground tanks, except at a fleet liquid motor fuel-dispensing facility complying with the FDNY requirements.
4. The capacity of an aboveground tank installation shall not exceed 4,000 gallons. The total storage capacity at a facility in both aboveground and underground tanks shall not exceed 40,000 gallons of liquid motor fuel. Each tank shall have a separate fill line and a separate vent line that are separate from the fill and vent lines of other tanks.

   Exception: When approved, individual tanks may exceed 4,000 gallons, but shall not exceed 12,000 gallons.

Examples of aboveground motor fuel-dispensing facility

Single-wall storage tank must be provided with drainage control or shall be diked.

5.2 Design and Constructions of Motor Fuel Tank Installations

(FC2206.2.3.3;FC2206.2.3.4;FC2206.2.3.5)

The manufacture of the tanks and all related equipments must be UL certificated. Only approved tanks shall be used. Tanks shall be placed on an approved base slab. The surface of such base slab must be a minimum of 6 inches above the level of the surrounding area to permit visual inspection. Tanks shall be adequately supported and anchored to the base slab to withstand uplifting by surface water and flooding.

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Tank connections shall be designed and located so as to:

i). Minimize the maneuvering necessary to position a cargo tank to make the delivery.

ii). Minimize obstructing a public right of way or motorists' view of roadways, or impeding the movement of motor vehicles or pedestrians, during deliveries.

iii). Provide connections by means of approved liquid and vapor-tight connections.

Tanks shall be provided with an approved **liquid level-indicating device**. The liquid level-indicating device shall be accessible to the delivery operator. Liquid level indicating devices shall be designed and constructed to be vapor-and-liquid tight.

5.3 Location Requirements

(FC312.2; FC2206.2.4;FC3404.2.9.5.2; FC3404.2.9.6.5)

5.3.1 Locations

Tanks shall be located as follows:

i.) At a location that will not obstruct or interfere with any means of egress or department access.

ii.) Tanks must not be installed under electrical transmission lines, bridges, or public highways.

iii.) Minimum separation requirements for aboveground tanks at fleet motor fuel-dispensing facilities:

	Individual tank capacity	
	4,000 gallons	> 4,000 gallons
Subway grating, entrance or exit	25 feet	25 feet
Nearest building	15 feet	25 feet
Lot line	15 feet	25 feet
Public street or private road	5 feet	15 feet
Other tanks	3 feet	3 feet

The separation between tanks containing stable liquids shall be in accordance with Table 2.3.2.2.1 of NFPA 30. Where tanks are in a diked area containing Class I or II liquids, or in the drainage path of Class I or II liquids, and are compacted in three or more rows or in an irregular pattern, the commissioner may require greater separation than specified in Table 2.3.2.2.1 of NFPA 30 or other means to make tanks in the interior of the pattern accessible for firefighting purposes. The separation between tanks containing unstable liquids shall not be less than one-half the sum of their diameters.

Exception: Tanks used for storing Class IIIB liquids are allowed to be spaced 3 feet apart unless within a diked area or drainage path for a tank storing Class I or II liquids.

5.3.2 Protection

1. Aboveground tanks for the storage of liquid motor fuel must be safeguarded in an approved manner by the agencies having jurisdiction from public access or unauthorized entry.

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2. Guard posts or other approved means must be provided to protect aboveground tanks against impact by a motor vehicle unless the tank is listed as a protected aboveground tank with vehicle impact protection. The guard posts must comply with the following requirements:

An example of guard posts

Guard posts should be
1. Constructed of steel not less than 4 inches in diameter and concrete filled.
2. Spaced not more than 4 feet between posts on center.
3. Set not less than 3 feet deep in a concrete footing of not less than a 15-inch diameter.
4. Set with the top of the posts not less than 3 feet above ground.
5. Located not less than 3 feet from the protected object.

3. Where protected aboveground tanks, piping, electrical conduit or dispensers are subject to vehicular impact, they shall be protected therefrom, either by having the impact protection incorporated into the system design in compliance with the impact test protocol of UL 2085, or by meeting the requirements of guard posts, or where necessary, a combination of both. Where posts or other approved barriers are provided, they shall be independent of each aboveground tank.

5.4 Drainage Control, Diking and Secondary Containment

(DEC 613.3(C)(6);FC2206.5; FC3404.2.9.6.4; FC3404.2.9.6.8;FC3404.2.10)

The area surrounding a tank or group of tanks shall be provided with drainage control or shall be diked to prevent accidental discharge of liquid from endangering adjacent tanks, adjoining property or reaching waterways. The area shall be in compliance with the following requirements.

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Exceptions:

1. For tanks having a capacity of less than 10,000 gallons, the commissioner may modify these requirements based on an approved technical report which demonstrates that such tank or group of tanks does not constitute a hazard to other tanks, waterways or adjoining property, after consideration of special features such as topographical conditions, nature of occupancy and proximity to buildings or structures on the same or adjacent property, capacity, and construction of proposed tanks and character of liquids to be stored, and nature and quantity of private and public fire protection provided.
2. Drainage control and diking is not required for listed secondary containment tanks.

5.4.1 Diked areas

The volumetric capacity of the diked area shall not be less than the greatest amount of liquid that can be released from the largest tank within the diked area. The capacity of the diked area enclosing more than one tank shall be calculated by deducting the volume of the tanks other than the largest tank below the height of the dike. Diked areas shall be kept free from combustible materials, drums and barrels. Diked areas containing multiple tanks shall be subdivided in accordance with NFPA 30.

Piping shall not pass through adjacent diked areas or impounding basins, unless provided with a sealed sleeve or otherwise protected from exposure to fire. Pumps, manifolds and fire protection equipment or controls shall not be located within diked areas or drainage basins or in a location where such equipment and controls would be endangered by fire in the diked area or drainage basin. Piping above ground shall be minimized and located as close as practical to the shell of the tank in diked areas or drainage basins. Equipments and controls must be fire-proof and all electrical equipments must be grounded.

Exceptions:

1. Pumps, manifolds and piping integral to the tanks or equipment being served which is protected by intermediate diking, berms, drainage or fire protection, such as water spray, monitors or resistive coating.
2. Fire protection equipment or controls which are appurtenances to the tanks or equipment being protected, such as foam chambers or foam piping and water or foam monitors and hydrants, or hand and wheeled extinguishers.

All dike walls shall be of steel or reinforced concrete, designed to be liquid tight and to withstand a full hydraulic head, and constructed to provide access to and from the diked area. Where stairways or other means are required to provide such access, they shall be constructed of steel. No dike wall shall be higher than 60 percent of the tank height.

5.4.2 Secondary containment system for aboveground tanks

A secondary containment system must be installed around any aboveground petroleum storage tank which:

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(a) could reasonably be expected to discharge petroleum to the waters of the state, or
(b) which has a capacity of 10,000 gallons or more.

The secondary containment system must be constructed so that spills of petroleum and chemical components of petroleum will not permeate, drain, infiltrate or otherwise escape to the ground waters or surface waters before cleanup occurs. The secondary containment system may consist of a combination of dikes, liners, pads, ponds, impoundments, curbs, ditches, sumps, receiving tanks and other equipment capable of containing the product stored. Construction of diking and the storage capacity of the diked area must be in accordance with NFPA No. 30, section 2-2.3.3.

If soil is used for the secondary containment system, it must be of such character that any spill onto the soil will be readily recoverable and will result in a minimal amount of soil contamination.

Storm water which collects within the secondary containment system must be controlled by a manually operated pump or siphon, or a gravity drain pipe which has two manually controlled dike valves, one on each side of the dike. All pumps, siphons and valves must be properly maintained and kept in good condition. If gravity drain pipes are used, all dike valves must be locked in a closed position except when the operator is in the process of draining clean water from the diked area.

Ideally, the floor of an aboveground storage tank should be sloped to a collection sump. Storm water or any other discharge at a facility must be uncontaminated and free of sheen prior to discharge. Storm water which is contaminated must be treated to reduce petroleum concentration to 15 parts per million or less and to remove any visible sheen prior to discharge. Additional requirements may be imposed under 6 NYCRR Parts 751-758 for protection of the state's waters.

The secondary containment systems shall be monitored either visually or automatically. Enclosed secondary containment systems shall be provided with emergency venting.

A spill container having a capacity of not less than 15 gallons shall be provided for each fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to the tank and equipped with a manual drain valve that drains into the primary tank. For tanks with a remote fill connection, a portable spill container shall be allowed.

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PART 6. FUEL-DISPENSING SYSTEM AND AREA

FC2203.1; FC2203.2; FC2204.1;FC2206.7; FC2203.2

6.1 Location of Dispensing Devices

6.1.1 Outdoor dispensing devices

When installed outdoors, dispensing devices shall be located as follows:

1. 10 feet or more from lot lines and building or structure openings.
2. 10 feet or more from buildings or structures having combustible exterior wall surfaces or buildings or structures having noncombustible exterior wall surfaces that are not part of a 1-hour fire-resistance-rated assembly or buildings or structures having combustible overhangs.

   Exception: Canopies constructed in accordance with the construction codes, including the Building Code, providing weather protection for the motor fuel dispensers.
3. Such that all portions of the vehicle being fueled will be on the premises of the automotive liquid motor fuel-dispensing facility.
4. Such that the nozzle, when the hose is fully extended, will not reach within 5 feet of building or structure openings.
5. 20 feet or more from fixed sources of ignition.
6. 25 feet or more from the nearest subway grating, entrance or exit.

6.1.2 Indoor dispensing devices

When installed inside a building or structure, the dispensing area shall be located at street level, with no dispenser located more than 50 feet from an exit or entrance to the building or structure used by motor vehicles.

6.2 Fuel-Dispensing Systems

(FC2206.7)

Electrical equipment, dispensers, hoses, nozzles and submersible or subsurface pumps used in fuel-dispensing systems shall be UL or approved listed.

6.2.1 Fixed pumps required

Liquid motor fuel shall be transferred only from the top of the tank by means of fixed pumps designed and equipped to allow control of the flow and prevent leakage or accidental discharge. Only one vehicle may be fueled at a time. Fuel dispensing from a location remote from the tank may be permitted when approved by the commissioner. Sump pumps shall be compatible with the liquid motor fuel being transferred, liquid-tight, and accessible for inspection. Prefabricated sump pumps shall be approved.

Liquid motor fuel shall not be dispensed by gravity from tanks, drums, barrels or similar containers. Liquid motor fuel shall not be dispensed by a device operating through pressure within a storage tank, drum or container.

6.2.2 Mounting of dispensers

Dispensing devices, except those installed on top of a protected aboveground tank that qualifies as vehicle-impact resistant, shall be protected against physical damage by

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mounting on a concrete island 6 inches or more in height, or shall otherwise be suitably protected in accordance with guard posts or other approved means. Dispensing devices shall be installed and securely fastened to their mounting surface in accordance with the dispenser manufacturer's instructions. Dispensing devices installed indoors shall be located in an approved position not in a direct line with vehicular traffic.

Openings in floors beneath automotive liquid motor fuel-dispensing facilities located inside buildings or structures shall be sealed. If a dispenser pan is installed beneath a dispenser, it shall be approved, compatible with the liquid motor fuel, liquid-tight, accessible for inspection, no larger than necessary, and installed solely for the purpose of collecting any liquid motor fuel leaking from the dispenser. The dispenser pan shall not be used to collect liquid motor fuel discharged from defective piping. The dispenser pan shall be backfilled up to not less than 6 inches above any nonmetallic piping and shall not interfere with the operation of any safety device.

6.2.3 Dispenser emergency valve

An approved emergency shutoff valve designed to close automatically in the event of a fire or impact shall be properly installed in the liquid supply line at the base of each dispenser supplied by a remote pump. The valve shall be installed so that the shear groove is flush with or within 0.5 inch of the top of the concrete dispenser island and there is clearance provided for maintenance purposes around the valve body and operating parts. The valve shall be installed at the liquid supply line inlet of each overhead-type dispenser. Where installed, a vapor return line located inside the dispenser housing shall have a shear section or approved flexible connector for the liquid supply line emergency shutoff valve to function. Emergency shutoff valves shall be installed and maintained in accordance with the manufacturer's instructions, tested at the time of initial installation and tested at least yearly.

6.2.4 Dispenser hose

Dispenser hoses shall be a maximum of 18 feet in length unless otherwise approved. Dispenser hoses shall be listed and approved. When not in use, hoses shall be reeled, racked or otherwise protected from damage. The length of the dispensing hose shall be such that at least 1 inch clearance between the hose and the ground is maintained when the nozzle is rested on its bracket. Dispensing hoses installed at aviation facilities, marine liquid motor fuel-dispensing facilities, and fleet vehicle liquid motor fuel-dispensing facilities shall be of an approved length. Dispenser hoses shall be equipped with a listed emergency breakaway device designed to retain liquid on both sides of a breakaway point. Such devices shall be installed and maintained in accordance with the manufacturer's instructions. Where hoses are attached to hose-retrieving mechanisms, the emergency breakaway device shall be located between the hose nozzle and the point of attachment of the hose-retrieval mechanism to the hose.

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The nozzle must be provided WITHOUT a latch-open device in a self-serving motor fuel station.

the hose-retrieval mechanism

Emergency Breakaway Device

6.2.5 Fuel delivery nozzles

A listed automatic-closing-type hose nozzle valve without a latch-open device shall be provided for dispensers used for dispensing liquid motor fuel, except that a nozzle valve with a latch-open device may be installed and used at the following automotive liquid motor fuel-dispensing facilities:

1. Full service automotive liquid motor fuel-dispensing facilities.
2. Fleet automotive liquid motor fuel-dispensing facilities.
3. Dispensing of diesel fuel at self-service automotive liquid motor fuel-dispensing facilities.

Special requirements for nozzles. Where dispensing of liquid motor fuel is performed, a listed automatic-closing-type hose nozzle valve shall be used that incorporates all of the following features:

1. The hose nozzle valve shall be equipped with an integral latch-open device, when the use of such a device is authorized by this section.
2. When the flow of product is normally controlled by devices or equipment other than the hose nozzle valve, the hose nozzle valve shall not be capable of being opened unless the delivery hose is pressurized. If pressure to the hose is lost, the nozzle shall close automatically.
   Exception: Vapor recovery nozzles incorporating insertion interlock devices designed to achieve shutoff on disconnect from the vehicle fill pipe.
3. The hose nozzle shall be designed such that the nozzle is retained in the fill pipe during the filling operation.

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4. The system shall include listed equipment with a feature that causes or requires the closing of the hose nozzle valve before the product flow can be resumed or before the hose nozzle valve can be replaced in its normal position in the dispenser.

Control device. A control device shall be provided that will allow a liquid motor fuel pump to operate only when the dispensing nozzle is removed from its bracket on the dispenser and the switch on the dispenser is manually activated. The flow of liquid motor fuel shall automatically stop when the switch is deactivated or the nozzle returned to its bracket.

6.2.6 Vapor-balance systems

((FC2206.7.9)

Dispensing devices incorporating provisions for vapor recovery shall be listed and labeled. When existing listed or labeled dispensing devices are modified for vapor recovery, such modifications shall be listed by report by a nationally recognized testing laboratory. The listing by report shall contain a description of the component parts used in the modification and the recommended method of installation on specific dispensers. Such report shall be made available for inspection by any department representative. Means shall be provided to shut down motor fuel dispensing in the event the vapor return line becomes blocked. An approved method shall be provided to close off the vapor return line from dispensers when the product is not being dispensed.

6.2.7 Emergency disconnect switches

An approved, clearly identified and readily accessible emergency disconnect switch shall be provided at an approved location, to immediately shut down the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency. An emergency disconnect switch for exterior fuel dispensers shall be located within 100 feet of, but not less than 20 feet from, the fuel dispensers. For interior fuel-dispensing operations, the emergency disconnect switch shall be installed at an approved location. An approved sign shall be posted on or immediately adjacent to such devices and should read: EMERGENCY FUEL SHUTOFF. Such emergency disconnect switches shall be of a type that is reset manually.

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6.3 Supervision of the Dispensing of Liquid Motor Fuel

(FC2204.2; FC2204.6; FC2204.7;FC2204.8;Rule 2204-01(c)

The dispensing of liquid motor fuel at automotive liquid motor fuel-dispensing facilities shall be conducted under the supervision of a P-15 Certificate of Fitness (C of F) holder.

It shall be unlawful to smoke or use or maintain an open flame in areas where fuel is dispensed. The engines of vehicles being fueled shall be shut off during fueling. Electrical equipment shall be installed, operated and maintained in accordance with the Electrical Code.

Flammable liquid motor fuel shall not be dispensed into the fuel tanks of motor vehicles imported by ship to this country while on any pier, dock or wharf.

6.3.1 Self-service motor fuel-dispensing facilities

The P-15 C of F holder's primary function shall be to supervise, observe and monitor the dispensing of motor fuel. The P-15 C of F holder shall:

(a) prevent the dispensing of motor fuel into containers that do not comply with the requirements of FDNY,
(b) control sources of ignition,
(c) take immediate action upon an accidental spill or release,
(d) be ready to use a portable fire extinguisher,
(e) activate the fixed fire extinguishing system,
(f) call 911 if an emergency arises.

Nothing shall be construed to prohibit a P-15 C of F holder from engaging in other activities so long as such activities do not interfere with the P-15 C of F holder's ability to supervise, observe and monitor the dispensing of motor fuel and other requirements of this chapter.

Approved self-service devices, equipment and systems such as, but not limited to, card-operated and remote-preset types, are allowed at automotive liquid motor fuel-dispensing facilities. The P-15 C of F holder shall set the dispensing devices in the "off" position when not in use if such dispensing device can be activated without the P-15 C of F holder's knowledge.

(1) Control area

A control area shall be located on the premises of every self-service automotive liquid motor fuel-dispensing facility. The control area shall be an interior or exterior enclosure to which the public has no access. The control booth shall be kept clean and orderly.

The P-15 C of F holder shall be present within the control area while dispensing operations are conducted. The control area shall be designed and located so that the P-15 C of F holder stationed therein shall have a full, unobstructed clear view of dispensing operations, except that mirrors and/or an approved closed-circuit television installation

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may be provided to afford the P-15 C of F holder a clear view of dispensing operations when the view from the control area is partially or temporarily obstructed. The glass panels of the control booth shall be kept clean and unobstructed at all times. Access to the controls in the booth shall be kept unobstructed by equipment, merchandise or litter. For purposes of this section, the "clear" view provided by a closed-circuit television installation shall mean that the image on the monitor shall be of such brightness and resolution as to allow ready identification of individuals and easy observation of activities at all times of day. Properly labeled manual switches that activate the fire extinguishing system and electrically disconnect the liquid motor fuel dispensing pumps shall be located adjacent to each other within the control area. Approved emergency controls shall be provided. A console that controls the self-service liquid motor fuel dispensers shall be provided within the control area and within 5 feet of the manual switches.

An operating manual consisting of a copy of this section, emergency procedures, and facility operating procedures (including the operation of the fire extinguishing system) shall be maintained in the control booth.

(2) Communications.
A two-way voice communication system shall be installed to provide contact between the control area and each dispensing island. A telephone not requiring a coin to operate, or other approved clearly identified means to notify the department, shall be provided at the facility in an approved location.

(3) Motor Fuel Dispensing (Rule 2204-01-(c)(6)(A); FC2707.4)
Persons dispensing motor fuel at a self-service motor fuel-dispensing facility shall hold a valid driver's license or be at least 18 years of age. The P-15 certified attendant or other facility personnel may require any member of the public to produce evidence of same.

Permits to transport motor fuel in a portable container that larger than 2.5 gallons shall be required. Such permits shall be issued to a particular vehicle or marine vessel for such transportation. The P-15 certified attendant shall not dispense liquid motor fuel into a portable container in quantities requiring a permit unless the P-15 certified attendant verifies that the customer possesses all such permits.

6.3.2 Full service motor fuel-dispensing facilities
(1)Operating instructions.
Approved emergency controls shall be provided. Dispenser operating instructions shall be conspicuously posted in approved locations on every dispenser and shall indicate the location of the emergency controls. An approved emergency procedures sign shall be provided and posted.

(2)Communications.
A telephone not requiring a coin to operate or other approved, clearly identified means to notify the department shall be provided at the facility in an approved location.

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PART 7. RECORD, MAINTENANCE AND REPORT
(FC2201.9; FC2206.2.1.1;FC2206.9.3; FC2205.2; DEC613.8)

7.1 Inventory Control for Underground Tanks

(1) Daily inventory records
Accurate daily inventory records shall be maintained and reconciled for underground liquid motor fuel storage tanks for indication of possible leakage from tanks and piping. Inventory reconciliation shall be in accordance with the regulations of the New York State Department of Environmental Conservation as set forth in 6 NYCRR Part 613. The records shall be kept at the premises and be made available for inspection by any representative of the department. Records shall include daily reconciliation between sales, use, receipts and inventory on hand. Where there is more than one system consisting of tanks serving separate pumps or dispensers for a product, the reconciliation shall be maintained separately for each tank system. A consistent or accidental loss of product shall be immediately reported to the commissioner.

(2) Maintenance log book.
A maintenance log shall be kept on the premises for inspection by any Department representative. Such log shall list all P-15 certified attendants and other persons on the premises who hold certificates of fitness, with their numbers and expiration dates. Entries shall be made in such log book of the daily inspections required by this section, any maintenance or repair of any system, and any fires, spills or other unusual occurrences.

(3) Daily inspections.
The P-15 C of F holder shall conduct an inspection of the facility **at least on a daily basis**, and document such inspection in the maintenance log book. The inspection shall verify that:

(A) The fire extinguishing system is properly pressurized, nozzles are clear and unobstructed, and heat detectors are undamaged and unobstructed.
(B) Portable fire extinguishers have been serviced and have adequate pressure.
(C) The fire extinguishing system remote manual pull station and the pump shutdown are clear of obstructions.
(D) Leak detection systems and other alarms are in good working order.
(E) Emergency procedures signage is posted, unobstructed and legible.
(F) Required lighting is in good working order.
(G) Any mirrors and/or approved closed-circuit television used to monitor dispensing operations are in good working order.
(H) The voice communications system is in good working order.

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Example of the maintenance log book

NYC Daily Inspection Log _____ Address _____ Month _____

DATE	FSS CYLINDERS PRESSURE	EMERGENCY SHUT-OFF SWITCHES & BEACON LIGHT	SENSORS & NOZZLES	EMERGENCY RESPONSE SIGNAGES	ILLUMINATION LIGHTS	PORTABLE EXTINGUISHERS	INTERCOM	MIRRORS /CCTV	COMMENTS
1									
2									
3									
4									
5									
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7									
8									
9									
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7.2 Inspections and Tests Records

Records of all inspections and testing shall be kept in a bound log book or other approved recordkeeping, maintained on the premises for a minimum of 5 years, and made available for inspection by a representative of the department.

Automatic-closing emergency shutoff valves (shear valves) shall be checked not less than once per year by manually tripping the hold-open linkage. In addition, the leak detection system shall be inspected daily for proper operation and tested at least once every 2 years by a person holding a certificate of license. Such test shall confirm that all leak detection equipment and associated alarms are in good working order.

7.3 Equipment Maintenance

Automotive liquid motor fuel-dispensing facility equipment shall be maintained in good working order at all times. Where maintenance to dispensing devices becomes necessary and such maintenance could allow the accidental release or ignition of liquid, the following precautions shall be taken:

1. Only persons with a W-16 certificate of license and knowledgeable in performing the required maintenance shall perform the work.
2. Electrical power to the dispensing device and pump serving the dispenser shall be shut off at the main electrical disconnect panel before maintenance begins.
3. The emergency shutoff valve at the dispenser, where installed, shall be closed before maintenance begins.
4. Vehicle traffic and unauthorized persons shall be prevented from coming within 12 feet of the dispensing device before and during maintenance.

7.4 Reporting of Spills and Discharges

The results of any inventory record, test or inspection which shows a facility is leaking must be reported to Bulk Fuel Safety Unit of FDNY and Department of Environmental Conservation (DEC) within 2 hours of the discovery.

All petroleum spills that occur within New York State (NYS) must be reported to the NYS Spill Hotline (1-800-457-7362) **within 2 hours of discovery**, except spills which meet **ALL of the following criteria**:

1. The quantity is known to be less than 5 gallons; and
2. The spill is contained and under the control of the spiller; and
3. The spill has not and will not reach the State's water or any land; and
4. The spill is cleaned up within 2 hours of discovery.

A spill is considered to have not impacted land if it occurs on a paved surface such as asphalt or concrete. **A spill in a dirt or gravel parking lot is considered to have impacted land and is reportable**.

More details on notification and reporting requirements can be found in the document posted by the Department of Environmental Conservation (http://www.dec.ny.gov/docs/remediation_hudson_pdf/1x1.pdf).
(The spill responses can be referred to http://www.dec.ny.gov/chemical/8692.html)

PART 8. RECONDITIONING, REPAIR AND OUT OF SERVICE TANKS

8.1 Reconditioning an Underground Steel Tank

DEC614.6;

8.1.1 Manufacturer's guarantee

An underground steel tank may be reconditioned by installing an interior coating (lining) under the direction of the lining manufacturer or a certified representative. The manufacturer or representative must guarantee to the owner in writing that the coating will not fail, crack, separate or deteriorate and the tank will not leak the product specified in storage for a period of 10 years. A copy of the guarantee (e.g. integrity report) must be kept by the owner for the life of the tank.

8.1.2 Structural requirements

(1) A steel tank may be lined with a coating only if it meets the following structural conditions:
   i. it has a design shell thickness of seven gauge or more;
   ii. the tank has a minimum metal thickness of 1/8 inch at holes after reaming;
   iii. the tank has no open seam or split;
   iv. the tank has less than 10 holes with none larger than 1/2 inch in diameter;
   v. the tank meets all standards for structural soundness of the lining manufacturer.

(2) A tank which fails to meet all of the requirements of paragraph (1) of this subdivision must be permanently closed.

(3) To determine adherence to the requirements of paragraph (1) of this subdivision, the entire interior surface of the tank must be tapped with a ballpeen hammer for soundness or inspected using other equivalent or superior nondestructive methods. Weak areas, holes and seams must be ballpeen hammered (before and after sandblasting) to obtain structurally sound edges. Holes and seams must be reamed until the edges of the opening are a minimum of 1/8 inch thick.

8.1.3 Preparation of tank interior

Prior to repair, a tank must be cleaned in accordance with generally accepted practices. Sludge accumulation on the bottom of the tank must be removed, transported and disposed of in a manner consistent with all State and Federal requirements for solid waste disposal. The entire internal tank surface must be sandblasted completely free of scale, rust and foreign matter. Following sandblasting, the entire surface must be brushed and vacuumed such that the surface when viewed without magnification is free of all moisture and foreign matter. All perforations must be tightly plugged with boiler plugs or screws made of noncorrodible plastic. Boiler plugs or screws must be covered with a laminate of resin and fiberglass cloth which overlaps all sides of the plug with a minimum of 6 inches and has a minimum area of 144 square inches.

Prior to applying the coating material, a 10-gauge steel plate which covers a minimum of 144 square inches must be installed and centered under the fill tube and gauging tube. The plate must be bonded to the interior surface of the tank.

8.1.4 Coating (lining) specifications

(1) Any noncorrodible epoxy based resins, isophthalic polyester-based resins or equivalent coating may be used for reconditioning a steel tank if the coating is of sufficient thickness, density and strength to form a hard impermeable shell which will not leak, crack, wear, soften or separate from the interior surface of the tank.

(2) The coating when applied to properly prepared steel must maintain a permanent bond to the tank.

(3) The coating's coefficient of thermal expansion must be compatible with steel so that stress due to temperature changes will not be detrimental to the soundness of the coating.

(4) The coating must be chemically compatible with petroleum products and product additives.

8.1.5 Application of coating

(1) The coating must be applied and cured in strict accordance with manufacturer's specifications.

(2) The coating must be applied as soon as possible but not later than 8 hours after sandblasting and cleaning of the internal surface. Visible rust, moisture or foreign material must not be present.

8.1.6 Tank closings

(1) If the tank has a manway, the manway cover gasket must be replaced with a new one before resealing.

(2) If the tank does not have a manway and an opening has been cut, the tank must have a manway properly welded in place prior to beginning work or the tank must be sealed as follows:

i. A 1/4-inch thick steel cover plate, rolled to the contour of the tank exterior must be made to overlap the hole at least two inches on each side (e.g., should measure at least 26" x 26" if the opening was cut 22" x 22").

ii. The cover must be used as a template to locate 3/4-inch diameter holes on five-inch centers, one inch from the edge of the cover.

iii. The cover plate must be sandblasted and both sides and the entire inside surface of the plate must be covered with coating material to act as a gasket.

iv. Before the coating on the cover cures, the cover must be fastened to the tank using 1/2-inch minimum diameter bolts. The bolt shafts are to be placed through the holes from the inside of the tank and held in place by spring clips, then fastened with lock washers and nuts which have been dipped in a seam sealer.

v. After being bolted to the tank, the cover plate and surrounding tank surface must be properly sandblasted, coated with coating material and allowed to cure before backfilling the hole.

8.1.7 Tank tightness testing

Following closure of the tank and before backfilling, the relined tank must be given a tightness test (i.e. hydrostatic test) and a test report must be sent to the department.

8.2 Repair or Alteration of Tanks and Piping
(FC3404.2.7.6; FC3404.2.7.10.1; DEC614.6;DEC614.12; FC3404.2.7.6)
The repair or alteration, including welding, cutting and hot tapping of storage tanks and piping that have been placed in service, shall be in accordance with NFPA 30. Hot tapping shall only be permitted with the approval of the commissioner. Leaking tanks shall be promptly emptied, repaired and returned to service, sealed in place or removed.

Repairing and reconditioning of aboveground storage tanks

8.2.1 Cleaning of tank prior to repair
(1) Prior to repair, a tank must be cleaned in accordance with generally accepted practices. Wash water must not be discharged to the waters of the State if the discharge would contravene the standards of DEC Part 701, 702 or 703 of this Title.
(2) Sludge which has accumulated on the bottom of the tank must be removed, transported and disposed of in a manner consistent with all applicable State and Federal requirements for solid waste disposal.

8.2.2 Coating (lining) specifications
(1) Before doing the re-lining task, the tank must be examinated by the engineer of record who will attest to the conditions of the tank for re-lining. Such a notification should be sent to the Bulk Fuel Safety Unit of FDNY.
(2) Any noncorrodible epoxy-based resins, isophthalic polyester-based resins or equivalent coating which is bonded firmly to the interior surfaces may be used as a coating to protect a tank from future corrosion.
(3) The coating must be applied as soon as possible, but not later than eight hours after sandblasting and cleaning of the internal surface. Visible rust, moisture or foreign matter must not be present.
(4) The coating must be of sufficient thickness, density and strength to form a hard impermeable shell which will not crack, soften or separate from the interior surface of the tank. The coating when applied to properly prepared steel must maintain a permanent bond to the tank.
(5) The coating's coefficient of thermal expansion must be compatible with steel so that stress due to temperature changes will not be detrimental to the soundness of the coating.
(6) The coating must be chemically compatible with petroleum products and product additives.
(7) The coating material must be applied and cured in strict accord with manufacturer's specifications.
(8) The re-lining of the tanks must be supervised by a W-16 Certificate of License holder and an affidavit provided to the Bulk Fuel Safety Unit of the Fire Department that the lining was completed under his supervision.

8.2.3 Inspection of coating
The coating must be checked for blisters, air pockets and electrically tested for pinholes. The coating thickness must be checked with an Elcometer Thickness Gauge or equivalent and the hardness checked with a Barcol Hardness Tester or equivalent to assure compliance with manufacturer's specifications. Any defects must be repaired. An interior coating must be installed under the direction of the lining

manufacturer or a certified representative. The manufacturer or representative must guarantee to the owner in writing that the coating will not leak the product specified in storage and the lining will not deteriorate in any way for a period of 10 years. A copy of the guarantee must be kept by the owner for the life of the tank.

8.3 Out of Service Tanks

(FC3404.2.13)

8.3.1 Underground out of service tanks

Underground tanks not used for a period of **30 days** or more shall be removed from the premises or safeguarded in compliance with the following requirements:

1. Flammable or combustible liquids shall be removed from the tank and connecting piping.
2. The tank and connecting piping shall be rendered free of flammable and combustible vapors using an inert gas.

The special regulations for the tanks which are not used for a period of **30 days to 364 days**:

1. **Except for any active fire extinguishing system piping**, the tank and connecting piping, including fill line, gauge opening, vapor return and pump connection, shall be capped or plugged and secured from tampering and the fill connection covered with concrete.
2. Vent lines shall remain open and be maintained in accordance with the regulations of normal venting and emergency venting.

The special regulations for the tanks which are not used for a period of **1 year** or more:

1. All tanks and connecting piping, **including fire extinguishing system lines**, fill line, gauge opening, vapor return and pump connection, shall be disconnected, capped or plugged and secured from tampering, and the fill connection **sealed** with concrete to prevent its use.
2. The tank shall be filled completely with an approved, inert solid material.

8.3.2 Aboveground out of service tanks

Aboveground tanks not used for a period of **30 days or more** shall be removed from the premises or safeguarded in compliance with the following requirements:

1. Flammable or combustible liquids shall be removed from the tank and connecting piping.
2. The tank and connecting piping shall be rendered free of flammable and combustible vapors using an inert gas.
3. Except for any active fire extinguishing system piping, the tank and connecting piping, including fill line, gauge opening, vapor return and pump connection, shall be capped or plugged and secured from tampering and the fill connection covered with concrete.
4. Vent lines shall remain open and be maintained in accordance with the regulations of normal venting and emergency venting.
5. The tank shall be protected from flotation in accordance with good engineering practice.

Aboveground tanks that have been out-of-service for a period of **1 year or more** shall be removed from the premises or sealed in place in compliance with the following requirements:

1. Flammable and combustible liquids shall be removed from the tank and connected piping.
2. The tank and connecting piping shall be rendered free of flammable and combustible vapors using an inert gas.
3. All piping, including fire extinguishing system lines, fill line, gauge opening, vapor return and pump connection, shall be disconnected, capped or plugged and secured from tampering, and the fill connection sealed with concrete to prevent its use.
4. The tank shall be adequately protected from flotation in accordance with good engineering practice.
5. The tank shall be stenciled with the date that it was sealed in place.

8.4 Removal of Tanks

(FC3404.2.14)

Tanks and piping shall be disposed of lawfully. Removal of aboveground and underground tanks shall be in compliance with the following requirements:

1. Flammable and combustible liquids shall be removed from the tank and connecting piping.
2. The tank and connecting piping shall be rendered free of flammable and combustible vapors using an inert gas.
3. Piping at tank openings shall be disconnected.
4. Piping shall be removed from the premises.
   Exception: Piping may be sealed in place where the commissioner determines that removal is not practical. Sealed in place piping shall be capped and safeguarded by filling with concrete or other approved material, and the fill connection removed from the fill pipe.
5. Tank openings shall be capped or plugged, leaving a 0.125-inch to 0.25-inch-diameter opening for pressure equalization.
6. Tanks shall be removed from the premises.
7. Tanks and piping shall be disposed of lawfully.

PART 9. EMERGENCY PLAN AND FIRE CONTROL
(NFPA 30A 9.2.5.1; FC2205.5; FC2205.7;FC2206.8; FC2206.9.4; Rule 2204-01(c)(3)(C))

9.1 Control of Ignition, Brush and Debris

Smoking materials, including matches and lighters, must not be used within 20 ft of areas used for fueling, servicing fuel system of internal combustion engines, or receiving or dispensing of Class I and Class II liquids. The motors of all equipment being fueled must be shut of during the fueling operation except for emergency generators, pumps and so forth, where continuing operation is essential.

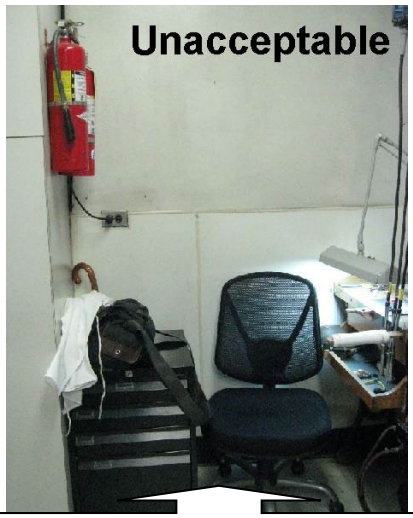
Brush, grass, vines or other vegetation and combustible waste shall be kept not less than 10 feet from the tank and dispensing location.

9.2 Fire Extinguishers

Approved portable fire extinguishers with a minimum rating of 40-B:C shall be provided and located such that an extinguisher is not less than 20 feet but not more than 75 feet from pumps, dispensers or storage tank fill-pipe openings. In addition to the portable fire
extinguishers required to be provided in the dispensing area, 2 portable fire extinguishers with at least a 40-B:C rating shall be provided within the control booth.

Fire extinguishers must be used in accordance with the instructions painted on the side of the extinguisher. They clearly describe how to use the extinguisher in case of an emergency. The Certificate holder should become familiar with the instructions for the extinguisher at his/her work site. When it come to using a fire-extinguisher just remember the acronym P.A.S.S. to help make sure you use it properly. P.A.S.S. stands for Pull, Aim, Squeeze, Sweep. An example of these instructions is depicted in the picture.

All fire extinguishers must be installed so that the top of the extinguisher is not more than 5 ft above the floor and the clearance between the bottom of the extinguisher and the floor is not less than 4 in. In other words, **no fire extinguisher is allowed to be on the floor.**



(1) The top of the fire extinguishers must not be more than 5 ft above the floor.
(2) The fire extinguishers must be accessible and unobstructed.

The bottom of the extinguisher must be at least 4 in above the floor.

9.2.1 Different Types Of Fire Extinguishers

The Certificate holder must be familiar with the different types of fire extinguishers available at the work site. The Certificate holder must know how to operate the extinguishers in a safe and efficient manner. The Certificate holder must also know the difference between the various types of extinguishers and when they may be used. A description of the classes of fires and the appropriate extinguishers are described below.

Class A fires are caused by ordinary combustible materials (such as wood, paper, and cloth). To extinguish a Class A fire, these extinguishers utilize either the heat-absorbing effects of water or the coating effects of certain dry chemicals.

Class B fires are caused by flammable or combustible liquids and gases such as oil, gasoline, etc. To extinguish a Class B fire, the blanketing-smothering effect of oxygen-excluding media such as CO_2, dry chemical or foam is most effective.

Class C fires involve electrical equipment. These fires must be fought with fire extinguishers that do not conduct electricity. Foam and water type extinguishers must not be used to extinguish electrical fires. After shutting off the electrical equipment, extinguishers for Class A or B fires may be used.

Class D fires are caused by ignitable metals, such as magnesium, titanium, and metallic sodium, or metals that are combustible under certain conditions, such as calcium, zinc, and aluminum. Generally, water should not be used to extinguish these fires.

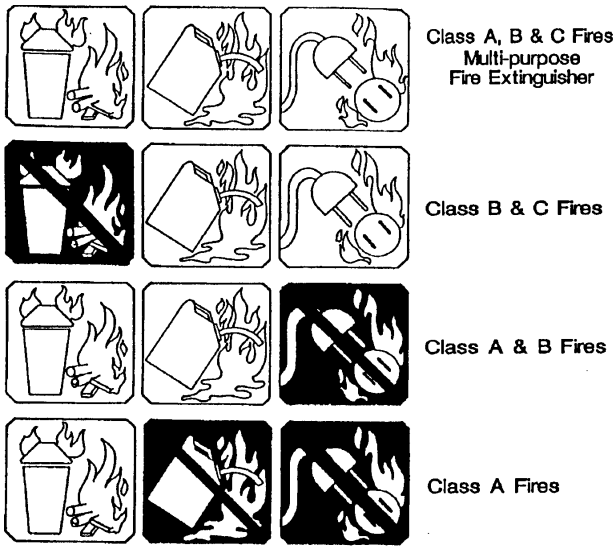
A multi-purpose dry chemical fire extinguisher may be used to extinguish more than 2 Classes fires. Examples of some fire extinguishers are shown below.

Examples of fire extinguishers

10-B:C (10BC)	3-A:40-B:C(3A40BC)

Symbols may also be painted on the extinguisher. The symbols indicate what kind of fires the extinguisher may be used on. Examples of these symbols are shown below.

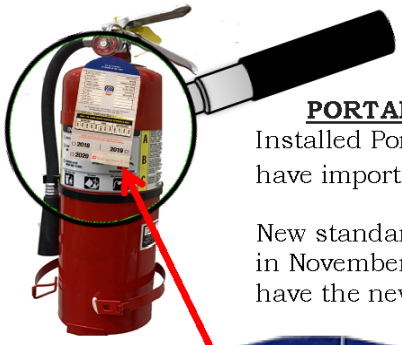
CLASSES OF FIRES	TYPES OF FIRES	PICTURE SYMBOL
A	Wood, paper, cloth, trash & other ordinary materials.	
B	Gasoline, oil, paint and other flammable liquids.	
C	May be used on fires involving live electrical equipment without danger to the operator.	
D	Combustible metals and combustible metal alloys.	D
K	Cooking media (Vegetable or Animal Oils and Fats)	



Fire Extinguisher Identification Symbols

The symbol with the shaded background and the slash indicates when the extinguisher must not be used. The Certificate holder must understand these symbols. All fire extinguishers should be kept in good working order at all times.

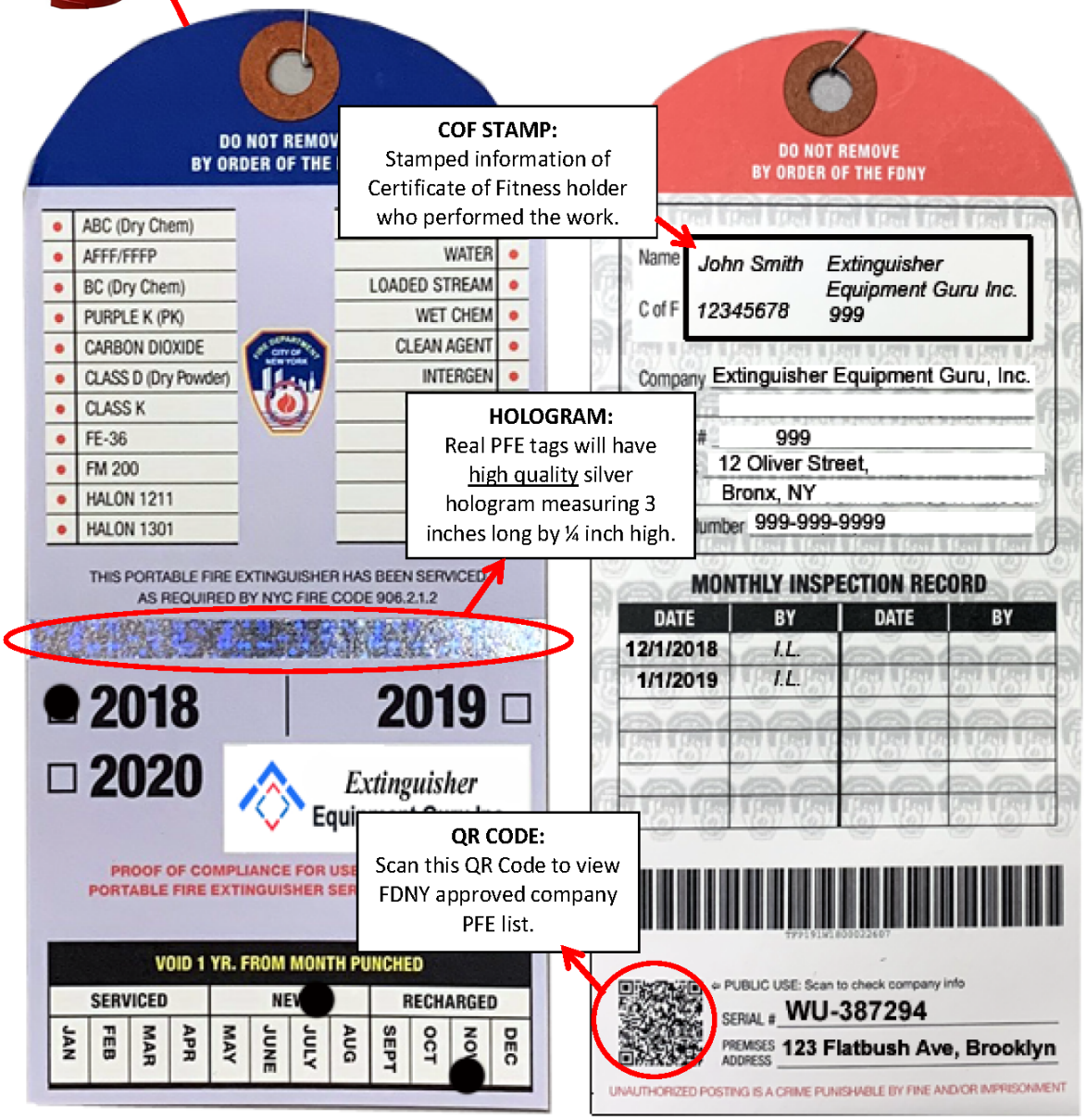
9.2.2 Portable Fire Extinguisher Tags



PORTABLE FIRE EXTINGUISHER (PFE) TAGS (NEW)

Installed Portable Fire Extinguishers must have a PFE tag affixed. This tag will have important information about the extinguisher.

New standardized PFE tags (see below) will begin appearing at premises starting in November 2018. By November of 2019, all portable fire extinguishers must have the new PFE tags.



TIPS

A real hologram strip is 3 inches long by ¼ inch wide. Counterfeit tags will NOT have a high quality silver hologram. The hologram on a counterfeit tag will NOT change color as it is moved against the light.

If your PFE tags look different than the one pictured above, contact your supervisor. If you suspect your PFE is a counterfeit, contact FDNY immediately by e-mail: Tags.Decal@fdny.nyc.gov

9.2.3 Fire Extinguisher Inspections

MONTHLY

The portable fire extinguishers are required to be checked monthly. The owner of the business is responsible to select a person to do a monthly inspection. This monthly inspection is called a "quick check".

The QUICK CHECK should check if:
(1) the fire extinguisher is fully charged;
(2) it is in its designated place;
(3) it has not been actuated or tampered with;
(4) there is no obvious or physical damage or condition to prevent its operation.

The information of the monthly inspection record must include the date of the inspection, the name/initials of the person who did the inspection. This monthly quick check record must be kept on the back of the PFE tag or by an approved electronic method that provides a permanent record.

ANNUALLY

At least annually all Portable Fire Extinguishers must be checked by a W-96 Certificate of Fitness holder from FDNY approved company. After each annual inspection W-96 COF holder will replace the PFE tag. The information of the annual inspection record must be indicated on the new PFE tag.

9.3 Fire Extinguishing System

Where flammable liquid motor fuel is dispensed at an automotive liquid motor fuel-dispensing facility, the dispensing area shall be provided with a dry chemical fire extinguishing system designed, and the following requirements must be met:

1. The fire extinguishing system shall be designed to provide overhead protection of the dispenser area encompassed by a circle formed by the fully extended hose and nozzle on each fuel dispenser and both ends of the dispenser island.
2. The extinguishing agent containers shall be equipped with indicators to show whether the system is fully charged. Indicators shall be positioned to be easily read from grade.
3. The installation, alteration, testing and repair of the fire extinguishing system, including any maintenance or modification of the system, shall be performed by a person possessing a master fire suppression piping contractor license issued by

the New York City Department of Buildings and certified in the installation, operation and maintenance of the specific fire extinguishing system.

4. Dispensers shall not be operated when the fire extinguishing system has discharged or is inoperative, except as authorized in writing by the department. The motor fuel-dispensing facility P-15 C of F holder shall immediately notify the department of system discharge or inoperability.
5. A performance test of the fire extinguishing system shall be performed at the time of installation in accordance with the approved design and installation documents, and such procedures as may be prescribed by the commissioner. Fire extinguishing systems shall be tested at least once every 5 years from the date of the first test of the initial installation. The test shall be in accordance with procedures prescribed by the commissioner.
6. Fire extinguishing systems at fleet vehicle automotive liquid motor fuel-dispensing facilities shall be monitored by an approved central station company.

10. LITHIUM-ION BATTERY SAFETY

Lithium-ion safety

Lithium-ion batteries are rechargeable batteries found in electric bikes, scooters, cars, laptops, tablets, phones, and many other common household devices.

Lithium-ion battery fires have caused deaths, serious injuries, and devastating damage to property around the city. It's important to follow rules for safe storage, charging, and disposal for these types of batteries.

If you own a lithium-ion powered device or plan to buy one, the FDNY has important safety tips that you should follow. These tips apply to all devices powered by lithium-ion batteries, including phones, tablets, laptops, e-cigarettes, toys, high-tech luggage, and even robotic vacuum cleaners.

Immediately stop using or charging battery and call 911 if you notice:

- **Fire or Smoke**
- **Overheating**
- **Change in color or shape**
- **Odd noises**
- **Leaking**
- **Strange smell**

ALWAYS:

- purchase and use devices certified by a Nationally Recognized Testing Laboratory (NRTL).
- follow the manufacturer's instructions for:
  - charging and storage.
  - correct battery, cord, and power adapter
- keep exit path clear at all times.
- plug directly into a wall electrical outlet for charging.
- keep batteries and devices at room temperature.
- store and/or charge batteries away from anything flammable.
- keep away from heat sources.
- bring batteries to a **NYC Battery Recycling Center.** Visit nyc.gov/batteries for more information.

NEVER:

- use aftermarket batteries or chargers.
- use damaged or altered batteries
- plug into a power strip or overload an outlet.
- overcharge or leave battery charging overnight.
- charge a battery or device under your pillow, on your bed, or near a couch.
- leave e-bikes or e-scooters unattended while charging.
- block your primary way in or out of a room/space with e-bikes, e-scooters, wheelchairs, etc.
- place batteries in Trash or Recycling bin. **It is ILLEGAL.** Visit nyc.gov/batteries for disposal locations and information.

In the event of a Fire, Leave and CLOSE the door. Call 911 once you are in a safe location.

Charging Lithium Ion

Lithium-ion batteries do not have to be fully charged; partial charge is the most suitable.

When **charging more than five (5)** personal mobility devices or their removable batteries, it must be in a **dedicated room with ventilation** and a self-closing door.

For a total battery capacity of 20 kilowatt-hours (kWh), a 2-foot separation between charging batteries is required. For a total battery capacity up to 50 kWh, a 3-foot separation is needed.

Chargers must only be used with a compatible battery pack. The original equipment manufacturer (OEM) charger interplays with the battery pack using the battery management system (BMS). The wrong battery/charger combination may not work safely. For example, the 100% cutoff to prevent overcharging, which damages batteries, may not work which can easily create hazardous conditions such as fires, explosions and/or injuries.

Always check with the manufacturer or retailer of the personal mobility device, an authorized repair shop or a testing laboratory such as Underwrites Laboratories (UL) to see if replacement is recommended or listed and safe for use with that device. Using unauthorized parts, including batteries and/or chargers, may cause damage, fire and possibly void your warranty.

Extinguishing Lithium-ion

Water may not prevent a battery from burning and spreading. Battery cells are known to explode and quickly spread to another battery. It can spread to another devices.

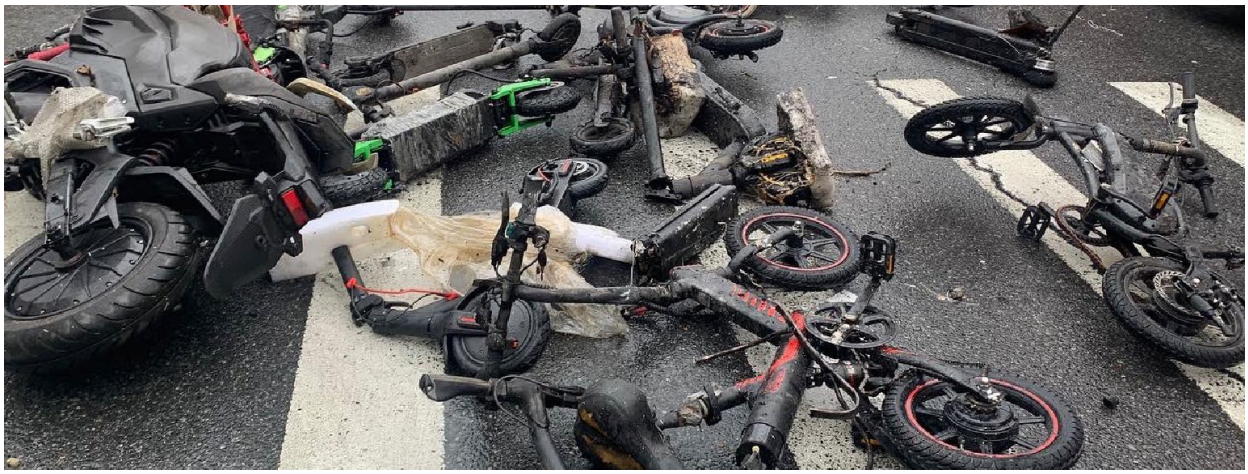
Fire Extinguishers
do not work
on lithium-ion batteries fires.

Unexpected Re-ignition.

Reignition is common. Lithium-Ion Batteries are known to unexpectedly re-ignite (without warning) minutes, hours and even days after all visible fire has been put out.

Lithium-ion batteries can enter an uncontrollable, self-heating state. This can result in the release of gas, cause fire and possible explosion.

These batteries may continue to generate heat even when there is no visible sign of fire. Once heat reaches a certain level fire may reignite on the battery and surrounding area.



APPENDIX A. STAGE II VAPOR COLLECTION DECOMMISIONING
NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Division of Air Resources
STAGE II VAPOR COLLECTION DECOMMISSIONING CHECKLIST(JUNE 2011)

This form may be used to document the procedure used to decommission a Stage II Vapor Collection System.

A. Facility Information

Facility Name: _____

Underground Storage Tank Program Identification #: _____

Facility Address (Street and City): _____

Owner: _____ Phone: (_____) _____- _____

B. Contractor Information

Contractor performing Stage II decommissioning: _____

Business Address: _____ Phone: (_____) _____-_____

City, State: _____ ZIP: _____

C. Decommissioning Actions

(a) Vapor collection piping:

- *Piping removed [if "yes" go on to (b)]?: Yes □ No □*
- *Piping purged of any liquid?: Yes □ No □*
- *Piping capped at dispenser end?: Yes □ No □*
- *Piping capped at tank end?: Yes □ No □*

(b) Liquid drop-out tank:

- *Liquid drop-out tank present [if "no" go on to (c)]?: Yes □ No □*
- *Liquid drop-out tank removed [if "no" go on to (c)]?: Yes □ No □*
- *Liquid in tank evacuated?: Yes □ No □*
- *Siphon line disconnected at submersible pump and capped?: Yes □ No □ Siphon not present □*

(c) Hanging hardware:

- *Stage II hanging hardware replaced with non-Stage II equipment? : Yes □ No □*

(d) Vacuum pump:

- *Vacuum motor disabled or removed? : Yes □ No □ NA □*

(e) Stage II Dispensing Instructions:

- *Decals with Stage II dispensing instructions removed? : Yes □ No □ NA □*

(f) Leak test:

- *Leak test performed? : Yes □ No □*
- *Test report attached? : Yes □ No □*

D. Comments (use this section if you need to provide additional information)

E. Certification of Information Accuracy

The information presented herein is true and accurate to the best of my knowledge and I am authorized to make this statement on behalf of this facility.

_____

Signature of Owner □, Operator □, or Authorized Agent □ *Date _____*

Name:_____ Title: _____

Business Address: _____ Phone: (_____)_____-_____

City, State: _____ ZIP: _____

APPENDIX B. FIRE CODE CHAPTER 9
FIRE PROTECTION SYSTEMS

FC 901 General

901.1 Scope. This chapter shall govern the design, installation, operation and maintenance, including inspection and testing, of fire protection devices, equipment and systems, and other fire protection measures for the control and extinguishment of fire.

901.1.1 General. Fire protection systems shall be designed, installed, operated and maintained in accordance with this chapter and the reference standards set forth in FC Table 901.6.1.

901.1.2 Emergency alarm systems. Except as otherwise provided in the construction codes, this code or the rules, emergency alarm systems shall be designed, installed, operated and maintained in the same manner as fire alarm systems.

901.2 Design and installation documents. The commissioner may require design and installation documents and calculations to be submitted for review for all fire protection systems. Design and installation documents required or regulated by this code or the rules shall be submitted for review and approval prior to installation, and shall certify that the design complies with the requirements of this code and the rules.

901.3 Permits. Permits shall be required as set forth in FC105.6.

901.4 Design and installation. Fire protection systems shall be designed and installed in accordance with FC 901.4.1 through [901.4.5] 901.4.6.

901.4.1 Required fire protection systems. Fire protection systems shall be designed and installed in accordance with the construction codes, including the Building Code, and, as applicable, this code and the rules, and the applicable referenced standards listed in this code. Required systems shall be extended or altered as necessary to maintain and continue protection whenever the building or structure is altered. Alterations to fire protection systems shall be performed in compliance with the requirements of this code, the rules, and the construction codes, as applicable. Buildings and structures shall be provided with such fire hose, portable fire extinguishers and other means of preventing and extinguishing fires as the commissioner may direct.

901.4.1.1 Fire protection systems deemed required. A fire protection system for which a design option, exception or reduction to the provisions of this code or the construction codes has been granted shall be deemed a required system.

901.4.2 Fire protection systems not required by code. Any fire protection system or portion thereof not required by this code, the rules or the construction codes, including the Building Code, may be installed to provide partial or complete protection of a building or structure, provided such system meets the requirements of this code, the rules and the construction codes, including the Building Code, as applicable. Where the design and installation of such fire protection system is governed by this code or the rules, the

commissioner may modify such requirements, consistent with the interests of fire safety, upon a determination that such modification will promote public safety by encouraging the installation of such systems.

901.4.3 Additional fire protection systems. Where an existing or proposed storage, handling or use of a material or the conduct of an operation in a particular occupancy gives rise to special hazards in addition to the normal hazards of the occupancy, or where the commissioner determines that size, design and arrangement of the occupancy would unduly delay the ability of firefighting personnel to gain access to the hazard, the commissioner may require additional fire protection or other fire safety measures. Such measures may include the following: automatic fire detection systems, fire alarm systems, fire extinguishing systems, standpipe systems, or portable or fixed extinguishers. Where a certificate of occupancy limits the commissioner's authority to order the installation of such additional systems or the implementation of such additional measures, the commissioner may apply to the Board of Standards and Appeals for a modification of such certificate of occupancy, and such application shall be granted upon a showing that such additional systems or measures will reasonably mitigate the special hazard or delayed access.

901.4.4 Prohibition of deceptive equipment. It shall be unlawful to install or maintain any device that has the physical appearance of fire protection equipment but that does not perform the fire protection function, in any building, structure or premises where it may be confused with actual fire protection equipment.

901.4.5 Certificate of approval. The [following] fire protection devices, equipment and systems listed in FC112 shall be of a type for which a certificate of approval has been issued in accordance with this code, or which was approved by the Department of Buildings or the Board of Standards and Appeals prior to the effective date of this section, unless such approval by the Department of Buildings or the Board of Standards and Appeals is amended or repealed by the commissioner[:

1. Pre-engineered non-water fire extinguishing systems, including systems installed in connection with commercial cooking systems.

2. Prefabricated hoods and grease filters installed in connection with commercial cooking systems.

3. Fire department connections, standpipe system hose outlets and pressure reducing valves.

4. Fire alarm control units, and medical gas, toxic, highly toxic and flammable gas detection system control panels].

901.4.6 Connection to water supply. Sprinkler systems, and other fire extinguishing and fire protection systems, connected to a potable water supply shall be protected against backflow in accordance with the construction codes and Department of Environmental Protection requirements.

901.5 Installation acceptance testing. Fire detection and alarm systems, fire extinguishing systems, private fire hydrant systems, yard hydrant systems, standpipe systems, fire pump systems, private fire service mains and all other fire protection systems and appurtenances thereto shall be subject to acceptance tests as set forth in the installation standards specified in this code. Where required by the construction codes, including the Building Code, this code or the rules, such tests shall be conducted, at the owner's risk, by his or her representative before a representative of the department. When an installation does not pass an acceptance test required to be witnessed by the department, the necessary corrections shall be made and the installation retested, or, when authorized by the rules, certification of such corrections by a licensed or certified professional submitted to the department.

901.5.1 Occupancy. It shall be unlawful to occupy any portion of a building or structure until [any] all required fire detection systems, fire alarm systems, standpipe systems and fire extinguishing systems have been tested and approved[.], except as follows:

1. In a new building undergoing construction, a completed floor below the level of ongoing construction may be occupied upon installation, testing and approval of the required fire protection systems on all floors up to and including the occupied floor.

2. In an existing building undergoing alteration, a completed floor may be occupied upon installation, testing and approval of the required fire protection systems for such floor in accordance with Building Code and Department of Buildings requirements.

901.5.2 Correction of non-compliant conditions. When the Department of Buildings authorizes occupancy of a building notwithstanding the existence of installation defects or other non-compliant conditions in the fire protection systems on the floors of the building in which occupancy has been authorized, any and all prior written inspection findings of such defects and other noncompliance shall, upon issuance of the occupancy authorization, constitute an enforceable violation of this code. Such violations shall be corrected within the time for correction set forth in the inspection finding, but in any event within 60 days of occupancy, unless additional time for compliance is granted by the department.

901.6 Maintenance. Fire protection systems shall be maintained in good working order at all times. Any fire protection system that is not in good working order shall be repaired or replaced as necessary to restore such system to good working order, or, where authorized by the Building Code, removed from the premises.

901.6.1 Standards. Fire protection systems shall be inspected, tested, serviced and otherwise maintained in accordance with this section, the rules and the referenced standards listed in FC Table 901.6.1. Where required by this section, such inspection, testing and maintenance shall additionally comply with the rules. Where applicable, the requirements of the reference standards listed in FC Table 901.6.1 shall be in addition to those requirements specified in the rules.

FC TABLE 901.6.1
FIRE PROTECTION SYSTEM MAINTENANCE STANDARDS

[SYSTEM	STANDARD

Portable fire extinguishers	NFPA 10
Low, medium and high expansion foam systems	NFPA 11 and NFPA 25
Carbon dioxide fire extinguishing system	NFPA 12
Halon 1301 fire extinguishing systems	NFPA 12A
Foam water sprinkler and spray systems	NFPA 16 and NFPA 25
Dry chemical fire extinguishing systems	NFPA 17
Wet chemical fire extinguishing systems	NFPA 17A
Water based fire protection systems	NFPA 25
Fire alarm systems	NFPA 72
Water mist fire extinguishing systems	NFPA 750
Clean agent fire extinguishing systems	NFPA 2001
Aerosol fire extinguishing systems	NFPA 2010]

FIRE PROTECTION SYSTEM	REFERENCED STANDARD
Fire alarm systems	NFPA 72
Fire extinguishing systems	
Aerosol fire extinguishing systems	NFPA 2010
Clean agent fire extinguishing systems	NFPA 2001
Carbon dioxide fire extinguishing system	NFPA 12
Dry chemical fire extinguishing systems	NFPA 17
Expansion foam systems (low, medium and high)	NFPA 11 and NFPA 25
Foam water sprinkler and spray systems	NFPA 16 and NFPA 25
Halon 1301 fire extinguishing systems	NFPA 12A
Water mist fire extinguishing systems	NFPA 25
Wet chemical fire extinguishing systems	NFPA 17A
Portable fire extinguishers	NFPA 10
Water-based fire protection systems (including hydrant, fire hose, sprinkler and standpipe systems)	NFPA 25

901.6.2 Records. Records of all system inspections, tests, servicing and other maintenance required by this code, the rules or the referenced standards shall be maintained in accordance with FC107.7.

901.6.2.1 Standpipe and sprinkler systems. [In addition to those records required by NFPA 25, an approved card bearing the dates of each inspection, certificate of fitness number and signature of the certificate of fitness holder shall be posted on the premises near the main water supply control valve. A detailed inspection report relative to conditions of water supply, gravity and pressure tanks and levels therein, valves, risers, piping, sprinkler heads, hose valves, hose and nozzles, fire department connections, alarms, fire pumps, obstructions, and conditions of all other system equipment and appurtenances] A visual inspection shall be completed monthly by the certificate of fitness holder in accordance with the requirements of NFPA 25. Periodic testing and other maintenance, as required by NFPA 25, shall be conducted by a certificate of fitness holder possessing the requisite qualifications. All defects or violations shall be noted on the inspection report.

901.6.3 Supervision. [A person holding a certificate of fitness for the following fire protection systems shall personally supervise the inspection, testing, servicing and other maintenance required by this code or the rules with respect to the system supervised by such certificate of fitness holder:] The inspection, testing, servicing and other maintenance of the following fire protection systems shall be personally conducted by a certificate of fitness holder, provided, however, that when required by the construction codes or other applicable law, rule or regulation to conduct such maintenance work, such certificate of fitness holder

shall hold a master fire suppression piping contractor license, master electrician license or other required license, or be under the direction and control of such license holder.

1. [Sprinkler] Fire extinguishing systems.

Exception: [Buildings classified] Sprinkler systems in Group R-3 occupancies.

2. Standpipe systems.

3. [Foam fire extinguishing systems.

4.] Fire alarm systems.

[5] 4. Private fire hydrant systems.

[6] 5. Yard hydrant systems.

901.6.3.1 Servicing of portable fire extinguishers. It shall be unlawful for any person engaged in the business of servicing portable fire extinguishers to service portable fire extinguishers without a portable fire extinguisher servicing company certificate. Any person that services portable fire extinguishers shall hold a certificate of fitness, except that a person training for such certificate of fitness may service portable fire extinguishers under the personal supervision of a certificate of fitness holder. Nothing in this section shall preclude portable fire extinguishers that are maintained on a premises for use at such premises from being serviced by the owner or occupant of the premises, or an employee of such owner or occupant, who possesses a certificate of fitness for portable fire extinguisher servicing and the tools, materials, equipment and facility necessary to perform such services.

901.6.3.2 Portable fire extinguisher sales. It shall be unlawful for any person to engage in the business of selling portable fire extinguishers door to door to owners of buildings or businesses for use on their premises without a portable fire extinguisher sales company certificate. Persons performing such services for or on behalf of licensed portable fire extinguisher sales companies shall possess a certificate of fitness for portable fire extinguisher sales.

Exception: Sale to owners of Group R-2 and R-3 occupancy buildings.

901.6.3.3 [Commercial cooking exhaust systems. It shall be unlawful for any person engaged in the business of inspecting and cleaning commercial cooking exhaust systems as required by the provisions of this code to perform such service without a commercial cooking exhaust system servicing company certificate. The inspection and cleaning of commercial cooking exhaust systems required by FC904.11 shall be performed by a person holding a certificate of fitness. Nothing in this section shall preclude commercial cooking exhaust systems from being inspected and cleaned by the owner or occupant of the premises, or an employee of such owner or occupant, who possesses a certificate of fitness for inspecting and cleaning commercial cooking exhaust systems and the tools,

materials, and equipment necessary to perform such services in accordance with this section.] Reserved.

901.6.3.4 Smoke detector cleaning and testing. The cleaning and testing for smoke entry and sensitivity of smoke detectors installed in a fire alarm system shall be performed by a person holding a certificate of fitness for smoke detector maintenance. Such work shall be performed under the supervision and by employees of a person holding a smoke detector maintenance company certificate, except that such smoke detector cleaning and testing may be performed by an owner or occupant of the premises, or an employee of such owner or occupant, who possesses a certificate of fitness for smoke detector maintenance, and possesses the tools, instruments or other equipment necessary to perform such services in accordance this code and the rules. All other smoke detector maintenance shall be performed by a person possessing the requisite qualifications and experience, and any applicable license or certificate.

901.6.3.5 Central station fire alarm monitoring. It shall be unlawful for any person to operate a central station that monitors fire alarm systems and maintain transmitters in protected premises without a certificate of operation.

901.6.4 Verification of system functionality. Any fire protection system which is or may have been damaged or rendered out of service in whole or in part as result of exposure to fire or water or other cause, shall be inspected to verify that the system is in good working order. If not in good working order, the system shall be repaired or otherwise restored to good working order forthwith.

901.7 Out-of-service systems. The owner and the impairment coordinator for a standpipe system, sprinkler system or fire alarm system shall comply with the requirements of this section whenever such fire protection system is out of service. The department may direct that, until such fire protection system has been returned to service, fire safety measures appropriate to the size, configuration, occupancy, use and hazards be implemented that are in addition to or in lieu of those required by this section.

901.7.1 Impairment coordinator. The building owner shall designate an impairment coordinator to take the actions required by this section when a standpipe system, sprinkler system or fire alarm system is out of service. In the absence of a specific designee, the owner shall be considered the impairment coordinator.

901.7.2 Fire watch. Unless otherwise directed by the department, the building shall be evacuated or a fire watch maintained in accordance with this section when a standpipe system, sprinkler system or fire alarm system is out of service. Such fire watch shall be conducted in compliance with the requirements of FC 901.7.2.1 through 901.7.2.3.

901.7.2.1 Duties and responsibilities. Persons conducting a fire watch shall:

1. continuously patrol the area affected by the out-of-service fire protection system to which such person has been assigned, keeping constant watch for fires;

2. be provided with at least one approved means for notification of the department and any FLS director, FEP coordinator or FEP staff on the premises;

3. immediately report any fire to the department and notify emergency preparedness staff on the premises;

4. be trained in the use of portable fire extinguishers and equipped with a portable fire extinguisher, or made aware of the location of readily accessible portable fire extinguishers in the area to which such person has been assigned to maintain a fire watch;

5. be responsible for extinguishing fires when they are limited in size and spread such that they can readily be extinguished using a portable fire extinguisher;

6. maintain a record of such fire watch on the premises during the fire watch and for a minimum of 48 hours after the fire watch has concluded; and

7. have no other duties.

901.7.2.2 Fire guards required. The fire watch required when a standpipe system, sprinkler system or fire alarm system is out of service shall be maintained in accordance with FC901.7.2.2.1 and this section.

Exception: The impairment coordinator or other building staff trained and knowledgeable in conducting a fire watch may conduct a fire watch in lieu of a fire guard during the initial 4 hours of a planned removal from service, or after discovery of an unplanned out-of-service condition, provided that the floor or area in which the fire protection system is out of service does not exceed 50,000 square feet (4645 m^2).

901.7.2.2.1 Fire guards required. The fire watch required for an out-of-service standpipe system, sprinkler system or fire alarm system shall be maintained by one or more fire guards.

901.7.2.3 Fire watch coverage. A sufficient number of fire guards shall be provided such that each floor or area in which the fire protection system is out of service is patrolled at least once an hour. The area to be patrolled by each fire guard shall not exceed more than 50,000 square feet (4645 m^2) of floor area. The area patrolled by each fire guard may be further limited by the department depending on the configuration of the premises, impediments to patrol, nature of the occupancy, fire risk, and other fire safety considerations.

901.7.3 Planned removal from service. The impairment coordinator shall be made aware in advance of any planned removal from service of a standpipe system, sprinkler system or fire alarm system, or system component, for repair, servicing, alteration, testing and other maintenance of the system or component, or to allow construction to be performed in the area protected by the system without unnecessarily activating it. The impairment coordinator shall authorize and personally supervise the placing of the fire protection system out of service.

Before authorizing the placing of the fire protection out of service the impairment coordinator shall:

1. notify the certificate of fitness holder responsible for supervising the maintenance of the standpipe system, sprinkler system or fire alarm system.

2. determine the extent and expected duration of the out-of-service condition.

3. inspect the areas or buildings involved and assess the increased risks.

4. make appropriate recommendations to the owner.

5. notify the department in accordance with FC901.7.5, if required.

6. notify the responsible person designated by the owner to issue hot work authorizations in accordance with FC Chapter [26] 35.

7. notify the central station and insurance carrier.

8. notify the occupants in the affected areas if the duration of time the sprinkler system or fire alarm system will be out of service is estimated to be more than 30 minutes.

9. place a tag at each fire department connection, standpipe and sprinkler system control valve and fire command center, indicating which fire protection system, or part thereof, is out of service.

10. maintain the fire protection system in service until work is ready to begin.

901.7.4 Unplanned out-of-service condition. Any person, upon becoming aware of any condition, except a planned removal from service, rendering a standpipe system, sprinkler system or fire alarm system, or part thereof, inoperable in whole or in part, shall notify the owner and the impairment coordinator of such condition. The impairment coordinator shall take the actions set forth in FC901.7.3 and 901.7.5, and such other actions as are necessary or appropriate to protect the occupants of the building and promptly restore the system to service.

901.7.5 Notification to department. The department shall be notified that a standpipe system, sprinkler system or fire alarm system is out of service, whether by reason of a planned removal from service or an unplanned out-of-service condition, where required by FC 901.7.5.1 through 901.7.5.3.

901.7.5.1 Standpipe systems. Notification shall be made to the department whenever a standpipe system is or will be out of service for any period of time.

901.7.5.2 Sprinkler systems and fire alarm systems. Notification that a sprinkler system or fire alarm system, or any part thereof, is or will be out of service shall be made to the department under the following circumstances:

1. The sprinkler system or fire alarm system is or will be out of service on more than one floor of a building; or

2. With respect to a sprinkler system, the work or repairs cannot be completed, and the system restored to service, within 8 hours of the time the system was placed or went out of service; or

3. With respect to a fire alarm system, the work or repairs will require the fire alarm system to be out of service for 8 hours or more [than 8 hours] in any 24-hour period or 30 hours or more (consecutive or non-consecutive) in any month; or

4. One or more other fire protection systems in the area in which a fire protection system is out of service are or will also be out of service at the same time.

901.7.5.3 Reporting requirements. Notification of an out-of-service condition pursuant to this section shall be made by the impairment coordinator to the [Department] department at the applicable telephone number set forth in [FC401.2.2] FC901.10. Such notification shall include the following information:

1. The owner or impairment coordinator's name and contact information;

2. The building address;

3. The type of fire protection system that is out of service;

4. Whether the fire protection system is out of service by reason of a planned removal from service (and if so, the reason for placing it out of service) or an unplanned out-of-service condition;

5. If a planned removal from service, the date and time the fire protection system will be placed out of service, and the estimated duration the system will be out of service;

6. If an unplanned out-of-service condition, the estimated duration the system will be out of service;

7. The floors or areas in which the fire protection system is out of service;

8. Whether the other fire protection systems are in good working order; and

9. The name and certificate number of the certificate of fitness holder responsible for supervision of the fire protection system that is out of service.

901.7.6 Restoring systems to service. When an out-of-service device, equipment or system is restored to service, the impairment coordinator shall:

1. conduct necessary inspections and tests to verify that the affected systems are operational.

2. notify the department in accordance with FC901.10.

3. notify the owner, central station, insurance carrier, emergency preparedness staff, and, if previously notified, the occupants in the affected areas.

4. remove the out-of-service tags.

901.7.7 Out-of-service standpipe systems at construction sites. The owner, fire safety manager and/or impairment coordinator shall take the following actions whenever a standpipe system at a construction site is out of service:

1. Immediately notify the department in accordance with FC901.10 of any unplanned out-of-service condition, and otherwise comply with the requirements of FC901.7.4.

2. Notify the department in accordance with FC901.10 at least 24 hours prior to any planned removal of the standpipe system from service, and otherwise comply with the requirements of FC901.7.3.

3. Ensure that a fire watch is continuously maintained in compliance with the requirements of FC901.7.2 while the standpipe system is out of service.

4. Repair the standpipe system and return it to service in compliance with the requirements of FC 901.7.6 and Section 3303.8.1 of the Building Code. The construction site may continue to be occupied, and construction, demolition or alteration activities may continue, pending such repair and restoration to service, except:

   4.1. as otherwise provided in Section 3303.8.1 of the Building Code; and/or

   4.2. as otherwise directed by the commissioner upon a determination that, in the absence of an operable standpipe system, the conduct of certain construction, demolition or alteration activities would be imminently perilous to life or property; and

   4.3. that in no circumstance shall hot work be conducted on the construction site until such time as the standpipe system is restored to service and the standpipe alarm reactivated.

901.8 Tampering with or rendering equipment inoperable. Fire protection systems and related apparatus shall not be tampered with or rendered inoperable, except as set forth in FC107.4.

901.9 Recall of fire protection system components. A component of a fire protection system regulated by this code that is subject to a voluntary or mandatory recall under federal law shall

be replaced with an approved, listed component in compliance with the referenced standards. A record of the replacement of the component shall be maintained in accordance with FC107.7.

901.10 Telephone numbers for department notification. Except as otherwise required by the rules or order of the department, when this code requires non-emergency notification to be made to the department, such notification shall be made by calling one of the following telephone numbers, depending upon the borough in which the property is located:

Bronx properties	(718) 430-0200
Brooklyn properties	(718) 965-8300
Manhattan properties	(212) 570-4300
Queens properties	(718) 476-6200
Staten Island properties	(718) 494-4296

FC 904 Fire Extinguishing Systems

904.1 General. Fire extinguishing systems shall be designed, installed, operated and maintained in accordance with this section, FC901[and], the terms and conditions of the listing, if applicable, the applicable referenced standards[, including performing all required inspections, testing and servicing] set forth in FC Table 904.1, and the manufacturer's instructions.

Exception: Sprinkler systems, which are governed by FC903.

FC TABLE 904.1
FIRE EXTINGUISHING SYSTEM REFERENCED STANDARDS

FIRE EXTINGUISHING SYSTEM	REFERENCED STANDARD
Aerosol fire extinguishing systems	NFPA 2010
Carbon dioxide fire extinguishing system	NFPA 12
Clean agent fire extinguishing systems	NFPA 2001
Dry chemical fire extinguishing systems	NFPA 17
Expansion foam systems (low, medium and high)	NFPA 11
Foam water sprinkler and spray systems	NFPA 16 and NFPA 25
Halon 1301 fire extinguishing systems	NFPA 12A
Water mist fire extinguishing systems	NFPA 750
Water Spray Fixed Systems for Fire Protection	NFPA 15
Wet chemical fire extinguishing systems	NFPA 17A

904.1.1 Fire extinguisher system design. Fire extinguishing systems may be engineered or pre-engineered. Pre-engineered systems shall be of a type for which a certificate of approval has been issued in accordance with FC 112 and 901.4.5. Except as otherwise provided in this code or other applicable law, rule, regulation or standard, fire extinguishing systems may be designed as local applications or as total flooding systems. All activation devices and other system components shall be listed and installed in accordance with the listing and the manufacturer's instructions.

904.1.2 Installation acceptance testing. [Fire] All fire extinguishing systems shall be subject to acceptance [tests as contained in the installation standards set forth in this code and the rules] test conducted at the owner's risk by his or her representative before a

representative of the department. The owner's representative shall furnish the necessary equipment required to conduct the test. [When a] A discharge test [is not] may be required [by] as set forth in the applicable installation standard[, the commissioner may require such test] or as required by the department when there is evidence that the system will not provide the necessary level of protection. [Such tests shall be conducted at the owner's risk by his or her representative before a representative of the department.

904.1.2] 904.1.3 Additional safeguards. If an area is protected by a fire extinguishing system which uses an extinguishing agent that will make the protected area hazardous by its discharge or thermal decomposition, suitable safeguards shall be provided to ensure prompt evacuation, to prevent entry into such atmospheres, and to provide means for prompt rescue of any trapped personnel. Such safeguards shall include establishment of a trained brigade, equipped with and qualified in the use of self-contained breathing apparatus with 30-minute minimum supply, for prompt search of the protected area.

Exception: Self-contained breathing apparatus shall not be required for a clean agent fire extinguishing system installation if:

1. The installation is provided with an alarm system that is connected to an approved central station.

2. The protected area is provided with an approved fixed emergency forced ventilation system able to expel the extinguishing agent. Such emergency forced ventilation system shall have a capacity sufficient to effect at least twenty air changes per hour.

3. The protected area is of a size, design and/or occupied in such a manner that egress will not be impeded.

4. The protected area is not normally occupied by any individual requiring assistance in evacuation.

904.1.4 Prohibited fire extinguishing systems. It shall be unlawful to install carbon dioxide, halon and clean agent fire extinguishing systems as set forth in FC 904.1.4.1 through 904.1.4.3.

904.1.4.1 Existing carbon dioxide systems. It shall be unlawful to install or continue to maintain total flooding carbon dioxide fire extinguishing systems within normally occupied areas, including commercial kitchens. Total flooding carbon dioxide systems installed in normally occupied areas prior to July 1, 2008 were required by this code to be removed by July 1, 2013. Existing total flooding carbon dioxide fire extinguishing systems in such areas shall be removed and a replacement fire extinguishing system installed, where required, in accordance with the Building Code, this code or other applicable laws, rules and regulations.

904.1.4.2 Existing halon systems. It shall be unlawful to install a halon system in any building or occupancy. Lawfully existing halon fire extinguishing systems shall be

maintained in accordance with FC904.5. If a lawfully existing system cannot be maintained under the laws, rules, regulations, standards and design and installation approvals under which it was installed, such system shall be removed and replaced with a type of fire extinguishing system complying with this code.

904.1.4.3 Clean agent systems. It shall be unlawful to install clean agent systems that are not total flooding systems. Lawfully existing clean agent fire extinguishing systems that are not total flooding systems shall be maintained in accordance with FC904.5. If a lawfully existing system cannot be maintained under the laws, rules, regulations, standards and design and installation approvals under which it was installed, such system shall be removed and replaced with a type of fire extinguishing system complying with this code.

904.2 Where required. Where this code or the rules requires the installation of a fire extinguishing system, other than a sprinkler system, the commissioner shall approve the type of fire extinguishing system to be installed. Fire extinguishing systems installed as an alternative to sprinkler systems otherwise required by this code or the construction codes, including the Building Code, shall be approved by the commissioner. Such a system may be accepted by the commissioner where the nature of the fire hazard is such that water would be ineffective or hazardous as an extinguishing agent, or the need to preserve the historic, irreplaceable or special nature of the contents of the occupancy militates against the installation of a sprinkler system. Sprinklers shall not be omitted from any room or area merely because it is of fire-resistance-rated construction or contains electrical equipment except as allowed by Section 903 of the Building Code.

If a system using a fixed amount of extinguishing agent is authorized to be installed in lieu of a required sprinkler system or any other fire extinguishing system otherwise required by law, a connected reserve of charged agent cylinders equal to the primary supply shall be provided. The commissioner may impose additional requirements on the installation of any fire extinguishing system to be installed in lieu of any required sprinkler system. Fire extinguishing systems shall not be considered alternatives for the purposes of exceptions or reductions allowed by other requirements of this code.

904.3 Installation. Fire extinguishing systems shall be installed in accordance with this section.

904.3.1 Electrical wiring. Electrical wiring shall be in accordance with the Electrical Code.

904.3.2 [**Actuation.** Fire] **Activation.** Unless otherwise provided by this code or the rules, fire extinguishing systems shall be designed and installed to activate automatically. Automatically activating fire extinguishing systems shall additionally be provided with a manual means of [actuation] activation.

904.3.3 System interlocking. Automatic equipment interlocks with fuel shutoffs, ventilation controls, door closers, window shutters, conveyor openings, smoke and heat vents, and other features necessary for proper operation of the fire extinguishing system shall be provided as required by the construction code or other design and installation standard utilized for the hazard.

904.3.4 Alarms and warning signs. Where alarms are required to indicate the operation of fire extinguishing systems, distinctive audible, visible alarms and warning signs shall be provided to warn of pending agent discharge. Where exposure to automatic-extinguishing agents poses a hazard to persons and a delay is required to ensure the evacuation of occupants before agent discharge, a separate warning signal shall be provided to alert occupants once agent discharge has begun. Carbon dioxide fire extinguishing systems, where allowed, shall comply with the signage requirements of NFPA 12.

904.3.5 Monitoring. All indoor fire extinguishing systems, except commercial cooking, domestic cooking and spray finishing fire extinguishing systems, installed after the effective date of this section shall be monitored by an approved central station. Where a building fire alarm system is installed, all such indoor fire extinguishing systems, except domestic cooking systems, shall be monitored by such fire alarm system.

904.3.6 Flood hazard. Non-water fire extinguishing system control panels located in areas of special flood hazard or on the premises of Group I-2 occupancies that are hospitals located in shaded X-Zones (as defined in Section G201.2 of Appendix G of the Building Code) shall be located at or above the design flood elevation in accordance with Appendix G of the Building Code.

904.3.7 Additional safety measures. Additional safety measures shall be provided for the fire extinguishing systems as set forth in FC 904.3.7.1 and 904.3.7.2.

904.3.7.1 Carbon dioxide systems. Carbon dioxide systems, where allowed, shall be provided with the additional safety measures set forth in FC 904.3.7.1.1 through 904.3.7.1.8.

904.3.7.1.1 Egress precautions. All areas whose atmospheres will be made hazardous by the discharge of carbon dioxide shall be provided with:

1. Exit and exit routes that are kept clear at all times.

2. Lighting and exit directional signs in accordance with the construction codes, including the Building Code.

3. Only outward swinging, self-closing doors at exits, and panic hardware on any such doors that are secured with a locking or latching device.

904.3.7.1.2. Ventilation and other safety equipment. A carbon dioxide system shall be provided with a fixed emergency forced ventilation system able to clear the area with sufficient capacity to accomplish at least 6 air changes per hour, and such other safety equipment as may be prescribed by the commissioner.

904.3.7.1.3 Detection, activation, alarm and control. Detection, predischarge alarms and discharge alarms shall be provided within and outside the protected area

and such other areas that are made hazardous by a carbon dioxide discharge. Such alarms shall be audible and visible.

904.3.7.1.3.1 Automatic operation. The carbon dioxide fire extinguishing system shall be activated by an automatic cross-zoned detection system in which activation of a detection device in one zone shall sound a local alarm and transmit an alarm to an approved central station, and activation of a detection device in the cross zone shall initiate the predischarge warning signal and after a time delay, initiate the discharge of carbon dioxide. The predischarge warning signal time delay shall be of sufficient duration to allow for evacuation from the protected area. Distinct alarms shall indicate the activation of a detector in one zone, the activation of a detector in a cross zone (predischarge alarm) and the discharge of carbon dioxide. Such alarms shall be continued until the atmosphere has been returned to normal except that the alarm for the detector in one zone may be discontinued when the alarm for the cross-zoned detector is activated.

Exceptions:

1. A carbon dioxide fire extinguishing system activated solely by manual means may be installed with department approval upon a showing satisfactory to the department of the need for such a system.

2. A detection system that is not cross-zoned may be installed with department approval upon a showing satisfactory to the department of the need for such a detection and activation system.

904.3.7.1.3.2 Manual operation. A manual pull station shall be provided which, upon activation, transmits an alarm to an approved central station, overrides any delay other than the predischarge delay, and causes the carbon dioxide to discharge. Activation of a carbon dioxide fire extinguishing system by means of a manual pull station shall result in a complete predischarge delay sequence prior to system discharge.

904.3.7.1.3.3 Abort systems. Abort systems may be installed, but shall be limited to systems activated by smoke detectors. Abort controls shall be located in the protected area near the means of egress for the area, and shall be designed to cause the discharge of carbon dioxide after a time delay unless the abort control is reactivated for another cycle of delay. Abort controls shall not interfere with transmission of local alarms or central station alarms.

904.3.7.1.3.4 Power supply. Power supply to the alarm system shall be in accordance with applicable requirements of the Electrical Code and the construction codes, including the Building Code.

904.3.7.1.4 Pressure relief venting. The protected area enclosure shall be provided with suitable pressure relief venting which vents outdoors.

Exception: Such venting shall not be required when a registered design professional certifies that the walls, ceilings and floors comprising the protected space have sufficient porosity and leakage to prevent damage to the integrity of such space upon discharge of the extinguishing agent, and that the inert gas agent leakage into other non-flooded rooms and spaces will not reach dangerous concentrations.

904.3.7.2 Clean agent systems. Clean agent systems, where allowed, shall be provided with the additional safety measures set forth in FC 904.3.7.2.1 through 904.3.7.2.6.

904.3.7.2.1 System alarm and activation. Audible and visible alarms shall be installed both inside and outside the protected area to signal the activation of an automatic detection device and the operation of the fire extinguishing system. Such signals shall continue until the atmosphere has been returned to normal. Activation of a single automatic detection device shall sound a local alarm and transmit an alarm to an approved central station. Unless the alarm is cancelled by an abort system as set forth in FC904.3.7.2.3, activation of a second automatic detection device shall, within 30 seconds, initiate the discharge of clean agent. Power supply to the alarm system shall be in accordance with the Electrical Code, the construction codes, including the Building Code, and NFPA 2001, as modified by FC Appendix B.

904.3.7.2.2 Warning and instruction signs. Warning and instruction signs shall be posted at entrances to and within the protected area subject to flooding.

904.3.7.2.3 Abort systems. Abort systems may be installed only on systems activated by smoke detectors. Abort controls shall be manually operated, shall be located in the protected area, and shall cause the discharge of the clean agent after a 2-minute delay unless the abort control is reactivated for another cycle of delay. A manual pull station shall be provided which, upon activation, shall transmit an alarm to an approved central station, override the delay and cause the clean agent to discharge immediately. Abort controls shall not interfere with transmission of local alarms or central station alarms.

904.3.7.2.4 Means of egress. Where the protected area is normally occupied, provision shall be made for adequate clear routes of exit with doors opening in direction of travel. Emergency lighting shall be provided for such exits. Exit directional signs shall clearly indicate the path of egress and exits shall be clearly marked.

904.3.7.2.5 Fixed emergency forced ventilation. When the protected area is normally occupied, a fixed emergency forced ventilation system sufficient to accomplish at least six air changes per hour of the flooded protected area shall be provided unless all of the following apply:

1. The clean agent fire extinguishing system is used to extinguish a Class A fire.

2. The design concentration does not exceed the "no observable adverse effect level" for halocarbon agents, or "no effect level" for inert gas agents as defined in NFPA 2001, as modified by FC Appendix B.

3. If other than inert gas agents are used, the quantity of the thermal decomposition products formed from such agents is below the dangerous toxic load (DTL) for humans as described in Meldrum's "Toxicology of Substances in Relation to Major Hazards: Hydrogen Fluoride" (HMSO, London, 1993). Upon request, documentation of hazard assessment of thermal decomposition products formed from such agents shall be filed with the department.

904.3.7.2.6 Pressure relief venting. Clean agent fire extinguishing systems using inert gas agents shall be provided with suitable pressure relief venting for the flooded protected area that discharges outdoors.

Exception: Such venting shall not be required when a registered design professional certifies that the walls, ceilings and floors comprising the protected space have sufficient porosity and leakage to prevent damage to the integrity of such space upon discharge of the extinguishing agent, and that the inert gas agent leakage into other non-flooded rooms and spaces will not reach dangerous concentrations.

904.3.8 Commercial cooking systems. Commercial cooking fire extinguishing systems shall be installed in accordance with FC 904.3.8.1 through 904.3.8.3.

904.3.8.1 Types of systems approved for commercial cooking operations. Commercial cooking operations shall be protected by one of the following types of fire protection systems, as listed for commercial cooking operations.

1. Wet chemical fire extinguishing systems designed in accordance with NFPA 17A, as modified by FC Appendix B, and tested in accordance with UL 300.

2. Foam-water sprinkler system or foam-water spray systems designed in accordance with NFPA 16, as modified by FC Appendix B.

3. Water mist systems designed in accordance with NFPA 750, as modified by FC Appendix B.

904.3.8.1.1 Dry chemical, non-listed wet chemical and carbon dioxide systems. Dry chemical systems, wet chemical systems not listed to the UL 300 standard and carbon dioxide systems may not be used for commercial cooking operations and shall be removed and replaced with a type of fire extinguishing system complying with this code.

904.3.8.2 Manual activation device. A manual activation device for the fire extinguishing system, except foam-water systems, shall be installed at a location near a means of egress that is readily accessible from the cooking area and not less than 10 feet

(3048 mm) nor more than 20 feet (6096 mm) from the commercial cooking appliances protected by the fire extinguishing system, or other approved location. The manual activation device shall be located a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1219 mm) above the floor. The manual activation device shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to activate the fire extinguishing system. A sign or marking in accordance with FC Table 609.7 that clearly identifies the commercial cooking appliances being protected shall be posted on or adjacent to the manual activation device. The manual activation device shall be kept unobstructed at all times.

904.3.8.3 System interconnection. The activation of the fire extinguishing system shall automatically shut down the fuel and electrical power supply to the cooking equipment. The fuel and electrical supply reset shall be manual.

904.4 Installation [acceptance] inspection and testing. Fire extinguishing systems shall be inspected and tested upon completion of the installation [in accordance with this section] prior to the installation acceptance testing required by [FC904.1.1] FC904.1.2.

904.4.1 Inspection. [Prior to conducting final acceptance tests, the following items shall be inspected] The fire extinguishing system shall be inspected for the following conditions:

1. Hazard specification for consistency with design hazard.

2. Type, location and spacing of automatic- and manual- initiating devices.

3. Size, placement and position of nozzles or discharge orifices.

4. Location and identification of audible and visible alarm devices.

5. Identification of devices with proper designations.

6. Operating instructions, to ensure that the system is correctly operated during the acceptance testing.

904.4.2 Alarm testing. Notification appliances, connections to fire alarm systems, and connections to an approved central station shall be tested [in accordance with this section and FC907] to verify proper operation[.], including the following conditions:

[904.4.2.1 Audible and visible signals. The audibility and visibility of notification appliances signaling agent discharge or system operation, where required, shall be verified.

904.4.3 Monitor testing. Connections to central stations shall be tested to verify proper identification and retransmission of alarms from fire extinguishing systems.]

1. The audibility and visibility of notification appliances signaling agent discharge or system operation, where required, shall be verified.

2. Central station connections shall be tested to verify proper identification and retransmission of alarms.

[904.5 Wet chemical systems. Wet chemical fire extinguishing systems shall be installed, periodically inspected, tested and otherwise maintained in accordance with FC 901, 904.1.1 and 904.4, NFPA 17A, as modified by FC Appendix B, and their listing.

904.5.1 Maintenance. At least once a month, an inspection shall be conducted by a trained and knowledgeable person to assess whether the system is in good working order. A licensed master fire suppression piping contractor properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on a semiannual basis. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing agent containers shall be weighed to verify the required amount of agent. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals specified by the manufacturer.

904.5.2 Fusible link maintenance. Fixed temperature- sensing elements shall be maintained to ensure proper operation of the system.

904.5.3 Commercial cooking installations. Wet chemical fire extinguishing systems installed to protect a commercial cooking operation shall additionally comply with the requirements of FC904.11.

904.6 Dry chemical systems. Dry chemical fire extinguishing systems shall be installed, periodically inspected, tested and otherwise maintained in accordance with FC 901, 904.1.1 and 904.4, NFPA 17, as modified by FC Appendix B, and their listing.

904.6.1 Maintenance. At least once a month, an inspection shall be conducted by a trained and knowledgeable person to assess that the system is in good working order. A licensed master fire suppression piping contractor properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on a semiannual basis. Tests shall include a check of the detection system, alarms and releasing devices, including manual stations and other associated equipment. Extinguishing agent containers shall be checked to verify that the system has not been discharged. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals specified by the manufacturer.

904.6.2 Fusible link maintenance. Fixed temperature-sensing elements shall be maintained to ensure proper operation of the system.

904.7 Foam systems. Foam fire extinguishing systems shall be installed, periodically inspected, tested and otherwise maintained in accordance with FC 901, 904.1.1 and 904.4, NFPA 11, as modified by FC Appendix B, and NFPA 16, as modified by FC Appendix B, and their listing.

904.7.1 Maintenance. At least once a month, an inspection shall be conducted by a certificate of fitness holder to assess whether the system is in good working order. A licensed master fire suppression piping contractor properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system, shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on an annual basis.

904.7.2 Commercial cooking installations. Foam fire extinguishing systems installed to protect a commercial cooking operation shall additionally comply with the requirements of FC904.11.

904.8 Carbon dioxide systems. Carbon dioxide fire extinguishing systems shall be installed, periodically inspected, tested and otherwise maintained in accordance with FC 901, 904.1.1 and 904.4, NFPA 12, as modified by FC Appendix B, and their listing. Total flooding carbon dioxide fire extinguishing systems shall not be installed to protect hazards within normally occupied areas. Existing total flooding carbon dioxide fire extinguishing systems installed to protect normally occupied areas prior to the effective date of this code may be continued in service until July 1, 2013, after which they shall be removed from service, and a replacement fire extinguishing system shall be installed, where required, in accordance with the Building Code, this code or other applicable laws, rules and regulations.

904.8.1 Maintenance. At least once a month, an inspection shall be conducted by a trained and knowledgeable person to assess whether the system is in good working order. A licensed master fire suppression piping contractor properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on a semiannual basis.

904.8.2 High-pressure cylinders. High-pressure cylinders shall be weighed and the date of the last hydrostatic test shall be verified at 6-month intervals. Where a container shows a loss in original content of more than 10 percent, the cylinder shall be refilled or replaced.

904.8.3 Low-pressure containers. The liquid-level gauges of low-pressure containers shall be observed at one-week intervals. Where a container shows a content loss of more than 10 percent, the container shall be refilled to maintain the minimum gas requirements.

904.8.4 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At five-year intervals, all hoses shall be tested.

904.8.4.1 Test procedure. Hoses shall be tested at not less than 2,500 pounds per square inch (psi) (17 238 kPa) for high-pressure systems and at not less than 900 psi (6206 kPa) for low-pressure systems.

904.8.5 Auxiliary equipment. Auxiliary and supplementary components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated at 12-month intervals to ensure that such components are in proper operating condition.

904.8.6 Safety precautions. All areas whose atmospheres will be made hazardous by the discharge of carbon dioxide shall be provided with:

1. Exit and exit routes that are kept clear at all times.

2. Lighting and exit directional signs in accordance with the construction codes, including the Building Code.

3. Only outward swinging, self-closing doors at exits, and panic hardware on any such doors that are secured with a locking or latching device.

4. A fixed emergency forced ventilation system able to clear the area. Such emergency forced ventilation shall have sufficient capacity to accomplish at least 6 air changes per hour.

5. Such other safety equipment as may be prescribed by the commissioner.

904.8.7 Detection, activation, alarm and control. Detection, pre-discharge alarms and discharge alarms shall be provided within and outside the protected area and such other areas that are made hazardous by a carbon dioxide discharge. Such alarms shall be audible and visible.

904.8.7.1 Automatic operation. The carbon dioxide fire extinguishing system shall be activated by an automatic cross-zoned detection system in which activation of a detection device in one zone shall sound a local alarm and transmit an alarm to an approved central station, and activation of a detection device in the cross zone shall initiate the predischarge warning signal and after a time delay, initiate the discharge of carbon dioxide. The predischarge warning signal time delay shall be of sufficient duration to allow for evacuation from the protected area. Distinct alarms shall indicate the activation of a detector in one zone, the activation of a detector in a cross zone (predischarge alarm) and the discharge of carbon dioxide. Such alarms shall be continued until the atmosphere has been returned to normal except that the alarm for the detector in one zone may be discontinued when the alarm for the cross-zone detector is activated.

Exceptions:

1. A carbon dioxide fire extinguishing system activated solely by manual means may be installed only if approved. Such a system may be approved upon a showing satisfactory to the commissioner of the need for such a system.

2. A detection system that is not cross-zoned may be approved upon a showing satisfactory to the commissioner of the need for such a detection and activation system.

904.8.7.2 Manual operation. A manual pull station shall be provided which, upon activation, transmits an alarm to an approved central station, overrides any delay other than the predischarge delay, and causes the carbon dioxide to discharge. Activation of a carbon dioxide fire extinguishing system by means of a manual pull station shall result in a complete predischarge delay sequence prior to system discharge.

904.8.7.3 Abort systems. Abort systems may be installed, but shall be limited to systems activated by smoke detectors. Abort controls shall be located in the protected area near the means of egress for the area, and shall be designed to cause the discharge of carbon dioxide after a time delay unless the abort control is reactivated for another cycle of delay. Abort controls shall not interfere with transmission of local alarms or central station alarms.

904.8.7.4 Power supply. Power supply to the alarm system shall be in accordance with applicable requirements of the construction codes, including the Building Code and the Electrical Code.

904.8.8 Pressure relief venting. The protected area enclosure shall be provided with suitable pressure relief venting which vents outdoors.

Exception: Such venting shall not be required when a registered design professional certifies that the walls, ceilings and floors comprising the protected space have sufficient porosity and leakage to prevent damage to the integrity of such space upon discharge of the extinguishing agent, and that the inert gas agent leakage into other non-flooded rooms and spaces will not reach dangerous concentrations.

904.8.9 Commercial cooking installations. Carbon dioxide fire extinguishing systems installed to protect commercial cooking operations shall additionally comply with the requirements of FC904.11.

904.9 Halon systems. It shall be unlawful to install a halon fire extinguishing system. Existing halon fire extinguishing systems shall be periodically inspected, tested and otherwise maintained in accordance with FC 901, 904.1.1 and 904.4, NFPA 12A and their listing.

904.9.1 Maintenance. At least once a month, an inspection shall be conducted by a trained and knowledgeable person to assess whether the system is in good working order. A licensed master fire suppression piping contractor properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on a semiannual basis.

904.9.2 Containers. The extinguishing agent quantity and pressure of containers shall be checked at least on a semiannual basis. Where a container shows a loss in original weight of

more than 5 percent or a loss in original pressure (adjusted for temperature) of more than 10 percent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.

904.9.3 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At 5-year intervals, all hoses shall be tested.

904.9.3.1 Test procedure. For Halon 1301 systems, hoses shall be tested at not less than 1,500 psi (10 343 kPa) for 600 psi (4137 kPa) charging pressure systems and not less than 900 psi (6206 kPa) for 360 psi (2482 kPa) charging pressure systems. For Halon 1211 hand-hose line systems, hoses shall be tested at 2,500 psi (17 238 kPa) for high-pressure systems and 900 psi (6206 kPa) for low-pressure systems.

904.9.4 Auxiliary equipment. Auxiliary and supplementary components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated at 12-month intervals to ensure such components are in proper operating condition.

904.10 Clean agent systems. Clean agent fire extinguishing systems shall be installed, periodically inspected, tested and otherwise maintained in accordance with FC 901, 904.1.1 and 904.4, NFPA 2001, as modified by FC Appendix B, and their listing. The use of a clean agent fire extinguishing system shall be limited to automatic total flooding systems.

904.10.1 Maintenance. At least once a month, an inspection shall be conducted by a trained and knowledgeable person to assess whether the system is in good working order. A licensed master fire suppression piping contractor properly trained and having knowledge of the installation, operation, and maintenance of the specific fire extinguishing system shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on a semiannual basis.

904.10.2 Containers. The extinguishing agent quantity and pressure of the containers shall be checked at 6-month intervals. Where a container shows a loss in original weight of more than 5 percent or a loss in original pressure, adjusted for temperature, of more than 10 percent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.

904.10.3 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. All hoses shall be tested at 5-year intervals.

904.10.4 System alarm and activation. Audible and visible alarms shall be installed both inside and outside the protected area to signal the activation of an automatic detection device and the operation of the fire extinguishing system. Such signals shall continue until the atmosphere has been returned to normal. Activation of a single automatic detection device shall sound a local alarm and transmit an alarm to an approved central station. Unless the alarm is cancelled by an abort system as set forth in FC904.10.5, activation of a second automatic detection device shall, within 30 seconds, initiate the discharge of clean agent. Power supply to the alarm system shall be in accordance with the construction codes,

including the Building Code, the Electrical Code and NFPA 2001, as modified by FC Appendix B.

904.10.4.1 Warning and instruction signs. Warning and instruction signs shall be posted at entrances to and within the protected area subject to flooding.

904.10.5 Abort systems. Abort systems may be installed only on systems activated by smoke detectors. Abort controls shall be manually operated, shall be located in the protected area, and shall cause the dumping of the clean agent after a 2-minute delay unless the abort control is reactivated for another cycle of delay. A manual pull station shall be provided which, upon activation, shall transmit an alarm to an approved central station, override the delay and cause the clean agent to dump immediately. Abort controls shall not interfere with transmission of local alarms or central station alarms.

904.10.6 Means of egress. Where the protected area is normally occupied, provision shall be made for adequate clear routes of exit with doors opening in direction of travel. Emergency lighting shall be provided for such exits. Exit directional signs shall clearly indicate the path of egress.

904.10.7 Fixed emergency forced ventilation. When the protected area is normally occupied, a fixed emergency forced ventilation system sufficient to accomplish at least six air changes per hour of the flooded protected area shall be provided unless all of the following apply:

1. The clean agent fire extinguishing system is used to extinguish a Class A fire.

2. The design concentration does not exceed the “no observable adverse effect level” for halocarbon agents, or “no effect level” for inert gas agents as defined in NFPA 2001, as modified by FC Appendix B.

3. If other than inert gas agents are used, the quantity of the thermal decomposition products formed from such agents is below the dangerous toxic load (DTL) for humans as described in Meldrum's “Toxicology of Substances in Relation to Major Hazards: Hydrogen Fluoride” (HMSO, London, 1993). Upon request, documentation of hazard assessment of thermal decomposition products formed from such agents shall be filed with the department.

904.10.8 Pressure relief venting. Clean agent fire extinguishing systems using inert gas agents shall be provided with suitable pressure relief venting for the flooded protected area that discharges outdoors.

Exception: Such venting shall not be required when a registered design professional certifies that the walls, ceilings and floors comprising the protected space have sufficient porosity and leakage to prevent damage to the integrity of such space upon discharge of the extinguishing agent, and that the inert gas agent leakage into other non-flooded rooms and spaces will not reach dangerous concentrations.

904.11 Commercial cooking systems. The fire extinguishing system for commercial cooking systems shall be designed and installed, and periodically inspected, tested and otherwise maintained in accordance with the construction codes, including the Building Code, FC 901, 904.1.1 and 904.4, and this section. The fire extinguishing system for commercial cooking systems shall be of an approved type recognized for protection of commercial cooking equipment and exhaust systems of the type and arrangement protected. Preengineered wet chemical fire extinguishing systems shall be tested in accordance with UL 300 and listed and labeled for the intended application. Dry chemical fire extinguishing systems shall not be installed to protect commercial cooking equipment and exhaust systems. Other types of fire extinguishing systems shall be listed and labeled for specific use as protection for commercial cooking operations. The system shall be installed in accordance with this code, its listing and the manufacturer's installation instructions. Fire extinguishing systems of the following types shall be installed in accordance with the referenced standard indicated, as follows:

1. Carbon dioxide fire extinguishing systems, NFPA 12, as modified by FC Appendix B.

2. Foam-water sprinkler system or foam-water spray systems, NFPA 16, as modified by FC Appendix B.

3. Wet chemical fire extinguishing systems, NFPA 17A, as modified by FC Appendix B.

904.11.1 Manual system operation. A manual activation device shall be located at or near a means of egress from the cooking area and a minimum of 10 feet (3048 mm) and a maximum of 20 feet (6096 mm) from the kitchen exhaust system. The manual activation device shall be located a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1219 mm) above the floor at its center. The manual activation shall require a maximum force of 40 pounds (178 N) and a maximum movement of 14 inches (356 mm) to activate the fire extinguishing system. A sign or marking on or adjacent to the manual activation device shall clearly identify the commercial cooking equipment being protected.

> **Exception:** Sprinkler systems shall not be required to be equipped with a manual activation device.

904.11.2 System interconnection. The activation of the fire extinguishing system shall automatically shut down the fuel and electrical power supply to the cooking equipment. The fuel and electrical supply reset shall be manual.

904.11.3 Reserved.

904.11.4 Acceptance testing. Upon completion of the installation of a commercial cooking system, such system shall be tested at the owner's risk, by his or her representative, to confirm proper installation and operation of the system in compliance with the requirements of the construction codes, including the Mechanical Code, and this code. The owner's representative shall furnish the necessary equipment required to conduct the test. No permit shall be issued for the operation of a commercial cooking system until satisfactory performance of the fire extinguishing system is demonstrated, including compliance with the following requirements:

1. A performance test of the fire extinguishing system conducted before a representative of the department, in accordance with the applicable installation standard set forth in this chapter and its listing.

2. Chimneys serving masonry ovens shall be proved tight by a smoke test. A report of such test shall be prepared by the installer and made available for inspection by a representative of the department at the time the performance tests of the exhaust system and fire extinguishing system are witnessed by such department representative.

904.11.5 Staff training. At least once every 6 months the owner or operator of the premises shall review with all kitchen staff the manual operation of the fire extinguishing system.

904.11.6 Maintenance. At least once a month, an inspection shall be conducted by a trained and knowledgeable person to assess that the system is in good working order. A licensed master fire suppression piping contractor properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on a semiannual basis. At a minimum, the semiannual inspection, testing and servicing shall include:

1. Verification that the hazard has not changed.

2. Verification that the fire extinguishing system has not been altered.

3. Examination of all detectors, agent and gas containers, releasing devices, piping, hose assemblies, nozzles, and all auxiliary equipment.

4. Verification that the agent distribution piping is not obstructed.

5. Verification that the extinguishing agent container and/or auxiliary pressure containers have been, as applicable, inspected, retested and marked in conformance with the requirements of the United States Department of Transportation.

6. A test of the system's automatic and manual releasing devices, including any associated equipment.

7. A test of the gas and electric power source shutoff devices.

8. Preparation and submission to the owner of a written report of any system defects.

9. Upon satisfactory completion of the semiannual inspection and correction of all defects, providing the owner with an inspection, testing and service compliance tag. Such tag shall indicate the date issued, the name and license number of the licensed master fire suppression piping contractor issuing the tag, and that the system was found to be in compliance with the requirements of this section.

904.11.6.1 Fusible link and sprinkler head replacement. Fusible links and foam water sprinkler heads shall be replaced at least annually, and other protection devices shall be serviced or replaced in accordance with the manufacturer's instructions.

Exception: Frangible bulbs are not required to be replaced annually.

904.11.6.2 Recordkeeping. Records shall be maintained as set forth in FC901.6.2. Upon satisfactory completion of each semiannual inspection required by FC904.11.6, and the correction of all system defects, the master fire suppression piping contractor licensed by the Department of Buildings shall issue and post in a conspicuous location in the cooking area an inspection, testing and servicing compliance tag. A new compliance tag shall be issued and posted for each required semiannual inspection.

904.11.6.3 Signage. Instructions for manual operation of the fire extinguishing system, including a statement that the fire extinguishing system shall be manually activated prior to using a portable fire extinguisher, shall be posted, under glass or laminated, near the system's manual activation device. Information shall be clearly and concisely written, and the posting shall be at least 8½ inches (216 mm) by 11 inches (279 mm) in size.

904.12 Water-mist systems. Water-mist fire extinguishing systems shall be installed, periodically inspected, tested and maintained in accordance with FC 901 and 904.4, NFPA 750, as modified by FC Appendix B, and their listing. All devices and appurtenances shall be listed and installed in conformance to the terms of the listing.

904.12.1 Maintenance. At least once a month, an inspection shall be conducted by a trained and knowledgeable person to assess whether the system is in good working order. A licensed master fire suppression piping contractor properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on an annual basis.

904.13 Aerosol fire extinguishing systems. Aerosol fire extinguishing systems shall be installed, periodically inspected, tested and maintained in accordance with FC 901 and 904.4, NFPA 2010, as modified by FC Appendix B, and their listing. All devices and appurtenances shall be listed and installed in conformance to the terms of the listing.

904.13.1 Maintenance. At least once a month, an inspection shall be conducted by a trained and knowledgeable person to assess whether the system is in good working order. A licensed master fire suppression piping contractor properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on an annual basis.]

904.5 Maintenance of fire extinguishing systems. Fire extinguishing systems shall be periodically inspected, tested and otherwise maintained in accordance with FC 901, 904.1.1 and 904.4, the applicable NFPA standard, and the system listing. Additional maintenance shall be performed as set forth in FC 904.5.1 through 904.5.13, FC Table 904.5.2, and the rules.

904.5.1 Monthly inspection. At least once a month, a visual inspection of the fire extinguishing system shall be conducted by a trained and knowledgeable person to confirm that the system appears to be in good working order, including the following conditions:

1. The fire extinguishing system is intact and undamaged, including the extinguishing agent container, system piping, nozzles and protective nozzle caps.

2. Any fusible links or other fire detection devices are clean.

3. Access to each manual activation device, if required, for the fire extinguishing system is not obstructed and any tamper indicator is intact.

4. Check the pressure gauge, control panel or control unit, as applicable, to determine whether the fire extinguishing system is operational and whether there are any supervisory or trouble signals.

5. If an automatic foam system or water mist system, check the water supply valve to confirm that it is in the locked, open position; if the system is manually operated, confirm that the water supply is in good working order.

6. The maintenance tag for the fire extinguishing system is in place and has not expired.

904.5.2. Semiannual inspection. A licensed master fire suppression piping contractor holding a certificate of fitness properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system, or a person holding a certificate of fitness under the direction and control of such license holder, shall inspect, test, service and otherwise maintain such system in accordance with this section and the manufacturer's specifications and servicing manuals at least on a semiannual basis. Such semiannual inspection, testing and servicing shall include all procedures necessary to determine that the system is in good working order, including the following actions:

1. Verification that the hazard has not changed.

2. Verification that the fire extinguishing system has not been altered.

3. Examination of all detection systems, alarms, manual stations, extinguishing agent containers, releasing devices, piping, hose assemblies, nozzles, and all ancillary equipment.

4. Verification that the extinguishing agent has not been discharged.

5. Verification that the agent distribution piping is not obstructed.

6. Verification that the extinguishing agent container and/or ancillary pressure containers have been, as applicable, inspected, retested and marked in conformance with the requirements of the United States Department of Transportation.

7. A test of the system's automatic and manual releasing devices, including any associated equipment. Fixed temperature-sensing elements shall be maintained to ensure proper operation of the system.

8. A test of the gas and electric power source shut-off (interlock) devices, if applicable.

9. Preparation and submission to the owner of a written report of any system defects.

10. Upon satisfactory completion of the semiannual inspection and correction of all defects, providing the owner with an inspection, testing and service compliance tag. Such tag shall indicate the date issued, the name and license number of the licensed master fire suppression piping contractor issuing the tag and the certificate of fitness holder conducting the inspection, and that the system was found to be in compliance with the requirements of this section.

FC TABLE 904.5.2
FIRE EXTINGUISHING SYSTEM
INSPECTION, TESTING AND MAINTENANCE SCHEDULE

SYSTEM	INSPECTION	TESTING	OTHER MAINTENANCE
Aerosol fire extinguishing systems	Monthly	Annually	
Carbon dioxide fire extinguishing system	Monthly	Semiannually	Annually
Clean agent fire extinguishing systems	Monthly	Semiannually	Annually
Dry chemical fire extinguishing systems	Monthly	Semiannually	
Expansion foam systems (low, medium and high)	Monthly	Annually	
Foam water sprinkler and spray systems	See NFPA 25		
Halon 1301 fire extinguishing systems	Monthly	Semiannually	
Water mist fire extinguishing systems	See NFPA 25		
Wet chemical fire extinguishing systems	Monthly	Semiannually	

904.5.3 Five-year retest. All fire extinguishing systems shall be retested once every five years from the date of acceptance of the system. The first retest of fire extinguishing systems lawfully existing on the effective date of this provision shall be conducted on or before the fifth anniversary of the date of acceptance after such effective date. Such test shall be conducted, and reported to the department, in the manner prescribed by rule, by a licensed master fire suppression contractor holding a certificate of fitness, properly trained and having knowledge of the installation, operation and maintenance of the specific fire extinguishing system, or a person holding a certificate of fitness under the direction and control of such license holder.

Exception: Commercial cooking and domestic cooking fire extinguishing systems.

904.6 Additional maintenance requirements. The following fire extinguishing systems shall be maintained in accordance with the additional maintenance requirements set forth in FC 904.6.1 through 904.6.10.

904.6.1 Aerosol systems. Aerosol fire extinguishing systems shall be maintained in accordance with FC 901.6.1 and 904.5.

904.6.2 Carbon dioxide systems. Carbon dioxide systems shall be maintained in accordance with FC 901.6.1, 904.5 and 904.6.2.1 through 904.6.2.4.

904.6.2.1 High-pressure containers. High-pressure containers shall be weighed and the date of the last hydrostatic test shall be verified at 6-month intervals. Where a container shows a loss in original content of more than 10 percent, the container shall be refilled or replaced.

904.6.2.2 Low-pressure containers. The liquid-level gauges of low-pressure containers shall be observed at one-week intervals. Where a container shows a content loss of more than 10 percent, the container shall be refilled to maintain the minimum gas requirements.

904.6.2.3 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At five-year intervals, all hoses shall be tested.

904.6.2.3.1 Test procedure. Hoses shall be tested at not less than 2,500 pounds per square inch (psi) (17 238 kPa) for high-pressure systems and at not less than 900 psi (6206 kPa) for low-pressure systems.

904.6.2.4 System components. System components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated at 12-month intervals to ensure that such components are in proper operating condition.

904.6.3 Clean agent systems. Clean agent systems shall be maintained in accordance with FC 901.6.1, 904.5, 904.6.3.1 and 904.6.3.2.

904.6.3.1 Containers. The extinguishing agent quantity and pressure of the containers shall be checked at 6-month intervals. Where a container shows a loss in original weight of more than 5 percent or a loss in original pressure, adjusted for temperature, of more than 10 percent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.

904.6.3.2 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. All hoses shall be tested at 5-year intervals.

904.6.4 Dry chemical systems. Dry chemical systems shall be maintained in accordance with FC 901.6.1, 904.5 and 904.6.4.1.

904.6.4.1. Additional maintenance requirements. Extinguishing agent containers shall be weighed to verify the required amount of agent. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals specified by the manufacturer.

904.6.5 Foam systems. Foam systems shall be maintained in accordance with FC 901.6.1, 904.5 and 904.6.5.1.

904.6.5.1 Commercial cooking installations. Foam fire extinguishing systems installed to protect a commercial cooking operation shall additionally comply with the requirements of FC904.3.8.

904.6.6 Halon systems. Lawfully existing halon systems shall be maintained in accordance with FC 901.6.1, 904.5 and 904.6.6.1 through 904.6.6.3. All other halon systems shall be removed in accordance with FC904.1.4.2.

904.6.6.1 Containers. The extinguishing agent quantity and pressure of containers shall be checked at least on a semiannual basis. Where a container shows a loss in original weight of more than 5 percent or a loss in original pressure (adjusted for temperature) of more than 10 percent, the container shall be refilled or replaced. The weight and pressure of the container shall be recorded on a tag attached to the container.

904.6.6.2 System hoses. System hoses shall be examined at 12-month intervals for damage. Damaged hoses shall be replaced or tested. At 5-year intervals, all hoses shall be tested.

904.6.6.2.1 Test procedure. For Halon 1301 systems, hoses shall be tested at not less than 1,500 psi (10 343 kPa) for 600 psi (4137 kPa) charging pressure systems and not less than 900 psi (6206 kPa) for 360 psi (2482 kPa) charging pressure systems. For Halon 1211 hand-hose line systems, hoses shall be tested at 2,500 psi (17 238 kPa) for high-pressure systems and 900 psi (6206 kPa) for low-pressure systems.

904.6.6.3 System components. System components, such as switches, door and window releases, interconnected valves, damper releases and supplementary alarms, shall be manually operated at 12-month intervals to ensure such components are in proper operating condition.

904.6.7 Water mist systems. Water mist systems shall be maintained in accordance with FC 901.6.1, 904.5 and NFPA 750, as modified by FC Appendix B.

904.6.8 Wet chemical systems. Wet chemical systems shall be maintained in accordance with FC 901.6.1, 904.5 and 904.6.8.1 through 904.6.8.3.

904.6.8.1 Additional maintenance requirements. Extinguishing agent containers shall be weighed to verify the required amount of agent. Stored pressure-type units shall be checked for the required pressure. The cartridge of cartridge-operated units shall be weighed and replaced at intervals specified by the manufacturer.

904.6.8.2 Fusible link maintenance. Fixed temperature-sensing elements shall be maintained to ensure proper operation of the system.

904.6.8.3 Commercial cooking installations. Wet chemical fire extinguishing systems installed to protect a commercial cooking operation shall additionally comply with the requirements of FC904.3.8.

904.6.9 Commercial cooking systems. Commercial cooking fire extinguishing systems shall be maintained in accordance with FC 609, 901.6.1, 904.5 and 904.6.9.1.

904.6.9.1 Fusible link and sprinkler head replacement. Fusible links and foam water sprinkler heads shall be replaced at least annually, and other protection devices shall be serviced or replaced in accordance with the manufacturer's instructions.

Exception: Frangible bulbs are not required to be replaced annually.

904.6.10 Domestic cooking systems. Fire extinguishing systems installed on domestic cooking hoods in Group I-2 occupancies, or in any other occupancy, shall be installed and maintained in accordance with FC 904.6.10.1 and 904.6.10.2.

904.6.10.1 Installation. Such fire extinguishing systems shall be installed by a master fire suppression piping contractor, who shall certify to the department that the installation is in compliance with the construction codes and this code. Such certification shall be submitted to the department in the manner prescribed by the department.

904.6.10.2 Maintenance. Such fire extinguishing systems shall be maintained in accordance with FC 901.6.1 and 904.5.

FC 906 Portable Fire Extinguishers

906.1 Where required. Portable fire extinguishers shall be installed in the following locations.

1. In all Group A, B, E, F, H, I, M, R-1, R-2 adult homes and enriched housing, and S occupancies.

2. Within 30 feet (9144 mm) of commercial cooking equipment.

3. In areas where flammable or combustible liquids are manufactured, stored, handled and used, including dispensing, in quantities requiring a permit pursuant to FC105.6.

4. On each floor of structures under construction, alteration or demolition, except detached Group R-3 occupancies, in accordance with [FC1415.1] FC3315.1.

5. Where required by the sections indicated in FC Table 906.1.

6. Special-hazard areas, including but not limited to laboratories, computer rooms and generator rooms, where required by the commissioner.

7. Where required by other provisions of this code or the rules.

FC TABLE 906.1
ADDITIONAL REQUIRED PORTABLE FIRE EXTINGUISHERS

SECTION	SUBJECT
303.5	Tar kettles and asphalt melters
307.4	Open fires
[307.5] 307.5.4	Portable outdoor barbecues
[308.3.1.5] 308.5.3.2	Flaming food and [beverages] beverage preparation in Group A occupancies and public gathering places
308.6.4	Alcohol fueled decorative open-flame device
309.4 and 309.7	Powered industrial trucks and storage areas
310.7.3.4	Non-tobacco hookah establishment
[315.3.4] 315.3.6	Outdoor storage of combustible material
317.5.2	Automotive salvage and wrecking facilities
603.3.1	Fuel oil-burning equipment
609.9	Commercial kitchen
[1105.2] 2005.2	Aircraft towing vehicles
[1105.3] 2005.3	Aircraft welding apparatus
[1105.4] 2005.4	Aircraft-fueling vehicles
[1105.5] 2005.5	Aircraft hydrant-fueling vehicles
[1105.6] 2005.6	Aircraft fuel-dispensing stations
[1107.7] 2007.7	Heliports and helistops
[1110.6.2] 2010.6.2	Helicopter lift operations
[1208.4] 2108.4	Dry cleaning facilities
[1415.1]	[Buildings, structures, premises and facilities under construction, alteration or demolition]
[1417.3]	[Roofing operations]
[1418.1]	[Powder-actuated tool loads at a construction site]
2305.5	Automotive liquid motor fuel-dispensing facilities
2308.7.4.2	CNG motor fuel-dispensing facilities
2310.6.4	Marine liquid motor fuel-dispensing facilities
2311.7 and 2311.8.7	Repair garages
[1504.4.10] 2404.4.10	Spraying spaces
[1504.5.5] 2404.5.5	Limited spraying areas
[1505.5.3] 2405.5.3	Dip-tank rooms and spaces
[1506.4.6] 2406.4.6	Powder coating rooms and spaces
[1510.1.2] 2410.1.2	Floor finishing operations
[1908.8] 2808.8	Storage of wood chips and other wood waste materials
[1909.5] 2809.5	Exterior lumber storage
[2003.5] 2903.5	Organic-coating areas
[2106.3] 3006.3	Industrial furnaces
[2205.5]	[Automotive liquid motor fuel-dispensing facilities]
[2208.7.4.2]	[CNG motor fuel-dispensing facilities]
[2210.6.4]	[Marine liquid motor fuel-dispensing facilities]
[2211.6]	[Repair garages]
3104.12	Tents and other membrane structures
[2306.10] 3206.10	High-piled storage
[2404.12]	[Tents and other membrane structures]
3315.1	Buildings, structures, premises and facilities under construction, alteration or demolition
3317.3	Roofing operations
[2508.2] 3408.2	Tire rebuilding/storage
[2604.2.6] 3504.2.6	Welding and other hot work
3605.2.3	Marina fire protection systems and equipment
3703.6 and 3706.6.4	Combustible fibers
4006.14	Distilleries
[2707.9.3] 5007.9.3	Transportation of flammable and combustible liquids in cargo tanks
[2903.6 and 2906.6.4]	[Combustible fibers]
5306.7	Medical gas storage
5606.8	Powder-actuated tool loads at a construction site
[3309.9.1] 5609.6.1	Special effects
[3403.2.1] 5703.2.1	Flammable and combustible liquids, general

[3404.3.3.1] 5704.3.3.1	Indoor storage of flammable and combustible liquids
[3404.3.7.5.2] 5704.3.7.5.2	Liquid storage rooms for flammable and combustible liquids
[3405.4.9] 5705.4.9	Solvent distillation units
[3406.2.7] 5706.2.7	Construction sites—flammable and combustible liquids storage
5706.2.8	Construction sites—dispensing from cargo tanks
[3406.4.10.1] 5706.4.10.1	Bulk plants and terminals for flammable and combustible liquids
[3406.8.1(20)] 5706.8.1(20)	Vapor recovery and processing equipment at bulk plants and terminals
5707.8	Fleet fueling operations
[3506.5] 5806.5	Sterilizers using flammable gas containing ethylene oxide
[3808.2] 6108.2	LPG

906.2 General requirements. Portable fire extinguishers shall be selected, installed and maintained in accordance with this section and NFPA 10.

Exceptions:

1. The travel distance to reach a portable fire extinguisher shall not apply to the spectator seating portions of Group A-5 occupancies.

2. In Group I-3, portable fire extinguishers may be provided at staff locations.

906.2.1 Maintenance. Portable fire extinguishers shall be maintained in accordance with FC901.6 and this section.

906.2.1.1 Monthly inspection. An inspection to verify that the portable fire extinguishers are readily available and in good working order shall be conducted at least once a month. The person conducting such inspections shall keep records of all portable fire extinguishers inspected, including the date the inspection was performed, the person performing the inspection, and those portable fire extinguishers found to require corrective action. Such recordkeeping shall be either kept on a tag or label securely attached to the portable fire extinguisher, on an inspection checklist maintained on file or by an approved electronic method that provides a permanent record.

Exception: An inspection to verify that the portable fire extinguishers are readily available and in good working order shall be conducted at least once every 3 years for dry-chemical or halogenated agent portable fire extinguishers that are monitored by a listed and approved electronic monitoring device complying with all of the following requirements:

1. The electronic monitoring device shall continuously confirm the proper location and charge of each portable fire extinguisher so monitored.

2. Loss of power to the electronic monitoring device or other interruption of the proper functioning of such device shall initiate a trouble signal at an approved location on the premises at which the portable fire extinguisher being monitored is installed.

3. The portable fire extinguisher being monitored shall be located indoors or in cabinets outdoors. The portable fire extinguisher being monitored shall not be in a corrosive environment.

4. The periodic inspection of the portable fire extinguisher shall include inspection and testing of the electronic monitoring device.

5. An electronic record that the electronic monitoring of the portable fire extinguisher is being maintained, and that the portable fire extinguisher is properly located and charged, shall be maintained in accordance with FC107.7.

906.2.1.2 Servicing. Annual servicing and recharging shall be [performed] conducted in accordance with NFPA 10 by [a person or] an approved portable fire extinguisher servicing company and a technician meeting the requirements of FC901.6.3.1. [Records of servicing and recharging of portable fire extinguishers shall be provided and maintained in accordance with NFPA 10. The required tag or label for servicing shall also include the following information:

1. The name and certificate of fitness number of the person who serviced the portable fire extinguisher.

2. The month and year the portable fire extinguisher was serviced.

3. The name, street address and telephone number of the portable fire extinguisher servicing company, if any, servicing the portable fire extinguisher.]

906.2.1.3 Hydrostatic testing. Periodic hydrostatic testing of portable fire extinguishers shall be done in accordance with NFPA 10.

906.2.1.4 Proof of compliance. A portable fire extinguisher servicing company holding a company certificate shall document its servicing of a portable fire extinguisher by affixing to the portable fire extinguisher the proof of compliance approved for such purposes and in such other manner as may be required by the rules.

906.3 Size and distribution. The size and distribution of portable fire extinguishers shall be in accordance with FC 906.3.1 through 906.3.4.

906.3.1 Class A fire hazards. The minimum size, number and placement of portable fire extinguishers in occupancies in which there is a Class A fire hazard risk (ordinary combustible materials) shall be in accordance with FC Table 906.3.1.

906.3.1.1 Sprinklered areas. In buildings classified as Group A-3 occupancy houses of worship and Group B occupancy office buildings that are protected throughout by a sprinkler system, the maximum floor area per unit of A required by FC Table 906.3.1 may be doubled.

906.3.2 Class B fire hazards. The minimum size, number and placement of portable fire extinguishers in occupancies in which there is a Class B fire hazard risk (flammable or combustible liquids with depths of less than or equal to 0.25-inch (6.35 mm)) shall be in accordance with FC Table 906.3.2. The minimum size, number and placement of portable fire extinguishers in occupancies in which there is a Class B fire hazard risk (flammable or combustible liquids with depths greater than 0.25-inch (6.35 mm)) shall be in accordance with NFPA 10.

906.3.3 Class C fire hazards. The minimum size, number and placement of portable fire extinguishers in which there is a Class C fire hazard risk (energized electrical equipment) shall be in accordance with NFPA 10.

906.3.4 Class D fire hazards. The minimum size, number and placement of portable fire extinguishers in occupancies in which there is a Class D fire hazard risk (combustible metals) shall be in accordance with NFPA 10.

FC TABLE 906.3.1
PORTABLE FIRE EXTINGUISHERS FOR CLASS A FIRE HAZARDS

	LIGHT (Low) HAZARD OCCUPANCY[d]	ORDINARY (Moderate) HAZARD OCCUPANCY[d]	EXTRA (High) HAZARD OCCUPANCY[d]
Minimum Rated Single Extinguisher	2-A[c]	2-A	4-A[a]
Maximum Floor Area Per Unit of A	3,000 square feet[e]	1,500 square feet	1,000 square feet
Maximum Travel Distance to Extinguisher	75 feet	75 feet	75 feet

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon = 3.785 L.
a. Two 2½-gallon water-type extinguishers shall be deemed the equivalent of one 4-A rated extinguisher.
b. Reserved.
c. Two water-type extinguishers each with a 1-A rating shall be deemed the equivalent of one 2-A rated extinguisher for Light (Low) Hazard Occupancies.
d. For the purposes of FC Table 906.3.1, the terms "Light (Low) Hazard", "Ordinary (Moderate) Hazard" and "Extra (High) Hazard" shall be as defined in NFPA 10.
e. In occupancies classified as Groups A-3, B, or E which are protected throughout by a sprinkler system, the maximum floor area per unit of A may be doubled.

FC TABLE 906.3.2
FLAMMABLE OR COMBUSTIBLE LIQUIDS WITH DEPTHS OF LESS THAN OR EQUAL TO 0.25-INCH[a]

TYPE OF HAZARD	BASIC MINIMUM PORTABLE FIRE EXTINGUISHER RATING	MAXIMUM TRAVEL DISTANCE TO PORTABLE FIRE EXTINGUISHERS (feet)
Light (Low)	5-B 10-B	30 50
Ordinary (Moderate)	10-B 20-B	30 50
Extra (High)	40-B 80-B	30 50

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.
a. For requirements on water-soluble flammable liquids and alternative sizing criteria, see NFPA 10.

906.4 Cooking grease fires. Portable fire extinguishers provided for the protection of cooking grease fires shall be of an approved type compatible with the fire extinguishing system agent and in accordance with [FC609.6] FC609.9.

906.5 Conspicuous location. Portable fire extinguishers shall be located in conspicuous locations where they will be readily accessible and immediately available for use. These

locations shall be along normal paths of travel, unless the commissioner determines that the hazard posed indicates the need for placement away from normal paths of travel.

Exceptions:

1. Portable fire extinguishers subject to theft, malicious use or damage may be located in locations approved by the commissioner.

2. In rooming houses and single room occupancies, as defined in the New York State Multiple Dwelling Law, with over 15 sleeping rooms, a 2-A rated portable fire extinguisher may be kept in the apartment of the manager or the building superintendent.

906.6 Unobstructed and unobscured. Portable fire extinguishers shall not be obstructed or obscured from view. In rooms or areas in which visual obstruction cannot be completely avoided, signs or other markings shall be provided to indicate the locations of portable fire extinguishers.

906.7 Hangers and brackets. Hand-held portable fire extinguishers, not housed in cabinets, shall be installed on the hangers or brackets supplied. Hangers or brackets shall be securely anchored to the mounting surface in accordance with the manufacturer's installation instructions.

906.8 Cabinets. Cabinets used to house portable fire extinguishers shall be readily identifiable and shall not be locked.

Exceptions:

1. Portable fire extinguishers subject to theft, malicious use or damage, if provided with an approved means of ready access.

2. Portable fire extinguishers in Group I-3 occupancies and in mental health areas in Group I-2 occupancies may be locked or located in staff locations, provided the staff of the institution has ready access to the cabinet or other storage location.

906.9 Extinguisher installation. The installation of portable fire extinguishers shall be in accordance with FC 906.9.1 through 906.9.3.

906.9.1 Extinguishers weighing 40 pounds or less. Portable fire extinguishers having a gross weight not exceeding 40 pounds (18 kg) shall be installed so that the top of the extinguisher is not more than 5 feet (1524 mm) above the floor.

906.9.2 Extinguishers weighing more than 40 pounds. Hand-held portable fire extinguishers having a gross weight exceeding 40 pounds (18 kg) shall be installed so that the top of the extinguisher is not more than 3.5 feet (1067 mm) above the floor.

906.9.3 Floor clearance. The clearance between the floor and the bottom of installed hand-held portable fire extinguishers shall not be less than 4 inches (102 mm).

906.10 Wheeled units. Wheeled portable fire extinguishers shall be kept in a designated location that is readily accessible.

APPENDIX C. CHAPTER 23
MOTOR FUEL-DISPENSING FACILITIES AND REPAIR GARAGES

SECTION FC [2201] 2301
GENERAL

[2201.1] 2301.1 Scope. This chapter shall govern the design, installation, operation and maintenance of fleet motor fuel-dispensing facilities, full-service motor fuel-dispensing facilities, self-service motor fuel-dispensing facilities, and repair garages.

[2201.2] 2301.2 Permits. Permits shall be required as set forth in FC105.6.

[2201.3] 2301.3 Design and installation documents. Design and installation documents shall be submitted to the department for review and approval in accordance with FC105.4 prior to the installation, alteration, repair or construction of fleet motor fuel-dispensing facilities, full-service motor fuel-dispensing facilities, [and] self-service motor fuel-dispensing facilities [in accordance with FC105.4], and repair garages for vehicles fueled by lighter-than-air motor fuels. Design and installation documents shall include the location of all storage tanks, dispensers, compressors, piping, fire protection systems and emergency shutdown devices.

> **[2201.3.1] 2301.3.1 Compliance with other codes.** The installation or alteration of a liquid motor fuel storage and dispensing system regulated by this chapter shall not be approved by the department unless the design and installation documents demonstrate that the proposed work complies with the regulations of the United States Environmental Protection Agency, as set forth in 40 CFR Part 280, and the regulations of the New York State Department of Environmental Conservation, as set forth in 6 NYCRR [Parts 612,] Part 613 [and 614,] as applicable.

[2201.4] 2301.4 General. All fleet motor fuel-dispensing facilities, full-service motor fuel-dispensing facilities, self-service motor fuel-dispensing facilities and repair garages shall be designed, installed, operated and maintained in accordance with this chapter, FC Chapter [34] 57 and the construction codes, including the Building Code, the Fuel Gas Code and the Mechanical Code, and, as applicable, NFPA 30A.

[2201.5] 2301.5 Electrical. Electrical wiring and equipment shall be suitable for the locations in which they are installed and shall comply with the requirements of FC605, NFPA 30A and the Electrical Code, as applicable. Upon request, proof of compliance with the Electrical Code shall be filed with the department.

[2201.6] 2301.6 Heat-producing appliances. Heat-producing appliances shall be suitable for the locations in which they are installed and shall comply with the requirements of the construction codes, including the Building Code, the Mechanical Code and the Fuel Gas Code, and NFPA 2 and 30A, as applicable.

[2201.7] 2301.7 Supervision of dispensing operations. The dispensing of motor fuel at fleet motor fuel-dispensing facilities, full-service motor fuel-dispensing facilities and self-service motor fuel-dispensing facilities shall be conducted by or under the personal supervision of a certified attendant, who shall be responsible for ensuring that dispensing operations are conducted and the facility is maintained in accordance with this chapter and the rules.

[2201.8] 2301.8 Supervision of defueling operations. The defueling of liquid motor fuel from the fuel tank of a motor vehicle shall be conducted by or under the personal supervision of a person holding a certificate of fitness.

[2201.9] 2301.9 Certificate of license. Persons who install, alter, test or repair any automotive or marine liquid motor fuel storage and dispensing systems, including liquid motor fuel storage and dispensing systems at a bulk plant or terminal, shall hold a certificate of license or shall be employed by and perform such duties under the general supervision of a person holding such certificate.

[2201.10] 2301.10 Records of inspections and testing. Records of all inspections and testing required by this chapter shall be kept in a bound log book or other approved recordkeeping, maintained on the premises for a minimum of 4 years, except that records of the required 5 year tests as set forth in FC [2206.9.4] 2306.9.4, [2206.9.6] 2306.9.6 and [2208.7.4.1] 2308.7.4.1 shall be maintained on the premises for a minimum of 6 years.

[2201.11] 2301.11 Prohibition. It shall be unlawful to operate as a self-service motor fuel-dispensing facility any motor fuel-dispensing facility or a motor fuel dispenser installed and approved as a fleet or full-service motor fuel-dispensing facility or dispenser.

SECTION FC [2202] 2302
DEFINITIONS

[2202.1] 2302.1 Definitions. The following terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings [shown herein] set forth in FC202.

ALCOHOL-BLENDED MOTOR FUEL. [Gasoline blended with ethanol or other alcohol with an alcohol concentration greater than 15 percent by volume.]

BIODIESEL.

CERTIFIED ATTENDANT. [A person holding a certificate of fitness for the supervision of a full-service motor fuel-dispensing facility or self-service motor fuel-dispensing facility.]

CNG. [Compressed natural gas.]

DISPENSING DEVICE, OVERHEAD TYPE. [A dispensing device mounted above a dispensing area, typically within a canopy structure, and characterized by the use of an overhead hose reel.]

FLAMMABLE LIQUID MOTOR FUEL. [Gasoline or other flammable liquids used as fuel in the operation of motor vehicles, motorcycles, watercraft and aircraft.]

FLEET MOTOR FUEL-DISPENSING FACILITY. [A motor fuel-dispensing facility wherein motor fuel is stored and/or dispensed into the fuel tank of a motor vehicle, motorcycle, marine vessel or watercraft owned or operated by or on behalf of the owner of the facility, and where such dispensing operations are conducted by persons employed by or on behalf of the owner of the facility. There are four approved types of fleet motor fuel-dispensing facilities:

Fleet automotive hydrogen motor fuel-dispensing facility (motor vehicles)
Fleet automotive liquid motor fuel-dispensing facility (motor vehicles and motorcycles)
Fleet CNG motor fuel-dispensing facility (motor vehicles, marine vessels and watercraft)
Fleet marine liquid motor fuel-dispensing facility (marine vessel and watercraft)]

FULL-SERVICE MOTOR FUEL-DISPENSING FACILITY. [A motor fuel-dispensing facility wherein motor fuel is dispensed into the fuel tank of motor vehicles, motorcycles, marine vessels or watercraft by a certified attendant or, when under the personal supervision of a certified attendant, by persons employed by or on behalf of the owner of the facility. There are four approved types of full-service motor fuel-dispensing facilities:

Full-service automotive hydrogen motor fuel-dispensing facility (motor vehicles)
Full-service automotive liquid motor fuel-dispensing facility (motor vehicles and motorcycles)
Full-service CNG motor fuel-dispensing facility (motor vehicles, marine vessels and watercraft)
Full-service marine liquid motor fuel-dispensing facility (marine vessel and watercraft)]

LIQUEFIED NATURAL GAS (LNG). [A fluid in the liquid state composed predominantly of methane and which may contain minor quantities of ethane, propane, nitrogen or other components normally found in natural gas.]

LIQUID MOTOR FUEL. [Gasoline, diesel fuel or other flammable or combustible liquids used as fuel in the operation of motor vehicles, motorcycles, marine vessels and watercraft.]

LIQUID MOTOR FUEL STORAGE AND DISPENSING SYSTEM. [A liquid motor fuel storage tank and all motor fuel storage and dispensing equipment associated with such tank, including the tank, piping, valves, fill connection catchment basins, vent lines, pumps, dispensing devices and any other ancillary equipment.]

MOTOR VEHICLE. [A vehicle or other conveyance having more than two running wheels and using liquid motor fuel or flammable gas as fuel for generating motive power, except such vehicles as have a storage tank with a maximum capacity for less than 2 gallons (7.6 L) of liquid motor fuel or flammable gas that generates energy that is equivalent to the energy generated by 2 gallons (7.6 L) of gasoline.]

REPAIR GARAGE. [A building, structure or portion thereof used for servicing or repairing motor vehicles or motorcycles.]

SELF-SERVICE MOTOR FUEL-DISPENSING FACILITY. [A motor fuel-dispensing facility wherein motor fuel is dispensed by customers of the facility from a motor fuel storage and dispensing system into the fuel tank of motor vehicles or motorcycles. There are two approved types of self-service motor fuel-dispensing facilities:

Self-service automotive liquid motor fuel-dispensing facility (motor vehicles and motorcycles)
Self-service CNG motor fuel-dispensing facility (motor vehicles)]

SECTION FC [2203] 2303
LOCATION OF LIQUID MOTOR FUEL DISPENSING DEVICES

[2203.1] 2303.1 Location of dispensing devices. Dispensing devices for liquid motor fuel storage and dispensing systems shall be located as set forth in FC [2203.1.1] 2303.1.1 and [2203.1.2] 2303.1.2.

[2203.1.1] 2303.1.1 Outdoor dispensing devices. When installed outdoors, dispensing devices shall be located as follows:

1. Ten feet (3048 mm) or more from lot lines and building or structure openings.

2. Ten feet (3048 mm) or more from buildings or structures having combustible exterior wall surfaces or buildings or structures having noncombustible exterior wall surfaces that are not part of a 1-hour fire-resistance-rated assembly or buildings or structures having combustible overhangs.

   Exception: Canopies constructed in accordance with the construction codes, including the Building Code, providing weather protection for the motor fuel dispensers.

3. Such that all portions of the vehicle being fueled will be on the premises of the motor fuel-dispensing facility.

4. Such that the nozzle, when the hose is fully extended, will not reach within 5 feet (1524 mm) of building or structure openings.

5. Twenty feet (6096 mm) or more from fixed sources of ignition.

6. Twenty-five feet (7620 mm) or more from the nearest subway grating, entrance or exit.

[2203.1.2] 2303.1.2 Indoor dispensing devices. When installed indoors, the dispensing area shall be located at street level, with no dispenser located more than 50 feet (15 240 mm) from an exit or entrance to the building or structure used by motor vehicles.

SECTION FC [2204] 2304
DISPENSING OF LIQUID MOTOR FUEL

[2204.1] 2304.1 General. The dispensing of liquid motor fuels at motor fuel-dispensing facilities, and the design, installation, operation and maintenance of liquid motor fuel storage and dispensing systems and facilities shall be in accordance with this section.

[2204.1.1] 2304.1.1 Prohibition. It shall be unlawful to dispense motor fuel into a vehicle while:

1. smoking;

2. using or maintaining an open flame;

3. the engine of the vehicle being fueled is not shut down;

4. using any object to override, bypass or otherwise render the fuel dispensing nozzle's manual hold-open design feature inoperable.

[2204.1.2] 2304.1.2 Emergency fuel shutoff. An approved, clearly identified and readily accessible emergency fuel shutoff switch shall be provided at an approved location to immediately shut down the transfer of fuel to the fuel dispensers in the event of a fuel spill or other emergency and activate an alarm audible in the dispensing area and any control booth. Such audible device may be the same device used to indicate activation of the fire extinguishing system installed to protect the fuel dispensers. An emergency fuel shutoff switch for outdoor fuel dispensers shall be located within 100 feet (30 480 mm) of, but not less than 20 feet (6096 mm) from, the fuel dispensers. For indoor fuel dispensers, the emergency fuel shutoff switch shall be installed at an approved location. An approved sign shall be posted on or immediately adjacent to the emergency fuel shutoff switch, which reads: EMERGENCY FUEL SHUTOFF. Such emergency fuel shutoff switches shall be of a type that must be reset manually.

[2204.1.3] 2304.1.3 Lighting. Dispensing areas shall be well lighted whenever dispensing is being conducted.

[2204.1.4] 2304.1.4 Dispensing area signage. Durable signs shall be conspicuously posted in dispensing areas in motor fuel-dispensing facilities in compliance with the requirements of FC [2204.1.4.1] 2304.1.4.1 through [2204.1.4.4] 2304.1.4.4.

[2204.1.4.1] 2304.1.4.1 Operating instructions. A sign setting forth dispenser operating instructions shall be posted on every dispenser. Such sign shall also indicate the location of the emergency fuel shutoff switches required by [FC2204.1.2] FC2304.1.2.

[2204.1.4.2] 2304.1.4.2 Fuel dispensing warning sign. A warning sign that reads as follows shall be posted on or immediately adjacent to each dispenser:

1. No smoking.

2. Shut off engine.

3. Before fueling, discharge any static electricity by touching a metal surface. Repeat before removing nozzle.

4. If a fire starts, do not remove nozzle—leave the area immediately.

5. It is unlawful and dangerous to dispense fuel into unapproved containers or to fill portable containers in or on a motor vehicle.

6. It is unlawful for anyone other than the certified attendant to fill portable containers.

[2204.1.4.3] 2304.1.4.3 Alcohol-blended motor fuel notice. A sign or marking indicating the type and concentration of alcohol in the motor fuel being dispensed shall be posted on or affixed to each dispenser dispensing alcohol-blended motor fuel.

[2204.1.4.4] 2304.1.4.4 Emergency procedures. A sign setting forth emergency procedures that reads as follows shall be posted in the dispensing area, or other location designated in this section:

IN CASE OF FIRE OR SPILL:

USE THE EMERGENCY FUEL SHUTOFF SWITCH
TO STOP THE FLOW OF FUEL

(*for flammable fuel dispensers*)
ACTIVATE THE FIRE EXTINGUISHING SYSTEM
PROTECTING THE DISPENSING AREA.
(SWITCH LOCATION):
(*indicate location*)

DIRECT VEHICLE OCCUPANTS TO EXIT VEHICLES
AND LEAVE AREA IMMEDIATELY

NOTIFY THE FIRE DEPARTMENT (CALL 911)
(FACILITY ADDRESS)
(*indicate address, with cross-street reference*).

KEEP ALL PERSONS AWAY FROM THE AREA.

[2204.1.5] 2304.1.5 Emergency telephone. A telephone not requiring a coin to operate or another approved, clearly identified means to notify the department, shall be provided at the facility in an approved location.

[2204.1.6] 2304.1.6 Dispensing on piers, docks or wharves. Flammable liquid motor fuel shall not be dispensed into the fuel tanks of motor vehicles imported by ship to this country while on any pier, dock or wharf.

[2204.1.7] 2304.1.7 Dispensing into portable containers. The dispensing of liquid motor fuel into portable containers shall comply with the requirements of FC [2204.1.7.1] 2304.1.7.1 through [2204.1.7.5] 2304.1.7.5.

[2204.1.7.1] 2304.1.7.1 Approved containers required. Liquid motor fuel shall not be dispensed into a portable container unless such container is of approved material and construction, and has a tight closure with screwed or spring-loaded cover so designed that the contents can be dispensed without spilling. Liquids shall not be dispensed into portable tanks or cargo tanks.

[2204.1.7.2] 2304.1.7.2 Container capacity. Liquid motor fuel shall be dispensed into approved containers with an individual capacity not greater than 2½ gallons (9.5 L).

[2204.1.7.3] 2304.1.7.3 Nozzle operation. When liquid motor fuel is being dispensed into a portable container the fuel dispensing nozzle shall be manually held open during the dispensing operation, whether or not the nozzle is provided with a latch-open device.

[2204.1.7.4] 2304.1.7.4 Location of containers being filled. Portable containers shall not be filled while located inside the trunk, passenger compartment or truck bed of a motor vehicle or upon a marine vessel or watercraft.

[2204.1.7.5] 2304.1.7.5 Certified attendant. Only a certified attendant shall dispense liquid motor fuel into portable containers.

[2204.1.8] 2304.1.8 Dispensing from portable containers. No motor vehicle, motorcycle, marine vessel or watercraft shall be fueled from a portable container while indoors.

[2204.1.9] 2304.1.9 Vegetation. Weeds, grass, vines, brush or other vegetation shall not be maintained within 10 feet (3048 mm) of any aboveground tank, tank fill connection or dispensing area.

[2204.1.10] 2304.1.10 Combustible waste. Rubbish and other combustible waste shall not be stored within 10 feet (3048 mm) of any aboveground tank, tank fill connection or dispensing area, except in the dispensing area when in an approved waste container with a capacity not exceeding 40 gallons (0.15 m^3).

[2204.2] 2304.2 Self-service motor fuel-dispensing facilities. Self-service motor fuel-dispensing facilities shall be designed, installed, operated and maintained in compliance with the requirements of FC [2204.2.1] 2304.2.1 through [2204.2.5] 2304.2.5.

[2204.2.1] 2304.2.1 Duties of certified attendant. The certified attendant's primary function shall be to supervise, observe and monitor the dispensing of fuel. The certified attendant shall prevent the dispensing of fuel into portable containers unless the dispensing is in compliance

with the requirements of [FC2204.1.7] FC2304.1.7. The certified attendant shall control sources of ignition, take immediate action upon an accidental spill or release, be ready to use a portable fire extinguisher, and activate the fixed fire extinguishing system. Nothing in this section shall be construed to prohibit a certified attendant from engaging in other activities so long as such activities do not interfere with the certified attendant's ability to supervise, observe and monitor the dispensing of fuel and other requirements of this chapter.

[2204.2.2] 2304.2.2 Self-service dispensers. Approved self-service devices, equipment and systems such as, but not limited to, card-operated and remote-preset types, are allowed at liquid motor fuel-dispensing facilities. The certified attendant shall set the dispensing devices in the "off" position when not in use if such dispensing device can be activated without the certified attendant's knowledge.

[2204.2.3] 2304.2.3 Monitoring of dispensing. A control booth shall be located on the premises of every self-service automotive liquid motor fuel-dispensing facility. The control booth shall be an interior or exterior enclosure to which the public has no access. The certified attendant shall be present within the control booth while dispensing operations are conducted. The control booth shall be designed and located so that the certified attendant stationed therein shall have a full, unobstructed clear view of dispensing operations, except that mirrors and/or an approved closed-circuit television installation may be provided to afford the certified attendant a clear view of dispensing operations when the view from the control booth is partially or temporarily obstructed. For purposes of this section, the "clear" view provided by a closed-circuit television installation shall mean that the image on the monitor shall be of such brightness and resolution as to allow ready identification of individuals and easy observation of activities at all times of day. Two properly labeled manual switches, one that activates the fire extinguishing system, and one that electrically disconnects the liquid motor fuel-dispensing pumps, shall be located adjacent to each other within the control booth. A console that controls the self-service liquid motor fuel dispensers shall be provided within the control booth and within 5 feet (1524 mm) of the manual switches.

[2204.2.4] 2304.2.4 Communications. A two-way voice communication system shall be installed to provide contact between the control booth and each dispensing island.

[2204.2.5] 2304.2.5 Signage. The signage required by [FC2204.1.4] FC2304.1.4 shall be posted in the dispensing area of a self-service motor fuel-dispensing facility, except that the emergency procedures sign required by [FC2204.1.4.4] FC2304.1.4.4 shall be posted in the control booth.

[2204.3] 2304.3 Fleet motor fuel-dispensing facilities. Fleet motor fuel-dispensing facilities shall be designed, installed, operated and maintained in compliance with the requirements of FC [2204.3.1] 2304.3.1 through [2204.3.3] 2304.3.3.

[2204.3.1] 2304.3.1 Inspection of dispensing area. The certified attendant responsible for supervision of the dispensing of liquid motor fuel at fleet motor fuel-dispensing facility shall inspect the dispensing area on a periodic basis in accordance with the rules to ensure that the facility is being maintained in accordance with this chapter and the rules. The certified

attendant shall notify the owner and make any other notifications required by this code if there is any evidence that the facility is not in good working order. A record of such inspections and notifications shall be maintained at the premises in accordance with FC107.7.

[2204.3.2] 2304.3.2 Duties of fleet personnel. Employees or other persons working for the owner of a fleet motor fuel-dispensing facility whose duties involve the dispensing of motor fuel shall be trained and knowledgeable in such dispensing in compliance with the requirements of this code and the rules.

[2204.3.3] 2304.3.3 Quantity limits. Dispensing equipment used at fleet automotive liquid motor fuel-dispensing facilities shall comply with one of the following:

1. Dispensing devices shall be programmed or set to limit uninterrupted liquid motor fuel delivery to not more than 25 gallons (95 L) and require a manual action to resume delivery.

2. For other than flammable liquid motor fuel, the amount of liquid motor fuel being dispensed shall be limited in quantity by a preprogrammed card as approved.

[2204.4] 2304.4 Full-service motor fuel-dispensing facilities. Full-service motor fuel-dispensing facilities shall be operated in compliance with the requirements of [FC2204.4.1] FC2304.4.1.

[2204.4.1] 2304.4.1 Duties of certified attendant. The certified attendant at a full-service motor fuel-dispensing facility shall personally supervise the dispensing of motor fuel into vehicles by facility personnel. The certified attendant shall conduct a visual inspection of the dispensing area on a daily basis to monitor the condition of such installation. The certificate of fitness holder shall notify the owner and make any other notifications required by this code if there is any evidence that the installation is not in good working order. A record of such inspections and notifications shall be maintained at the premises in accordance with FC107.7.

SECTION FC [2205] 2305
OPERATION AND MAINTENANCE OF LIQUID MOTOR FUEL-DISPENSING FACILITIES

[2205.1] 2305.1 Tank filling operations for liquid motor fuel. Delivery operations to tanks for liquid motor fuel shall comply with the requirements of FC [2205.1.1] 2305.1.1 through [2205.1.3] 2305.1.3 and the applicable requirements of FC Chapter [34] 57.

[2205.1.1] 2305.1.1 Delivery vehicle location. Where liquid delivery to a motor fuel storage tank is accomplished by positive-pressure operation, cargo tanks making delivery shall be positioned a minimum of 25 feet (7620 mm) from tanks receiving flammable liquids and 15 feet (4572 mm) from tanks receiving combustible liquids. During delivery, a cargo tank

shall not obstruct a public street, private road, block motorists' view of roadways or impede the movement of vehicles or pedestrians.

[2205.1.2] 2305.1.2 Tank capacity calculation. The driver, operator or attendant of a cargo tank shall, before making delivery to a tank, determine the unfilled, available capacity of such tank by an approved tank level-indicating device or method. A measuring stick shall not be used to measure the contents of the tank through the fill connection line, except where there is a direct fill connection.

[2205.1.3] 2305.1.3 Tank connections. Delivery of liquid motor fuel shall be made by means of approved liquid- and vapor-tight connections between the delivery hose and tank fill pipe. Where tanks are equipped with any type of vapor recovery system, all connections required for the safe and proper functioning of the particular vapor recovery process shall be made. Such connections shall be made liquid- and vapor-tight and remain connected throughout the delivery process. Vapors shall not be discharged at grade level during delivery.

[2205.2] 2305.2 Equipment maintenance. Liquid motor storage and dispensing systems shall be maintained in good working order at all times in accordance with FC [2205.2.1] 2305.2.1 through [2205.2.3] 2305.2.3.

[2205.2.1] 2305.2.1 Dispensing devices. Where maintenance to dispensing devices becomes necessary and such maintenance could allow the accidental release or ignition of liquid, the following precautions shall be taken:

1. Only persons with a certificate of license and knowledgeable in performing the required maintenance shall perform the work.

2. Electrical power to the dispensing device and pump serving the dispenser shall be shut off at the main electrical disconnect panel before maintenance begins.

3. The emergency dispenser shutoff valve shall be closed before maintenance begins.

4. Vehicular traffic and unauthorized persons shall be prevented from coming within 12 feet (3658 mm) of the dispensing device before and during maintenance.

[2205.2.2] 2305.2.2 Dispenser emergency shutoff valves. Dispenser emergency shutoff valves required by [FC2206.7.4] FC2306.7.4 shall be checked not less than once per year by manually tripping the hold-open linkage.

[2205.2.3] 2305.2.3 Leak detection system. The leak detection system required by [FC2206.7.7] FC2306.7.7 shall be inspected monthly for proper operation and tested at least annually in accordance with the manufacturer’s specifications to ensure that it is in good working order.

[2205.3] 2305.3 Use of alcohol-blended motor fuel in existing liquid motor fuel storage and dispensing systems. Department approval shall be obtained prior to using a liquid motor fuel

storage and dispensing system for alcohol-blended motor fuel when such system has previously been used to store and dispense another type of motor fuel. If approved, such system may be used alternatively for the various approved fuel types.

[2205.4] 2305.4 Signage. Durable signs shall be conspicuously posted at motor fuel-dispensing facilities in accordance with this section.

[2205.4.1] 2305.4.1 Tank overfill warning sign. A warning sign shall be posted on or immediately adjacent to tank overfill alarm panel that reads: "CAUTION: WHEN ALARM ACTIVATES, TANK IS FILLED TO CAPACITY. DO NOT OVERFILL."

[2205.5] 2305.5 Portable fire extinguishers. Approved portable fire extinguishers complying with the requirements of FC906 with a minimum rating of 40-B:C shall be provided and located such that an extinguisher is not less than 20 feet (6096 mm) but not more than 75 feet (22 860 mm) from pumps, dispensers or storage tank fill connections.

SECTION FC [2206] 2306
DESIGN AND INSTALLATION REQUIREMENTS FOR LIQUID MOTOR FUEL-DISPENSING FACILITIES

[2206.1] 2306.1 General. Liquid motor fuel storage and dispensing systems shall be designed and installed in accordance with FC Chapter [34] 57 except as otherwise specified in this chapter, including the requirements of this section.

[2206.2] 2306.2 Method of storage. Approved methods of storage for liquid motor fuel at motor fuel-dispensing facilities shall be in accordance with FC [2206.2.1] 2306.2.1 through [2206.2.4] 2306.2.4.

[2206.2.1] 2306.2.1 Underground tanks. The installation of underground tanks for the storage of liquid motor fuel shall comply with the requirements of FC Chapter [34] 57 except as otherwise specified in this chapter.

[2206.2.1.1] 2306.2.1.1 Inventory control for underground tanks. Accurate daily inventory records shall be maintained and reconciled for underground liquid motor fuel storage tanks for indication of possible leakage from tanks and piping. Inventory reconciliation shall be in accordance with the regulations of the New York State Department of Environmental Conservation as set forth in 6 NYCRR Part 613. The records shall be maintained in accordance with FC107.7. Records shall include daily reconciliation between sales, use, receipts and inventory on hand. Where there is more than one system consisting of tanks serving separate pumps or dispensers for a product, the reconciliation shall be maintained separately for each tank system. A consistent or accidental loss of product shall be immediately reported to the commissioner.

[2206.2.1.2] 2306.2.1.2 Listing and approval. Underground liquid motor fuel storage tanks shall be listed and approved.

[2206.2.1.3] 2306.2.1.3 Tank design and construction. Underground liquid motor fuel storage tanks shall be designed and constructed in accordance with the following:

1. Tanks shall be completely double-walled and constructed of steel, fiberglass-reinforced plastic or a combination of both materials. The secondary tank shall be capable of containing any leakage from the primary tank.

2. Tanks shall be designed and constructed to withstand one and one-half times the maximum operating loads and stresses, regardless of the amount of liquid motor fuel contained in the tank. Such capabilities shall be established by buoyancy calculations and load and stress analyses.

3. Tanks shall be designed and constructed to withstand a pressure of 15 pounds per square inch gauge (psig)(103.4 kPa) or one and one-half times the maximum anticipated static head pressure, whichever is greater, for the primary tank and 5 pounds per square inch gauge (psig)(34.5 kPa) for the secondary tank.

4. The capacity of each individual tank shall not exceed 12,000 gallons (45 420 L) of liquid motor fuel.

[2206.2.1.4] 2306.2.1.4 Tank connections. Tank connections shall be designed and located so as to:

1. Minimize the maneuvering necessary to position a cargo tank to make the delivery.

2. Minimize any obstructions of a public right of way or motorists' view of roadways, or any impediment to the movement of motor vehicles or pedestrians, during delivery.

3. Provide connections by means of approved liquid- and vapor-tight connections.

4. Comply with the requirements of [FC2205.1.3] FC2305.1.3.

[2206.2.1.5] 2306.2.1.5 Liquid level-indicating devices. Tanks shall be provided with an approved liquid level-indicating device. The quantity of fuel in the tank as indicated on the liquid level-indicating device shall be accessible to the delivery operator. Liquid level-indicating devices shall be designed, constructed and installed to be vapor- and liquid-tight.

[2206.2.1.6] 2306.2.1.6 Tank overfill alarm. Tanks shall be provided with an approved overfill alarm designed to activate a local audible and visual alarm in an area supervised by the cargo tank delivery operator. Such alarms shall activate when the quantity of fuel in the tank exceeds a designated level, which shall not be more than 95 percent of capacity.

[2206.2.2] 2306.2.2 Prohibited aboveground storage. The storage of motor fuel in aboveground tanks shall be prohibited as set forth in FC [2206.2.2.1] 2306.2.2.1, [2206.2.2.2] 2306.2.2.2 and [2206.2.2.3] 2306.2.2.3.

[2206.2.2.1] 2306.2.2.1 Storage of flammable liquid motor fuel. It shall be unlawful to store flammable liquid motor fuel in aboveground tanks.

[2206.2.2.2] 2306.2.2.2 Storage of combustible liquid motor fuel. It shall be unlawful to store combustible liquid motor fuel in aboveground tanks, except outdoors at a fleet motor fuel-dispensing facility complying with the requirements of this chapter.

[2206.2.2.3] 2306.2.2.3 Indoor storage. It shall be unlawful to store liquid motor fuel in aboveground tanks indoors.

[2206.2.3] 2306.2.3 Aboveground tanks located outdoors, at grade. Outdoor storage of combustible liquid motor fuel in aboveground tanks at a fleet motor fuel-dispensing facility shall comply with the requirements set forth in FC [2206.2.3.1] 2306.2.3.1 through [2206.2.3.6] 2306.2.3.6.

[2206.2.3.1] 2306.2.3.1 Tank design and construction. Only protected aboveground tanks shall be used.

[2206.2.3.2] 2306.2.3.2 Tank capacity. The capacity of each tank shall not exceed [4,000 gallons (15 140 L)] 10,000 gallons (37 850 L). Not more than a total of [4,000 gallons (15 140 L)] 10,000 gallons (37 850 L) of liquid motor fuel shall be stored aboveground at any facility. The total storage capacity at a facility in both aboveground and underground tanks shall not exceed 40,000 gallons (15 140 L) of liquid motor fuel. Each tank shall have a separate fill line and a separate vent line that are separate from the fill and vent lines of other tanks.

Exception: When approved, individual tanks may exceed [4,000 gallons (151 400 L)] 10,000 gallons (37 850 L) but shall not exceed 12,000 gallons (45 420 L).

[2206.2.3.3] 2306.2.3.3 Tank base support. Tanks shall be placed on an approved base slab. The surface of such base slab shall be a minimum of 6 inches (152 mm) above the level of the surrounding area to permit visual inspection. Tanks shall be adequately supported and anchored to the base slab to withstand uplifting by surface water and flooding.

[2206.2.3.4] 2306.2.3.4 Tank connections. Tank connections shall be designed and located in accordance with [FC2206.2.1.4] FC2306.2.1.4.

[2206.2.3.5] 2306.2.3.5 Liquid level-indicating devices. Tanks shall be provided with an approved liquid level-indicating device in accordance with [FC2206.2.1.5] FC2306.2.1.5.

[2206.2.3.6] 2306.2.3.6 Tank overfill alarm. Tanks shall be provided with an approved overfill alarm in accordance with [FC2206.2.1.6] FC2306.2.1.6.

[2206.2.4] 2306.2.4 Location requirements for aboveground tanks at fleet motor fuel-dispensing facilities. Tanks shall be located in accordance with FC Table [2206.2.4] 2306.2.4 and as follows:

1. A minimum of 25 feet (7620 mm) from a subway grating, entrance or exit.

2. At a location that will not obstruct or interfere with any means of egress or department access.

3. Tanks shall not be installed under electrical transmission lines, bridges, or public highways.

FC TABLE [2206.2.4] 2306.2.4
MINIMUM SEPARATION REQUIREMENTS FOR ABOVEGROUND TANKS AT FLEET MOTOR FUEL-DISPENSING FACILITIES

CLASS OF LIQUID AND TANK TYPE	INDIVIDUAL TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM NEAREST BUILDING (feet)	MINIMUM DISTANCE FROM LOT LINE (feet)	MINIMUM DISTANCE FROM PUBLIC STREET OR PRIVATE ROAD (feet)	MINIMUM DISTANCE BETWEEN TANKS (feet)
Liquid motor fuel tanks	4000	15	15	15	3
	Greater than 4000	25	25	15	3

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

[2206.3] 2306.3 Security. Aboveground tanks for the storage of liquid motor fuel shall be safeguarded in an approved manner from public access or unauthorized entry.

[2206.4] 2306.4 Physical protection. Posts complying with the requirements of FC312 or other approved means shall be provided to protect aboveground tanks against impact by a motor vehicle unless the tank is listed as a protected aboveground tank with vehicle impact protection.

[2206.5] 2306.5 Secondary containment. Aboveground tanks shall be provided with diking in accordance with FC Chapter [34] 57. Diking is not required for listed secondary containment tanks. The secondary containment systems shall be monitored either visually or automatically. Enclosed secondary containment systems shall be provided with emergency venting in accordance with [FC2206.6.2.5] FC2306.6.2.5.

[2206.6] 2306.6 Piping, valves, fittings and ancillary equipment for use with liquid motor fuel. The design, fabrication, assembly, testing and inspection of piping, valves, fittings and ancillary equipment for use with liquid motor fuel shall be in accordance with FC Chapter [34] 57 except as otherwise specified in FC [2206.6.1] 2306.6.1 through [2206.6.3] 2306.6.3, and FC [2206.9] 2306.9 and [2206.10] 2306.10.

[2206.6.1] 2306.6.1 Protection from damage. Piping shall be located such that it is protected from physical damage and designed to accommodate settlement, vibration, expansion or contraction.

[2206.6.2] 2306.6.2 Piping, valves, fittings and ancillary equipment for aboveground tanks. Piping, valves, fittings and ancillary equipment for aboveground tanks shall comply with the requirements of FC [2206.6.2.1] 2306.6.2.1 through [2206.6.2.11] 2306.6.2.11.

[2206.6.2.1] 2306.6.2.1 Tank openings. Tank openings for aboveground tanks shall be through the top only. There shall be no openings except those necessary to inspect, fill, empty and vent the tank.

[2206.6.2.2] 2306.6.2.2 Fill-pipe connections. The fill-pipe for aboveground tanks shall be provided with a means for making a direct connection to the cargo tank's fuel-delivery hose so that liquid motor fuel is not exposed to the open air during the filling operation. Operator safety equipment for the filling operation shall be provided in accordance with OSHA regulations. Where any portion of the fill-pipe exterior to the tank extends below the level of the top of the tank, a check valve, a dry break coupling and a quick closing valve shall be installed at the fill connection. Tank fill connections from a remote location are prohibited.

[2206.6.2.3] 2306.6.2.3 Overfill protection. Overfill protection shall be provided for aboveground storage tanks. Overfill prevention devices shall be designed to withstand the pressure generated by the cargo tank discharge pump and shall automatically shut off the flow into the tank when the tank is not more than 95 percent full.

[2206.6.2.4] 2306.6.2.4 Siphon prevention. An approved antisiphon method shall be provided in the piping system to prevent flow of liquid motor fuel by siphon action.

[2206.6.2.5] 2306.6.2.5 Emergency relief venting. Aboveground storage tanks, tank compartments and enclosed secondary containment spaces shall be provided with emergency relief venting in accordance with FC Chapter [34] 57.

[2206.6.2.6] 2306.6.2.6 Spill containers. Aboveground tank spill containers having a capacity of not less than 5 gallons (19 L) shall be provided for each fill connection. Spill containers shall be noncombustible and shall be fixed to the tank and equipped with a manual drain valve that drains into the primary tank.

[2206.6.2.7] 2306.6.2.7 Piping material construction. Piping shall be of a minimum Schedule 40 steel construction.

[2206.6.2.8] 2306.6.2.8 Compatibility. Piping, fittings, components and joint compounds shall be mutually compatible, and compatible with diesel fuel and other commonly-used combustible liquid motor fuels, including the additives commonly used in such combustible motor fuels. Joint compounds shall be listed and approved.

[2206.6.2.9] 2306.6.2.9 Pressure relief devices. Where liquid motor fuel may become trapped between shutoff valves and/or check valves, affected piping sections shall be provided with pressure-relief devices that will discharge the pressure generated by thermal expansion back into the tank.

[2206.6.2.10] 2306.6.2.10 Vent piping. Each tank shall be provided with a separate unobstructed vent line, without any trap or device that causes excessive back pressure, and shall be maintained unobstructed at all times.

[2206.6.2.11] 2306.6.2.11 Vent termination. Vent outlets shall discharge outdoors and upward. The discharge point shall be no less than 15 feet (4572 mm) above the adjacent ground level and no less than 10 feet (3048 mm) from the nearest building opening.

[2206.6.3] 2306.6.3 Piping, valves, fittings and ancillary equipment for underground tanks. Piping, valves, fittings and ancillary equipment for underground tanks shall comply with the requirements of FC Chapter [34] 57 and NFPA 30A, except as otherwise provided in FC [2206.6.3.1] 2306.6.3.1, [2206.6.3.2] 2306.6.3.2 and [2206.10] 2306.10.

[2206.6.3.1] 2306.6.3.1 Piping design and construction. Piping, including vent piping, shall be of a minimum Schedule 40 steel construction. Approved nonmetallic piping, such as fiberglass-reinforced plastic or other equivalent corrosion-resistant material, may be installed underground.

[2206.6.3.2] 2306.6.3.2 Underground tank piping. Piping shall be installed underground, except for the vertical riser of the vent.

[2206.6.3.3] 2306.6.3.3 Compatibility. Piping, fittings, components and joint compounds shall be mutually compatible, and compatible with gasoline, diesel fuel, methanol and other commonly-used liquid motor fuels, including the additives commonly used in such liquid motor fuels. Joint compounds shall be listed and approved.

[2206.7] 2306.7 Fuel-dispensing systems for liquid motor fuel. The design and installation of liquid motor fuel-dispensing systems shall be in accordance with FC [2206.7.1] 2306.7.1 through [2206.7.9.2.4] 2306.7.9.2.4. Alcohol-blended motor fuel-dispensing systems shall additionally comply with [FC2206.7.10] FC2306.7.10.

[2206.7.1] 2306.7.1 Listed equipment. Electrical equipment, dispensers, hose, nozzles and submersible or subsurface pumps used in liquid motor fuel storage and dispensing systems shall be listed and approved.

[2206.7.2] 2306.7.2 Fixed pumps required. Liquid motor fuel shall be transferred only from the top of the tank by means of fixed pumps designed and equipped to allow control of the flow and prevent leakage or accidental discharge.

[2206.7.2.1] 2306.7.2.1 Aboveground tank dispenser. Only one vehicle may be fueled at a time. Fuel dispensing from a location remote from the tank may be allowed when approved by the commissioner.

[2206.7.2.2] 2306.7.2.2 Pump sumps. Pump sumps shall be compatible with the liquid motor fuel, liquid-tight, and accessible for inspection. Prefabricated pump sumps shall be approved.

[2206.7.3] 2306.7.3 Mounting of dispensers. Dispensing devices, except those installed on top of a protected aboveground tank that qualifies as vehicle-impact resistant, shall be protected against physical damage by mounting on a concrete island 6 inches (152 mm) or more in height, or shall otherwise be suitably protected in accordance with FC312. Dispensing devices shall be installed and securely fastened to their mounting surface in accordance with the dispenser manufacturer's instructions. Dispensing devices installed indoors shall be located in an approved position not in a direct line with vehicular traffic.

[2206.7.3.1] 2306.7.3.1 Protection of floor openings in indoor facilities. Openings in floors beneath liquid motor fuel-dispensing facilities located indoors shall be sealed.

[2206.7.3.2] 2306.7.3.2 Dispenser pans. An approved dispenser pan that is compatible with the liquid motor fuel shall be installed beneath a dispenser. The dispenser pan shall be liquid-tight, accessible for inspection, no larger than necessary, and installed solely for the purpose of collecting any liquid motor fuel leaking from the dispenser. The dispenser pan shall not be used to collect liquid motor fuel discharged from defective piping. The dispenser pan shall be backfilled up to not less than 6 inches (152 mm) above any nonmetallic piping and shall not interfere with the operation of any safety device.

[2206.7.4] 2306.7.4 Dispenser emergency valve. An approved automatic emergency shutoff valve designed to close in the event of a fire or impact shall be properly installed in the liquid supply line at the base of each dispenser supplied by a remote pump. The valve shall be installed so that the shear groove is flush with or within ½ inch (12.7 mm) of the top of the concrete dispenser island and there is clearance provided for maintenance purposes around the valve body and operating parts. The valve shall be installed at the liquid supply line inlet of each overhead-type dispenser. Where installed, a vapor return line located inside the dispenser housing shall have a shear section or approved flexible connector for the liquid supply line emergency shutoff valve to function. Emergency shutoff valves shall be installed and maintained in accordance with the manufacturer's instructions, tested at the time of initial installation and tested at least yearly thereafter in accordance with [FC2205.2.2] FC2305.2.2.

[2206.7.5] 2306.7.5 Dispenser hose. Dispenser hoses shall be a maximum of 18 feet (5486 mm) in length unless otherwise approved. Dispenser hoses shall be listed and approved. When not in use, hoses shall be reeled, racked or otherwise protected from damage. The length of the dispensing hose shall be such that at least 1 inch (25 mm) clearance between the hose and the ground is maintained when the nozzle is rested on its bracket. Dispensing hoses installed at aviation facilities, marine liquid motor fuel-dispensing facilities, and fleet liquid motor fuel-dispensing facilities shall be of an approved length.

[2206.7.5.1] 2306.7.5.1 Breakaway devices. Dispenser hoses shall be equipped with a listed emergency breakaway device designed to retain liquid on both sides of a breakaway point. Such devices shall be installed and maintained in accordance with the manufacturer's instructions. Where hoses are attached to hose-retrieving mechanisms, the emergency breakaway device shall be located between the hose nozzle and the point of attachment of the hose-retrieval mechanism to the hose.

[2206.7.6] 2306.7.6 Fuel delivery nozzles. A listed automatic-closing-type hose nozzle valve without a latch-open device shall be provided for dispensers used for dispensing liquid motor fuel, except that a nozzle valve with a latch-open device may be installed and used at the following automotive liquid motor fuel-dispensing facilities:

1. Full-service automotive liquid motor fuel-dispensing facilities.

2. Fleet automotive liquid motor fuel-dispensing facilities.

3. Dispensing of diesel fuel at self-service automotive liquid motor fuel-dispensing facilities.

[2206.7.6.1] 2306.7.6.1 Special requirements for nozzles. Where dispensing of liquid motor fuel is performed, a listed automatic-closing-type hose nozzle valve shall be used that incorporates all of the following features:

1. When the flow of product is normally controlled by devices or equipment other than the hose nozzle valve, the hose nozzle valve shall not be capable of being opened unless the delivery hose is pressurized. If pressure to the hose is lost, the nozzle shall close automatically.

   Exception: Vapor recovery nozzles incorporating insertion interlock devices designed to achieve shutoff on disconnect from the vehicle fill pipe.

2. The hose nozzle shall be designed such that the nozzle is retained in the fill pipe during the filling operation.

3. The system shall include listed equipment with a feature that causes or requires the closing of the hose nozzle valve before the product flow can be resumed or before the hose nozzle valve can be replaced in its normal position in the dispenser.

[2206.7.6.2] 2306.7.6.2 Control device. A control device shall be provided that will allow a liquid motor fuel pump to operate only when the dispensing nozzle is removed from its bracket on the dispenser and the switch on the dispenser is manually activated. The flow of liquid motor fuel shall automatically stop when the switch is deactivated or the nozzle returned to its bracket.

[2206.7.7] 2306.7.7 Leak detection. Underground liquid motor fuel storage and dispensing systems shall be provided with a leak detection system in accordance with the following:

1. The leak detection system shall provide continuous monitoring of the tank's interstitial space.

2. The leak detection system shall provide continuous monitoring of liquid motor fuel pump sumps. Activation of the leak detection system shall cause shutdown of the liquid motor fuel pumps.

3. The leak detection system shall provide continuous monitoring of dispenser pans. Activation of the leak detection system shall cause shutdown of the affected dispenser or liquid motor fuel pump supplying such dispenser.

4. Primary discharge piping shall be provided with an automatic line leak detector. Activation of such leak detector shall cause shutdown of the liquid motor fuel pump or significantly restrict the product flow.

5. The leak detection system shall have an alarm panel in a supervised location on the premises; trigger both an audible and visible local alarm; be capable of producing hardcopy printouts of all tests and/or leak notification reports; operate on low voltage; and be intrinsically safe for a liquid motor fuel environment.

6. Leak detection systems shall be listed and approved.

[2206.7.8] 2306.7.8 Gravity and pressure dispensing. Liquid motor fuel shall not be dispensed by gravity from tanks, drums, barrels or similar containers. Liquid motor fuel shall not be dispensed by a device operating through pressure within a storage tank, drum or container.

[2206.7.9] 2306.7.9 Vapor-recovery and vapor-processing systems. [Vapor-recovery] Stage I vapor-recovery and vapor-processing systems, when required by the New York State Department of Environmental Conservation, shall be installed in accordance with [FC2206.7.9] FC2306.7.9 and the regulations of the New York State Department of Environmental Conservation, and shall be approved.

[2206.7.9.1] 2306.7.9.1 Vapor-balance systems. Vapor-balance systems shall comply with the requirements of FC [2206.7.9.1.1] 2306.7.9.1.1 through [2206.7.9.1.5] 2306.7.9.1.5.

[2206.7.9.1.1] 2306.7.9.1.1 Dispensing devices. Dispensing devices incorporating provisions for vapor recovery shall be listed and labeled. When existing listed or labeled dispensing devices are modified for vapor recovery, such modifications shall be listed by report by a nationally recognized testing laboratory. The listing by report shall contain a description of the component parts used in the modification and the recommended method of installation on specific dispensers. Such report shall be made available for inspection by any department representative. Means shall be provided to shut down fuel dispensing in the event the vapor return line becomes blocked.

[2206.7.9.1.2] 2306.7.9.1.2 Vapor-return line closeoff. An approved method shall be provided to close off the vapor return line from dispensers when the product is not being dispensed.

[2206.7.9.1.3] 2306.7.9.1.3 Piping. Piping in vapor-balance systems shall be in accordance with FC [3403.6] 5703.6 and [3404.2] 5704.2. Nonmetallic piping shall be installed in accordance with the manufacturer's installation instructions. Vapor

return piping shall be installed in a manner that drains back to the tank, without sags or traps in which liquid can become trapped. If necessary, because of grade, condensate tanks are allowed in vapor return piping. Condensate tanks shall be designed and installed so that they can be drained without opening.

2306.7.9.1.3.1 Removal of piping. The owner shall be responsible for notifying the department, in writing, upon decommissioning of the piping in vapor-balance system. Such notification shall include the location of the facility and the name, address and telephone number of the contractor who performed the removal.

[2206.7.9.1.4] 2306.7.9.1.4 Flexible joints and shear joints. Flexible joints shall be installed in accordance with [FC3403.6.9] FC5703.6.9. An approved shear joint shall be rigidly mounted and connected by a union in the vapor return piping at the base of each dispensing device. The shear joint shall be mounted flush with the top of the surface on which the dispenser is mounted.

[2206.7.9.1.5] 2306.7.9.1.5 Testing. Vapor return lines and vent piping shall be tested in accordance with [FC2206.9] FC2306.9.

[2206.7.9.2] 2306.7.9.2 Vapor-processing systems. Vapor-processing systems shall comply with the requirements of FC [2206.7.9.2.1] 2306.7.9.2.1 through [2206.7.9.2.4] 2306.7.9.2.4.

[2206.7.9.2.1] 2306.7.9.2.1 Equipment. Equipment in vapor-processing systems, including hose nozzle valves, vapor pumps, flame arresters, fire checks or systems for prevention of flame propagation, controls and vapor-processing equipment, shall be individually listed for the intended use in a specified manner. Vapor-processing systems that introduce air into the underground piping or storage tanks shall be provided with equipment for prevention of flame propagation that has been tested and listed as suitable for the intended use.

[2206.7.9.2.2] 2306.7.9.2.2 Location. Vapor-processing equipment shall be located at or above grade. Sources of ignition shall be located not less than 50 feet (15 240 mm) from fuel-transfer areas and not less than 18 inches (457 mm) above tank fill openings and tops of dispenser islands. Vapor-processing units shall be located not less than 10 feet (3048 mm) from the nearest building or structure or lot line.

Exception: Where the required distances to buildings or structures, lot lines or fuel-transfer areas cannot be obtained, means shall be provided to protect equipment against fire exposure. Acceptable means shall include:

1. Approved protective enclosures, which extend at least 18 inches (457 mm) above the equipment, constructed of fire-resistant or noncombustible materials; and

2. Fire protection using an approved water-spray system.

[2206.7.9.2.2.1] 2306.7.9.2.2.1 Location and safeguards. Vapor-processing equipment shall be located a minimum of 20 feet (6096 mm) from dispensing devices. Processing equipment shall be protected against physical damage by guardrails, curbs, protective enclosures or fencing. Where approved protective enclosures are used, approved means shall be provided to ventilate the volume within the enclosure to prevent pocketing of flammable vapors. Where a downslope exists toward the location of the vapor-processing unit from a fuel-transfer area, the commissioner may require additional separation by distance and height.

[2206.7.9.2.3] 2306.7.9.2.3 Installation. Vapor-processing units shall be securely mounted on concrete, masonry or structural steel supports on concrete or other noncombustible foundations. Vapor-recovery and vapor-processing equipment is allowed to be installed on roofs when approved.

[2206.7.9.2.4] 2306.7.9.2.4 Piping. Piping in a mechanical-assist system shall be in accordance with [FC3403.6] FC5703.6.

[2206.7.10] 2306.7.10 Alcohol-blended motor fuel-dispensing equipment. Dispensers, hoses, nozzles, breakaway fittings, swivels, flexible connectors, dispenser emergency shutoff valves, vapor recovery systems and pumps used in alcohol-blended motor fuel storage and dispensing systems shall be compatible with such fuels and shall be listed or approved for such purpose.

[2206.8] 2306.8 Fire extinguishing system for dispensing area. Where flammable liquid motor fuel is dispensed at an automotive liquid motor fuel-dispensing facility, the dispensing area shall be provided with a dry chemical fire extinguishing system designed and installed in accordance with FC904.6, and the following requirements:

1. The fire extinguishing system shall be designed to provide overhead protection of the dispenser area encompassed by a circle formed by the fully extended hose and nozzle on each fuel dispenser and both ends of the dispenser island.

2. The extinguishing agent containers shall be equipped with indicators to show whether the system is fully charged. Indicators shall be positioned to be easily read from grade.

3. The installation, alteration, testing and repair of the fire extinguishing system, including any maintenance or modification of the system, shall be performed by a person possessing a master fire suppression piping contractor license issued by the Department of Buildings and trained and knowledgeable in the installation, operation and maintenance of the specific fire extinguishing system.

4. Dispensers shall not be operated when the fire extinguishing system has discharged or is inoperative, except as authorized in writing by the department. The motor fuel-dispensing facility certified attendant shall immediately notify the department of system discharge or inoperability.

5. Fire extinguishing systems shall be inspected and tested in accordance with [FC2206.9] FC2306.9.

6. Fire extinguishing systems at fleet automotive liquid motor fuel-dispensing facilities shall be monitored by an approved central station company.

[2206.9] 2306.9 Inspection and testing. Inspection and testing required by FC [2206.9.1] 2306.9.1 through [2206.9.7] 2306.9.7 shall be conducted at the owner's risk by his or her representative before a representative of the department.

[2206.9.1] 2306.9.1 Initial tank test. Underground and aboveground tanks shall be tested hydrostatically at 15 pounds per square inch (psig)(103.4 kPa), or one and one-half times the maximum anticipated static head pressure, whichever is greater, for the inner tank, and pneumatically or hydrostatically at 5 pounds per square inch (psig)(34.5 kPa) for the annular space (secondary containment tank). When a pneumatic test is allowed, an inert gas shall be used; however, air may be used if the tank or piping system does not contain any liquid motor fuel or combustible vapor. Test pressure shall be maintained for a sufficient time to complete visual inspection, but not less than 1 hour. A tank shall be deemed to have passed the test if it shows no evidence of leakage or permanent deformation.

[2206.9.2] 2306.9.2 Initial piping test. Prior to backfill, primary piping shall be tested hydrostatically to one and one-half times the maximum anticipated operating pressure, but not less than 15 pounds per square inch (psig)(103.4 kPa). After backfill and installation of the top slab, discharge piping shall be tested hydrostatically at one and one-half times the maximum anticipated pressure, but not less than 50 pounds per square inch (psig)(345 kPa). Secondary containment piping (annular space) shall be tested pneumatically at 5 pounds per square inch (psig)(34.5 kPa) utilizing an inert gas; however, air may be used if the tank system or piping system does not contain any liquid motor fuel or combustible vapor. Hydrostatic test pressure shall be maintained for sufficient time to complete visual inspection but not less than 1 hour. The test shall show that there is no evidence of leakage. Test pressure for aboveground tank piping shall be at one and one-half times the maximum anticipated operating pressure but not less than 100 pounds per square inch (psig)(690 kPa).

[2206.9.3] 2306.9.3 Leak detection functionality test. Leak detection systems shall be inspected and tested at the time of installation in accordance with the rules. Leak detection systems monitoring liquid motor fuel storage systems shall be tested at least once every 2 years by a person holding a certificate of license. Such test shall confirm that all leak detection equipment and associated alarms are in good working order.

[2206.9.4] 2306.9.4 Fire extinguishing system test. A performance test of the fire extinguishing system shall be performed at the time of installation in accordance with the approved design and installation documents, and such procedures as may be prescribed by the commissioner. Fire extinguishing systems shall be tested at least once every 5 years. The test shall be in accordance with procedures prescribed by the commissioner.

[2206.9.5] 2306.9.5 Emergency tank and piping system test. The commissioner may require that a tank and piping system be precision tested or pressure tested in accordance

with this section to determine the condition of the tank or piping. Storage systems that may contain liquid motor fuel or combustible vapor shall not be tested pneumatically.

[2206.9.6] 2306.9.6 Periodic tank and piping test. Any existing underground single-walled liquid motor fuel storage [tanks] tank previously approved by the department or any existing underground [tanks] tank that is not provided with a leak detection system meeting the requirements of [FC2206.7.7] FC2306.7.7 shall be precision tested at least once every 5 years.

[2206.9.7] 2306.9.7 Pouring concrete and backfilling. The pouring of concrete for the base and top slab, the backfilling of tank and piping, and the construction of the top slab support shall be witnessed by a representative of the department at time of installation.

[2206.10] 2306.10 Installation of underground tank and piping systems. The installation of tank and piping systems shall be in accordance with FC Chapter [34] 57, except as otherwise specified in this section.

1. Tanks shall be located so that the forces from building foundations and support loads are not transmitted to the tanks. The distance from any part of a tank to the nearest wall of any basement, pit, cellar or any property line shall not be less than 3 feet (914 mm). Tanks shall not be placed less than 20 feet (6096 mm) from a subway wall.

2. Tanks shall be installed so that the highest point of the tank is not less than 2 feet (609.6 mm) below the level of the lowest cellar floor of any building within a radius of 10 feet (3048 mm) from the tank. No tank shall be located under a sidewalk or beyond the property line of the liquid motor fuel-dispensing facility.

3. Tanks shall be placed on a 12-inch (305-mm) thick base slab approved by the Department of Buildings, or installed in such other manner as may be approved by the Commissioner of Buildings, and secured against flotation. The system used for anchoring the tank shall not damage the tank or its coating.

4. Tanks shall be placed on a bed of approved backfill material in accordance with manufacturer's specifications. The backfill material shall evenly and completely support the bottom quadrant of the tank. The backfill material shall be carefully placed along the bottom, under the sides and under the end caps or heads of the tank, by shoveling and tamping. Backfilling shall then be completed in 12-inch (305-mm) lifts placed uniformly around the tank. Provision shall be made, consistent with site conditions, to prevent the migration of backfill.

5. Tanks shall be covered with a reinforced concrete slab not less than 8 inches (203 mm) thick, which shall extend not less than 12 inches (305 mm) beyond the horizontal outlines of the tank. The support of the top slab shall be of a design approved by the Department of Buildings.

6. Fill, suction and discharge piping shall be encased in 4 inches (102 mm) of concrete or covered by a minimum of 18 inches (457 mm) of manufacturer-approved backfill, or

covered by 4 inches (102 mm) of manufacturer-approved backfill and an 8-inch (203-mm) reinforced concrete slab.

7. Not more than 40,000 gallons (151 400 L) of liquid motor fuel shall be stored at any facility, including liquid motor fuel stored in aboveground tanks.

8. Tanks containing identical products may be wet-manifolded provided that the total aggregate capacity of such tanks does not exceed 12,000 gallons (45 420 L) of liquid motor fuel, and each tank is provided with its own submersible pump.

9. Tank connections shall be designed and located so as to:

    9.1. Minimize the maneuvering necessary to position a cargo tank to make the delivery.

    9.2. Minimize obstructing a public right of way or motorists' view of roadways, or impeding the movement of motor vehicles or pedestrians, during deliveries.

    9.3. Provide connections by means of approved liquid- and vapor-tight connections.

10. Tanks installed underground indoors shall be provided with an approved liquid level-indicating device. Liquid level-indicating devices shall be designed and constructed to prevent the escape of liquid or vapor and shall be approved.

11. Test wells shall be prohibited in tanks located underground indoors. Unused tank openings shall be permanently sealed at the tank to prevent removal of plugs or covers.

12. Secondary containment piping shall be required on all nonmetallic product-carrying pipes except direct fill lines, suction lines or siphon lines containing only one check valve located at the highest point of the line.

13. Underground piping shall have a slope of not less than ⅛ inch per foot (10.4 mm per meter) pitched toward the tank and shall be installed so as to facilitate initial and periodic testing.

14. Flexible joints shall be installed in accordance with [FC3403.6.9] FC5703.6.9.

15. Each underground motor fuel storage tank shall be provided with a separate unobstructed vent line without any trap or device that causes excessive back pressure.

16. Vent piping shall be installed not less than 12 inches (305 mm) below the finished surface measured from the point where the piping rises vertically and shall slope toward the tank.

17. Vent outlets shall discharge outdoors and upward. The discharge point shall be no less than 15 feet (4572 mm) above the adjacent ground level and no less than 10 feet (3048 mm) from the nearest building opening.

18. An approved overfill prevention device shall be provided to prevent overfilling. When installed in diesel fuel tanks, such overfill prevention device shall be designed to withstand the pressure generated by the cargo tank discharge pump and shall automatically shut off the flow into the tank when the tank is not more than 95 percent full.

19. Each tank shall be provided with one fill connection only, unless approved. Each tank fill connection shall be provided with a catchment basin with a capacity of at least 15 gallons (56.8 L). The contents of the catchment basin shall be automatically drained into the tank without overfilling the tank after the transfer from the cargo tank is completed provided, however, that if the Stage II vapor recovery system approved for the tank does not allow for the installation of an automatic drain, a manual drain may be installed.

20. Where the discharging piping leak detector required by [FC2206.7.7(4)] FC2306.7.7(4) does not cause shutdown of the liquid motor fuel pump, secondary containment piping shall be provided.

[2206.11] 2306.11 Spill control. Provision shall be made to prevent liquids spilled during dispensing operations from flowing into buildings, by grading driveways, raising doorsills or other approved means.

SECTION FC [2207 RESERVED] 2307
DESIGN AND INSTALLATION REQUIREMENTS FOR BIODIESEL MOTOR FUEL

2307.1 General. Biodiesel motor fuel shall be stored and dispensed in motor fuel storage and dispensing systems designed and installed in accordance with this section.

2307.2 Biofuel content. The amount of biofuel content in biodiesel motor fuel shall not exceed 20 percent, except as authorized by the department.

2307.3 Aboveground storage. Biodiesel motor fuel may be stored and dispensed in protected aboveground tanks in accordance with FC2306.2.3.1.

2307.4 Design and installation. The design of motor fuel storage and dispensing systems used for biodiesel motor fuel shall be in accordance with FC Chapter 23.

2307.5 Change of tank contents. Any motor fuel storage and dispensing system that is to be used for biodiesel, which was previously used for other types of motor fuel, shall comply with the requirements of FC5704.2.1.

SECTION FC [2208] 2308
COMPRESSED NATURAL GAS MOTOR FUEL-DISPENSING FACILITIES

[2208.1] 2308.1 General. CNG motor fuel-dispensing facilities shall be designed, installed, operated and maintained in accordance with NFPA 52 except as otherwise specified in this section and [FC2201] FC2301.

[2208.1.1] 2308.1.1 Prohibitions. It shall be unlawful to:

1. Operate a self-service marine CNG motor fuel-dispensing facility.

2. Fill a portable container, other than permanently mounted fuel containers on CNG-powered vehicles, except outdoors at a utility-operated facility.

[2208.1.2] 2308.1.2 Supervision of dispensing operations. The dispensing of CNG at CNG motor fuel-dispensing facilities shall be supervised by a certified attendant as set forth in [FC2201.7] FC2301.7.

[2208.1.3] 2308.1.3 Maintenance. Maintenance of CNG motor fuel-dispensing systems shall be conducted under the personal supervision of a person holding a CNG fueling facility maintenance certificate of fitness.

[2208.1.4] 2308.1.4 Lighting. Dispensing areas shall be well lighted whenever dispensing is being conducted.

[2208.1.5] 2308.1.5 Dispensing area signage. Durable signs shall be conspicuously posted in dispensing areas in CNG motor fuel-dispensing facilities in compliance with the requirements of FC [2208.1.5.1] 2308.1.5.1 through [2208.1.5.3] 2308.1.5.3.

[2208.1.5.1] 2308.1.5.1 Operating instructions. A sign setting forth dispenser operating instructions shall be posted on every dispenser. Such sign shall also indicate the location of the emergency shutdown switches required by [FC2208.7] FC2308.7.

[2208.1.5.2] 2308.1.5.2 CNG dispensing warning sign. A warning sign that reads as follows shall be posted on or immediately adjacent to each dispenser:

1. No smoking.

2. Shut off engine.

[2208.1.5.3] 2308.1.5.3 Emergency procedures. A sign setting forth emergency procedures that reads as follows shall be posted in the dispensing area, or other location designated in this section:

IN CASE OF FIRE, LEAK OR EMERGENCY:

ACTIVATE EMERGENCY CNG SHUTDOWN

DIRECT VEHICLE OCCUPANTS TO EXIT VEHICLES
AND LEAVE AREA IMMEDIATELY

KEEP ALL PERSONS AWAY FROM THE AREA.

NOTIFY THE FIRE DEPARTMENT (CALL 911)

(FACILITY ADDRESS)
(*indicate address, with cross-street reference*).

[2208.1.6] 2308.1.6 Emergency telephone. A telephone not requiring a coin to operate or another approved, clearly identified means to notify the department, shall be provided at the facility in an approved location.

[2208.1.7] 2308.1.7 Electrical equipment. Electrical wiring and equipment shall be suitable for the location in which they are installed and shall be in accordance with FC605, NFPA 52 and the Electrical Code.

[2208.1.8] 2308.1.8 Audible and visible alarms. All audible and visible alarms required by this section shall actuate at a supervised location on the premises that assures immediate response.

[2208.1.9] 2308.1.9 Smoking and open flames. It shall be unlawful to smoke or use or maintain an open flame in any area where CNG motor fuel is compressed, stored or dispensed.

> **Exception**: Welding, cutting or similar hot work may be conducted for emergency repair, alteration or installation work, providing that all necessary safety precautions are taken, and all required department permits and authorization from the holder of a certificate of fitness for CNG station maintenance have been obtained.

[2208.1.10] 2308.1.10 Records of incidents. Records shall be kept of all incidents including fire, leak, device, equipment or system failure, out-of-service fire protection, alarm, or safety system, and of all equipment maintenance. Such records shall be kept in a bound log book or other recordkeeping approved by the department, maintained on the premises for a minimum of 4 years.

[2208.1.11] 2308.1.11 Self-service CNG motor fuel-dispensing facilities. Self-service CNG motor fuel-dispensing facilities shall be designed, installed, operated and maintained in compliance with the requirements of FC [2208.1.11.1] 2308.1.11.1 through [2208.1.11.5] 2308.1.11.5.

> **[2208.1.11.1] 2308.1.11.1 Duties of certified attendant.** The certified attendant's primary function shall be to supervise, observe and monitor the dispensing of CNG. The certified attendant shall prevent the dispensing of CNG into portable containers, control sources of ignition, take immediate action upon a fire, leak or other emergency and be ready to use a portable fire extinguisher. Nothing in this section shall be construed to prohibit a certified attendant from engaging in activities directly related to the sale of CNG motor fuel, such as the collection of money or processing of credit cards.

[2208.1.11.2] 2308.1.11.2 Self-service dispensers. Approved self-service devices, equipment and systems such as, but not limited to, card-operated and remote-preset types, are allowed at CNG motor fuel-dispensing facilities. The certified attendant shall set the dispensing devices in the "off" position when not in use if such dispensing device can be activated without the certified attendant's knowledge.

[2208.1.11.3] 2308.1.11.3 Monitoring of dispensing. A control booth shall be located on the premises of every self-service CNG motor fuel-dispensing facility. The control booth shall be an interior or exterior enclosure to which the public has no access. The certified attendant shall be present within the control booth while dispensing operations are conducted. The control booth shall be designed and located so that the certified attendant stationed therein shall have a full, unobstructed clear view of dispensing operations, except that mirrors and/or an approved closed-circuit television installation may be provided to afford the certified attendant a clear view of dispensing operations when the view from the control booth is partially or temporarily obstructed. For purposes of this section, the "clear" view provided by a closed-circuit television installation shall mean that the image on the monitor shall be of such brightness and resolution as to allow ready identification of individuals and easy observation of activities at all times of day. Audible and visible alarms required by this section shall actuate within the control booth. A properly labeled manual switch that activates the emergency shut down device shall be located within the control booth. A console that controls the self-service CNG motor fuel dispensers shall be provided within the control booth and within 5 feet (1524 mm) of the emergency shutdown device manual switch.

[2208.1.11.4] 2308.1.11.4 Two-way voice communication. A two-way voice communication system shall be installed to provide contact between the control booth and each dispensing island.

[2208.1.11.5] 2308.1.11.5 Signage. The signage required by [FC2208.1.5] FC2308.1.5 shall be posted in the dispensing area of a self-service motor fuel-dispensing facility, except that the emergency procedures sign required by [FC2208.1.5.3] FC2308.1.5.3 shall be posted in the control booth.

[2208.1.12] 2308.1.12 Fleet CNG motor fuel-dispensing facilities. Fleet CNG motor fuel-dispensing facilities shall be designed, installed, operated and maintained in compliance with the requirements of FC [2208.1.12.1] 2308.1.12.1 through [2208.1.12.3] 2308.1.12.3.

[2208.1.12.1] 2308.1.12.1 Inspection of dispensing areas. The certified attendant responsible for supervision of the dispensing of CNG at a fleet motor fuel-dispensing facility shall inspect the dispensing area on a periodic basis in accordance with the rules to ensure that the facility is being maintained in accordance with this chapter and the rules. The certified attendant shall notify the owner and make any other notifications required by this code if there is any evidence that the facility is not in good working order. A record of such inspections and notifications shall be maintained at the premises in accordance with FC107.7.

[2208.1.12.2] 2308.1.12.2 Duties of fleet personnel. Employees or other persons working for the owner of a fleet CNG fuel-dispensing facility whose duties involve the dispensing of CNG shall be trained and knowledgeable in such dispensing in compliance with the requirements of this code and the rules.

[2208.1.12.3] 2308.1.12.3 Quantity limits. Dispensing equipment used at fleet CNG motor fuel-dispensing facilities shall be programmed or set to limit uninterrupted CNG delivery to an approved amount and require a manual action to resume delivery.

[2208.1.13] 2308.1.13 Full-service CNG motor fuel-dispensing facilities. Full-service CNG motor fuel-dispensing facilities shall be operated and maintained in compliance with the requirements of [FC2208.1.13.1] FC2308.1.13.1.

[2208.1.13.1] 2308.1.13.1 Duties of certified attendant. The certified attendant at a full-service CNG motor fuel-dispensing facility shall personally supervise the dispensing of motor fuel into vehicles by facility personnel. The certified attendant shall conduct a visual inspection of the dispensing area on a daily basis to monitor the condition of such installation. The certificate of fitness holder shall notify the owner and make any other notifications required by this code if there is any evidence that the installation is not in good working order. A record of such inspections and notifications shall be maintained at the premises in accordance with FC107.7.

[2208.2] 2308.2 Design, installation and testing requirements. Devices, equipment and systems used for the compression, storage and dispensing of CNG shall be designed, approved, listed and/or tested in accordance with FC [2208.2.1] 2308.2.1 through [2208.2.7] 2308.2.7.

[2208.2.1] 2308.2.1 Approved equipment. Containers, vessels, compressors, pressure regulators, pressure relief valves and other pressure relief devices and piping used for CNG shall be approved.

[2208.2.2] 2308.2.2 Listed equipment. Hoses, hose connections, dispensers, gas detection systems and electrical equipment used for CNG shall be listed. Vehicle-fueling connections shall be listed and labeled.

[2208.2.3] 2308.2.3 Vehicle fueling hose. Vehicle fueling hose shall be compatible with CNG and shall withstand a pressure of at least four times the service pressure. Hoses shall be of retractable design and shall be protected against physical damage. Hoses shall be tested for leaks with a noncorrosive solution or equivalent leak detection method at least annually by a certified attendant and shall be replaced if damaged. Records of required inspections and testing shall be kept in a bound log book or other approved recordkeeping, maintained on the premises for a minimum of 4 years.

[2208.2.4] 2308.2.4 Initial container testing. Prior to placing containers and pressure vessels in CNG service, evidence of container and pressure vessel pressure tests shall be submitted to the department demonstrating compliance with the requirements of NFPA 52.

[2208.2.5] 2308.2.5 Gas piping. All CNG system gas piping shall be tested by a qualified person in accordance with NFPA 52 at the owner's risk and before a representative of the department prior to placing the system in service. Required tests shall begin at the downstream side of the remote manual shutdown valve.

[2208.2.6] 2308.2.6 Filters and dryers. Filters and dryers used at CNG motor fuel-dispensing facilities shall be rated for the service and pressure intended and shall be tested in accordance with the gas piping test requirements set forth in [FC2208.2.5] FC2308.2.5.

[2208.2.7] 2308.2.7 Safety devices. Upon installation, all automatic safety devices intended to cause equipment shutdown shall be tested at the owner's risk by his or her representative before a representative of the department.

[2208.3] 2308.3 Location of dispensing operations and equipment. CNG motor fuel-dispensing facilities shall be located at a site operated by a natural gas utility, or other approved location.

[2208.3.1] 2308.3.1 Location on property. In addition to the requirements of [FC2203.1] FC2303.1 and NFPA 52, compression, storage and dispensing devices, equipment and systems shall be installed as follows:

1. Aboveground, and not beneath power lines.

2. At least 10 feet (3048 mm) from the nearest building, lot line, public street, private road, sidewalk, or source of ignition.

   Exception: Dispensing equipment need not be separated from canopies that are constructed in accordance with the construction codes, including the Building Code, and which provide weather protection for the dispensing equipment.

3. At least 25 feet (7620 mm) from the nearest rail of any railroad track and 50 feet (15 240 mm) or more from the nearest rail of any railroad main track or any railroad or transit line where power for train propulsion is provided by an outside electrical source such as third rail or overhead catenary.

4. At least 50 feet (15 240 mm) from the vertical plane below the nearest overhead wire of a trolley bus line.

[2208.3.2] 2308.3.2 Rooftop operations. Rooftop dispensing shall be in accordance with FC [2208.3.2.1] 2308.3.2.1 through [2208.3.2.3] 2308.3.2.3.

[2208.3.2.1] 2308.3.2.1 Roof construction. The roof of the building or structure shall be of noncombustible construction.

[2208.3.2.2] 2308.3.2.2 Compressor and discharge piping. The compressor shall be located on the roof and the discharge piping shall not enter the building or structure.

[2208.3.2.3] 2308.3.2.3 Height. The building or structure shall be 75 feet (22 860 mm) or less in height.

[2208.4] 2308.4 Reserved.

[2208.5] 2308.5 Pressure regulators. Pressure regulators shall be designed and installed or protected so that their operation will not be affected by the elements (freezing rain, sleet, snow or ice), mud or debris. The protection is allowed to be an integral part of the regulator.

[2208.6] 2308.6 Manual valves. Gas supply piping to equipment shall be provided with a remote, readily accessible manual shutoff valve of the fast-closing, quarter-turn type. Manual valves shall be located so as to minimize the risk of physical damage and minimize being rendered inoperable as a result of freezing.

[2208.6.1] 2308.6.1 Location. Manual valves shall be located within the boundary of the facility and as follows:

1. Not less than 25 feet (7620 mm) from the compressor for compressors rated for 300 standard cubic feet per minute (8.5 m^3/min) or less.

2. Not less than 75 feet (22 860 mm) from the compressor for compressors rated for greater than 300 standard cubic feet per minute (8.5 m^3/min).

[2208.7] 2308.7 Emergency shutdown switches. An approved, clearly identified and readily accessible emergency shutdown switch shall be provided at an approved location. The switch, upon activation, shall automatically and immediately shut off the power supply to the compressor and close valves between the gas supply and the compressor and between the storage tanks and the dispensers. Such emergency shutdown switches for outdoor CNG dispensers shall be located within 75 feet (22 860 mm) of, but not less than 25 feet (7620 mm) from, the fuel dispensers. For interior fuel-dispensing operations, such emergency shutdown switches shall be installed at an approved location. An additional automatic emergency shutdown switch shall be provided in the compressor area for both indoor and outdoor compressors. An approved sign shall be posted on or immediately adjacent to such switches and shall read: EMERGENCY CNG SHUTOFF. Such emergency shutdown switch shall be of a type that is manually resettable.

[2208.7.1] 2308.7.1 Compressor shutdown devices. Each compressor shall be equipped with an automatic shutdown device that will shut down the compressor in the event of low suction pressure, high suction pressure, high motor temperature, high discharge pressure or high discharge temperature.

[2208.7.2] 2308.7.2 Gas detection system. Indoor compressing, storage and dispensing areas shall be provided with a combustible gas detection alarm system meeting the standards of the construction codes, including the Building Code. Such system shall activate a local audible and visible alarm at 20 percent of the LEL and automatically shut off gas supply at 50 percent of the LEL, with simultaneous transmission of an alarm to the department by an approved central station company. The automatic shutoff valve shall be located upstream

from the confined high-pressure piping and shall be installed underground or otherwise protected from exposure to fire in an approved manner.

[2208.7.3] 2308.7.3 Heat detection system. Indoor compressing, storage and dispensing areas shall be provided with a closed-circuit heat detection system utilizing approved heat detection devices and equipment designed to automatically activate a local audible and visible alarm with simultaneous transmission to an approved central station, activate a fire extinguishing system over the area or enclosure, and shut off the gas supply to the compressor and dispenser. The automatic shutoff valve shall be installed underground or be otherwise protected from exposure to fire in an approved manner.

[2208.7.3.1] 2308.7.3.1 Outdoor heat detection system. Outdoor compressing, storage and dispensing shall be provided with a closed-circuit heat detection system designed utilizing approved heat detection devices and equipment designed to automatically activate a local audible and visible alarm and shut off the gas supply to the compressor and dispenser. The automatic shutoff valve shall be installed underground or otherwise protected from exposure to fire in an approved manner.

[2208.7.3.2] 2308.7.3.2. Outdoor storage exceeding 35,000 SCF [(991.2 m^3)] (991.1 m^3)**.** For outdoor CNG storage exceeding 35,000 SCF [(991.2 m^3)] (991.1 m^3) located within 25 feet (7620 mm) of a building or structure, activation of the heat detection system shall simultaneously transmit an alarm to an approved central station.

[2208.7.4] 2308.7.4 Fire extinguishing systems and appliances. Indoor compressing, storage and dispensing areas shall be protected throughout by a fire extinguishing system.

[2208.7.4.1] 2308.7.4.1 Fire extinguishing system periodic testing. A performance test of the non-water fire extinguishing system and the dispensing facility emergency shutdown system shall be conducted at least once every 5 years. The test shall be conducted at the owner's risk by his or her representative before a representative of the department.

[2208.7.4.2] 2308.7.4.2 Portable fire extinguishers. Portable fire extinguishers shall be provided adjacent to the CNG motor fuel-dispensing facility in the number and size specified by NFPA 52 and FC906.

[2208.8] 2308.8 Discharge of CNG from motor vehicle fuel storage containers. The discharge of CNG from motor vehicle fuel containers for the purposes of maintenance, container certification, calibration of dispensers or other activities shall be in accordance with FC [2208.8.1] 2308.8.1 through [2208.8.1.2] 2308.8.1.2.

[2208.8.1] 2308.8.1 Methods of discharge. The discharge of CNG from motor vehicle fuel containers shall be accomplished through a closed transfer system in accordance with [FC2208.8.1.1] FC2308.8.1.1 or an approved method of atmospheric venting in accordance with [FC2208.8.1.2] FC2308.8.1.2.

[2208.8.1.1] 2308.8.1.1 Closed transfer system. Documentation of the procedure for discharging the container shall be provided to the commissioner for approval. The procedure shall include the actions the operator will take in the event of a low-pressure or high-pressure natural gas release during the discharging activity. A schematic design document illustrating the arrangement of piping, regulators and equipment settings, and their relation to the location of the compressor, storage vessels and emergency shutdown devices, shall be provided to the commissioner for approval.

[2208.8.1.2] 2308.8.1.2 Atmospheric venting. Atmospheric venting of CNG shall comply with the requirements of FC [2208.8.1.2.1] 2308.8.1.2.1 through [2208.8.1.2.6] 2308.8.1.2.6.

[2208.8.1.2.1] 2308.8.1.2.1 Plans and specifications. A schematic design document illustrating the location of the vessel support, piping, the method of grounding and bonding, and other requirements specified herein or requested by the department shall be provided to the commissioner for approval.

[2208.8.1.2.2] 2308.8.1.2.2 Container stability. A method of rigidly supporting the container during the venting of CNG shall be provided. The selected method shall provide not less than two points of support and shall prevent the horizontal and lateral movement of the container. The system shall be designed to prevent the movement of the container based on the highest gas-release velocity through valve orifices at the container's rated pressure and volume. The structure or appurtenance shall be constructed of noncombustible materials.

[2208.8.1.2.3] 2308.8.1.2.3 Separation. The structure or appurtenance used for stabilizing the container shall be separated from other equipment or features as set forth in FC Table [2208.8.1.2.3] 2308.8.1.2.3.

FC TABLE [2208.8.1.2.3] 2308.8.1.2.3
SEPARATION DISTANCE FOR ATMOSPHERIC VENTING OF CNG

EQUIPMENT OR FEATURE	MINIMUM SEPARATION (feet)
Buildings	25
Building openings	25
Lot lines	15
Public street or private roads	15
Vehicles	25
CNG compressor and storage containers	25
CNG dispensers	25

For SI: 1 foot = 304.8 mm.

[2208.8.1.2.4] 2308.8.1.2.4 Grounding and bonding. The structure or appurtenance used for supporting the container shall be grounded in accordance with the Electrical Code. The container valve shall be bonded prior to the commencement of venting operations.

[2208.8.1.2.5] 2308.8.1.2.5 Vent tube. A vent tube that will divert the gas flow to the atmosphere shall be installed on the container prior to commencement of the venting and purging operation. The vent tube shall be constructed of pipe or tubing materials

approved for use with CNG in accordance with FC Chapter [30] 53. The vent tube shall be capable of dispersing the gas a minimum of 10 feet (3048 mm) above grade level. The vent tube shall not be provided with a rain cap or other feature that would limit or obstruct the gas flow. At the connection fitting of the vent tube and the CNG container, a listed bi-directional detonation flame arrester shall be provided.

[2208.8.1.2.6] 2308.8.1.2.6 Signage. Approved "No Smoking" signs complying with the requirements of FC310 shall be conspicuously posted within 10 feet (3048 mm) of the container support structure or appurtenance. Approved CONTAINER SHALL BE BONDED signs shall be posted on the container support structure or appurtenance.

[2208.9] 2308.9 Residential and other vehicle fueling appliance facilities. The compressing and dispensing of CNG by a vehicle fueling appliance shall be in accordance with FC [2208.9.1] 2308.9.1 through [2208.9.4] 2308.9.4.

[2208.9.1] 2308.9.1 Residential fueling appliance facilities. The compressing and dispensing of CNG at a residential fueling appliance facility shall be in accordance with NFPA 52 and this chapter, except that such facilities shall be exempt from the requirements of [FC2208.3.1(2)] FC2308.3.1(2) with regard to the distance to the nearest building, and FC [2208.7] 2308.7 through [2208.7.4] 2308.7.4.

[2208.9.2] 2308.9.2 Nonresidential fueling appliance facilities. The compressing and dispensing of CNG at a nonresidential fueling appliance facility shall be in accordance with NFPA 52 and this chapter, except that such facilities shall be exempt from [FC2208.3.1(2)] FC2308.3.1(2) with regard to the distance to the nearest building, and FC [2208.7] 2308.7 through [2208.7.4] 2308.7.4.

[2208.9.3] 2308.9.3 Prohibitions. It shall be unlawful to:

1. Fill or store any containers, other than permanently mounted fuel containers on CNG-powered vehicles.

2. Compress and dispense CNG indoors.

[2208.9.4] 2308.9.4 Supervision. The operation of a vehicle fueling appliance facility shall be under the personal supervision of a certified attendant.

[2208.10] 2308.10 Mobile CNG motor fuel compression, storage and dispensing. A mobile CNG motor fuel compression, storage and/or dispensing system may be used to fuel vehicle-mounted containers as approved by the commissioner and subject to such conditions as the commissioner may prescribe consistent with public safety.

SECTION FC [2209] 2309
HYDROGEN MOTOR FUEL-DISPENSING AND GENERATING FACILITIES

[2209.1] 2309.1 General. Hydrogen motor fuel-dispensing and generating facilities shall be designed, installed, operated and maintained in accordance with this section and FC Chapters [30] 53, [32] 55 and [35] 58, as applicable.

[2209.1.1] 2309.1.1 Prohibition. It shall be unlawful to:

1. Maintain or operate a self-service hydrogen motor fuel-dispensing facility.

2. Maintain or operate a marine hydrogen motor fuel-dispensing facility.

3. Fill a container with hydrogen, other than containers permanently mounted on a powered industrial truck or a hydrogen-powered motor vehicle and used for motive power as set forth in [FC3501.5(1)] FC5801.5(1).

4. Generate, compress, store or dispense hydrogen indoors, except for gaseous hydrogen in hydrogen fuel gas rooms in accordance with FC5808.

[2209.1.2] 2309.1.2 Supervision. The dispensing of hydrogen at hydrogen motor fuel-dispensing facilities shall be conducted by or under the personal supervision of a certified attendant in accordance with [FC2201.7] FC2301.7.

[2209.1.2.1] 2309.1.2.1 Inspection of dispensing area. The certified attendant at a hydrogen motor fuel-dispensing facility responsible for supervision of the dispensing of hydrogen shall inspect the dispensing area on a daily basis to ensure that the facility is being maintained in accordance with this chapter and the rules. The certified attendant shall notify the owner and make any other notifications required by this code if there is any evidence that the facility is not in good working order. A record of such inspections and notifications shall be maintained at the premises in accordance with FC107.7.

[2209.1.2.2] 2309.1.2.2 Duties of fleet personnel. Employees or other persons working for the owner of a fleet hydrogen motor fuel-dispensing facility whose duties involve the dispensing of hydrogen shall be trained and knowledgeable in such dispensing in compliance with the requirements of this code and the rules.

[2209.1.3] 2309.1.3 Maintenance. Maintenance of hydrogen motor fuel-dispensing facilities shall be conducted under the personal supervision of a person holding a hydrogen fueling-facility maintenance certificate of fitness.

[2209.1.4] 2309.1.4 Lighting. Dispensing areas shall be well lighted whenever dispensing is conducted.

[2209.1.5] 2309.1.5 Dispensing area signage. Durable signs shall be conspicuously posted in dispensing areas in hydrogen motor fuel-dispensing facilities in compliance with the requirements of FC [2209.1.5.1] 2309.1.5.1 through [2209.1.5.4] 2309.1.5.4.

[2209.1.5.1] 2309.1.5.1 Operating instructions. A sign setting forth dispenser operating instructions shall be posted on every dispenser. Such sign shall also indicate the location of the emergency shutdown valves and emergency shutdown controls required by FC [2209.7.3] 2309.7.3 and [2209.7.4] 2309.7.4.

[2209.1.5.2] 2309.1.5.2 Hydrogen dispensing warning sign. A warning sign that reads as follows shall be posted on or immediately adjacent to each dispenser:

1. No smoking.

2. Shut off engine.

[2209.1.5.3] 2309.1.5.3 Emergency procedures. A sign setting forth emergency procedures that reads as follows shall be posted in the dispensing area, or other location designated in this section:

IN CASE OF FIRE, LEAK OR EMERGENCY:

ACTIVATE EMERGENCY SHUTDOWN

DIRECT VEHICLE OCCUPANTS TO EXIT VEHICLES
AND LEAVE AREA IMMEDIATELY

KEEP ALL PERSONS AWAY FROM THE AREA

NOTIFY THE FIRE DEPARTMENT (CALL 911)

(FACILITY ADDRESS)
(*indicate address, with cross-street reference*).

[2209.1.5.4] 2309.1.5.4 Canopy top hydrogen storage. An approved sign having 2-inch (51-mm) block letters shall be conspicuously posted at approved locations on the exterior of any canopy structure when gaseous hydrogen compression and storage equipment is located on top of such canopy reading "CANOPY TOP HYDROGEN STORAGE."

[2209.1.6] 2309.1.6 Emergency telephone. A telephone not requiring a coin to operate or another approved, clearly identified means to notify the department, shall be provided on the site in an approved location.

[2209.2] 2309.2 Equipment. Equipment used for the generation, compression, storage or dispensing of hydrogen shall be designed for hydrogen motor fuel in accordance with this section.

[2209.2.1] 2309.2.1 Approved equipment. Containers and tanks; pressure relief devices, including pressure valves, hydrogen vaporizers, pressure regulators, and piping used for gaseous hydrogen systems shall be designed and constructed in accordance with FC Chapters [30] 53, [32] 55 and [35] 58.

[2209.2.2] 2309.2.2 Listed or approved equipment. Hoses, hose connections, compressors, hydrogen generators, dispensers, detection systems and electrical equipment used for hydrogen shall be listed or approved for use with hydrogen. Hydrogen motor fueling connections shall be listed and labeled or approved for use with hydrogen.

[2209.2.3] 2309.2.3 Electrical equipment. Electrical wiring and equipment shall be suitable for the location in which they are installed and shall be in accordance with the Electrical Code.

[2209.3] 2309.3 Location. In addition to the requirements of [FC2203.1] FC2303.1, generation, compression, storage and dispensing equipment shall be located in accordance with this section.

[2209.3.1] 2309.3.1 Outdoors. Generation, compression, storage or dispensing equipment shall be allowed outdoors only in accordance with FC Chapter [35] 58 and NFPA 2.

[2209.3.2] 2309.3.2 Gaseous hydrogen storage. Storage of gaseous hydrogen shall be in accordance with FC Chapters [30] 53 and [35] 58 and NFPA 2.

[2209.3.3] 2309.3.3 Liquefied hydrogen storage. Storage of liquefied hydrogen shall be in accordance with FC Chapters [32] 55 and [35] 58 and NFPA 2.

[2209.3.4] 2309.3.4 Canopy tops. Gaseous hydrogen compression and storage equipment located on top of motor fuel-dispensing facility canopies shall be in accordance with FC Chapters [30] 53 and [35] 58, the Fuel Gas Code and this section.

[2209.3.4.1] 2309.3.4.1 Construction. Canopies shall be constructed in accordance with the motor fuel-dispensing facility canopy requirements of Chapter 4 of the Building Code and the following:

1. The canopy shall meet or exceed Type I construction requirements.

2. Operations located under canopies shall be limited to fueling only.

3. The canopy shall be constructed in a manner that prevents the accumulation of hydrogen gas.

[2209.3.4.2] 2309.3.4.2 Fire extinguishing systems. Fuel-dispensing areas under canopies shall be protected throughout by a sprinkler system. The design of the sprinkler system shall not be less than that required for Extra Hazard Group 2 occupancies. Operation of the sprinkler system shall activate the emergency functions of this section.

[2209.3.4.3] 2309.3.4.3 Emergency discharge. Operation of the sprinkler system shall activate an automatic emergency discharge system, which will discharge the hydrogen gas from the equipment on the canopy top through the vent pipe system.

[2209.3.4.4] 2309.3.4.4 Emergency shutdown control. Operation of the sprinkler system shall activate the emergency shutdown control required by [FC2209.7.4] FC2309.7.4.

[2209.4] 2309.4 Canopies. Dispensing equipment need not be separated from canopies of Type I or II construction that are constructed in a manner that prevents the accumulation of hydrogen gas and in accordance with Chapter 4 of the Building Code.

[2209.5] 2309.5 Weather protection. Generation, compression, storage or dispensing equipment shall be allowed under weather protection in accordance with the requirements of Chapter 4 of the Building Code and [FC2704.13] FC5004.13. The weather protection shall be constructed in a manner that prevents the accumulation of hydrogen gas.

[2209.6] 2309.6 Overpressure protection. Dispensing systems shall be equipped with an overpressure protection device set at 140 percent of the service pressure of the fueling nozzle it supplies.

[2209.7] 2309.7 Safety precautions. Safety precautions at hydrogen motor fuel-dispensing and generating facilities shall be in accordance with this section.

[2209.7.1] 2309.7.1 Protection from vehicles. Guard posts or other approved means shall be provided to protect hydrogen storage systems and use areas subject to vehicular damage in accordance with FC312.

[2209.7.2] 2309.7.2 Vehicle fueling pad. The motor vehicle shall be fueled on noncoated concrete or other approved paving material having a resistance not exceeding 1 megohm as determined by the methodology specified in EN 1081.

[2209.7.3] 2309.7.3 Emergency shutoff valves. A manual emergency shutoff valve shall be provided at a clearly visible, accessible and approved location, to shut down the flow of gas from the hydrogen supply to the piping system.

[2209.7.4] 2309.7.4 Emergency shutdown controls. In addition to the manual emergency shutoff valve required by [FC2209.7.3] FC2309.7.3, a remotely located, manually activated emergency shutdown control shall be provided. An emergency shutdown control shall be located within 75 feet (22 860 mm) of, but not less than 25 feet (7620 mm) from, dispensers and hydrogen generators.

[2209.7.5] 2309.7.5 System requirements. Activation of the emergency shutdown control shall automatically shut down the power supply to all hydrogen storage, compression and dispensing equipment; shut off natural gas or other fuel supply to the hydrogen generator; and close valves between the main supply and the compressor and between the storage containers and dispensing equipment.

2309.8 Defueling procedure. The defueling, purging or other discharge of gaseous hydrogen from hydrogen motor fuel supply systems, including tanks and piping, shall be conducted in accordance with FC Chapters 53 and 58 and NFPA 2. Documentation setting forth the procedure for discharging the storage container shall be submitted to the department for review in connection with the approval of the hydrogen motor fuel storage and dispensing system installation. The written procedure shall address the actions the operator shall take in the event of a low-pressure or high-pressure hydrogen release during gaseous hydrogen discharge.

Exception: Discharges limited to the fuel supply piping from the fuel storage tank to the engine compartment on a motor vehicle or powered industrial truck.

SECTION FC [2210] 2310
MARINE LIQUID MOTOR FUEL-DISPENSING FACILITIES

[2210.1] 2310.1 General. The construction of marine liquid motor fuel-dispensing facilities shall be in accordance with the construction codes, including the Building Code, and NFPA 30A. The installation, inspection, testing, maintenance and operation of a liquid motor fuel storage and dispensing system at marine liquid motor fuel-dispensing facilities shall be in accordance with this chapter governing automotive liquid motor fuel-dispensing facilities, except that full-service marine liquid motor fuel-dispensing facilities do not require a fire extinguishing system for the dispensing area.

[2210.1.1] 2310.1.1 Prohibited facility. It shall be unlawful to operate a self-service marine liquid motor fuel-dispensing facility.

[2210.2] 2310.2 Storage and handling. The storage and handling of liquid motor fuel at marine liquid motor fuel-dispensing facilities shall be in accordance with FC [2210.2.1] 2310.2.1 through [2210.2.3] 2310.2.3.

[2210.2.1] 2310.2.1 Class I, II or IIIA liquid storage. Class I, II or IIIA liquids stored indoors used for marine liquid motor fuel-dispensing facilities shall be stored in approved containers. Storage of Class I liquids shall not exceed 10 gallons (38 L).

[2210.2.2] 2310.2.2 Dispensing from portable containers. No marine vessel or watercraft shall be fueled from a portable container while indoors.

[2210.2.3] 2310.2.3 Heating equipment. Heating equipment installed in liquid motor fuel storage or dispensing areas shall comply with the requirements of [FC2201.6] FC2301.6.

[2210.3] 2310.3 Dispensing. The dispensing of liquid motor fuel at marine liquid motor fuel-dispensing facilities shall comply with the requirements of FC [2210.3.1] 2310.3.1 through [2210.3.4] 2310.3.4.

[2210.3.1] 2310.3.1 General. Unless another use has been approved, piers, docks or wharves at marine liquid motor fuel-dispensing facilities shall be used exclusively for the dispensing or transfer of liquid motor fuel to or from marine vessel, watercraft, except that transfer of essential ship stores is allowed.

[2210.3.1.1] 2310.3.1.1 Flexible metallic piping. Where there is a need to provide flexibility in piping to allow for motion of a pier or dock, flexible metallic piping of an approved length and design may be installed and used in compliance with NFPA 30A. All flexible metallic piping or other flexible hose connections authorized by this section shall be inspected for proper operation at least once a year by a certificate of license holder. A record of such inspection shall be kept in a bound log book or other approved form of recordkeeping, and maintained on the premises for a minimum of 4 years.

[2210.3.2] 2310.3.2 Supervision. The dispensing of liquid motor fuel at marine liquid motor fuel-dispensing facilities shall be conducted by or under the personal supervision of a certified attendant as set forth in [FC2201.7] FC2301.7.

[2210.3.3] 2310.3.3 Hoses and nozzles. Dispensing of liquid motor fuel into the fuel tanks of marine vessels and watercraft shall be by means of an approved-type hose equipped with a listed automatic-closing nozzle without a latch-open device. Hoses used for dispensing or transferring liquid motor fuel, when not in use, shall be reeled, racked or otherwise protected from mechanical damage.

[2210.3.4] 2310.3.4 Portable containers. Liquid motor fuel dispensing into portable containers shall be performed in accordance with [FC2204.1.7] FC2304.1.7, except that portable containers that are approved and used as the fuel tank for marine vessels or watercraft may be of a capacity not greater than 5½ gallons (20.8 L).

[2210.4] 2310.4 Fueling of marine vehicles at other than approved marine liquid motor fuel-dispensing facilities. It shall be unlawful to fuel floating marine vessels and watercraft with liquid motor fuel at other than a marine liquid motor fuel-dispensing facility, except fueling of marine vessels and watercraft performed by off-shore fueling vessels approved by the United States Coast Guard.

[2210.5] 2310.5 Fire prevention. Marine liquid motor fuel-dispensing facilities shall comply with the requirements of FC [2210.5.1] 2310.5.1 through [2210.5.7] 2310.5.7.

[2210.5.1] 2310.5.1 Housekeeping. Marine motor fuel-dispensing facilities shall be maintained in a neat and orderly manner. Accumulations of rubbish or waste oils in excessive amounts are prohibited. Rubbish and other combustible waste shall be regularly removed from the premises and disposed of lawfully.

[2210.5.2] 2310.5.2 Spills. Spills of liquid motor fuel near or in the water shall be reported immediately to the department and other governmental agencies requiring such reporting.

[2210.5.3] 2310.5.3 Rubbish containers. Metal containers with tight-fitting or self-closing metal lids shall be provided for the temporary storage of rubbish or other combustible waste.

[2210.5.4] 2310.5.4 Marine vessel and watercraft mooring. When marine vessels and watercraft are being fueled at a fuel dock, no other marine vessel or watercraft shall be made fast to the marine vessel or watercraft being fueled or to the fuel dock. The dispensing hose shall not cross one marine vessel or watercraft to reach another.

[2210.5.5] 2310.5.5 Sources of ignition. Any activity or operation involving the use of open flames, arc- or spark-producing devices shall not be performed at marine motor fuel-dispensing facilities or within 50 feet (15 240 mm) of the dispensing facilities, including piers, docks or wharves, except where approved by the commissioner. Dispensing shall not be conducted at such pier, dock or wharf during the course of such emergency repairs.

[2210.5.5.1] 2310.5.5.1 Smoking. It shall be unlawful to smoke, use or maintain an open flame within 50 feet (15 240 mm) of fueling operations. "No Smoking" signs complying with the requirements of FC310 shall be conspicuously posted throughout the premises. Such signs shall have letters of not less than 4 inches (102 mm) in height with a background of contrasting color.

[2210.5.6] 2310.5.6 Preparation of tanks for fueling. Marine vessel and watercraft owners and operators shall not offer their marine vessel or watercraft for fueling unless the tanks being filled are properly vented to dissipate fumes to the outdoors.

[2210.5.7] 2310.5.7 Warning signs. Warning signs shall be prominently displayed at the face of each pier, dock or wharf at such elevation as to be clearly visible from the decks of marine vessels and watercraft being fueled. Such signs shall have letters not less than 3 inches (76 mm) in height on a background of contrasting color bearing the following or approved equivalent wording:

WARNING
NO SMOKING—STOP ENGINE WHILE
FUELING, SHUT OFF ELECTRICITY.
DO NOT START ENGINE UNTIL AFTER
BELOW DECK SPACES ARE VENTILATED.

[2210.6] 2310.6 Fire protection. Marine liquid motor fuel-dispensing facilities shall comply with the requirements of FC [2210.6.1] 2310.6.1 through [2210.6.4] 2310.6.4, and the construction codes, including the Building Code.

[2210.6.1] 2310.6.1 Standpipe hose stations. Fire hose, when required, shall be provided and enclosed within a cabinet, and hose stations shall be labeled: FIRE HOSE—EMERGENCY USE ONLY.

[2210.6.2] 2310.6.2 Obstruction of fire protection equipment. Materials shall not be placed or stored on a pier, dock or wharf in such a manner as to obstruct access to firefighting equipment or piping system control valves.

[2210.6.3] 2310.6.3 Access. Where the pier, dock or wharf is accessible to vehicular traffic, an unobstructed roadway to the shore end of the pier, dock or wharf shall be maintained for access by fire apparatus.

[2210.6.4] 2310.6.4 Portable fire extinguishers. One portable fire extinguisher in accordance with FC906 having a minimum rating of 40-B:C shall be provided on the pier, dock or wharf within 25 feet (7620 mm) of the head of the gangway to the pier, dock or wharf. If the certified attendant's office is within 25 feet (7620 mm) of the gangway or is on the pier, dock or wharf, the fire extinguisher may be provided therein.

SECTION FC [2211] 2311
REPAIR GARAGES

[2211.1] 2311.1 General. Repair garages shall comply with the requirements of this section and the construction codes, including the Building Code. Repair garages for vehicles that use more than one type of fuel shall comply with the applicable requirements of this section for each type of fuel used. Where a repair garage also includes a motor fuel-dispensing facility, the fuel-dispensing operation shall comply with the requirements of this chapter for motor fuel-dispensing facilities.

[2211.1.1] 2311.1.1 Supervision of defueling operations. The defueling of liquid motor fuel from the fuel tank of a motor vehicle shall be [conducted by or under the personal supervision of a person holding a certificate of fitness] supervised in accordance with FC2301.8.

2311.1.2 Supervision of repair garages for vehicles fueled by lighter-than-air motor fuels. The defueling of motor fuel from the fuel tank of a motor vehicle fueled by lighter-than-air motor fuel, and the refueling of such vehicles, shall be conducted by or under the personal supervision of a person holding a certificate of fitness.

[2211.2] 2311.2 Storage and use of flammable and combustible liquids. The storage and use of flammable and combustible liquids in repair garages shall comply with the requirements of FC Chapter [34] 57 and FC [2211.2.1] 2311.2.1 through [2211.2.4] 2311.2.4.

[2211.2.1] 2311.2.1 Cleaning of parts. Cleaning of parts shall be conducted in listed and approved parts-cleaning machines in accordance with FC Chapter [34] 57.

[2211.2.2] 2311.2.2 Waste oil, motor oil and other Class IIIB liquids. Waste oil, motor oil and other Class IIIB liquids, including crankcase drainings shall be stored in approved tanks or containers, which are allowed to be stored and dispensed from inside repair garages.

[2211.2.2.1] 2311.2.2.1 Tanks storing waste oil. For tanks of a capacity of 500 gallons (1893 L) or less, the fill connection may be located indoors provided that discharge of vapor from the fill port is prevented from entering the building or structure during and after filling. An automatic spring-loaded vertical check valve in the fill line or other

device designed to prevent vapors from escaping shall be provided. The fill line shall be capped immediately after filling.

[2211.2.3] 2311.2.3 [Drainage] Draining and disposal of liquids and oil-soaked waste. Garage floor drains, where provided, shall drain to approved oil separators or traps discharging to a sewer in accordance with the construction codes, including the Plumbing Code. Contents of oil separators, traps and floor drainage systems shall be collected at sufficiently frequent intervals and removed from the premises to prevent oil from being carried into the sewers. Crankcase drainings and liquids shall not be dumped into sewers, streams or on the ground, but shall be stored in approved tanks or containers in accordance with FC Chapter [34] 57 until removed from the premises. Self-closing metal cans shall be used for oily waste.

2311.2.3.1 Draining of liquid motor fuel tanks. Portable equipment used for defueling and refueling shall be listed and labeled and shall have fuel storage tanks not exceeding 65 gallons (246 L). Stationary systems for defueling and refueling, shall be approved by the department.

[2211.2.4] 2311.2.4 Spray finishing. Spray finishing with flammable or combustible liquids shall comply with the requirements of FC Chapter [15] 24.

[2211.3] 2311.3 Sources of ignition. Sources of ignition shall not be located within 18 inches (457 mm) of the floor and shall comply with the requirements of FC Chapters 3 and [26] 35.

[2211.3.1] 2311.3.1 Equipment. Appliances and equipment installed in a repair garage shall comply with the requirements of the construction codes, including the Building Code, the Mechanical Code and the Electrical Code.

[2211.3.2] 2311.3.2 Smoking. Smoking is prohibited in repair garages.

[2211.4] 2311.4 Below grade areas. Pits and other work areas below grade in repair garages shall comply with the requirements of FC [2211.4.1] 2311.4.1 through [2211.4.3] 2311.4.3.

[2211.4.1] 2311.4.1 Construction. Pits and other work areas below grade shall be constructed in accordance with the construction codes, including the Building Code.

[2211.4.2] 2311.4.2 Means of egress. Pits and other work areas below grade shall be provided with means of egress in accordance with the Building Code.

[2211.4.3] 2311.4.3 Ventilation. Where Class I liquids are stored or used within a building having a basement or pit wherein flammable vapors could accumulate, the basement or pit shall be provided with mechanical ventilation in accordance with the construction codes, including the Mechanical Code, at a minimum rate of 1.5 cubic feet per minute per square foot (0.008 $m^3/s/m^2$) to prevent the accumulation of flammable vapors.

[2211.5 Preparation of vehicles for repair. For vehicles powered by gaseous fuels, the fuel shutoff valves shall be closed prior to repairing any portion of the vehicle fuel system. Vehicles

powered by gaseous fuels in which the fuel system has been damaged shall be inspected and evaluated for fuel system integrity prior to being brought into the repair garage. The inspection shall include testing of the entire fuel delivery system for leakage.

2211.5.1 Drainage of liquid motor fuel tanks. Portable equipment used for defueling and refueling shall be listed and labeled and shall have fuel storage tanks not exceeding 65 gallons (246 L). Systems for defueling and refueling, other than by use of portable equipment, shall be approved.]

2311.5 Reserved.

2311.6 Reserved.

[2211.6] 2311.7 Portable fire extinguishers. Portable fire extinguishers shall be provided in accordance with FC906.

[2211.7] 2311.8 Repair garages for vehicles fueled by lighter-than-air motor fuels. [Repair garages] The repair garage, or the room, booth or area thereof, for the conversion and/or repair of vehicles which use CNG, liquefied natural gas (LNG), hydrogen or other lighter-than-air motor fuels shall be designed, installed, operated and maintained in accordance with FC [2211.7.1 and 2211.7.2, and, as applicable, FC2211] 2311.8.1 through 2311.8.8.

[**Exception:**] **Exceptions:**

1. Repair garages where work is conducted only on vehicles that have been defueled and their systems purged with nitrogen gas, and which will not be re-fueled in the repair garage. Documentation of such purging shall be maintained on the premises and signage conspicuously posted that no lighter-than-air gas fueling shall be conducted in the repair garage.

2. Repair garages where work is not performed on the fuel system and is limited to exchange of parts and maintenance requiring no open flame or welding on the CNG-, LNG-, hydrogen- or other lighter-than-air-fueled motor vehicle.

3. Repair garages for hydrogen-fueled vehicles where work is not performed on the hydrogen storage tank and is limited to the exchange of parts and maintenance requiring no open flame or welding on the hydrogen-fueled vehicle. During the work, the entire hydrogen fuel system shall contain less than 200 cubic feet (5.6 m^3) of hydrogen.

4. Repair garages for natural-gas-fueled vehicles where work is not being performed on the fuel storage tank, and is limited to the exchange of parts and maintenance requiring no open flame or welding on the natural-gas-fueled vehicle. During the work, the natural gas in the vehicle fuel tank shall contain a pressure of not more than 250 psi at 70ºF (1724 kPa at 21ºC).

2311.8.1 Construction requirements. Any room or booth in a repair garage that is used for motor vehicle repair shall be constructed in accordance with the Building Code and FC 2311.8.1.1 and 2311.8.1.2.

2311.8.1.1 Motor vehicle repair spaces. When motor vehicle repairs are performed in an unenclosed interior space, noncombustible spray curtains shall be provided to restrict the spread of flammable gases.

2311.8.1.2 Below grade areas. Motor vehicle repair rooms, booths and spaces shall not be constructed in below grade areas.

2311.8.2 Fire protection. Motor vehicle repair booths or spaces installed in a room or area shall be protected by a sprinkler system as set forth in the Building Code.

[2211.7.1 Ventilation] 2311.8.3 Exhaust ventilation system. Repair garages used for the repair of vehicles fueled by CNG, LNG or [hydrogen-fueled vehicles] other lighter-than-air motor fuels other than hydrogen shall be provided with an approved mechanical ventilation system[. The mechanical ventilation system shall be] designed in accordance with this section and the construction codes, including the Mechanical Code. Repair garages used for the repair of hydrogen-fueled vehicles shall be provided with an approved exhaust ventilation system in accordance with the construction codes, including the Mechanical Code, and Chapter 6 of NFPA 2.

2311.8.3.1 Design. For indoor locations, air supply inlets and exhaust outlets for mechanical ventilation shall be arranged to provide uniformly distributed air movement with inlets uniformly arranged on walls near floor level and outlets at the high point of the room in walls or the roof. Failure of the ventilation system shall cause the fueling system to shut down. The exhaust ventilation rate shall be not less than 1 cubic foot per minute (0.03 m^3/minute) per 12 cubic feet (34 m^3) of room volume.

2311.8.3.2 Operation. The mechanical exhaust ventilation system shall operate continuously.

Exceptions:

1. Mechanical exhaust ventilation systems that are interlocked with a gas detection system designed in accordance with FC2311.8.4.

2. Mechanical exhaust ventilation systems in repair garages that are used only for repair of vehicles fueled by liquid fuels or odorized gases, such as CNG, where the ventilation system is electrically interlocked with the lighting circuit.

[2211.7.2] 2311.8.4 Gas detection system. Repair garages used for repair of vehicles fueled by CNG, LNG or hydrogen shall be provided with [an approved flammable] a gas detection system [meeting the requirements of the construction codes, including the Building Code] in accordance with FC 908 and 2311.8.4.1 through 2311.8.4.3.

2311.8.4.1 System design. The gas detection system shall be designed to detect leakage of nonodorized gaseous fuel. Where lubrication or chassis service pits are provided in garages used for repairing nonodorized LNG-fueled vehicles, gas sensors shall be provided in such pits.

2311.8.4.2 System activation. Activation of the gas detection system alarm shall initiate the following actions:

1. Activation of local audible and visual alarms in approved locations.

2. Deactivation of heating systems located in the repair garage.

3. Activation of the mechanical exhaust ventilation system, where the ventilation system is interlocked with gas detection.

2311.8.4.3 System failure. Failure of the gas detection system shall automatically deactivate the heating system, activate the mechanical exhaust ventilation system where the system is interlocked with the gas detection system, and transmit a supervisory signal to the control panel and a central station.

2311.8.5 Electrical requirements. Areas within 18 inches (450 mm) of a ceiling within a motor vehicle repair room or motor vehicle repair booth shall be designed and installed in accordance with the requirements for Class I, Division 2 classified locations, as set forth in the Electrical Code.

Exceptions:

1. Motor vehicle repair rooms with exhaust ventilation of not less than 1 cfm per square foot (0.03 m^3/minute/m^2) of floor area, with suction taken from a point within 18 inches (450 mm) of the highest point in the ceiling in repair garages for vehicles that use CNG, liquefied natural gas (LNG) or other lighter-than-air motor fuels.

2. Motor vehicle repair rooms used for the repair of hydrogen-fueled vehicles that have an approved exhaust ventilation system in accordance with the Mechanical Code and NFPA 2.

2311.8.6 Preparation of vehicles for repair. For vehicles powered by gaseous fuels, the fuel shutoff valves shall be closed prior to repairing any portion of the vehicle fuel system. Where the fuel system of a vehicle powered by a gaseous fuel has been damaged, the entire fuel system of the vehicle shall be inspected and evaluated for integrity prior to being brought into the repair garage.

2311.8.7 Other requirements. Repair garages for vehicles fueled by lighter-than-air motor fuels shall comply with the requirements of FC 2311.1.2, 2311.3 and 2311.7 with respect to supervision, sources of ignition and portable fire extinguishers.

[2211.8] 2311.8.8 Defueling [of hydrogen from motor vehicle fuel storage containers. Discharge or defueling of hydrogen from motor vehicle fuel storage containers for the purpose of maintenance, container certification or other purposes shall be performed in accordance with FC2211.8.1.]**equipment required at vehicle maintenance and repair facilities.** Repair garages that repair or replace hydrogen fuel systems on hydrogen-fueled vehicles shall have equipment to defuel hydrogen fuel storage tanks. Where work must be performed on a vehicle's fuel storage tank for the purpose of maintenance, repair or cylinder certification, defueling and purging shall be conducted in accordance with FC 2309.8 and NFPA 2.

[2211.8.1 Methods of discharge. The discharge of hydrogen from motor vehicle fuel storage containers shall be accomplished through a closed transfer system in accordance with FC2211.8.1.1or an approved method of atmospheric venting in accordance with FC2211.8.1.2.

2211.8.1.1 Closed transfer system. A documented procedure that explains the logic sequence for discharging the storage container shall be provided to the commissioner for review and approval. The procedure shall include the actions the operator is required to take in the event of a low-pressure or high-pressure hydrogen release during discharging activity. Schematic design documents shall be provided illustrating the arrangement of piping, regulators and equipment settings. The design and installation documents shall illustrate the piping and regulator arrangement and shall be shown in spatial relation to the location of the compressor, storage vessels and emergency shutdown devices.

2211.8.1.2 Atmospheric venting of hydrogen from motor vehicle fuel storage containers. When atmospheric venting is used for the discharge of hydrogen from motor vehicle fuel storage containers, such venting shall be performed in accordance with FC 2211.8.1.2.1 through 2211.8.1.2.4.

2211.8.1.2.1 Defueling equipment required at vehicle maintenance and repair facilities. All facilities for repairing hydrogen systems on hydrogen-fueled vehicles shall have equipment to defuel vehicle storage containers. Equipment used for defueling shall be listed and labeled for the intended use.

2211.8.1.2.1.1 Manufacturer's equipment required. Equipment supplied by the vehicle manufacturer shall be used to connect the vehicle storage containers to be defueled to the vent pipe system.

2211.8.1.2.1.2 Vent pipe maximum diameter. Defueling vent pipes shall have a maximum inside diameter of 1 inch (25 mm) and be installed in an approved manner.

2211.8.1.2.1.3 Maximum flow rate. The maximum rate of hydrogen flow through the vent pipe system shall not exceed 1,000 SCF/min (28.3 m^3/min) and shall be controlled by means of the manufacturer's equipment, at low pressure and without adjustment.

2211.8.1.2.1.4 Isolated use. The vent pipe used for defueling shall not be connected to a venting system used for another purpose.

2211.8.1.2.2 Design and installation documents. Design and installation documents shall be provided illustrating the defueling system to be utilized. Plan details shall be of sufficient detail and clarity to allow for evaluation of the piping and control systems to be utilized and include the method of support for containers to be used as part of a closed transfer system, the method of grounding and bonding, and other requirements set forth in this section.

2211.8.1.2.3 Stability of containers. A method of rigidly supporting containers used during defueling of hydrogen shall be provided. The method shall provide not less than two points of support and shall be designed to resist lateral movement of the receiving container. The system shall be designed to resist movement of the receiver based on the highest gas-release velocity through valve orifices at the receiver's rated service pressure and volume. Supporting structures or appurtenances used to support containers shall be constructed of noncombustible materials in accordance with the construction codes, including the Building Code.

2211.8.1.2.4 Grounding and bonding. Containers and piping systems used for defueling shall be bonded and grounded. Structures or appurtenances used for supporting the containers shall be grounded in accordance with the Electrical Code. The valve of the vehicle storage container shall be bonded with the defueling system prior to the commencement of discharge or defueling operations.

2211.8.2 Repair of hydrogen piping. Piping systems containing hydrogen shall not be opened to the atmosphere for repair without first purging the piping with an inert gas to achieve 1 percent hydrogen or less by volume. Defueling operations and exiting purge flow shall be vented in accordance with FC2211.8.1.2.

2211.8.3 Purging. Each individual component of a hydrogen defueling system shall have a label affixed as well as a description in the installation and owner's manuals describing the procedure for purging air from the system during startup, regular maintenance and for purging hydrogen from the system prior to disassembly (to admit air). For the interconnecting piping between the individual manufactured components, the pressure rating must be at least twenty times the absolute pressure present in the piping when any hydrogen meets any air.

2211.8.3.1 System purge required. After installation, repair or maintenance, the hydrogen piping system shall be purged of air in accordance with the manufacturer's specifications.]

APPENDIX D. FIRE CODE CHAPTER 57
FLAMMABLE AND COMBUSTIBLE LIQUIDS

SECTION FC [3401] 5701
GENERAL

[3401.1] 5701.1 Scope. This chapter shall govern the storage, handling and use of flammable and combustible liquids, including the dispensing and mixing of such liquids, including flammable and combustible liquids subject to the New York State Department of Environmental Conservation regulations, as set forth in 6 NYCRR Parts [595] 596 through [614] 613.

Exceptions[.]: This chapter shall not apply to:

1. Medicines, foodstuffs, cosmetics, and commercial, institutional and industrial products in the same concentration and packaging containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solution not being flammable, and alcoholic beverages in retail or wholesale sales or storage uses when packaged in individual containers not exceeding 1.3 gallons (5 L).

2. Installation of fuel oil storage tanks and auxiliary storage tanks for oil-burning equipment, except that this chapter shall apply with respect to permit requirements and requirements relating to out-of-service fuel oil tanks.

3. Refrigerant liquids and oils in refrigerating systems (see FC606).

4. Storage and display of aerosol products complying with the requirements of FC Chapter [28] 51.

5. Storage and use of liquids that have no fire point when tested in accordance with ASTM D 92.

6. Liquids with a flash point greater than 95ºF (35ºC) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion.

7. Liquids without flash points that can be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.

8. The storage of [distilled spirits and] wines in wooden barrels and casks.

9. The manufacturing, storage, handling and use of distilled spirits in distilleries in accordance with FC Chapter 40.

10. Commercial cooking oil storage systems in accordance with FC610.

[3401.2] 5701.2 Reserved.

[3401.3] 5701.3 Design and installation documents. The commissioner may require design and installation documents, specifications and calculations in connection with the installation, alteration or repair of tanks and related devices, equipment and systems pursuant to this chapter, including fire protection systems.

[3401.4] 5701.4 Permits. Permits shall be required as set forth in FC105.6.

[3401.5] 5701.5 Material classification. Flammable and combustible liquids shall be classified in accordance with the definitions in [FC3402.1] 5702.1.

[3401.6] 5701.6 Supervision. Manufacture, storage, handling and use of flammable and combustible liquids, including the dispensing of such liquids, shall be supervised as set forth in FC [3401.6.1] 5701.6.1 through [3401.6.3] 5701.6.3.

[3401.6.1] 5701.6.1 Manufacture. The manufacture of flammable and combustible liquids shall be under the personal supervision of a certificate of fitness holder.

[3401.6.2] 5701.6.2 Storage. The storage of flammable liquids, and combustible liquids with a flash point of 300ºF (149ºC) or less, shall be under the general supervision of a certificate of fitness holder when the quantity of such stored liquids exceeds the following amounts:

1. 275 gallons (1041 L) in a closed system;

2. 275 gallons (1041 L) of alcohol-based hand rubs in consumer-product (non-bulk) packaging, including sealed refills for hand dispensers, when stored for use on the premises (excluding dispensers installed or placed for use);

3. 20 gallons (76 L) of combustible liquid in portable containers;

4. 10 gallons (38 L) of flammable liquid in portable containers, except alcohol-based hand rubs subject to FC5701.6.2(2) and gasoline; or

5. 2½ gallons (9.5 L) of gasoline.

[3401.6.3] 5701.6.3 Handling and use. The handling and use of flammable liquids, and combustible liquids with a flash point of 300ºF (149ºC) or less, shall be under the personal supervision of a certificate of fitness holder when the quantity of such handled and used liquids exceeds the amounts set forth in [FC3401.6.2] FC5701.6.2, except for alcohol-based hand rubs subject to subject to FC5701.6.2(2).

5701.6.4 Fleet fueling operations. Fleet fueling operations shall be personally conducted by a cargo tank operator holding a certificate of fitness for that purpose. The certificate of fitness holder shall be responsible for ensuring that fleet fueling operations are conducted in accordance with this section.

[3401.7] 5701.7 Prohibitions. It shall be unlawful to:

1. Manufacture, refine or distill petroleum or coal tar, or the liquid products thereof.

2. Operate a refinery.

3. Install an aboveground flammable liquid storage tank indoors.

4. Store or transport in the harbor or the city any flammable or combustible liquid, except in a barge, marine vessel, or watercraft constructed, protected and operated in accordance with the regulations of the United States Coast Guard.

5. Store flammable liquids in basements, cellars or other areas below grade.

6. Clean number six fuel oil tanks by heating number two fuel oil and circulating it within such tanks.

[3401.8] 5701.8 Certificate of license. Persons who install, alter, test or repair any flammable or combustible liquid storage system shall hold a certificate of license or shall be employed by and perform such duties under the general supervision of a person holding such certificate.

SECTION FC [3402] 5702
DEFINITIONS

[3402.1] 5702.1 Definitions. The following terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings [shown herein] set forth in FC202.

ALCOHOL-BASED HAND RUB. [An alcohol-containing preparation designed for application to the hands for anti microbacterial or other medicinal purpose that contains ethanol or isopropanol.]

BULK PLANT OR TERMINAL. [Any premises upon which flammable or combustible liquids are received from marine vessel, watercraft, pipeline, tank car or cargo tank and are stored or blended in bulk for the purpose of distributing such liquids by marine vessel, watercraft, pipeline, tank car, cargo tank or container.]

BULK TRANSFER. [The loading or unloading of flammable or combustible liquids from or between marine vessels, watercraft, pipelines, tank cars, cargo tanks or storage tanks.]

COMBUSTIBLE LIQUID. [For purposes of transportation, a combustible liquid, as defined in the regulations of the United States Department of Transportation, as set forth in 49 CFR Section 173.120. For all other purposes, a liquid, other than a compressed gas or cryogenic fluid, having a closed cup flash point at or above 100°F (38°C), classified as follows:]

Class II. [Liquids having a closed cup flash point at or above 100°F (38°C) and below 140°F (60°C).]

Class IIIA. [Liquids having a closed cup flash point at or above 140°F (60°C) and below 200°F (93°C).]

Class IIIB. [Liquids having closed cup flash points at or above 200°F (93°C).]

FIRE POINT. [The lowest temperature at which a liquid will ignite and achieve sustained burning when exposed to a test flame in accordance with ASTM D 92.]

FLAMMABLE AND COMBUSTIBLE LIQUID STORAGE SYSTEM. [A flammable or combustible liquid storage tank and all devices, equipment and systems associated with such tank, including the tank, piping, valves, fill connection, vent lines, pumps and any other ancillary equipment, except liquid motor fuel storage and dispensing systems and flammable and combustible liquid storage systems at a bulk plant or terminal used for bulk transfer operations.]

FLAMMABLE LIQUID. [For purposes of transportation, a flammable liquid defined in the regulations of the United States Department of Transportation, as set forth in 49 CFR Section 173.120. For all other purposes, a liquid, other than a compressed gas or cryogenic fluid, having a closed cup flash point below 100°F (38°C), classified as follows:]

Class I.

Class IA. [Liquids having a flash point below 73°F (23°C) and having a boiling point below 100°F (38°C).]

Class IB. [Liquids having a flash point below 73°F (23°C) and having a boiling point at or above 100°F (38°C).]

Class IC. [Liquids having a flash point at or above 73°F (23°C) and below 100°F (38°C).]

FLASH POINT. [The minimum temperature in degrees Fahrenheit at which a liquid will give off sufficient vapors to form an ignitable mixture with air near the surface or in the container, but will not sustain combustion. The flash point of a liquid shall be determined by appropriate test procedure and apparatus as specified in ASTM D 56, ASTM D 93 or ASTM D 3278.]

FLEET FUELING.

LIQUID STORAGE ROOM. [A room classified as a Group H-3 occupancy used for the storage of flammable or combustible liquids.]

LIQUID STORAGE WAREHOUSE. [A building classified as a Group H-2 or H-3 occupancy used for the storage of flammable or combustible liquids in closed containers.]

PROCESS TRANSFER. [The transfer of flammable or combustible liquids between cargo tanks or tank cars and containers, tanks piping and other equipment that is to be used in process operations.]

PROCESSING VESSEL. [A tank or other container used in manufacturing or other process operation that involves the use of a flammable or combustible liquid supplied from other than a cargo tank, tank car or pipeline.]

REFINERY. [A plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, gasoline or other hydrocarbon sources.]

REMOTE SOLVENT RESERVOIR. [A liquid solvent container enclosed against evaporative losses to the atmosphere during periods when the container is not being utilized, except for a solvent return opening not larger than 16 square inches (10 322 mm^2), which allows pump-cycled used solvent to drain back into the reservoir from a separate solvent sink or work area.]

SOLVENT DISTILLATION UNIT. [An appliance that receives contaminated flammable or combustible liquids and which distills the contents to remove contaminants and recover the solvents.]

TANK, PRIMARY. [A listed atmospheric tank used to store liquid.]

SECTION FC [3403] 5703
GENERAL REQUIREMENTS

[3403.1] 5703.1 Electrical. Electrical wiring and equipment shall be installed and maintained in accordance with the Electrical Code.

[3403.1.1] 5703.1.1 Classified locations for flammable liquids. Areas where flammable liquids are stored, handled or used, including the dispensing or mixing of such liquids, shall be in accordance with FC Table [3403.1.1] 5703.1.1 and the Electrical Code. A classified area shall not extend beyond any floor, roof or other solid partition having no openings. The extent of the classified area is allowed to be reduced, or eliminated, where sufficient technical justification is provided to the commissioner that a concentration in the area in excess of 25 percent of the lower flammable limit cannot be generated.

[3403.1.2] 5703.1.2 Classified locations for combustible liquids. Areas where Class II or III liquids are heated above their flash points shall have electrical installations in accordance with [FC3403.1.1] FC5703.1.1 and the Electrical Code.

Exception: Solvent distillation units in accordance with [FC3405.4] FC5705.4.

[3403.1.3] 5703.1.3 Other applications. The commissioner may determine the extent of the Class I electrical equipment and wiring location when a condition is not specifically covered by these requirements or the Electrical Code.

[3403.1.4] 5703.1.4 Tank grounding. Tanks shall be properly grounded.

[3403.2] 5703.2 Fire protection. Fire protection for the storage, handling, and use of flammable and combustible liquids, including the dispensing and mixing of such liquids, and on-site transportation, shall be provided in accordance with this chapter and FC Chapter 9.

[3403.2.1] 5703.2.1 Portable fire extinguishers and hose lines. Portable fire extinguishers shall be provided in accordance with FC906. Where required, hose lines shall be provided in accordance with FC905.

[3403.3] 5703.3 Site assessment. The commissioner may require an owner or operator of a tank system to conduct a site assessment upon a determination that a potential fire or explosion hazard exists as a result of a spill, leak or discharge from such system. Such site assessments shall be conducted to ascertain potential fire hazards and shall be completed and submitted to the department within a time period established by the commissioner, not to exceed 60 calendar days.

[3403.4] 5703.4 Spill control and secondary containment. Where the maximum allowable quantity per control area is exceeded, and when required by [FC2704.2] FC5004.2, rooms, buildings or areas used for storage, handling or use of Class I, II and III-A liquids, including the dispensing or mixing of such liquids, shall be provided with spill control and secondary containment in accordance with [FC2704.2] FC5004.2.

[3403.5] 5703.5 Labeling and signage. The commissioner may require warning signs for the purpose of identifying the hazards of manufacturing, storing, handling or using flammable liquids, including the dispensing or mixing of such liquids. Signage for identification and warning such as for the inherent hazard of flammable liquids or smoking shall be provided in accordance with this chapter and FC [2703.5] 5003.5 and [2703.6] 5003.6.

[3403.5.1] 5703.5.1 Style. Warning signs shall be of a durable material. Signs warning of the hazard of flammable liquids shall have red, black or white lettering on a contrasting background and shall read: DANGER—FLAMMABLE LIQUIDS. Letters shall not be less than 3 inches (76 mm) in height and ½ inch (12.7 mm) in stroke.

[3403.5.2] 5703.5.2 Location. Signs shall be posted in locations as required by the commissioner. Piping containing flammable liquids shall be identified in accordance with ASME A13.1.

[3403.5.3] 5703.5.3 Warning labels. Individual containers, packages and cartons shall be identified, marked, labeled and placarded in accordance with federal regulations and applicable state laws.

[3403.5.4] 5703.5.4 Identification. Color coding or other approved identification means consistent with the New York State Department of Environmental Conservation regulations, as set forth in 6 NYCRR Section 613[.3(b)], shall be provided on each loading and unloading riser for flammable or combustible liquids to identify the contents of the tank served by the riser.

FC TABLE [3403.1.1] 5703.1.1
CLASS I ELECTRICAL EQUIPMENT LOCATIONS[a]

LOCATION	GROUP D DIVISION	EXTENT OF CLASSIFIED AREA
Underground tank fill opening	1	Pits, boxes or spaces below grade level, any part of which is within the Division 1 or 2 classified area.
	2	Up to 18 inches above grade level within a horizontal radius of 10 feet from a loose-fill connection and within a horizontal radius of 5 feet from a tight-fill connection.
Vent—Discharging upward	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 5 feet of open end of vent, extending in all directions.
Drum and container filling		
Outdoor or indoor with adequate ventilation	1	Within 3 feet of vent and fill opening, extending in all directions.
	2	Area between 3 feet and 5 feet from vent of fill opening, extending in all directions. Also up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening.
Pumps, bleeders, withdrawal fittings, meters and similar devices		
Indoor	2	Within 5 feet of any edge of such devices, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of such devices.
Outdoor	2	Within 3 feet of any edge of such devices, extending in all directions. Also up to 18 inches horizontally from an edge of such devices.
Pits		
Without mechanical ventilation	1	Entire area within pit if any part is within a Division 1 or 2 classified area.
With mechanical ventilation	2	Entire area within pit if any part is within a Division 1 or 2 classified area.
Containing valves, fittings or piping, and not within a Division 1 or 2 classified area	2	Entire pit.
Drainage ditches, separators, impounding basins		
Indoor	1 or 2	Same as pits.
Outdoor	2	Area up to 18 inches above ditch, separator or basin. Also up to 18 inches above grade within 15 feet horizontal from any edge.
Cargo tank and tank car[b]		
Loading through open dome	1	Within 3 feet of edge of dome, extending in all directions.
	2	Area between 3 feet and 15 feet from edge of dome, extending in all directions.
Loading through bottom connections with atmospheric venting	1	Within 3 feet of point of venting to atmosphere, extending in all directions.
	2	Area between 3 feet and 15 feet from point of venting to atmosphere, extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of loading connection.
Office and restrooms	Ordinary	Where there is an opening to these rooms within the extent of an indoor classified location, the room shall be classified the same as if the wall, curb or partition did not exist.
Cargo tank and tank car[b]–continued		
Loading through closed dome with atmospheric venting	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 15 feet from open end of vent, extending in all directions. Also within 3 feet of edge of dome, extending in all directions.
Loading through closed dome with vapor control	2	Within 3 feet of point of connection of both fill and vapor lines, extending in all directions.

Bottom loading with vapor control or any bottom unloading	2	Within 3 feet of point of connection, extending in all directions. Also up to 18 inches above grade within a horizontal radius of 10 feet from point of connection.
Repair garage for cargo tanks	1 2	Pits or spaces below floor level. Area up to 18 inches above floor or grade level for entire storage or repair garage.
Garages for other than cargo tanks	Ordinary	Where there is an opening to these rooms within the extent of an outdoor classified area, the entire room shall be classified the same as the area classification at the point of the opening.
Outdoor drum storage	Ordinary	
Indoor warehousing where there is no flammable liquid transfer	Ordinary	Where there is an opening to these rooms within the extent of an indoor classified area, the room shall be classified the same as if the wall, curb or partition did not exist.
Indoor equipment where flammable vapor/air mixtures could exist under normal operations	1 2	Area within 5 feet of any edge of such equipment, extending in all directions. Area between 5 feet and 8 feet of any edge of such equipment, extending in all directions. Also, area up to 3 feet above floor or grade level within 5 feet to 25 feet horizontally from any edge of such equipment.[c]
Outdoor equipment where flammable vapor/air mixtures could exist under normal operations	1 2	Area within 3 feet of any edge of such equipment, extending in all directions. Area between 3 feet and 8 feet of any edge of such equipment extending in all directions. Also, area up to 3 feet above floor or grade level within 3 feet to 10 feet horizontally from any edge of such equipment.
Tank—Aboveground		
Shell, ends or roof and dike area	1 2	Area inside dike where dike height is greater than the distance from the tank to the dike for more than 50 percent of the tank circumference. Area within 10 feet from shell, ends or roof of tank. Area inside dikes to level of top of dike.
Vent	1 2	Area within 5 feet of open end of vent, extending in all directions. Area between 5 feet and 10 feet from open end of vent, extending in all directions.
Floating roof	1	Area above the roof and within the shell.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Locations as classified in the Electrical Code.

b. When classifying extent of area, consideration shall be given to the fact that tank cars or cargo tanks can be situated at varying points. Therefore, the perimeter of the loading or unloading positions shall be used.

c. The release of Class I liquids can generate vapors to the extent that the entire building, and possibly a zone surrounding it, are considered a Class I, Division 2 location.

[3403.6] 5703.6 Piping systems. Piping systems for flammable and combustible liquids shall be in accordance with this section.

Exception: Piping that is integral to stationary or portable engines, including engines in aircraft, marine vessels, watercraft and motor vehicles, and piping associated with boilers and pressure vessels regulated by the construction codes, including the Mechanical Code.

[3403.6.1] 5703.6.1 Reserved.

[3403.6.2] 5703.6.2 Design and manufacture of piping system components. Piping system components shall be designed and manufactured in accordance with the applicable standard listed in FC Table [3403.6.2] 5703.6.2 and NFPA 30, except as modified by this section.

FC TABLE [3403.6.2] 5703.6.2
PIPING STANDARDS

PIPING USE	STANDARD
Power Piping	ASME B31.1
Process Piping	ASME B31.3
Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids	ASME B31.4
Building Services Piping	ASME B31.9

[3403.6.2.1] 5703.6.2.1 Special materials. Low-melting-point materials, such as aluminum, copper or brass, that soften on fire exposure, such as nonmetallic materials, and nonductile material, such as cast iron, shall be acceptable for use underground only in accordance with the applicable standard listed in FC Table [3403.6.2] 5703.6.2. Aboveground piping system components shall be constructed of Schedule 40 steel or a higher schedule steel.

[3403.6.3] 5703.6.3 Testing. Unless tested in accordance with the applicable section of ASME B31.9, piping, before being covered, enclosed or placed in use, shall be hydrostatically tested to 150 percent of the maximum anticipated operating pressure of the system, or pneumatically tested to 110 percent of the maximum anticipated pressure of the system, but not less than 15 pounds per square inch gauge (psig) (103.4 kPa) at the highest point of the system. This test shall be maintained for a sufficient time period to complete visual inspection of joints and connections. For a minimum of 60 minutes, there shall be no leakage or permanent distortion. Pneumatic testing shall be conducted using an inert gas, except that air may be used if the piping system does not contain flammable or combustible liquid vapors. Piping system tests shall be conducted at the owner's risk by his or her representative before a representative of the department. Care shall be exercised to ensure that these pressures are not applied to vented storage tanks. Such storage tanks shall be tested independently from the piping.

[3403.6.3.1] 5703.6.3.1 Existing piping. Existing piping shall be tested in accordance with this section, upon a determination by the commissioner that such piping may be leaking. Piping that could contain flammable or combustible liquid vapors shall not be tested pneumatically, except that vapor-recovery piping may be tested pneumatically using an inert gas. Such tests shall be conducted at the owner's risk by his or her representative.

[3403.6.4] 5703.6.4 Protection from vehicles. Posts or other approved means shall be provided in accordance with FC312 to protect piping, valves, fittings or ancillary equipment subject to vehicular damage.

[3403.6.5] 5703.6.5 Protection from corrosion and galvanic action. Where subject to external corrosion, piping, related fluid-handling components and supports for both underground and aboveground applications shall be fabricated from noncorrosive materials, coated or otherwise provided with corrosion protection. Dissimilar metallic parts that promote galvanic action shall not be joined.

[3403.6.6] 5703.6.6 Valves. Piping systems shall contain a sufficient number of manual control valves and check valves to operate the system properly and to protect the facility under both normal and emergency conditions. Piping systems in connection with pumps shall contain a sufficient number of such valves to control properly the flow of liquids in normal operation and in the event of physical damage or fire exposure.

[3403.6.6.1] 5703.6.6.1 Backflow protections. Connections to pipelines or piping by which tank cars, cargo tanks, marine vessels, watercraft or other equipment discharge liquids into storage tanks shall be provided with check valves or block valves for automatic protection against backflow where the piping arrangement is such that backflow from the system is possible. Where loading and unloading is done through a common pipe system, a check valve is not required except as required by the applicable provisions of the New York State Department of Environmental Conservation regulations, as set forth in 6 NYCRR Section 613.[3(c)(4).] However, a block valve shall be provided which is located so as to be readily accessible or remotely operable.

[3403.6.6.2] 5703.6.6.2 Manual drainage. Manual drainage-control valves shall be located at approved locations remote from the tanks, diked area, drainage system and impounding basin to ensure their operation in a fire condition.

[3403.6.7] 5703.6.7 Connections. Aboveground tanks with connections located below normal liquid level shall be provided with internal or external isolation valves located as close as practical to the shell of the tank. Except for liquids whose chemical characteristics are incompatible with steel, such valves, when external, and their connections to the tank shall be of steel.

[3403.6.8] 5703.6.8 Piping supports. Piping systems shall be substantially supported and protected from physical damage and designed to accommodate settlement, vibration, expansion, contraction or exposure to fire. The supports shall be constructed of steel, concrete or other approved noncombustible material.

[3403.6.9] 5703.6.9 Flexible joints. Flexible joints shall be listed and approved and shall be installed on underground liquid, vapor and vent piping at all of the following locations:

1. Where piping connects to underground tanks.

2. Where piping ends at pump islands and vent risers.

3. At points where differential movement in the piping can occur.

[3403.6.9.1] 5703.6.9.1 Fiberglass-reinforced plastic piping. Fiberglass-reinforced plastic piping is not required to be provided with flexible joints in locations where both of the following conditions are present:

1. Piping does not exceed 4 inches (102 mm) in diameter.

2. Piping has a straight run of not less than 4 feet (1219 mm) on one side of the connection when such connections result in a change of direction.

[3403.6.9.1.1] 5703.6.9.1.1 Flexible joints. In lieu of the minimum 4-foot (1219 mm) straight run length required in [FC3403.6.9.1(2)] FC5703.6.9.1(2), approved and listed flexible joints are allowed to be used under dispensers and suction pumps, at submerged pumps and tanks, and where vents extend aboveground.

[3403.6.10] 5703.6.10 Pipe joints. Joints shall be liquid-tight and shall be welded, flanged or threaded except that listed flexible connectors are allowed in accordance with [FC3403.6.9] FC5703.6.9. Threaded or flanged joints shall fit tightly by using approved methods and materials for the type of joint. Joints in piping systems used for Class I liquids shall be welded when located in concealed spaces within buildings or structures. Nonmetallic joints shall be subject to the approval of the commissioner and shall be installed in accordance with the manufacturer's instructions. Pipe joints that are dependent on the friction characteristics or resiliency of combustible materials for liquid tightness of piping shall not be used in buildings or structures. Piping shall be secured to prevent disengagement at the fitting.

[3403.6.11] 5703.6.11 Bends. The bending of piping and tubing shall be performed in accordance with ASME B31.9.

[3403.6.12] 5703.6.12 Contents. Piping system components shall be documented as being compatible with the liquid to which such components will be exposed. Such documentation shall be approved and submitted to the department upon request.

SECTION FC [3404] 5704
STORAGE

[3404.1] 5704.1 General. Flammable and combustible liquids in containers and tanks shall be stored in accordance with this section, FC Chapter [27] 50 and the New York State Department of Environmental Conservation regulations, as set forth in 6 NYCRR Parts 596, 598, 599, [612,] and 613[and 614].

[3404.1.1] 5704.1.1 Aboveground storage prohibited. Except as specifically authorized in [FC3406] 5706, it shall be unlawful to store flammable liquids in an aboveground storage tank.

[3404.1.2] 5704.1.2 Tank capacity limitations. Except at a bulk plant or terminal or as otherwise specified in this chapter, the capacity of flammable and combustible liquid storage tanks shall not exceed the amounts set forth in FC [3404.1.2.1] 5704.1.2.1 through [3404.1.2.4] 5704.1.2.4.

[3404.1.2.1] 5704.1.2.1 Underground flammable liquid tanks. Individual underground flammable liquid storage tanks shall not exceed a capacity of 4,000 gallons (15 140 L). The aggregate capacity of underground flammable liquid storage tanks at a premises shall not exceed 20,000 gallons (75 700 L).

[3404.1.2.2] 5704.1.2.2 Underground combustible liquid tanks. Individual underground combustible liquid storage tanks shall not exceed a capacity of 12,000 gallons (45 420 L). The aggregate capacity of underground combustible liquid storage tanks at a premises shall not exceed 40,000 gallons (151 400 L).

[3404.1.2.3] 5704.1.2.3 Aboveground, outdoor combustible liquid tanks. The aggregate capacity of aboveground combustible liquid tanks installed outdoors at a premises shall not exceed 30,000 gallons (113 550 L).

[3404.1.2.4] 5704.1.2.4 Aboveground, indoor combustible liquid tanks. The aggregate capacity of aboveground combustible liquid tanks installed indoors shall not exceed 20,000 gallons (75 700 L).

[3404.2] 5704.2 Tank storage. The provisions of this section shall apply to:

1. The storage of flammable liquids in stationary aboveground tanks located outdoors and underground tanks.

2. The storage of combustible liquids in stationary aboveground tanks indoors and outdoors, and underground tanks.

3. Existing storage tank installations at bulk plants and terminals which have not been used for the storage of flammable or combustible liquids for a period in excess of 2 years from the date of completion of construction of the tank structure, if the tank is to be placed in service.

[3404.2.1] 5704.2.1 Change of tank contents. Tanks [subject to] that will be undergoing a change in contents shall [be subject to the approval of the commissioner and] comply with the design and installation requirements applicable to the type of flammable or combustible liquid with which it is proposed to be filled in accordance with this chapter, including [FC3404.2.7] FC5704.2.7. Prior to a change in contents, [the commissioner] notification shall be made to the department, which may require submission of design and installation documents, testing of a tank for leaks [and], and/or documentation of compatibility. Tanks that have previously contained Class I liquids shall not be [loaded] filled with Class II or Class III liquids until such tanks and all piping, pumps, hoses and meters connected thereto have been completely drained and flushed. Tanks that previously contained combustible

motor fuel may be used for biodiesel motor fuel as set forth in FC2307. Approval of the department shall be required for a change in contents to biodiesel only if the biofuel content exceeds 20 percent.

[3404.2.2] 5704.2.2 Use of transport containers as stationary storage tanks. Cargo tanks, tank cars, barges, marine vessels and watercraft shall not be used as stationary storage tanks unless approved.

> **Exception:** A marine vessel or watercraft moored or anchored to privately owned waterfront property storing fuel oil to be used on such waterfront property, when the barge or vessel is located within the bulkhead line and the riparian ownership to the bulkhead line is under the same ownership as the waterfront property, the fuel oil is used only by the owner of such vessel or watercraft and the fuel oil is used beyond a radius of 200 feet (60 960 mm) from the waterfront. Fuel oil stored shall have the specific gravity of not more than 16 degrees Baume. Such marine vessels and watercraft shall be located wholly within the bulkhead line and in such a position as not to constitute an encumbrance to navigation, and shall be constructed, equipped and protected against fire in compliance with the requirements of the commissioner.

[3404.2.3] 5704.2.3 Labeling and signs. Labeling and signs for storage tanks and storage tank areas shall comply with the requirements of FC [3404.2.3.1] 5704.2.3.1 and [3404.2.3.2] 5704.2.3.2.

> **[3404.2.3.1] 5704.2.3.1 Smoking and open flame.** Signs shall be posted in storage areas prohibiting open flames and smoking. Signs shall comply with the requirements of [FC3403.5] 5703.5.
>
> **[3404.2.3.2] 5704.2.3.2 Label or placard.** Tanks more than 100 gallons (379 L) in capacity, which are used for the storage of Class I, II or III liquids, shall bear a label and placard identifying the material therein. Placards shall be in accordance with NFPA 704.
>
> > **Exception:** Tanks located underground.

[3404.2.4] 5704.2.4 Sources of ignition. Open flames are prohibited in storage areas in accordance with [FC2703.7] FC5003.7.

[3404.2.5] 5704.2.5 Explosion control. Explosion control shall be provided in accordance with FC911.

[3404.2.6] 5704.2.6 Separation from incompatible materials. Flammable and combustible liquids shall be stored separated from incompatible materials, in accordance with [FC2703.9.8] FC5003.9.8.

[3404.2.7] 5704.2.7 Design and installation requirements for tanks. Tanks shall be designed, constructed and installed in accordance with NFPA 30. Each tank shall bear a permanent nameplate or marking indicating the standard used as the basis of design.

[3404.2.7.1] 5704.2.7.1 Materials used in tank construction. The materials used in tank construction shall be in accordance with NFPA 30.

[3404.2.7.2] 5704.2.7.2 Pressure limitations for tanks. Tanks shall be designed for the pressures to which they will be subjected in accordance with NFPA 30.

[3404.2.7.3] 5704.2.7.3 Tank vents for normal venting. Tank vents for normal venting shall be installed and maintained in accordance with FC [3404.2.7.3.1] 5704.2.7.3.1 through [3404.2.7.3.6] 5704.2.7.3.5.

[3404.2.7.3.1] 5704.2.7.3.1 Vent lines. Vent lines from tanks shall not be used for purposes other than venting unless approved.

[3404.2.7.3.2] 5704.2.7.3.2 Vent-line flame arresters and venting devices. Listed or approved flame arresters or Pressure-vacuum (PV) vents that remain closed unless venting under pressure or vacuum conditions shall be installed in normal vents of tanks containing Class IB and IC liquids. Vent-line flame arresters [and venting devices] shall be installed in accordance with their listings or API 2000 and maintained in accordance with NFPA 30 or API 2000. [Use of] In-line flame arresters in piping systems shall be installed and maintained in accordance with their listing or API 2028. Pressure-vacuum vents shall be installed in accordance with NFPA 30 or API 2000 and maintained in accordance with NFPA 30 or API 2000.

Exception: Where the department determines that the use of such devices can result in damage to the tank.

[3404.2.7.3.3] 5704.2.7.3.3 Vent pipe outlets. Vent pipe outlets shall be located such that the vapors are released at a safe point outdoors and not less than 15 feet (4572 mm) above the adjacent ground level. Vapors shall be discharged upward or horizontally away from adjacent walls to assist in vapor dispersion. Vent outlets shall be located such that flammable or combustible vapors will not be trapped by eaves or other obstructions and shall be at least 10 feet (3048 mm) from building openings.

[3404.2.7.3.4] 5704.2.7.3.4 Installation of vent piping. Vent piping shall be designed, sized, constructed and installed in accordance with [FC3403.6] FC5703.6. Vent pipes shall be installed such that they will drain toward the tank without sags or traps in which liquid can collect. Vent pipes shall be installed in such a manner so as not to be subject to physical damage or vibration.

[3404.2.7.3.5] 5704.2.7.3.5 Manifolding. Tank vent piping shall not be manifolded unless required for special purposes such as vapor recovery, vapor conservation or air pollution control.

[3404.2.7.3.5.1] 5704.2.7.3.5.1 Aboveground tanks. For aboveground tanks, manifolded vent pipes shall be adequately sized to prevent system pressure limits from being exceeded when manifolded tanks are subject to the same fire exposure.

[3404.2.7.3.5.2] 5704.2.7.3.5.2 Underground tanks. For underground tanks, manifolded vent pipes shall be sized to prevent system pressure limits from being exceeded when manifolded tanks are filled simultaneously.

[3404.2.7.3.5.3] 5704.2.7.3.5.3 Tanks storing Class I liquids. Vent piping for tanks storing Class I liquids shall not be manifolded with vent piping for tanks storing Class II and III liquids unless positive means are provided to prevent the vapors from Class I liquids from entering tanks storing Class II and III liquids, to prevent contamination and possible change in classification of less volatile liquid.

[3404.2.7.3.6 Tank venting for tanks and pressure vessels storing Class IB and IC liquids. Tanks and pressure vessels storing Class IB or IC liquids shall be equipped with venting devices which shall remain closed except when venting under pressure or vacuum conditions, or with listed flame arresters. The vents shall be installed and maintained in accordance with NFPA 30 or API 2000.

3404.2.7.4] 5704.2.7.4 Emergency venting. Aboveground tanks shall be equipped with additional venting that will relieve excessive internal pressure caused by exposure to fires. Emergency vents shall not discharge indoors. The venting shall be installed and maintained in accordance with NFPA 30.

Exception: Tanks storing Class IIIB liquids that are larger than 12,000 gallons (45 420 L) in capacity, located outdoors and not within the diked area or the drainage path of Class I or II liquids, do not require emergency relief venting.

[3404.2.7.5] 5704.2.7.5 Tank openings other than vents. Tank openings for other than vents shall comply with the requirements of FC [3404.2.7.5.1] 5704.2.7.5.1 through [3404.2.7.5.8] 5704.2.7.5.8.

[3404.2.7.5.1] 5704.2.7.5.1 Connections below liquid level. Connections for tank openings below the liquid level shall be liquid-tight.

[3404.2.7.5.2] 5704.2.7.5.2 Filling, emptying and vapor recovery connections. Filling, emptying and vapor recovery connections to tanks shall be located outdoors at a location free from sources of ignition and not less than 10 feet (3048 mm) away from building openings. Such openings shall be provided with a liquid-tight cap which shall be closed when not in use and properly identified.

[3404.2.7.5.3] 5704.2.7.5.3 Piping, connections and fittings. Piping, connections, fittings and other appurtenances shall be installed in accordance with [FC3403.6] FC5703.6.

[3404.2.7.5.4] 5704.2.7.5.4 Manual gauging. Openings for manual gauging, if independent of the fill pipe, shall be provided with a liquid-tight cap or cover. Covers shall be kept closed when not gauging. Openings for manual gauging shall not be allowed for tanks installed indoors.

[3404.2.7.5.5] 5704.2.7.5.5 Fill pipes and discharge lines. For top-loaded tanks, a metallic fill pipe shall be designed and installed to minimize the generation of static electricity by terminating the pipe within 6 inches (152 mm) of the bottom of the tank, and it shall be installed in a manner which avoids excessive vibration.

[3404.2.7.5.5.1] 5704.2.7.5.5.1 Class I liquids. For Class I liquids other than crude oil, gasoline and asphalt, the fill pipe shall be designed and installed in a manner which will minimize the possibility of generating static electricity by terminating within 6 inches (152 mm) of the bottom of the tank.

[3404.2.7.5.5.2] 5704.2.7.5.5.2 Underground tanks. For underground tanks, fill pipe and discharge lines shall enter only through the top. Fill lines shall be sloped toward the tank. Underground tanks for Class I liquids shall be equipped with a vapor- and liquid-tight fill connection.

[3404.2.7.5.6] 5704.2.7.5.6 Location of connections. Filling, withdrawal and vapor-recovery connections that are made and broken shall be located outdoors at a location away from sources of ignition and not less than 10 feet (3048 mm) away from building openings. Such connections shall be closed and liquid-tight when not in use and shall be properly identified.

[3404.2.7.5.7] 5704.2.7.5.7 Protection against vapor release. Tank openings provided for purposes of vapor recovery shall be protected against vapor release by means of a spring-loaded check valve or dry-break connections, or other approved device, unless the opening is a pipe connected to a vapor processing system. Openings designed for combined fill and vapor recovery shall also be protected against vapor release unless connection of the liquid delivery line to the fill pipe simultaneously connects the vapor recovery line. Connections shall be vapor-tight.

[3404.2.7.5.8] 5704.2.7.5.8 Overfill prevention. An approved means or method in accordance with FC [3404.2.9.4] 5704.2.9.4 and [3404.2.9.6.6] 5704.2.9.6.5 for aboveground storage and [FC3404.2.11.4] FC5704.2.11.4 for underground storage shall be provided to prevent the overfill of all flammable and combustible liquid storage tanks.

[3404.2.7.6] 5704.2.7.6 Repair or alteration of tanks and piping. The repair or alteration, including welding, cutting and hot tapping of storage tanks and piping that have been placed in service, shall be in accordance with NFPA 30. Hot work on such tanks shall be conducted in accordance with FC3510. Hot tapping shall only be allowed with the approval of the commissioner.

[3404.2.7.7] 5704.2.7.7 Design of supports. The design of the supporting structure for tanks shall be in accordance with the construction codes, including the Building Code and NFPA 30.

[3404.2.7.8] 5704.2.7.8 Locations subject to flooding. When a tank is located in an area where it is subject to buoyancy because of a rise in the water table, flooding or accumulation of water from fire suppression operations, the tank shall be secured from movement in accordance with NFPA 30.

[3404.2.7.9] 5704.2.7.9 Corrosion protection. Where subject to external corrosion, tanks shall be fabricated from corrosion-resistant materials, coated or provided with corrosion protection in accordance with NFPA 30 and the New York State Department of Environmental Conservation regulations, as set forth in 6 NYCRR Part [614] 613.

[3404.2.7.10] 5704.2.7.10 Leak reporting. A consistent or accidental loss of liquid, or other indication of a leak from a tank system, shall be reported immediately to the department and other authorities having jurisdiction.

[3404.2.7.10.1] 5704.2.7.10.1 Leaking tank disposition. Leaking tanks shall be promptly emptied, repaired and returned to service, sealed in place or removed in accordance with FC [3404.2.13] 5704.2.13[or 3404.2.14].

[3404.2.7.11] 5704.2.7.11 Tank lining. Steel tanks are allowed to be lined only for the purpose of protecting the interior from corrosion or providing compatibility with a material to be stored. Only those liquids tested for compatibility with the lining material are allowed to be stored in lined tanks. Tank lining shall not be used for purposes of repairing a tank.

[3404.2.8] 5704.2.8 Reserved.

[3404.2.9] 5704.2.9 Aboveground tanks. Aboveground storage of combustible liquids in tanks shall comply with the requirements of [FC3404.2] FC5704.2, and FC [3404.2.9.1.2] 5704.2.9.1.2 through [3404.2.9.6.10] 5704.2.9.6.9. Except as specifically authorized in [FC3406] FC5706, the storage of flammable liquid in aboveground storage tanks is prohibited.

[3404.2.9.1] 5704.2.9.1 Reserved.

[3404.2.9.1.1] 5704.2.9.1.1 Reserved.

[3404.2.9.1.2] 5704.2.9.1.2 Foam fire protection system installation. Where foam fire protection is approved for a required fire extinguishing system pursuant to this chapter, it shall be designed and installed in accordance with NFPA 11, as modified by FC Appendix B.

[3404.2.9.1.2.1] 5704.2.9.1.2.1 Foam storage. Where foam fire protection is approved for a required fire extinguishing system pursuant to this chapter, the foam-producing materials shall be stored on the premises.

[3404.2.9.1.3] 5704.2.9.1.3 Fire protection of supports. Supports or pilings for aboveground tanks storing Class I, II or IIIA liquids elevated more than 12 inches

(305 mm) above grade shall have a fire-resistance rating of not less than 2 hours in accordance with the fire exposure criteria specified in ASTM E 1529.

Exception: Structural supports tested as part of a protected aboveground tank in accordance with UL 2085.

[3404.2.9.1.4] 5704.2.9.1.4 Inerting of tanks with boilover liquids. Liquids with boilover characteristics shall not be stored in fixed roof tanks larger than 150 feet (45 720 mm) in diameter unless an approved gas enrichment or inerting system is provided on the tank.

[3404.2.9.2] 5704.2.9.2 Supports, foundations and anchorage. Supports, foundations and anchorages for aboveground tanks shall be designed and constructed in accordance with NFPA 30 and the construction codes, including the Building Code.

[3404.2.9.3] 5704.2.9.3 Stairs, platforms and walkways. Stairs, platforms and walkways shall be of noncombustible construction and shall be designed and constructed in accordance with NFPA 30 and the construction codes, including the Building Code.

[3404.2.9.4] 5704.2.9.4 Aboveground tank overfill prevention. Aboveground tanks shall not be filled in excess of 95 percent of their capacity. An approved overfill prevention system shall be provided for each tank. During tank-filling operations, the system shall automatically shut off the flow of liquid to the tank when the quantity of liquid in the tank reaches 95 percent of tank capacity. For rigid hose liquid-delivery systems, an approved means shall be provided to empty the fill hose into the tank after the automatic shutoff device is activated.

[3404.2.9.5] 5704.2.9.5 Outdoor aboveground tanks. Outdoor aboveground tanks shall comply with the requirements of FC [3404.2.9.5.1] 5704.2.9.5.1 through [3404.2.9.5.3] 5704.2.9.5.3.

[3404.2.9.5.1] 5704.2.9.5.1 Locations of aboveground tanks. Outdoor aboveground tanks shall be located in accordance with FC [3404.2.9.5.1.1] 5704.2.9.5.1.1 through [3404.2.9.5.1.5] 5704.2.9.5.1.5, as applicable.

[3404.2.9.5.1.1] 5704.2.9.5.1.1 Location of tanks with pressures 2.5 psig or less. Aboveground tanks operating at pressures not exceeding 2.5 psig (17.2 kPa) for storage of Class I, II or IIIA liquids, which are designed with a floating roof or a weak roof-to-shell seam, or equipped with emergency venting devices limiting pressure to 2.5 psig (17.2 kPa), shall be located in accordance with NFPA 30.

Exceptions:

1. Vertical tanks having a weak roof-to-shell seam and storing Class IIIA liquids are allowed to be located at one-half the distances specified in NFPA 30, provided the tanks are not within a diked area or drainage path for a tank storing Class I or II liquids.

2. Liquids with boilover characteristics and unstable liquids in accordance with FC [3404.2.9.5.1.4] 5704.2.9.5.1.3 and [3404.2.9.5.1.5] 5704.2.9.5.1.4.

3. For protected aboveground tanks in accordance with [FC3404.2.9.6] FC5704.2.9.6, the distances in NFPA 30 shall apply and shall be reduced by one-half, but not to less than 5 feet (1524 mm).

[3404.2.9.5.1.2] 5704.2.9.5.1.2 Location of tanks with pressures exceeding 2.5 psig. Aboveground tanks for the storage of Class I, II or IIIA liquids operating at pressures exceeding 2.5 psig (17.2 kPa) or equipped with emergency venting allowing pressures to exceed 2.5 psig (17.2 kPa) shall be located in accordance with NFPA 30.

Exception: Liquids with boilover characteristics and unstable liquids in accordance with FC [3404.2.9.5.1.4] 5704.2.9.5.1.3 and [3404.2.9.5.1.5] 5704.2.9.5.1.4.

[3404.2.9.5.1.3] 5704.2.9.5.1.3 Location of tanks for boilover liquids. Aboveground tanks for storage of liquids with boilover characteristics shall be located in accordance with NFPA 30.

[3404.2.9.5.1.4] 5704.2.9.5.1.4 Location of tanks for unstable liquids. Aboveground tanks for the storage of unstable liquids shall be located in accordance with NFPA 30.

[3404.2.9.5.1.5] 5704.2.9.5.1.5 Location of tanks for Class IIIB liquids. Aboveground tanks for the storage of Class IIIB liquids, excluding unstable liquids, shall be located in accordance with NFPA 30, except when located within a diked area or drainage path for a tank or tanks storing Class I or II liquids. Where a Class IIIB liquid storage tank is within the diked area or drainage path for a Class I or II liquid, distances required by [FC3404.2.9.5.1.2] FC5704.2.9.5.1.2 shall apply.

[3404.2.9.5.2] 5704.2.9.5.2 Separation between adjacent stable or unstable liquid tanks. The separation between tanks containing stable liquids shall be in accordance with NFPA 30. Where tanks are in a diked area containing Class I or II liquids, or in the drainage path of Class I or II liquids, and are compacted in three or more rows or in an irregular pattern, the commissioner may require greater separation than specified in NFPA 30 or other means to make tanks in the interior of the pattern accessible for firefighting purposes. The separation between tanks containing unstable liquids shall not be less than one-half the sum of their diameters.

Exception: Tanks used for storing Class IIIB liquids are allowed to be spaced 3 feet (914 mm) apart unless within a diked area or drainage path for a tank storing Class I or II liquids.

[3404.2.9.5.3] 5704.2.9.5.3 Separation between adjacent tanks containing flammable or combustible liquids and LPG. The minimum horizontal separation between an LPG container and a Class I, II or IIIA liquid storage tank shall be 20 feet (6096 mm) except in the case of Class I, II or IIIA liquid tanks operating at pressures exceeding 2.5 psig (17.2 kPa) or equipped with emergency venting allowing pressures to exceed 2.5 psig (17.2 kPa), in which case the provisions of [FC3404.2.9.5.2] FC5704.2.9.5.2 shall apply. An approved means shall be provided to prevent the accumulation of Class I, II or IIIA liquids under adjacent LPG containers such as by dikes, diversion curbs or grading. When flammable or combustible liquid storage tanks are within a diked area, the LPG containers shall be outside the diked area and at least 10 feet (3048 mm) away from the centerline of the wall of the diked area.

Exception: Horizontal separation is not required between LPG containers and underground flammable and combustible liquid tanks.

[3404.2.9.6] 5704.2.9.6 Additional requirements for protected aboveground tanks. In addition to the requirements of this chapter for aboveground tanks, the installation of protected aboveground tanks shall be in accordance with FC [3404.2.9.6.1] 5704.2.9.6.1 through [3404.2.9.6.10] 5704.2.9.6.9.

[3404.2.9.6.1] 5704.2.9.6.1 Tank construction. The construction of a protected aboveground tank and its primary tank shall be in accordance with [FC3404.2.7] FC5704.2.7.

[3404.2.9.6.2] 5704.2.9.6.2 Normal and emergency venting. Normal and emergency venting for protected aboveground tanks shall be provided in accordance with FC [3404.2.7.3] 5704.2.7.3 and [3404.2.7.4] 5704.2.7.4. The vent capacity reduction factor shall not be allowed.

[3404.2.9.6.3 Flame arresters. Approved flame arresters or pressure vacuum breather valves shall be installed in normal vents.]

[3404.2.9.6.4] 5704.2.9.6.3 Secondary containment. Protected aboveground tanks shall be provided with secondary containment, drainage control or diking in accordance with [FC2704.2] FC5004.2 and 6 NYCRR [Part 613.3(c)(6)] Part 613. A means shall be provided to establish the integrity of the secondary containment in accordance with NFPA 30.

[3404.2.9.6.5] 5704.2.9.6.4 Vehicle impact protection. Where protected aboveground tanks, piping, electrical conduit or dispensers are subject to vehicular impact, they shall be protected therefrom, either by having the impact protection incorporated into the system design in compliance with the impact test protocol of UL 2085, or by meeting the provisions of FC312, or where necessary, a combination of both. Where posts or other approved barriers are provided, they shall be independent of each aboveground tank.

[3404.2.9.6.6] 5704.2.9.6.5 Overfill prevention sign. A durable sign shall be conspicuously posted on or immediately adjacent to the fill point for the tank, setting forth the filling procedure and the tank calibration chart. The filling procedure shall require the person filling the tank to determine the number of gallons required to fill it to 90 percent of capacity before commencing the fill operation.

[3404.2.9.6.7] 5704.2.9.6.6 Fill pipe connections. The fill pipe shall be provided with a means for making a direct connection to the cargo tank's fuel delivery hose so that the delivery of fuel by means of a liquid-tight connection is not exposed to the open air during the filling operation. Where any portion of the fill pipe exterior to the tank extends below the level of the top of the tank, a check valve shall be installed in the fill pipe not more than 12 inches (305 mm) from the fill hose connection.

[3404.2.9.6.8] 5704.2.9.6.7 Spill containers. A spill container having a capacity of not less than 15 gallons (56.8 L) shall be provided for each fill connection. For tanks with a top fill connection, spill containers shall be noncombustible and shall be fixed to the tank and equipped with a manual drain valve that drains into the primary tank. For tanks with a remote fill connection, a portable spill container shall be allowed.

[3404.2.9.6.9] 5704.2.9.6.8 Tank openings. Tank openings in protected aboveground tanks shall be through the top only.

[3404.2.9.6.10] 5704.2.9.6.9 Antisiphon devices. Approved antisiphon devices shall be installed in each external pipe connected to the protected aboveground tank when the pipe extends below the level of the top of the tank.

[3404.2.10] 5704.2.10 Drainage and diking. The area surrounding a tank or group of tanks shall be provided with drainage control or shall be diked to prevent accidental discharge of liquid from endangering adjacent tanks, adjoining property or reaching waterways. The area shall be in compliance with the requirements of the New York State Department of Environmental Conservation regulations, as set forth in 6 NYCRR [Section 613.3(c)(6)] Part 613.

Exceptions:

1. For tanks having a capacity of less than 10,000 gallons (37 850 L), the commissioner may modify these requirements based on an approved technical report which demonstrates that such tank or group of tanks does not constitute a hazard to other tanks, waterways or adjoining property, after consideration of special features such as topographical conditions, nature of occupancy and proximity to buildings or structures on the same or adjacent property, capacity, and construction of proposed tanks and character of liquids to be stored, and nature and quantity of private and public fire protection provided.

2. Drainage control and diking is not required for listed secondary containment tanks.

[3404.2.10.1] 5704.2.10.1 Volumetric capacity. The volumetric capacity of the diked area shall not be less than the greatest amount of liquid that can be released from the largest tank within the diked area. The capacity of the diked area enclosing more than one tank shall be calculated by deducting the volume of the tanks other than the largest tank below the height of the dike.

[3404.2.10.2] 5704.2.10.2 Diked areas containing multiple tanks. Diked areas containing multiple tanks shall be subdivided in accordance with NFPA 30.

[3404.2.10.3] 5704.2.10.3 Protection of piping from exposure fires. Piping shall not pass through adjacent diked areas or impounding basins, unless provided with a sealed sleeve or otherwise protected from exposure to fire.

[3404.2.10.4] 5704.2.10.4 Combustible materials in diked areas. Diked areas shall be kept free from combustible materials, drums and barrels.

[3404.2.10.5] 5704.2.10.5 Equipment, controls and piping in diked areas. Pumps, manifolds and fire protection equipment or controls shall not be located within diked areas or drainage basins or in a location where such equipment and controls would be endangered by fire in the diked area or drainage basin. Aboveground piping shall be minimized and located as close as practical to the shell of the tank in diked areas or drainage basins.

Exceptions:

1. Pumps, manifolds and piping integral to the tanks or equipment being served which is protected by intermediate diking, berms, drainage or fire protection, such as water spray, monitors or resistive coating.

2. Fire protection equipment or controls which are appurtenances to the tanks or equipment being protected, such as foam chambers or foam piping and water or foam monitors and hydrants, or hand and wheeled extinguishers.

[3404.2.10.6] 5704.2.10.6 Dike construction. All dike walls shall be of steel or reinforced concrete, designed to be liquid-tight and to withstand a full hydraulic head, and constructed to provide access to and from the diked area. Where stairways or other means are required to provide such access, they shall be constructed of steel. No dike wall shall be higher than 60 percent of the tank height.

[3404.2.11] 5704.2.11 Underground tanks. Underground storage of flammable and combustible liquids in tanks shall comply with the requirements of FC [3404.2] 5704.2, and [3404.2.11.1] 5704.2.11.1 through [3404.2.11.5.2] 5704.2.11.5.2.

[3404.2.11.1] 5704.2.11.1 Contents. Underground tanks shall not store petroleum products containing mixtures of a nonpetroleum nature, such as ethanol or methanol blends, without evidence of compatibility.

[3404.2.11.2] 5704.2.11.2 Location. Flammable and combustible liquid storage tanks located underground, either outdoors or under buildings, shall be in compliance with the following requirements:

1. Tanks shall be installed so that the external forces exerted from building foundations and support loads are not transmitted to the tanks. The distance from any part of a tank to the nearest wall of any basement, pit, cellar or any property line shall not be less than 3 feet (914 mm). Tanks shall not be placed less than 20 feet (6096 mm) from a subway wall.

2. Tanks shall be installed so that the highest point of the tank is not less than 2 feet (610 mm) below the level of the lowest cellar floor of any building within a radius of 10 feet (3048 mm) from the tank. No tank shall be located under a sidewalk or beyond the property line.

3. A minimum distance of 18 inches (458 mm), shell to shell, shall be maintained between underground tanks.

4. Manufacturer's installation instructions.

[3404.2.11.3] 5704.2.11.3 Depth and cover. Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks shall be set on firm foundations and surrounded with at least 6 inches (152 mm) of noncorrosive inert material, in accordance with the manufacturer's installation instructions.

[3404.2.11.4] 5704.2.11.4 Overfill protection and prevention systems. Fill pipes shall be equipped with a spill container of not less than 15-gallon (56.8 L) capacity and an approved overfill prevention system to automatically prevent overflow in accordance with NFPA 30 and [FC3404.2.9.4] FC5704.2.9.4.

[3404.2.11.5] 5704.2.11.5 Leak prevention. Leak prevention for underground tanks shall comply with the requirements of FC [3404.2.11.5.1] 5704.2.11.5.1 and [3404.2.11.5.2] 5704.2.11.5.2.

[3404.2.11.5.1] 5704.2.11.5.1 Inventory control. Daily inventory records shall be maintained for underground storage tank systems.

[3404.2.11.5.2] 5704.2.11.5.2 Leak detection. Underground storage tank systems shall be provided with an approved method of leak detection from any component of the system that is designed and installed in accordance with NFPA 30. Leak detection systems shall be tested at the time of installation at the owner’s risk by his or her representative before a representative of the department.

[3404.2.11.6] 5704.2.11.6 Periodic tank and piping test. Any underground single-walled flammable or combustible liquid storage tank existing prior to the effective date of

this code that is not provided with a leak detection system meeting the requirements of [FC3404.2.11.5.2] FC5704.2.11.5.2 shall be precision tested at least once every 5 years.

Exception: Bulk plant and terminal tanks.

[3404.2.11.7] 5704.2.11.7 Emergency tank and piping system test. The commissioner may require a tank and piping system to be precision tested, pressure tested or tested by other approved method in accordance with this section to determine the condition of the tank or piping or when the commissioner has good cause to believe that a leak exists. Storage systems that may contain flammable or combustible liquid vapor shall not be tested pneumatically. Such tests shall be conducted at the owner's risk by his or her representative.

[3404.2.12] 5704.2.12 Testing. Tank testing required by FC [3404.2.12.1] 5704.2.12.1 through [3404.2.12.3] 5704.2.12.3 shall be at the owner's risk by his or her representative before a representative of the department.

[3404.2.12.1] 5704.2.12.1 Acceptance testing. Prior to being placed into service, tanks shall be tested in accordance with NFPA 30.

[3404.2.12.2] 5704.2.12.2 Testing of underground tanks. Underground tanks shall be tested hydrostatically at 15 pounds per square inch (psig)(103.4 kPa), or 150 percent of the maximum anticipated static head pressure, whichever is greater, for the inner tank, and pneumatically or hydrostatically at 5 pounds per square inch (psig)(34.5 kPa) for the annular space (secondary containment tank). When a pneumatic test is allowed, an inert gas shall be used; however, air may be used if the tank does not contain any flammable or combustible liquid vapor. Test pressure shall be maintained for sufficient time to complete visual inspection, but not less than 1 hour. A tank shall be deemed to have passed the test if it shows no evidence of leakage or permanent deformation.

[3404.2.12.3] 5704.2.12.3 Testing of aboveground tanks. Aboveground tanks shall be tested hydrostatically at 15 pounds per square inch (psig)(103.4 kPa) for the inner tank, and pneumatically or hydrostatically at 5 pounds per square inch (psig)(34.5 kPa) for the annular space (secondary containment tank). When a pneumatic test is allowed, an inert gas shall be used; however, air may be used if the tank does not contain any flammable or combustible liquid vapor. Test pressure shall be maintained for sufficient time to complete visual inspection, but not less than 1 hour. A tank shall be deemed to have passed the test if it shows no evidence of leakage or permanent deformation.

[3404.2.13] 5704.2.13 Out-of-service tanks. Tanks taken out of service shall comply with the requirements of FC [3404.2.13.1] 5704.2.13.1 through [3404.2.13.2.3] 5704.2.13.2.3 and API 1604. Tanks taken out of service shall be removed, sealed in place or safeguarded by a certificate of license holder or a plumber in accordance with the rules.

Exceptions:

1. Tanks within operating facilities at bulk plants and terminals.

2. Tanks connected to fuel oil burning equipment that is used seasonally or as one of the fuels in dual-fueled equipment.

3. Tanks that are used for seasonal storage or standby storage.

[3404.2.13.1] 5704.2.13.1 Underground tanks. Underground tanks taken out of service shall comply with the requirements of FC [3404.2.13.1.1] 5704.2.13.1.1 through [3404.2.13.1.3] 5704.2.13.1.3.

[3404.2.13.1.1] 5704.2.13.1.1 Fuel conversions. A fuel oil storage tank removed from service by reason of conversion of the heating system to an alternative fuel or power source, or other replacement of the tank, shall be sealed or removed from the premises in compliance with [FC3404.2.13.1.3] FC5704.2.13.1.3 at the time of conversion or replacement.

[3404.2.13.1.2] 5704.2.13.1.2 Out of service for 30 days. Except as otherwise provided in [FC3404.2.13.1.1] FC5704.2.13.1.1, underground tanks not used for a period of 30 calendar days or more shall be removed from the premises, or sealed in place in compliance with the requirements of [FC3404.2.13.1.3] FC5704.2.13.1.3, or safeguarded in compliance with the following requirements:

1. Flammable or combustible liquids shall be removed from the tank and connecting piping.

2. The tank and connecting piping shall be rendered free of flammable and combustible vapors using an inert gas.

3. Except for any active fire extinguishing system piping, the tank and connecting piping, including fill line, gauge opening, vapor return and pump connection, shall be capped or plugged and secured from tampering and the fill connection covered with concrete.

4. Vent lines shall remain open and be maintained in accordance with FC [3404.2.7.3] 5704.2.7.3 and [3404.2.7.4] 5704.2.7.4.

[3404.2.13.1.3] 5704.2.13.1.3 Out of service for 1 year. Except as otherwise provided in [FC3404.2.13.1.1] FC5704.2.13.1.1, underground tanks that have been out of service for a period of 1 year or more shall be removed from the premises or sealed in place in compliance with the following requirements:

1. Flammable and combustible liquids shall be removed from the tank and connected piping.

2. The tank and connecting piping shall be rendered free of flammable and combustible vapors, using an inert gas.

3. The tank shall be disconnected from system piping and removed from the premises, or filled completely with an approved, inert solid material, and sealed in place.

4. All system piping, including fire extinguishing system lines, fill line, gauge opening and vapor return and pump connection, shall be disconnected from the tank and removed from the premises, or sealed in place and secured from tampering. Unless other methods are approved, the fill connection shall be cut from the fill piping and removed; the fill piping shall be capped or plugged; and the fill box filled with concrete.

5. Tank openings shall be capped and plugged, leaving a 0.125-inch to 0.25-inch-diameter (3.2-mm to 6.4-mm-diameter) opening for pressure equalization, when tanks are removed from the premises.

[3404.2.13.2] 5704.2.13.2 Aboveground tanks. Aboveground tanks taken out of service shall comply with the requirements of FC [3404.2.13.2.1] 5704.2.13.2.1 through [3404.2.13.2.3] 5704.2.13.2.3.

[3404.2.13.2.1] 5704.2.13.2.1 Fuel conversions. A fuel oil storage tank removed from service by reason of conversion of the heating system to an alternative fuel or power source, or other replacement of the tank, shall be sealed or removed from the premises in compliance with [FC3404.2.13.2.3] FC5704.2.13.2.3 at the time of conversion or replacement.

[3404.2.13.2.2] 5704.2.13.2.2 Out of service for 30 days. Except as otherwise provided in [FC3404.2.13.2.1] FC5704.2.13.2.1, aboveground tanks not used for a period of 30 calendar days or more shall be removed from the premises or sealed in place in compliance with the requirements of [FC3404.2.13.2.3] FC5704.2.13.2.3, or safeguarded in compliance with the following requirements:

1. Tank and connecting piping shall be safeguarded in accordance with [FC3404.2.13.1.2] FC5704.2.13.1.2.

2. The tank shall be protected from flotation in accordance with good engineering practice.

[3404.2.13.2.3] 5704.2.13.2.3 Out of service for 1 year. Except as otherwise provided in [FC3404.2.13.2.1] FC5704.2.13.2.1, aboveground tanks that have been out of service for a period of 1 year or more shall be removed from the premises or sealed in place in compliance with the following requirements:

1. Flammable and combustible liquids shall be removed from the tank and connected piping.

2. The tank and connecting piping shall be rendered free of flammable and combustible vapors using an inert gas.

3. The tank shall be disconnected from system piping and removed from the premises, or filled completely with an approved, inert solid material, and sealed in place.

4. All system piping, including fire extinguishing system lines, fill line, gauge opening, and vapor return and pump connection, shall be disconnected from the tank and removed from the premises, or sealed in place and secured from tampering. Unless other methods are approved, the fill connection shall be cut from the fill piping and removed; the fill piping shall be capped or plugged; and the spill containment box shall be removed.

5. Tank openings shall be capped and plugged, leaving a 0.125-inch to 0.25-inch-diameter (3.2-mm to 6.4-mm-diameter) opening for pressure equalization, when tanks are removed from the premises.

6. The tank shall be protected from flotation in accordance with good engineering practice.

7. The tank shall be stenciled with the date that it was sealed in place.

[3404.3] 5704.3 Container storage. Storage of flammable and combustible liquids in barrels, and in closed containers that do not exceed 60 gallons (227 L) in individual capacity, and transfers incidental thereto, shall comply with the requirements of this section. It shall be unlawful to store flammable and combustible liquids in containers with an individual capacity of greater than 60 gallons (227 L).

[3404.3.1] 5704.3.1 Design, construction and capacity of containers. The design, construction and capacity of containers for the storage of flammable and combustible liquids shall be in accordance with this section and NFPA 30. It shall be unlawful to store flammable and combustible liquids in portable tanks, intermediate bulk containers and fiber drums.

[3404.3.1.1] 5704.3.1.1 Approved containers. Only approved containers shall be used.

5704.3.1.2 Barrel storage of distilled spirits. Barrels containing distilled spirits shall be stored in a liquid warehouse in accordance with FC5704.3.8 and the rules.

[3404.3.2] 5704.3.2 Liquid storage cabinets. Where other sections of this code require that liquid containers be stored in storage cabinets, such cabinets and storage shall be in accordance with FC [3404.3.2.1] 5704.3.2.1 through [3404.3.2.3] 5704.3.2.3.

[3404.3.2.1] 5704.3.2.1 Design of storage cabinets. Design of liquid storage cabinets shall be in accordance with this section.

[3404.3.2.1.1] 5704.3.2.1.1 Materials. Cabinets shall be listed in accordance with UL 1275.

[3404.3.2.1.2] 5704.3.2.1.2 **Labeling.** Cabinets shall be provided with a conspicuous label in red letters on contrasting background which reads: FLAMMABLE—KEEP FIRE AWAY.

[3404.3.2.1.3] 5704.3.2.1.3 **Doors.** Doors shall be well fitted, self-closing and equipped with a three-point latch.

[3404.3.2.1.4] 5704.3.2.1.4 **Bottom.** The bottom of the cabinet shall be liquid-tight to a height of at least 2 inches (51 mm).

[3404.3.2.2] 5704.3.2.2 **Capacity.** The combined total quantity of liquids in a cabinet shall not exceed 120 gallons (454 L).

[3404.3.2.3] 5704.3.2.3 **Number of storage cabinets.** Not more than three storage cabinets shall be located in a single fire area, except that in a Group F occupancy, additional cabinets are allowed to be located in the same fire area if the additional cabinets (or groups of up to three cabinets) are separated from other cabinets or groups of cabinets by at least 100 feet (30 480 mm).

[3404.3.3] 5704.3.3 **Indoor storage.** Storage of flammable and combustible liquids indoors in containers shall be in accordance with this section.

Exceptions:

1. Liquids in the fuel tanks of motor vehicles, aircraft, marine vessel, watercraft or portable or stationary engines.

2. The storage of [distilled spirits and] wines in wooden barrels or casks.

[3404.3.3.1] 5704.3.3.1 **Portable fire extinguishers.** Approved portable fire extinguishers shall be provided in accordance with specific sections of this chapter and FC906.

[3404.3.3.2] 5704.3.3.2 **Incompatible materials.** Materials that will react with water or other liquids to produce a hazard shall not be stored in the same room with flammable and combustible liquids in accordance with [FC2703.9.8] FC5003.9.8.

[3404.3.3.3] 5704.3.3.3 **Clear means of egress.** Storage of any liquids, including stock for sale, shall not be stored near or be allowed to obstruct physically the route of egress.

[3404.3.3.4] 5704.3.3.4 **Empty containers storage.** The storage of empty containers previously used for the storage of flammable or combustible liquids shall be stored as required for filled containers. Containers, when emptied, shall have the covers or plugs immediately replaced in openings, be removed to an outdoor location and, if not cleaned on the premises, the empty containers shall be removed from the premises as soon as practical, but at least daily.

[3404.3.3.5] 5704.3.3.5 Shelf storage. Shelving shall be of approved noncombustible construction, adequately braced and anchored. Seismic requirements shall be in accordance with the construction codes, including the Building Code.

[3404.3.3.5.1] 5704.3.3.5.1 Reserved.

[3404.3.3.5.2] 5704.3.3.5.2 Displacement protection. Shelves shall be of sufficient depth and provided with a lip or guard to prevent individual containers from being displaced.

Exception: Shelves in storage cabinets or on laboratory furniture specifically designed for such use.

[3404.3.3.5.3] 5704.3.3.5.3 Orderly storage. Shelf storage of flammable and combustible liquids shall be maintained in an orderly manner.

[3404.3.3.6] 5704.3.3.6 Rack storage. Where storage on racks is allowed elsewhere in this code, a minimum 4-foot-wide (1219 mm) aisle shall be provided between adjacent rack sections and any adjacent storage of liquids. Main aisles shall have a minimum of 8 feet (2438 mm).

[3404.3.3.7] 5704.3.3.7 Pile or palletized storage. Solid pile and palletized storage in liquid warehouses shall be arranged so that piles are separated from each other by at least 4 feet (1219 mm). Aisles shall be provided so that no container is more than 20 feet (6096 mm) from an aisle. Main aisles shall have a minimum width of 8 feet (2438 mm).

[3404.3.3.8] 5704.3.3.8 Combustible materials storage. Approved quantities of combustible materials may be stored in liquid storage areas, provided that a distance of not less than 8 feet (2438 mm) horizontally is maintained between the liquid storage area and combustible materials and fire protection systems are provided in accordance with this code and Chapter 9 of the Building Code.

[3404.3.3.9] 5704.3.3.9 Idle combustible pallets. Storage of empty or idle combustible pallets inside an unprotected liquid storage area shall be limited to a maximum pile size of 2,500 square feet (232 m^2) and to a maximum storage height of 6 feet (1829 mm). Storage of empty or idle combustible pallets inside a protected liquid storage area shall comply with the requirements of NFPA 13, as modified by FC Appendix B. Pallet storage shall be separated from liquid storage by aisles with a minimum width of 8 feet (2438 mm).

[3404.3.3.10] 5704.3.3.10 Containers in piles. Containers in piles shall be stacked in such a manner as to provide stability and to prevent excessive stress on container walls. Adequate material-handling equipment shall be available to handle containers safely at the upper tier level.

[3404.3.4] 5704.3.4 Quantity limits for storage. Liquid storage quantity limitations shall comply with the requirements of FC [3404.3.4.1] 5704.3.4.1 through [3404.3.4.5] 5704.3.4.4.

[3404.3.4.1] 5704.3.4.1 Maximum allowable quantity per control area. For occupancies other than Group M wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area indicated in FC Table [2703.1.1(1)] 5003.1.1(1) and shall not exceed the additional limitations set forth in this section. For Group M occupancy wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area indicated in FC Table [3404.3.4.1] 5704.3.4.1, except that no gasoline or flammable liquid motor fuel may be stored in portable containers for wholesale or retail sale. Storage of hazardous production material flammable and combustible liquids in Group H-5 occupancies shall be in accordance with FC Chapter [18] 27.

[3404.3.4.2] 5704.3.4.2 Limitations on storage. The quantity of flammable or combustible liquid stored shall be limited by occupancy as follows:

1. **Group A, B, E, F, I and S occupancies**. Flammable and combustible liquids shall be stored only for lawful uses incidental to the occupancy, including maintenance and operation of equipment, and in quantities not to exceed that which is necessary for such use.

2. **Group M occupancies.** Flammable and combustible liquids shall be stored only for lawful uses incidental to the occupancy, including maintenance and operation of equipment, and in quantities not to exceed that which is necessary for such use. The maximum allowable quantities for storage in wholesale and retail sales areas shall be in accordance with [FC3404.3.4.1] FC5704.3.4.1.

3. **Group R occupancies.** Flammable and combustible liquids shall be stored only for maintenance and operation of equipment, and in quantities not to exceed that which is necessary for such use. Quantities within a dwelling unit shall be stored only for household use and in quantities below permit amounts. It shall be unlawful to store gasoline or other flammable liquid motor fuel within a dwelling unit.

4. **Gasoline and other flammable liquid motor fuel.**[ ] Storage of gasoline and other flammable liquid motor fuel in portable containers in quantities requiring a permit is subject to the approval of the commissioner, regardless of the occupancy classification of the premises.

[3404.3.4.3] 5704.3.4.3 Quantities exceeding limits for control areas. Quantities exceeding those allowed in control areas set forth in [FC3404.3.4.1] FC5704.3.4.1 shall be stored in liquid storage rooms or liquid storage warehouses in accordance with FC [3404.3.7] 5704.3.7 and [3404.3.8] 5704.3.8.

[3404.3.4.4] 5704.3.4.4 Liquids for maintenance and operation of equipment. In all occupancies, quantities of flammable and combustible liquids requiring a permit pursuant to FC105.6, used for maintenance purposes and the operation of equipment, shall be stored in liquid storage cabinets in accordance with [FC3404.3.2] FC5704.3.2. Quantities

not requiring a permit pursuant to FC105.6 shall be stored in approved containers and locations.

[3404.3.5] 5704.3.5 Storage in control areas. Storage of flammable and combustible liquids in control areas shall be in accordance with FC [3404.3.5.1] 5704.3.5.1 through [3404.3.5.4] 5704.3.5.4.

[3404.3.5.1] 5704.3.5.1 Storage of flammable and combustible liquids below grade. Flammable liquids shall not be allowed in basements, cellars or other areas below grade. Combustible liquids shall be allowed to be stored in basements, cellars or other areas below grade provided that such basement, cellar or other area below grade is protected throughout by a sprinkler system, and other fire protection is provided in accordance with FC Chapter 9 and the construction codes, including the Building Code.

Exception: Class IIIB combustible liquids may be stored in basements, cellars and other areas below grade that are not protected throughout by a sprinkler system when stored in a room or other area that is segregated, vertically and horizontally, from surrounding spaces by a fire separation of not less than 2-hour fire-resistance rating and such room or other area is protected throughout by a sprinkler system.

[3404.3.5.2] 5704.3.5.2 Storage pile heights. Containers having less than a 30-gallon (114 L) capacity which contain Class I or II liquids shall not be stacked more than 3 feet (914 mm) or two containers high, whichever is greater, unless stacked on fixed shelving or otherwise satisfactorily secured. Containers of Class I or II liquids having a capacity of 30 gallons (114 L) or more shall not be stored more than one container high. Containers shall be stored in an upright position.

[3404.3.5.3] 5704.3.5.3 Storage distance from ceilings and roofs. Piles of containers shall not be stored closer than 3 feet (914 mm) to the nearest beam, chord, girder or other obstruction, and shall be 3 feet (914 mm) below sprinkler deflectors or discharge orifices of water spray or other overhead fire extinguishing system.

[3404.3.5.4] 5704.3.5.4 Combustible materials. In areas that are inaccessible to the public, Class I, II and IIIA liquids shall not be stored in the same pile or rack section as ordinary combustible commodities unless such materials are packaged together as kits.

FC TABLE [3404.3.4.1] 5704.3.4.1
MAXIMUM ALLOWABLE QUANTITY OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN WHOLESALE AND RETAIL SALES USES PER CONTROL AREA[a]

	MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA (gallons)		
TYPE OF LIQUID	Sprinklered[b] per footnote densities and arrangements	Sprinklered per FC Tables [3404.3.6.3(4)] 5704.3.6.3(4) through [3404.3.6.3(8)] 5704.3.6.3(8) and FC Table [3404.3.7.5.1] 5704.3.7.5.1 and the construction codes, including the Building Code	Nonsprinklered
Class IA	60	60	30
Class IB, IC, II and IIIA	7,500[c]	15,000[c]	1,600
Class IIIB	Unlimited	Unlimited	13,200

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929m^2, 1 gallon = 3.785 L, 1 gallon per minute per square foot = 40.75 L/min/m^2.
a. Control areas shall be separated from each other by not less than a 1-hour fire barrier wall.

b. To be considered as sprinklered, a building shall be protected throughout by a sprinkler system with a design providing minimum densities as follows:
   1. For uncartoned commodities on shelves 6 feet or less in height where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of Ordinary Hazard Group 2.
   2. For cartoned, palletized or racked commodities where storage is 4 feet 6 inches or less in height and where the ceiling height does not exceed 18 feet, quantities are those allowed with a minimum sprinkler design density of 0.21 gallon per minute per square foot over the most remote 1,500-squarefoot area.
c. Where wholesale and retail sales or storage areas exceed 50,000 square feet in area, the maximum allowable quantities are allowed to be increased by 2 percent for each 1,000 square feet of area in excess of 50,000 square feet, up to a maximum of 100 percent of the table amounts. A control area separation is not required. The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

[3404.3.6] 5704.3.6 Wholesale and retail sales. Flammable and combustible liquids in Group M occupancy wholesale and retail sales shall be in accordance with FC [3404.3.6.1] 5704.3.6.1 through [3404.3.6.5] 5704.3.6.5, or NFPA 30.

[3404.3.6.1] 5704.3.6.1 Container type. Containers for Class I liquids shall be metal.

Exception: In sprinklered buildings, an aggregate quantity of 120 gallons (454 L) of water-miscible Class IB and Class IC liquids is allowed in nonmetallic containers, each having a capacity of 16 ounces (0.473 L) or less.

[3404.3.6.2] 5704.3.6.2 Container capacity. Containers for Class I liquids shall not exceed a capacity of 5 gallons (19 L).

Exception: Metal containers not exceeding 55 gallons (208 L) are allowed to store up to 240 gallons (908 L) of the maximum allowable quantity per control area of Class IB and IC liquids in a control area. The building shall be protected throughout by a sprinkler system in accordance with FC Table [3404.3.4.1] 5704.3.4.1. The containers shall be provided with plastic caps without cap seals and shall be stored upright. Containers shall not be stacked or stored in racks and shall not be located in areas accessible to the public.

[3404.3.6.3] 5704.3.6.3 Fire protection and storage arrangements. Fire protection and container storage arrangements shall be in accordance with FC Table [3404.3.6.3(1)] 5704.3.6.3(1) or the following:

1. Storage on shelves shall not exceed 6 feet (1829 mm) in height, and shelving shall be metal.

2. Storage on pallets or in piles greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height, shall be protected by a sprinkler system in accordance with FC Table [3404.3.6.3(4)] 5704.3.6.3(4), and the storage heights and arrangements shall be limited to those specified in FC Table [3404.3.6.3(2)] 5704.3.6.3(2).

3. Storage on racks greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height shall be protected in accordance with FC Tables [3404.3.6.3(5)] 5704.3.6.3(5), [3404.3.6.3(6)] 5704.3.6.3(6), [3404.3.6.3(7)] 5704.3.6.3(7) and [3404.3.6.3(8)] 5704.3.6.3(8) and the construction codes, including the Building Code as appropriate, and the storage

heights and arrangements shall be limited to those specified in FC Table [3404.3.6.3(3)] 5704.3.6.3(3).

[3404.3.6.3.1] 5704.3.6.3.1 Combustible commodities. Combustible commodities shall not be stored above flammable and combustible liquids.

FC TABLE [3404.3.6.3(1)] 5704.3.6.3(1)
MAXIMUM STORAGE HEIGHT IN CONTROL AREAS

TYPE OF LIQUID	NONSPRINKLERED AREA (feet)	SPRINKLERED AREA (feet)	SPRINKLERED BUILDINGS[a, b] WITH IN-RACK PROTECTION (feet)
Flammable liquids:			
Class IA	4	4	4
Class IB	4	8	12
Class IC	4	8	12
Combustible liquids:			
Class II	6	8	12
Class IIIA	8	12	16
Class IIIB	8	12	20

For SI: 1 foot = 304.8 mm.

a In buildings protected throughout by a sprinkler system, the storage height for metallic containers shall not exceed the maximum height allowed by NFPA 30 based on the type of fire protection systems provided, or the maximum height as determined by the department based on a full-scale fire test, whichever is greater. These storage heights do not apply to storage of nonmetallic containers.

b. In-rack protection shall be in accordance with FC Table [3404.3.6.3(5)] 5704.3.6.3(5), [3404.3.6.3(6)] 5704.3.6.3(6), [3404.3.6.3(7)] 5704.3.6.3(7) or [3404.3.6.3(8)] 5704.3.6.3(8) and the construction codes, including the Building Code.

FC TABLE [3404.3.6.3(2)] 5704.3.6.3(2)
STORAGE ARRANGEMENTS FOR PALLETIZED OR SOLID-PILE STORAGE IN LIQUID STORAGE ROOMS AND WAREHOUSES

CLASS	STORAGE LEVEL	MAXIMUM STORAGE HEIGHT		MAXIMUM QUANTITY PER PILE (gallons)	MAXIMUM QUANTITY PER ROOM[a] (gallons)
		Drums	Containers[b] (feet)	Containers	Containers
IA	Ground floor	1	5	3,000	12,000
	Upper floors	1	5	2,000	8,000
	Basements[e]	Not Allowed	Not Allowed	Not Allowed	Not Allowed
IB	Ground floor	1	6.5	5,000	15,000
	Upper floors	1	6.5	3,000	12,000
	Basements[e]	Not Allowed	Not Allowed	Not Allowed	Not Allowed
IC	Ground floor[d]	1	6.5[c]	5,000	15,000
	Upper floors	1	6.5[c]	3,000	12,000
	Basements[e]	Not Allowed	Not Allowed	Not Allowed	Not Allowed
II	Ground floor[d]	3	10	10,000	25,000
	Upper floors	3	10	10,000	25,000
	Basements[e]	1	5	7,500	7,500
III	Ground floor	5	20	15,000	50,000
	Upper floors	5	20	15,000	50,000
	Basements[e]	3	10	10,000	25,000

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. See [FC3404.3.8.1] FC5704.3.8.1 for unlimited quantities in liquid storage warehouses.

b. In buildings protected throughout by a sprinkler system, the storage height for metallic containers shall not exceed the maximum height allowed by NFPA 30 based on the type of fire protection systems provided, or the maximum height as determined by the department based on a full-scale fire test, whichever is greater. These storage heights do not apply to storage of nonmetallic containers.

c. These height limitations are allowed to be increased to 10 feet for containers having a capacity of 5 gallons or less.

d. For palletized storage of unsaturated polyester resins (UPR) in relieving-style metal containers with 50 percent or less by weight Class IC or II liquid and no Class IA or IB liquid, height and pile quantity limits shall be allowed to be 10 feet and 15,000 gallons, respectively, provided that such storage is protected by sprinklers in accordance with NFPA 30 and that the UPR storage area is not located in the same containment area or drainage path for other Class I or II liquids.

e. Basements include cellars and other areas below grade.

FC TABLE [3404.3.6.3(3)] 5704.3.6.3(3)

STORAGE ARRANGEMENTS FOR RACK STORAGE IN LIQUID STORAGE ROOMS AND WAREHOUSES

CLASS	TYPE RACK	STORAGE LEVEL	MAXIMUM STORAGE HEIGHT (feet)[b]	MAXIMUM QUANTITY PER ROOM[a] (gallons)
			Containers	Containers
IA	Double row or Single row	Ground floor Upper floors Basements	25 15 Not Allowed	7,500 4,500 Not Allowed
IB IC	Double row or Single row	Ground floor Upper floors Basements	25 15 Not Allowed	15,000 9,000 Not Allowed
II	Double row or Single row	Ground floor Upper floors Basements	25 25 15	24,000 24,000 9,000
III	Multirow Double room Single row	Ground floor Upper floors Basements	40 20 20	48,000 48,000 24,000

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. See [FC3404.3.8.1] FC5704.3.8.1 for unlimited quantities in liquid storage warehouses.

b. In buildings protected throughout by a sprinkler system, the storage height for metallic containers shall not exceed the maximum height allowed by NFPA 30 based on the type of fire protection systems provided, or the maximum height as determined by the department based on a full-scale fire test, whichever is greater. These storage heights do not apply to storage of nonmetallic containers.

FC TABLE [3404.3.6.3(4)] 5704.3.6.3(4)
SPRINKLER SYSTEM PROTECTION FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN METAL CONTAINERS AND PORTABLE TANKS[a]

STORAGE CONDITIONS		CEILING SPRINKLER DESIGN AND DEMAND				MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAMS (hours)
			Area (square feet)				
Class Liquid	Container size and arrangement	Density (gpm/ft^2)	High-temperature sprinklers	Ordinary temperature sprinklers	Maximum spacing (square feet)		
IA	5 gallons or less, with or without cartons, palletized or solid pile[b]	0.30	3,000	5,000	100	750	2
	Containers greater than 5 gallons, on end or side, palletized or solid pile	0.60	5,000	8,000	80	750	
IB, IC and II	5 gallons or less, with or without cartons, palletized or solid pile[b]	0.30	3,000	5,000	100	500	2
	Containers greater than 5 gallons on pallets or solid pile, one high	0.25	5,000	8,000	100		
II	Containers greater than 5 gallons on pallets or solid pile, more than one high, on end or side	0.60	5,000	8,000	80	750	2
III	5 gallons or less, with or without cartons, palletized or solid pile	0.25	3,000	5,000	120	500	1
	Containers greater than 5 gallons on pallets or solid pile, on end or sides, up to three high	0.25	3,000	5,000	120	500	1
III	Containers greater than 5 gallons, on pallets or solid pile, on end or sides, up to 18 feet high	0.35	3,000	5,000	100	750	2

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L, 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.
a. The design area contemplates the use of Class II standpipe systems. Where Class I standpipe systems are used, the area of application shall be increased by 30 percent without revising density.
b. For storage heights above 4 feet or ceiling heights greater than 18 feet, an approved engineering design shall be provided in accordance with FC104.7.2.

FC TABLE [3404.3.6.3(5)] 5704.3.6.3(5)
SPRINKLER SYSTEM PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESS WITH OR WITHOUT CARTONS ON CONVENTIONAL WOOD PALLETS[a]

CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
	Density (gpm/ft^2)	Area (square feet)		Maximum Spacing	Racks up to 9 feet deep	Racks more than 9 feet to 12 feet deep	30 psi (standard orifice)	Number of sprinklers operating		
		High-temperature sprinklers	Ordinary Temperature Sprinklers				14 psi (large orifice)			
I (maximum 25-foot height) Option 1	0.40	3,000	5,000	80 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line sprinklers above each level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multilevel	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line sprinklers above each level of storage 3. Locate in transverse flue spaces, staggered vertical and within 20 inches of aisle 4. Shields required where multilevel	30 psi (0.5-inch orifice)	1. Eight sprinklers if only one level 2. Six sprinklers each on two levels if only two levels 3. Six sprinklers each on top three levels, if three or more levels 4. Hydraulically most remote	750	2
I (maximum 25-foot height) Option 2	0.55	2,000[b]	Not Applicable	100 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. See 2 above 3. See 3 above 4. See 4 above	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. See 2 above 3. See 3 above 4. See 4 above	14 psi (0.53-inch orifice)	See 1 through 4 above	500	2
I and II (maximum 14-foot storage height) (maximum three tiers)	0.55[c]	2,000[b, d]	Not Applicable	100 ft^2/head	Not Applicable None for maximum 6-foot-deep racks	Not Applicable	Not Applicable	Not Applicable	500	2
II (maximum 25-foot height)	0.30	3,000	5,000	100 ft^2/head	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers between levels at	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. Two lines between levels at nearest 10-	30 psi	Hydraulically most remote—six sprinklers at each level, up to a maximum	750	2

					nearest 10-foot vertical intervals 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multilevel	foot vertical intervals 3. Locate in transverse flue spaces, staggered vertical and within 20 inches of aisle 4. Shields required where multilevel		of three levels		
III (40-foot height)	0.25	3,000	5,000	120 ft^2/head	Same as for Class II liquids	Same as for Class II liquids	30 psi	Same as for Class II liquids	500	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. The design area contemplates the use of Class II standpipe systems. Where Class I standpipe systems are used, the area of application shall be increased by 30 percent without revising density.

b. When the installation uses listed or approved extra-large orifices, high-temperature quick-response or standard element sprinklers, such spaces may be provided with a maximum 30-foot ceiling height provided minimum 7.5-foot aisles are maintained.

c. For friction lid cans and other metal containers equipped with plastic nozzles or caps, the density shall be increased to 0.65 gpm per square foot using listed or approved extra-large orifice, high-temperature quick-response sprinklers.

d. When the installation uses listed or approved extra-large orifice, high-temperature quick-response or standard element sprinklers, such spaces may be provided with a maximum 18-foot ceiling height provided minimum 7.5-foot aisles are maintained and only metal containers are stored.

FC TABLE [3404.3.6.3(6)] 5704.3.6.3(6)
SPRINKLER SYSTEM PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS GREATER THAN 5-GALLON CAPACITY[a]

	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND					MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLER AND HOSE STREAM (hours)
		Area (square feet)								
CLASS LIQUID	Density (gpm/ ft^2)	High-temperature sprinklers	Ordinary Temperature Sprinklers	Maximum spacing	On-side storage racks up to 9-foot-deep racks	On-end storage (on pallets) up to 9-foot-deep racks	Minimum nozzle Pressure	Number of sprinklers operating		
IA (maximum 25-foot height)	0.60	3,000	5,000	80 ft^2/head	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers above each tier of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multilevel	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers above each tier of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multilevel	30 psi	Hydraulically most remote—six sprinklers at each level	1,000	2
IB, IC and II (maximum 25-foot height)	0.60	3,000	5,000	100 ft^2/head	1. See 1 above 2. One line sprinklers every three tiers of storage	1. See 1 above 2. See 2 above	30 psi	Hydraulically most remote—six sprinklers at each level	750	2

					3. See 3 above 4. See 4 above	3. See 3 above 4. See 4 above				
III (maximum 40-foot height)	0.25	3,000	5,000	120 ft^2/head	1. See 1 above 2. One line sprinklers every sixth level (maximum) 3. See 3 above 4. See 4 above	1. See 1 above 2. One line sprinklers every third level (maximum) 3. See 3 above 4. See 4 above	15 psi	Hydraulically most remote—six sprinklers at each level	500	1

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.
a. The design assumes the use of Class II standpipe systems. Where a Class I standpipe system is used, the area of application shall be increased by 30 percent without revising density.

FC TABLE [3404.3.6.3(7)] 5704.3.6.3(7)
AUTOMATIC AFFF WATER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN METAL CONTAINERS GREATER THAN 5-GALLON CAPACITY[a,b]

	CEILING SPRINKLER DESIGN AND DEMAND			IN-RACK SPRINKLER ARRANGEMENT AND DEMAND[c]					
		Area (square feet)							
CLASS LIQUID	Density (gpm/ft^2)	High-temperature Sprinklers	Ordinary temperature sprinklers	On-end storage of drums on pallets, up to 25 feet	Minimum nozzle pressure (psi)	Number of Sprinklers Operating	Hose stream demand[d] (gpm	DURATION AFFF SUPPLY (minimum)	DURATION WATER SUPPLY (hours)
IA, IB, IC and II	0.30	1,500	2,500	1. Ordinary temperature sprinkler up to 10 feet apart horizontally 2. One line sprinklers above each level of storage 3. Locate in longitudinal flue space, staggered vertically 4. Shields required for multilevel	30	Three sprinklers per level	500	15	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.
a. System shall be a closed-head wet system with approved devices for proportioning aqueous film-forming foam.
b. Except as modified by this table, in-rack sprinklers shall be installed in accordance with NFPA 13, as modified by FC Appendix B.
c. Storage heights shall not exceed 25 feet.
d. Hose stream demand includes 1½-inch inside hand hose, when required.

FC TABLE [3404.3.6.3(8)] 5704.3.6.3(8)
SPRINKLER SYSTEM PROTECTION REQUIREMENTS FOR CLASS I LIQUID STORAGE IN METAL CONTAINERS OF 1-GALLON CAPACITY OR LESS WITH UNCARTONED OR CASE-CUT SHELF DISPLAY UP TO 6.5 FEET, AND PALLETIZED STORAGE ABOVE IN A DOUBLE-ROW RACK ARRAY[a]

	CEILING SPRINKLER DESIGN AND DEMAND				IN-RACK SPRINKLER ARRANGEMENT AND DEMAND				MINIMUM HOSE STREAM DEMAND (gpm)	MINIMUM DURATION SPRINKLERS AND HOSE STREAM (hours)
		Area (square feet)								
STORAGE HEIGHT	Density (gpm/ft^2)	High temperature	Ordinary Temperature	Maximum spacing	Racks up to 9 feet deep	Racks 9 to 12 feet	Minimum nozzle pressure	Number of sprinklers operating		
Maximum 20-foot storage height	0.60	2,000[b]	Not Applicable	100 ft^2/head	1. Ordinary temperature, quick-response sprinklers, maximum 8 feet 3 inches horizontal spacing 2. One line of sprinklers at the 6-foot level and the 11.5-foot level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multilevel	Not Applicable	30 psi (standard orifice) or 14 psi (large orifice)	1. Six sprinklers each on two levels 2. Hydraulically most remote 12 sprinklers	500	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 pound per square inch = 6.895 kPa, 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 L/min/m^2.

a. This table shall not apply to racks with solid shelves.

b. When the installation uses extra-large orifice sprinklers, such spaces may be provided with a maximum 30-foot ceiling height provided [ ]minimum 7.5-foot aisles are maintained.

[3404.3.6.4] 5704.3.6.4 Container warning labels. All containers of flammable liquids offered for sale shall bear a warning label in accordance with federal laws, rules and regulations, painted or printed on the container, cautioning that the liquid is flammable and must be kept away from heat and open flames.

[3404.3.6.5] 5704.3.6.5 Storage plan. The commissioner may require that aisle and storage plans be submitted to the department in accordance with FC Chapter [27] 50.

[3404.3.7] 5704.3.7 Liquid storage rooms. Liquid storage rooms shall comply with the requirements of FC [3404.3.7.1] 5704.3.7.1 through [3404.3.7.5.2] 5704.3.7.5.2.

[3404.3.7.1] 5704.3.7.1 General. Quantities of liquids exceeding those set forth in [FC3404.3.4.1] FC5704.3.4.1 for storage in control areas shall be stored in a liquid storage room complying with the requirements of this section and constructed and separated as required by the construction codes, including the Building Code.

[3404.3.7.2] 5704.3.7.2 Quantities and arrangement of storage. The quantity limits and storage arrangements in liquid storage rooms shall be in accordance with FC Tables [3404.3.6.3(2)] 5704.3.6.3(2) and [3404.3.6.3(3)] 5704.3.6.3(3) and FC [3404.3.7.2.1] 5704.3.7.2.1 through [3404.3.7.2.3] 5704.3.7.2.3.

[3404.3.7.2.1] 5704.3.7.2.1 Mixed storage. Where two or more classes of liquids are stored in a pile or rack section:

1. The quantity in that pile or rack shall not exceed the smallest of the maximum quantities for the classes of liquids stored in accordance with FC Table [3404.3.6.3(2)] 5704.3.6.3(2) or [3404.3.6.3(3)] 5704.3.6.3(3); and

2. The height of storage in that pile or rack shall not exceed the smallest of the maximum heights for the classes of liquids stored in accordance with FC Table [3404.3.6.3(2)] 5704.3.6.3(2) or [3404.3.6.3(3)] 5704.3.6.3(3).

[3404.3.7.2.2] 5704.3.7.2.2 Separation and aisles. Piles shall be separated from each other by at least 4-foot (1219 mm) aisles. Aisles shall be provided so that all containers are 20 feet (6096 mm) or less from an aisle. Where the storage of liquids is on racks, a minimum 4-foot-wide (1219 mm) aisle shall be provided between adjacent rows of racks and adjacent storage of liquids. Main aisles shall be a minimum of 8 feet (2438 mm) wide. Additional aisles shall be provided for access to doors, required windows and ventilation openings, standpipe connections, mechanical equipment and switches. Such aisles shall be at least 3 feet (914 mm) in width, unless greater widths are required for separation of piles or racks, in which case the greater width shall be provided.

[3404.3.7.2.3] 5704.3.7.2.3 Stabilizing and supports. Containers and piles shall be separated by pallets or dunnage to provide stability and to prevent excessive stress to container walls. Adequate material-handling equipment shall be readily available and used to handle containers safely at upper tier levels.

[3404.3.7.3] 5704.3.7.3 Spill control and secondary containment. Liquid storage rooms shall be provided with spill control and secondary containment in accordance with [FC2704.2] FC5004.2.

[3404.3.7.4] 5704.3.7.4 Ventilation. Liquid storage rooms shall be ventilated in accordance with [FC2704.3] FC5004.3.

[3404.3.7.5] 5704.3.7.5 Fire protection. Fire protection for liquid storage rooms shall comply with the requirements of FC [3404.3.7.5.1] 5704.3.7.5.1 and [3404.3.7.5.2] 5704.3.7.5.2.

[3404.3.7.5.1] 5704.3.7.5.1 Fire extinguishing systems. Liquid storage rooms shall be protected throughout by sprinkler systems installed in accordance with FC Chapter 9, FC Tables [3404.3.6.3(4)] 5704.3.6.3(4) through [3404.3.6.3(8)] 5704.3.6.3(8) and FC Table [3404.3.7.5.1] 5704.3.7.5.1 and the construction codes, including the Building Code. In-rack sprinklers shall additionally comply with the requirements of NFPA 13, as modified by FC Appendix B, and the construction codes, including the Building Code. Foam fire extinguishing systems and aqueous film-forming foam (AFFF) fire extinguishing systems shall not be used except when approved by the commissioner and the Commissioner of Buildings. Protection criteria developed from fire modeling or full-scale fire testing conducted at an approved testing laboratory are allowed in lieu of the protection as required in FC Tables [3404.3.6.3(2)] 5704.3.6.3(2) through [3404.3.6.3(8)] 5704.3.6.3(8) and FC Table [3404.3.7.5.1] 5704.3.7.5.1 and the construction codes, including the Building Code when approved by the commissioner and the Commissioner of Buildings.

FC TABLE [3404.3.7.5.1] 5704.3.7.5.1
AUTOMATIC AFFF-WATER PROTECTION REQUIREMENTS FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESS[a,b]

PACKAGE TYPE	CLASS LIQUID	CEILING SPRINKLER DESIGN AND DEMAND					STORAGE HEIGHT (feet)	HOSE DEMAND (gpm)[c]	DURATION AFFF SUPPLY (minimum)	DURATION WATER SUPPLY (hours)
		Density (gpm/ft^2)	Area (square feet)	Temperature rating	Maximum spacing	Orifice size (inch)				
Cartoned	IB, IC, II and III	0.40	2,000	286°F	100 ft^2/head	0.531	11	500	15	2
Uncartoned	IB, IC, II and III	0.30	2,000	286°F	100 ft^2/head	0.5 or 0.531	12	500	15	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 gallon per minute per square foot = 40.75 $L/min/m^2$, °C. = (°F-32)/1.8.

a. System shall be a closed-head wet system with approved devices for proportioning aqueous film-forming foam.

b. Ceiling heights shall not exceed 30 feet.

c. Hose stream demand includes 1½-inch inside hand hose, when required.

[3404.3.7.5.2] 5704.3.7.5.2 Portable fire extinguishers. A minimum of one portable fire extinguisher complying with the requirements of FC906 and having a rating of not less than 20-B shall be located not less than 10 feet (3048 mm) or more than 50 feet (15 240 mm) from any Class I or II liquid storage area located outside of a liquid storage room. A minimum of one portable fire extinguisher having a rating of not less than 20-B shall be located outside of, but not more than 10 feet (3048 mm) from, the door opening into a liquid storage room.

[3404.3.8] 5704.3.8 Liquid warehouses. Buildings used for storage of flammable or combustible liquids in quantities exceeding those set forth in [FC3404.3.4] FC5704.3.4 for control areas and [FC3404.3.7] FC5704.3.7 for liquid storage rooms shall comply with the requirements of FC [3404.3.8.1] 5704.3.8.1 through [3404.3.8.5] 5704.3.8.5 and shall be constructed and separated as required by the construction codes, including the Building Code.

[3404.3.8.1] 5704.3.8.1 Quantities and storage arrangement. Except as may be limited by the commissioner at a particular premises in the interest of public safety, any amount of flammable and combustible liquids may be stored in a liquid warehouse as defined in NFPA 30. The arrangement of such storage shall be in accordance with FC Table [3404.3.6.3(2)] 5704.3.6.3(2) or [3404.3.6.3(3)] 5704.3.6.3(3).

[3404.3.8.1.1] 5704.3.8.1.1 Mixed storage. Mixed storage shall be in accordance with [FC3404.3.7.2.1] FC5704.3.7.2.1.

[3404.3.8.1.2] 5704.3.8.1.2 Separation and aisles. Separation and aisles shall be in accordance with [FC3404.3.7.2.2] FC5704.3.7.2.2.

[3404.3.8.2] 5704.3.8.2 Spill control and secondary containment. Liquid warehouses shall be provided with spill control and secondary containment as set forth in [FC2704.2] FC5004.2.

[3404.3.8.3] 5704.3.8.3 Ventilation. Liquid warehouses storing containers greater than 5 gallons (19 L) in capacity shall be ventilated in accordance with the Mechanical Code.

[3404.3.8.4] 5704.3.8.4 Fire extinguishing systems. Liquid warehouses shall be protected throughout by sprinkler systems installed in accordance with FC Chapter 9 and FC Tables [3404.3.6.3(4)] 5704.3.6.3(4) through [3404.3.6.3(8)] 5704.3.6.3(8) and FC Table [3404.3.7.5.1] 5704.3.7.5.1, or NFPA 30. In-rack sprinklers shall additionally comply with the requirements of NFPA 13, as modified by FC Appendix B, and the construction codes, including the Building Code. Foam fire extinguishing systems and automatic aqueous film-forming foam fire extinguishing systems shall not be used except when approved. Protection criteria developed from fire modeling or full-scale fire testing conducted at an approved testing laboratory are allowed in lieu of the protection as required in FC Tables [3404.3.6.3(2)] 5704.3.6.3(2) through [3404.3.6.3(8)] 5704.3.6.3(8) and FC Table [3404.3.7.5.1] 5704.3.7.5.1 and the construction codes, including the Building Code, when approved by the commissioner and the Commissioner of Buildings.

[3404.3.8.5] 5704.3.8.5 Warehouse hose lines. In liquid warehouses, either 1½-inch ([8] 38-mm) lined or 1-inch (25-mm) hard rubber hand hose lines shall be provided in sufficient number to reach all liquid storage areas and shall be in accordance with FC905 and the construction codes, including the Building Code.

[3404.4] 5704.4 Outdoor storage of containers. Outdoor storage areas for portable containers of flammable and combustible liquids shall be designed, installed, operated and maintained in

compliance with the requirements of [FC3403] FC5703, and [3404.4.1] 5704.4.1 through [3404.4.8] 5704.4.8.

[3404.4.1] 5704.4.1 Design and construction. Outdoor portable container storage areas shall be designed and constructed in accordance with approved design and installation documents.

[3404.4.2] 5704.4.2 Location on property. Outdoor portable container storage areas shall be designed, installed, operated and maintained in accordance with FC Table [3404.4.2] 5704.4.2 and in compliance with the requirements of [FC3404.4.2.1] FC5704.4.2.1 through [3404.4.2.4] 5704.4.2.4.

[3404.4.2.1] 5704.4.2.1 Mixed liquid piles. Where two or more classes of liquids are stored in a single pile, the quantity in the pile shall not exceed the smallest of maximum quantities for the classes of material stored.

[3404.4.2.2] 5704.4.2.2 Fire apparatus access. Outdoor portable container storage areas shall be provided with fire apparatus access in accordance with [FC319.7.1] FC3605.3.1.

[3404.4.2.3] 5704.4.2.3 Reserved.

[3404.4.2.4] 5704.4.2.4 Storage adjacent to buildings. A maximum amount of 1,100 gallons (4163 L) of flammable and combustible liquids stored in portable containers may be stored adjacent to a building located on the same premises and under the same ownership, provided that:

1. The building does not exceed one story in height. Such building shall be of fire-resistance-rated construction with noncombustible exterior surfaces or noncombustible construction and shall be used principally for the storage of liquids; or

2. The exterior building wall adjacent to the storage area shall have a fire-resistance rating of not less than 2 hours, having no openings to above grade areas within 10 feet (3048 mm) horizontally of such storage and no openings to below grade areas within 50 feet (15 240 mm) horizontally of such storage.

[3404.4.2.4.1] 5704.4.2.4.1 Separation. The quantity of liquids stored adjacent to a building protected in accordance with [FC3404.4.2.4(2)] FC5704.4.2.4(2) may exceed 1,100 gallons (4163 L), provided that the maximum quantity per pile does not exceed 1,100 gallons (4163 L) and each pile is separated by a 10-foot-minimum (3048 mm) clear space along the common wall. Where the quantity stored exceeds 1,100 gallons (4163 L) adjacent to a building complying with [FC3404.4.2.4(1)] FC5704.4.2.4(1), or the provisions of [FC3404.4.2.4(1)] FC5704.4.2.4(1) cannot be met, a minimum distance in accordance with the column for distance to a lot line in FC Table [3404.4.2] 5704.4.2 shall be maintained between buildings and the nearest container.

FC TABLE [3404.4.2] 5704.4.2
OUTDOOR LIQUID STORAGE IN CONTAINERS

CLASS OF LIQUID	CONTAINER STORAGE—MAXIMUM PER PILE	MINIMUM DISTANCE	MINIMUM DISTANCE	MINIMUM DISTANCE

	Quantity[a, b] (gallons)	Height (feet)	BETWEEN PILES OR RACKS (feet)	TO LOT LINE[d] (feet)	TO PUBLIC STREET OR PRIVATE ROAD[d] (feet)
IA	1,100	10	5	50	10
IB	2,200	12	5	50	10
IC	4,400	12	5	50	10
II	8,800	12	5	25	5
III	22,000	18	5	10	5

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

a. For mixed class storage, see [FC3404.4.2] FC5704.4.2.

b. For storage in racks, the quantity limits per pile do not apply, but the rack arrangement shall be limited to a maximum of 50 feet in length and two rows or 9 feet in depth.

c. Reserved.

d. When the total quantity stored does not exceed 50 percent of the maximum allowed per pile, the distances are allowed to be reduced 50 percent, but not less than 3 feet.

[3404.4.3] 5704.4.3 Spill control and secondary containment. Outdoor portable container storage areas shall be provided with spill control and secondary containment in accordance with [FC3403.4] FC5703.4.

Exception: Containers stored on approved containment pallets in accordance with [FC2704.2.3] FC5004.2.3 and containers stored in cabinets and lockers with integral spill containment.

[3404.4.4] 5704.4.4 Security. Outdoor portable container storage areas shall be protected against tampering or trespassers by fencing or other approved control measures.

[3404.4.5] 5704.4.5 Protection from vehicles. Posts or other means shall be provided to protect outdoor portable container storage areas from vehicular damage. When posts are installed, the posts shall be installed in accordance with FC312.

[3404.4.6] 5704.4.6 Clearance from combustibles. Outdoor portable container storage areas shall be kept free from vegetation and other combustible waste as set forth in FC [3404.4.6.1] 5704.4.6.1 and [3404.4.6.2] 5704.4.6.2.

[3404.4.6.1] 5704.4.6.1 Vegetation. Brush, grass, vines, weeds and other vegetation capable of being ignited that is located within 15 feet (4572 mm) of an outdoor portable container storage area shall be regularly mowed or pruned and the clippings removed from the premises.

[3404.4.6.2] 5704.4.6.2 Combustible waste. Rubbish and other combustible waste shall not be allowed to accumulate within 15 feet (4572 mm) of an outdoor portable container storage area.

[3404.4.7] 5704.4.7 Weather protection. Weather protection for outdoor portable container storage areas shall be in accordance with [FC2704.13] FC5004.13.

[3404.4.8] 5704.4.8 Empty containers storage. The storage of empty containers previously used for the storage of flammable or combustible liquids shall be stored as required for filled

containers. Containers when emptied shall have the covers or plugs immediately replaced in openings.

SECTION FC [3405] 5705
HANDLING AND USE

[3405.1] 5705.1 Scope. The handling and use of flammable and combustible liquids, including the dispensing and mixing of such liquids, shall be conducted in accordance with this chapter. Cargo tank and tank car loading and unloading and other special operations shall be conducted in accordance with [FC3406] FC5706.

Exception: Containers of organic coatings having no fire point and which are opened for pigmentation are not required to comply with the requirements of this section.

[3405.2] 5705.2 Liquid transfer. Liquid transfer equipment and methods for transfer of Class I, II and IIIA liquids shall be subject to the approval of the commissioner and conducted in compliance with the requirements of FC [3405.2.1] 5705.2.1 through [3405.2.7] 5705.2.7.

[3405.2.1] 5705.2.1 Pumps. Positive-displacement pumps shall be provided with pressure relief discharging back to the tank, pump suction or other approved location, or shall be provided with interlocks to prevent over-pressure.

[3405.2.2] 5705.2.2 Pressured systems. Gases shall not be used to pressurize containers or tanks to provide for transfer.

[3405.2.3] 5705.2.3 Piping, hoses and valves. Piping, hoses and valves used in liquid transfer operations shall be subject to the approval of the commissioner or listed for the intended use.

[3405.2.4] 5705.2.4 Class I, II and III liquids. Class I and II liquids or Class III liquids in containers exceeding 5.3 gallons (20 L) capacity that are at a temperature higher than 20°F (11°C) less than their flash points shall not be dispensed by gravity, but shall be transferred by one of the following methods:

1. From safety cans complying with the requirements of UL 30.

2. Through an approved closed piping system.

3. From containers or tanks by an approved pump taking suction through an opening in the top of the container or tank.

4. Approved engineered liquid transfer systems.

[3405.2.5] 5705.2.5 Manual container filling operations for Class I liquids. Class I liquids and Class II or III liquids at a temperature higher than 20°F (11°C) less than their flash points

shall not be transferred into containers unless the nozzle and containers are electrically interconnected. Acceptable methods of electrical interconnection include:

1. Metallic floor plates on which containers stand while filling, when such floor plates are electrically connected to the fill stem; or

2. Where the fill stem is bonded to the container during filling by means of a bond wire.

[3405.2.6] 5705.2.6 Automatic container-filling operations for flammable liquids. Container-filling operations for flammable liquids involving conveyor belts or other automatic-feeding operations shall be designed to prevent static accumulations.

[3405.2.7] 5705.2.7 Portable container dispensing. When a portable container is used to dispense gasoline or other flammable or combustible liquids into portable fueled equipment or stationary fuel-burning equipment by means of pouring or other gravity dispensing, the individual capacity of the portable container shall not exceed 2½ gallons (9.5L), except as authorized by this code at construction sites.

[3405.3] 5705.3 Indoor use. Indoor use of flammable and combustible liquids, including the dispensing and mixing of such liquids, shall be in accordance with [FC3405.2] FC5705.2, and FC [3405.3.1] 5705.3.1 through [3405.3.5.3] 5705.3.5.3.

[3405.3.1] 5705.3.1 Closure of mixing or blending vessels. Vessels used for mixing or blending of flammable liquids and combustible liquids at a temperature higher than 20°F (11°C) less than their flash points shall be provided with self-closing, tight-fitting, noncombustible lids that will control a fire within such vessel.

Exception: Where such devices are determined by the commissioner to be impractical, a fire extinguishing system shall be provided.

[3405.3.2] 5705.3.2 Bonding of vessels. Where differences of potential could be created, vessels containing flammable liquids, or combustible liquids at a temperature higher than 20°F (11°C) less than their flash points shall be electrically connected by bond wires, ground cables, piping or similar means to a static grounding system to maintain equipment at the same electrical potential to prevent sparking.

[3405.3.3] 5705.3.3 Heating, lighting and cooking devices, equipment and systems. Heating, lighting and cooking devices, equipment and systems which utilize flammable liquids shall not be operated indoors, and shall comply with the requirements of FC Chapters 3 and [14] 33, as applicable.

[3405.3.4] 5705.3.4 Location of processing vessels. Processing vessels shall be located with respect to distances to lot lines, in accordance with FC Tables [3405.3.4(1)] 5705.3.4(1) and [3405.3.4(2)] 5705.3.4(2). Processing vessels for flammable liquids shall be limited to not more than 550 gallons (2082 L). Processing vessels for Class II and IIIA combustible liquids shall be

limited to not more than 1,100 gallons (4164 L). Processing vessels for Class IIIB combustible liquids shall be limited to not more than 20,000 gallons (75 700 L).

Exception: Where the exterior wall facing the adjoining lot line is a blank wall having a fire-resistance rating of not less than 4 hours, the commissioner may modify the distances. The distance shall not be less than that set forth in the construction codes, including the Building Code, and when Class IA or unstable liquids are involved, explosion control shall be provided in accordance with FC911.

FC TABLE [3405.3.4(1)] 5705.3.4(1)
SEPARATION OF PROCESSING VESSELS FROM LOT LINES

PROCESSING VESSELS WITH EMERGENCY RELIEF VENTING	LOCATION	
	Stable liquids	Unstable liquids
Not in excess of 2.5 psig	FC Table [3405.3.4(2)] 5705.3.4(2)	two and one-half times FC Table [3405.3.4(2)] 5705.3.4(2)
Over 2.5 psig	one and one-half times FC Table [3405.3.4(2)] 5705.3.4(2)	four times FC Table [3405.3.4(2)] 5705.3.4(2)

For SI: 1 pound per square inch gauge = 6.895 kPa.

FC TABLE [3405.3.4(2)] 5705.3.4(2)
REFERENCE TABLE FOR USE WITH FC TABLE [3405.3.4(1)] 5705.3.4(1)

TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM LOT LINE (feet)	MINIMUM DISTANCE FROM A BUILDING, PUBLIC STREET OR PRIVATE ROAD (feet)
275 or less	5	5
Over 275 to 750	10	5
Over 750 to 12,000	15	5
Over 12,000 to 20,000	20	5

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

[3405.3.5] 5705.3.5 Quantity limits for use. Liquid use quantity limitations shall comply with the requirements of FC [3405.3.5.1] 5705.3.5.1 through [3405.3.5.3] 5705.3.5.3.

[3405.3.5.1] 5705.3.5.1 Maximum allowable quantity per control area. Indoor use of flammable and combustible liquids, including the dispensing and mixing of such liquids, shall not exceed the maximum allowable quantity per control area indicated in FC Table [2703.1.1(1)] 5003.1.1(1) and shall not exceed the additional limitations set forth in [FC3405.3.5] FC5705.3.5.

Exceptions:

1. Cleaning with Class I, II and IIIA liquids shall be in accordance with [FC3405.3.6] FC5705.3.6.

2. Use of hazardous production material flammable and combustible liquids in Group H-5 occupancies shall be in accordance with FC Chapter [18] 27.

[3405.3.5.2] 5705.3.5.2 Limitations on handling and use. The quantity of flammable or combustible liquid handled and used, including the quantity dispensed and mixed, shall be limited by occupancy as follows:

1. **Group A, B, E, F, I and S occupancies**. Flammable and combustible liquids shall be handled and used only for lawful uses incidental to the occupancy, including maintenance and operation of equipment, and in quantities not to exceed those which are necessary for such use.

2. **Group M occupancies.** Flammable and combustible liquids shall be handled and used only for lawful uses incidental to the occupancy, including maintenance and operation of equipment, and in quantities not to exceed those which are necessary for such use.

3. **Group R occupancies.** Flammable and combustible liquids shall be handled and used only for maintenance and operation of equipment, and in quantities not to exceed those which are necessary for such use. Quantities used within a dwelling unit shall be for household uses only and in quantities below permit amounts. It shall be unlawful to handle or use gasoline or other flammable liquid motor fuel within a dwelling unit.

4. **Gasoline and other flammable liquid motor fuel.** Gasoline and other flammable liquid motor fuel in portable containers in quantities requiring a permit is subject to the approval of the commissioner, regardless of the occupancy classification of the premises.

[3405.3.5.3] 5705.3.5.3 Quantities exceeding limits for control areas. Quantities exceeding the maximum allowable quantity per control area indicated in FC [3405.3.5.1] 5705.3.5.1 and [3405.3.5.2] 5705.3.5.2 shall be in compliance with the following requirements:

1. For open systems, indoor use of flammable and combustible liquids, including the dispensing and mixing of such liquids, shall be within a room or building complying with the construction codes, including the Building Code and FC [3405.3.7.1] 5705.3.7.1 through [3405.3.7.5] 5705.3.7.5.

2. For closed systems, indoor use of flammable and combustible liquids, including the dispensing and mixing of such liquids, shall be within a room or building complying with the requirements of the construction codes, including the Building Code and FC [3405.3.7] 5705.3.7 through [3405.3.7.4] 5705.3.7.4 and [3405.3.7.6] 5705.3.7.6.

[3405.3.6] 5705.3.6 Cleaning with flammable and combustible liquids. Cleaning with Class I, II and IIIA liquids shall be in accordance with this section.

Exceptions:

1. Dry cleaning shall be in accordance with FC Chapter [12] 21.

2. Spray-nozzle cleaning shall be in accordance with [FC1503.3.5] FC2403.3.5.

[3405.3.6.1] 5705.3.6.1 Cleaning operations. Class IA liquids and gasoline shall not be used to clean facilities or for other maintenance purposes, except as authorized by this code or the rules in connection with commercial and industrial process-related operations. The cleaning with Class IB, IC or II liquids shall be conducted as follows:

1. In a room or building in accordance with [FC3405.3.7] FC5705.3.7; or

2. In a machine listed and approved for the purpose in accordance with [FC3405.3.6.2] FC5705.3.6.2.

[3405.3.6.2] 5705.3.6.2 Listed and approved machines. Parts cleaning and degreasing conducted in listed and approved machines in accordance with [FC3405.3.6.1] FC5705.3.6.1 shall be in accordance with FC [3405.3.6.2.1] 5705.3.6.2.1 through [3405.3.6.2.7] 5705.3.6.2.7.

[3405.3.6.2.1] 5705.3.6.2.1 Solvents. Solvents shall be classified and shall be compatible with the machines within which they are used.

[3405.3.6.2.2] 5705.3.6.2.2 Machine capacities. The quantity of solvent shall not exceed the listed design capacity of the machine for the solvent being used with the machine.

[3405.3.6.2.3] 5705.3.6.2.3 Solvent quantity limits. Solvent quantities shall be limited as follows:

1. Machines without remote solvent reservoirs shall be limited to quantities set forth in [FC3405.3.5] FC5705.3.5.

2. Machines with remote solvent reservoirs using a Class IB or IC liquid shall be limited to quantities set forth in [FC3405.3.5] FC5705.3.5.

3. Machines with remote solvent reservoirs using Class II liquids shall be limited to 35 gallons (132 L) per machine. The total quantities shall not exceed an aggregate of 240 gallons (908 L) per control area in buildings not protected throughout by a sprinkler system and an aggregate of 480 gallons (1817 L) per control area in buildings protected throughout by a sprinkler system.

4. Machines with remote solvent reservoirs using Class IIIA liquids shall be limited to 80 gallons (303 L) per machine.

[3405.3.6.2.4] 5705.3.6.2.4 Immersion soaking of parts. Work areas of machines with remote solvent reservoirs shall not be used for immersion soaking of parts.

[3405.3.6.2.5] 5705.3.6.2.5 Separation. Multiple machines shall be separated from each other by a distance of not less than 30 feet (9144 mm) or by a fire barrier with a minimum 1-hour fire-resistance rating.

[3405.3.6.2.6] 5705.3.6.2.6 Ventilation. Machines shall be located in areas adequately ventilated to prevent accumulation of vapors.

[3405.3.6.2.7] 5705.3.6.2.7 Installation. Machines shall be installed in accordance with their listings.

[3405.3.7] 5705.3.7 Rooms or buildings for quantities exceeding the maximum allowable quantity per control area. Where required by FC [3405.3.5.3] 5705.3.5.3 or [3405.3.6.1] 5705.3.6.1, rooms or buildings used for the handling and use of flammable and combustible liquids, including the dispensing and mixing of such liquids, shall be in accordance with FC [3405.3.7.1] 5705.3.7.1 through [3405.3.7.6.3] 5705.3.7.6.3.

[3405.3.7.1] 5705.3.7.1 Construction, location and fire protection. Rooms or buildings classified in accordance with the Building Code as Group H-2 or H-3 occupancies based on use of flammable or combustible liquids, including the dispensing or mixing of such liquids, shall be constructed in accordance with the construction codes, including the Building Code.

[3405.3.7.2] 5705.3.7.2 Basements and other areas below grade. In rooms or buildings classified in accordance with the Building Code as Group H-2 or H-3, dispensing or mixing of flammable or combustible liquids shall not be conducted in basements, cellars or other areas below grade.

[3405.3.7.3] 5705.3.7.3 Fire protection. Rooms or buildings classified in accordance with the construction codes, including the Building Code, as Group H-2 or H-3 occupancies shall be protected throughout by a sprinkler system.

[3405.3.7.4] 5705.3.7.4 Doors. Interior doors to rooms or portions of such buildings shall be self-closing fire doors in accordance with the construction codes, including the Building Code.

[3405.3.7.5] 5705.3.7.5 Open systems. The handling and use of flammable and combustible liquids, including the dispensing and mixing of such liquids, in open systems shall be in accordance with FC [3405.3.7.5.1] 5705.3.7.5.1 through [3405.3.7.5.3] 5705.3.7.5.3.

[3405.3.7.5.1] 5705.3.7.5.1 Ventilation. Continuous mechanical ventilation shall be provided and shall comply with the requirements of the construction codes, including the Building Code and the Mechanical Code.

[3405.3.7.5.2] 5705.3.7.5.2 Explosion control. Explosion control shall be provided in accordance with FC911.

[3405.3.7.5.3] 5705.3.7.5.3 Spill control and secondary containment. Spill control shall be provided in accordance with [FC3403.4] FC5703.4 where Class I, II or IIIA liquids are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control

and secondary containment shall be provided in accordance with [FC3403.4] FC5703.4 when the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 100 gallons (378.5 L).

[3405.3.7.6] 5705.3.7.6 Closed systems. The handling and use of flammable or combustible liquids in closed containers, including the mixing of such liquids, shall be in accordance with FC [3405.3.7.6.1] 5705.3.7.6.1 through [3405.3.7.6.3] 5705.3.7.6.3.

[3405.3.7.6.1] 5705.3.7.6.1 Ventilation. Closed systems designed to be opened as part of normal operations shall be provided with ventilation in accordance with [FC3405.3.7.5.1] FC5705.3.7.5.1.

[3405.3.7.6.2] 5705.3.7.6.2 Explosion control. Explosion control shall be provided when an explosive environment can occur as a result of the use, including any mixing process. Explosion control shall be designed in accordance with FC911.

Exception: When process vessels are designed to contain fully the worst-case explosion anticipated within the vessel under process conditions considering the most likely failure.

[3405.3.7.6.3] 5705.3.7.6.3 Spill control and secondary containment. Spill control shall be provided in accordance with [FC3403.4] FC5703.4 when flammable or combustible liquids are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with [FC3403.4] FC5703.4 when the capacity of an individual container or tank exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 1,000 gallons (3785 L).

[3405.3.8] 5705.3.8 Outdoor handling and use. Outdoor handling and use of flammable and combustible liquids, including the dispensing of such liquids, shall be in accordance with FC [3405.3.8.1] 5705.3.8.1 through [3405.3.8.3] 5705.3.8.3.

Exception: Dispensing of liquids into motor vehicle fuel tanks at liquid motor fuel-dispensing facilities shall be in accordance with FC Chapter [22] 23.

[3405.3.8.1] 5705.3.8.1 Spill control and drainage control. Outdoor handling and use of flammable and combustible liquids, including the dispensing areas for such liquids, shall be provided with spill control as set forth in [FC3403.4] FC5703.4.

[3405.3.8.2] 5705.3.8.2 Location. Dispensing activities which exceed the quantities set forth in FC Table [3405.3.8.2] 5705.3.8.2 shall not be conducted within 15 feet (4572 mm) of buildings or combustible materials or within 25 feet (7620 mm) of building openings, lot lines, public streets or private roads. Dispensing activities that exceed the quantities set forth in FC Table [3405.3.8.2] 5705.3.8.2 shall not be conducted within 15 feet (4572 mm) of storage of Class I, II or III liquids unless such liquids are stored in tanks which are listed and

labeled as 2-hour protected tank assemblies in accordance with UL 2085. The commissioner may impose by rule, or as a condition of a permit, additional restrictions on dispensing activities, including dispensing locations, dispenser requirements, container requirements and fire protection requirements, upon a determination that such additional restrictions are required in the interest of public safety.

Exceptions:

1. The requirements shall not apply to areas where only the following liquids are dispensed: Class III liquids; liquids that are heavier than water; water-miscible liquids; and liquids with viscosities greater than 10,000 centipoise (cp).

2. Flammable and combustible liquid dispensing in chemical plants, process facilities, oil blending and packaging facilities, bulk plants and terminals.

FC TABLE [3405.3.8.2] 5705.3.8.2
MAXIMUM ALLOWABLE QUANTITIES FOR DISPENSING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN OUTDOOR CONTROL AREAS[a]

CLASS OF LIQUID	QUANTITY (gallons)
Flammable	
Class IA	10
Class IB	15
Class IC	20
Combination Class IA, IB and IC	30[c]
Combustible	
Class II	30
Class IIIA	80
Class IIIB	3,300

For SI: 1 gallon = 3.785 L.
a. For definition of "Outdoor Control Area," see [FC2702.1] FC202.
b. Reserved.
c. Containing not more than the maximum allowable quantity per control area of each individual class.

[3405.3.8.3] 5705.3.8.3 Location of processing vessels. Processing vessels shall be located with respect to distances to lot lines in accordance with FC Table [3405.3.4(1)] 5705.3.4(1).

[3405.3.9] 5705.3.9 Mobile trailers using fuel oil for heating and power generation. Mobile trailers using fuel oil for heating and power generation shall comply with the requirements of the rules.

[3405.4] 5705.4 Solvent distillation units. Solvent distillation units shall comply with the requirements of FC [3405.4.1] 5705.4.1 through [3405.4.9] 5705.4.9.

[3405.4.1] 5705.4.1 Unit with a capacity of not more than 60 gallons. Solvent distillation units used to recycle Class I, II or IIIA liquids having a distillation chamber capacity of not more than 60 gallons (227 L) shall be listed, labeled and installed in accordance with [FC3405.4] FC5705.4 and UL 2208.

Exceptions:

1. Solvent distillation units installed in dry cleaning facilities in accordance with FC Chapter [12] 21.

2. Solvent distillation units used in continuous through-put industrial processes where the source of heat is remotely supplied using steam, hot water, oil or other heat transfer fluids, the temperature of which is below the auto-ignition point of the solvent.

3. Solvent distillation units listed for and used in laboratories.

4. Approved research, testing and experimental processes.

[3405.4.2] 5705.4.2 Units with a capacity exceeding 60 gallons. Solvent distillation units used to recycle Class I, II or IIIA liquids, having a distillation chamber capacity exceeding 60 gallons (227 L) shall be used in locations that comply with the use and mixing requirements of [FC3405] FC5705 and other applicable provisions in this chapter.

[3405.4.3] 5705.4.3 Prohibited processing. It shall be unlawful to process Class I, II and IIIA liquids also classified as unstable (reactive) in solvent distillation units.

[3405.4.4] 5705.4.4 Labeling. Solvent distillation units shall bear a permanent label indicating the capacity of the distillation chamber, the distance the unit shall be placed away from sources of ignition, and the products for which the unit has been listed for use.

[3405.4.5] 5705.4.5 Manufacturer's manual and [Material] Safety Data Sheets. The manufacturer's manual for the installation, operation and servicing of the solvent distillation unit shall be maintained on the premises, readily available to the user and for inspection by any department representative. In accordance with [FC2703.4] FC5003.4, [material] safety data sheets shall be maintained on the premises for each flammable or combustible liquid used in the distillation unit.

[3405.4.6] 5705.4.6 Location. Solvent distillation units shall be installed at locations in accordance with the listing for the unit. Solvent distillation units shall not be used in basements, cellars or other areas below grade.

[3405.4.7] 5705.4.7 Storage of liquids. Distilled liquids and liquids awaiting distillation shall be stored in accordance with [FC3404] FC5704.

[3405.4.8] 5705.4.8 Storage of residues. Hazardous residue from the distillation process shall be stored in accordance with [FC3404] FC5704 and FC Chapter [27] 50.

[3405.4.9] 5705.4.9 Portable fire extinguishers. Portable fire extinguishers shall be provided in accordance with FC906. At least one portable fire extinguisher having a rating of not less than 40-B shall be located not less than 10 feet (3048 mm) or more than 30 feet (9144 mm) from any solvent distillation unit.

[3405.5] 5705.5 Alcohol-based hand rubs classified as Class I or Class II liquids. [The storage, handling and use of dispensers] Dispensers containing alcohol-based hand rubs classified as Class I or Class II liquids for use on the premises, shall be designed, installed, operated and maintained in [compliance with the following requirements] accordance with FC 5705.5.1 through 5705.5.4. Storage, handling and use of alcohol-based hand rubs in dispensers or other containers for purposes other than use on the premises shall be in accordance with the provisions of this code applicable to flammable liquids generally.

5705.5.1. Dispenser design and operation. Except as otherwise provided in FC5705.5.4, all dispensers installed or placed for use on the premises, including wall-mounted, floor-mounted or tabletop dispensers, shall comply with the following requirements:

1. Dispensers shall be of the nonaerosol[, disposable and nonrefillable] type.

2. The maximum capacity of each dispenser shall be 68 fluid ounces (2.0 L).

3. The maximum alcohol content shall not exceed 95 percent by volume.

4. [The minimum separation between dispensers shall be 48 inches (1219 mm).] Dispensers shall either be disposable or designed to be refilled with a sealed refill.

5. Dispensers shall not be installed or placed directly adjacent to, above or below any electrical receptacle, switch, appliance, device or other ignition source. [The wall space between the dispenser and the floor shall remain clear and unobstructed.]

6. [Dispensers shall be wall mounted with the bottom of each dispenser a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1219 mm) above the finished floor.

7.] Dispensers shall not release their contents except when the dispenser is manually activated. Dispensers manually activated by touch-free devices shall comply with the following requirements:

6.1. The dispensing mechanism shall be tested in accordance with the manufacturer's instructions each time a new refill is installed.

6.2. Dispensers shall be designed to minimize accidental or malicious activations of the dispensing device and shall have the following safety features:

6.2.1. The dispenser shall activate only when an object is placed within four inches of the sensing device.

6.2.2. The dispenser shall not dispense more than the amount required for hand hygiene consistent with United States Food and Drug Administration labeling regulations.

6.2.3. An object placed within the activation zone and left in place will cause only one activation.

[8. The storage of dispensers shall be in compliance with the applicable requirements of FC3404.

9. In occupancies with carpeted floors, dispensers may only be installed in smoke compartments or fire areas protected throughout by a sprinkler system.

3405.5.1 Corridor installations. Dispensers installed in corridors shall additionally comply with the following requirements:] **5705.5.2 Wall-mounted dispenser installation.** Except as otherwise provided in FC 5705.5.4, wall-mounted dispensers shall be installed in compliance with the following requirements:

1. The bottom of each wall-mounted dispenser shall be a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1219 mm) above the finished floor.

2. The wall space between the dispenser and the floor shall remain clear and unobstructed.

3. The minimum separation between dispensers shall be 48 inches (1219 mm).

[1] 4. The maximum capacity of each dispenser installed in a public hallway shall be 41 fluid ounces (1.21 L).

[2] 5. The maximum quantity allowed in a [corridor] public hallway within a control area shall be 10 gallons (38 L), unless the public hallway is protected throughout by a sprinkler system or a smoke detection system.

[3. The minimum corridor width shall be 72 inches (1829 mm).

4] 6. Projections into a [corridor] public hallway shall be in accordance with the construction codes, including the Building Code.

[5. The corridor shall be protected throughout by a sprinkler system or smoke detection system.]

5705.5.3 Storage of alcohol-based hand rub dispensers. Storage of alcohol-based hand rubs in dispensers for use on the premises (excluding dispensers installed or placed for use) shall be in accordance with FC Table 5003.1.1(1), except as may be otherwise authorized by the department.

5705.5.4 Alcohol-based hand rubs in bulk packaging. Storage, handling and use of alcohol-based hand rub dispensers in packaging not in compliance with FC5705.5.1, including dispensers with a capacity exceeding 68 fluid ounces (2 L) or dispensers of any size that must be manually refilled from a container, shall be stored, handled and used on a premises for use at such premises only as may be prescribed by rule and/or authorized by permit.

SECTION FC [3406] 5706
SPECIAL OPERATIONS

[3406.1] 5706.1 Scope. Flammable and combustible liquids shall be stored, handled and used in connection with special operations, including the following operations, in compliance with the requirements of this section:

1. Storage and dispensing of flammable and combustible liquids at construction sites.

2. Bulk plants or terminals.

3. Bulk transfer and process transfer operations utilizing cargo tanks and tank cars.

4. Cargo tanks and cargo tank operation.

5. Vapor recovery and vapor-processing systems.

[3406.1.1] 5706.1.1 General. Special operations involving the storage, handling and use of flammable and combustible liquids shall be conducted in accordance with FC [3401] 5701, [3403] 5703, [3404] 5704 and [3405] 5705, except as otherwise provided in this section.

[3406.1.2] 5706.1.2 Prohibition. It shall be unlawful to dispense any flammable or combustible liquid from a cargo tank or tank car into the fuel tanks of motor vehicles, except for the transfer of liquids from a cargo tank to construction equipment at a construction site in accordance with [FC3406.2.8] FC5706.2.8.

[3406.2] 5706.2 Storage and dispensing of flammable and combustible liquids at construction sites. Temporary storage and dispensing of flammable and combustible liquids at construction sites shall be in accordance with FC [3406.2.1] 5706.2.1 through [3406.2.8] 5706.2.8.

Exception: Storage and use of fuel oil connected with nonportable oil-burning equipment regulated by the Mechanical Code.

[3406.2.1] 5706.2.1 Combustibles and open flames near tanks. Storage areas shall be kept free from weeds and other combustible waste. It shall be unlawful to smoke, or light or maintain an open flame in a flammable or combustible liquid storage area.

[3406.2.2] 5706.2.2 Marking of tanks and containers. Tanks and containers for aboveground storage of liquids shall be conspicuously marked with the name of the product which they contain and the words: FLAMMABLE—KEEP FIRE AND FLAME AWAY. Tanks shall bear the additional marking: KEEP 50 FEET FROM BUILDINGS.

[3406.2.3] 5706.2.3 Containers for storage and use. Flammable and combustible liquid shall only be stored in metal containers of a type meeting the requirements of the regulations of the

United States Department of Transportation, as set forth in 49 CFR Part 178, or in containers of an approved design.

[3406.2.3.1] 5706.2.3.1 Liquid handling devices. Discharge devices shall be of a type that do not develop an internal pressure on the container. Pumping devices or approved self-closing faucets used for dispensing liquids shall not leak and shall be well-maintained. Individual containers shall not be interconnected and shall be kept closed when not in use.

[3406.2.3.2] 5706.2.3.2 Outdoor storage. Containers stored outdoors shall be in accordance with [FC3404] FC5704 and the construction codes, including the Building Code.

[3406.2.4] 5706.2.4 Temporary tanks. The capacity of a storage tank temporarily installed aboveground containing flammable or combustible liquids shall not exceed 660 gallons (2498 L). Tanks shall be of the single-compartment design, shall be constructed of steel, and shall meet the requirements of the New York State Department of Environmental Conservation regulations, as set forth in 6 NYCRR [Parts] Part 613[and 614].

[3406.2.4.1] 5706.2.4.1 Fill-opening security. Fill openings shall be equipped with a locking closure device. Fill openings shall be separate from vent openings.

[3406.2.4.2] 5706.2.4.2 Vents. Tanks shall be provided with a method of normal and emergency venting. Normal vents shall also be in accordance with [FC3404.2.7.3] FC5704.2.7.3. Emergency vents shall be in accordance with [FC3404.2.7.4] FC5704.2.7.4. Emergency vents shall be arranged to discharge in a manner which prevents localized overheating or flame impingement on any part of the tank in the event that vapors from such vents are ignited.

[3406.2.4.3] 5706.2.4.3 Location. Tanks containing flammable or combustible liquids shall be kept outdoors and at least 50 feet (15 240 mm) from buildings, combustible material and combustible waste. Additional distance shall be provided when necessary to ensure that vehicles, equipment and containers being filled directly from such tanks will not be less than 50 feet (15 240 mm) from structures or combustible storage.

[3406.2.5] 5706.2.5 Type of tank. Tanks shall be provided with top openings only.

Exception: Aerial crane refueling operations when conducted in accordance with [FC3406.2.5.2] FC5706.2.5.2.

[3406.2.5.1] 5706.2.5.1 Tanks with top openings only. Tanks with top openings shall be mounted as follows:

1. On well-constructed metal legs connected to shoes or runners designed so that the tank is stabilized and the entire tank and its supports can be moved as a unit; or

2. For stationary tanks, on a stable base of timbers or blocks approximately 6 inches (152 mm) in height which prevents the tank from contacting the ground.

[3406.2.5.1.1] 5706.2.5.1.1 Pumps and fittings. Tanks with top openings only shall be equipped with a tightly and permanently attached, approved pumping device having an approved hose of sufficient length for filling construction equipment or containers to be served from the tank. Either the pump or the hose shall be equipped with a padlock to its hanger to prevent tampering. An antisiphoning device shall be provided in the pump discharge unless a self-closing nozzle is used. Siphons or internal pressure discharge devices shall not be used.

[3406.2.5.2] 5706.2.5.2 Tanks for gravity discharge. Tanks with a connection in the bottom or the end for gravity-dispensing liquids for aerial crane refueling operations shall be mounted and equipped as follows:

1. Support lugs used to elevate the tank for gravity discharge shall be designed to carry all required loads and provide stability.

2. Bottom or end openings for gravity discharge shall be equipped with a valve located adjacent to the tank shell which will close automatically in the event of fire through the operation of a heat-activated releasing device. Where this valve cannot be operated manually, it shall be supplemented by a second, manually operated valve.

3. The gravity discharge outlet shall be provided with an approved hose equipped with a self-closing valve at the discharge end of a type that can be padlocked to its hanger.

[3406.2.6] 5706.2.6 Spill control drainage control and diking. Indoor storage and dispensing areas shall be provided with spill control and drainage control as set forth in [FC3403.4] FC5703.4. Outdoor storage areas shall be provided with drainage control or diking as set forth in [FC3404.2.10] FC5704.2.10.

[3406.2.7] 5706.2.7 Portable fire extinguishers. Portable fire extinguishers with a minimum rating of 20-B:C and complying with the requirements of FC906 shall be provided where required by this code.

[3406.2.8] 5706.2.8 Dispensing from cargo tanks. Where approved, liquids used as fuels are allowed to be transferred from cargo tanks into the fuel tanks of construction equipment at a construction site, subject to the following requirements:

1. The cargo tank is used solely for the purpose of supplying fuel to construction equipment at a construction site.

2. The dispensing hose does not exceed 100 feet (30 480 mm) in length.

3. The dispensing nozzle is an approved type.

4. The dispensing hose is properly placed on the approved reel or in a compartment provided before the cargo tank is moved.

5. Signs prohibiting smoking and open flames within 25 feet (7620 mm) of the cargo tank and construction equipment being refueled are prominently posted on the cargo tank.

6. Electrical devices and wiring in areas where fuel dispensing is conducted are in accordance with the Electrical Code.

7. Cargo tank-dispensing equipment is operated only by a person holding a certificate of fitness.

8. Provision has been made to control and mitigate the accidental or unauthorized release of flammable and combustible liquid.

9. The cargo tank has a capacity of not more than 1,920 gallons (7267 L), and contains no Class IA liquid and not more than 640 gallons (2422 L) of any other Class I liquid.

10. Dispensing is conducted at least 50 feet (15 240 mm) from buildings, structures, combustible material or combustible waste.

11. A portable fire extinguisher with a minimum rating of 40-B:C shall be provided on the cargo tank with signage clearly indicating its location.

12. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an approved container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.

13. Operators of tank vehicles used for mobile fueling operations shall have in their possession at all times an approved means of notifying the department of a fire or other emergency.

14. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.

15. The engines of vehicles being fueled shall be shut off during dispensing operations.

16. Nighttime fueling operations shall only be conducted in adequately lighted areas.

17. The cargo tank shall be positioned with respect to the construction equipment being fueled so as to prevent vehicular traffic from driving over the delivery hose.

18. During fueling operations, a cargo tank shall be secured from movement by setting the cargo tank's brakes and chocking the wheels, and the cargo tank's warning lights shall be activated.

[3406.3] **5706.3** Reserved.

[3406.4] 5706.4 Bulk plants and terminals. Any premises in or upon which flammable and combustible liquids are received by marine vessels, watercraft, pipelines, tank cars or cargo tanks and which are stored or blended in bulk for the purpose of distributing such liquids by marine vessels, watercraft, pipelines, tanks cars, cargo tanks or containers shall be designed, installed, operated and maintained in accordance with FC [3406.4.1] 5706.4.1 through [3406.4.10.4] 5706.4.10.4.

[3406.4.1] 5706.4.1 Building construction. Buildings and structures housing bulk plant or terminal materials, operations and facilities shall be constructed in accordance with the construction codes, including the Building Code.

[3406.4.1.1] 5706.4.1.1 Design and installation documents. A site plan of the bulk plant or terminal, indicating the location and dimensions of all buildings and structures housing bulk plan or terminal materials, operations and facilities, and all flammable and combustible liquid installations, shall be filed with the department, together with such other design and installation documents as the department may require.

[3406.4.2] 5706.4.2 Means of egress. Rooms in which flammable and combustible liquids are stored, handled or used shall be arranged such that occupants engaging in such handling and use have readily available access to a means of egress in the event of fire.

[3406.4.3] 5706.4.3 Heating. Rooms in which Class I liquids are stored, handled or used shall be heated only by means not constituting a source of ignition, such as steam or hot water.

[3406.4.4] 5706.4.4 Ventilation. Ventilation shall be provided for rooms, enclosures and other areas in buildings or structures in which Class I liquids are handled or used, including any pumping or transfer. Ventilation systems shall be designed in a manner that takes into consideration the relatively high specific gravity of the vapors. When natural ventilation is approved, adequate openings in outside walls at floor level, unobstructed except by louvers or coarse screens, shall be provided. When natural ventilation is not approved, mechanical ventilation shall be provided in accordance with the construction codes, including the Mechanical Code.

[3406.4.4.1] 5706.4.4.1 Basements and other areas below grade. Class I liquids shall not be stored, handled or used within a building or structure having a basement, cellar or other area below grade into which flammable vapors can travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

[3406.4.4.2] 5706.4.4.2 Dispensing of Class I liquids. Containers of Class I liquids shall not be drawn from or filled indoors unless a provision is made to prevent the accumulation of flammable vapors in hazardous concentrations. Where mechanical ventilation is required, it shall be kept in operation while flammable vapors could be present.

[3406.4.5] 5706.4.5 Storage. Except as otherwise provided in [FC3406.4] FC5706.4, storage of flammable and combustible liquids in bulk plants and terminals shall be in compliance with the applicable requirements of [FC3404] FC5704.

[3406.4.5.1] 5706.4.5.1 Distance to lot line. The distance between any part of an aboveground flammable or combustible liquid storage tank and the nearest lot line shall be as provided in FC Table [3406.4.5.1] 5706.4.5.1, except where FC [3406.4.5.1.1] 5706.4.5.1.1 through [3406.4.5.1.5] 5706.4.5.1.5 require a greater distance.

FC TABLE [3406.4.5.1] 5706.4.5.1
DISTANCE BETWEEN AN ABOVEGROUND STORAGE TANK AND LOT LINES

TANK CAPACITY	MINIMUM DISTANCE (FEET)
≤30,000 gallons	20
Over 30,000 to 50,000 gallons	30
Over 50,000 to 100,000	50
Over 100,000 to 500,000	80
Over 500,000 to 1,000,000	100
Over 1,000,000 to 2,000,000	135
Over 2,000,000 to 3,000,000	165
Over 3,000,000 to 6,000,000	175

[3406.4.5.1.1] 5706.4.5.1.1 Vertical cylindrical tanks over 50,000 gallons (189 250 L) storing a flammable liquid. For vertical cylindrical tanks over 50,000 gallons (189 250 L) storing a flammable liquid, the distance shall not be less than the greater dimension of height or diameter of the tank, up to a maximum distance of 175 feet (53 340 mm).

[3406.4.5.1.2] 5706.4.5.1.2 Rectangular tanks over 50,000 gallons (189 250 L) storing a flammable liquid. For rectangular tanks over 50,000 gallons (189 250 L) storing a flammable liquid, the distance shall not be less than the total of the length and the width of the tank divided by two, up to a maximum distance of 175 feet (53 340 mm).

[3406.4.5.1.3] 5706.4.5.1.3 Vertical cylindrical tanks over 50,000 gallons (189 250 L) storing a combustible liquid. For vertical cylindrical tanks over 50,000 gallons (189 250 L) storing a combustible liquid, the distance shall not be less than 1/2 the greater dimension of height or diameter of the tank, up to a maximum distance of 175 feet (53 340 mm).

[3406.4.5.1.4] 5706.4.5.1.4 Rectangular tanks over 50,000 gallons (189 250 L) storing a combustible liquid. For rectangular tanks over 50,000 gallons (189 250 L) storing a combustible liquid, the distance shall not be less than the total of the length and the width of the tank divided by 4, up to a maximum distance of 175 feet (53 340 mm).

[3406.4.5.1.5] 5706.4.5.1.5 Tank construction. Newly constructed tanks shall be in accordance with API 650. Repairs and alterations to existing tanks shall be in accordance with API 653.

[3406.4.5.2] 5706.4.5.2 Distance between aboveground tanks. The distance between any part of an aboveground storage tank and adjacent tanks shall be in accordance with FC Table [3406.4.5.2] 5706.4.5.2.

FC TABLE [3406.4.5.2] 5706.4.5.2
DISTANCE BETWEEN ABOVEGROUND STORAGE TANKS

ADJACENT TANK CAPACITY	MINIMUM DISTANCE (FEET)
≤ 50,000 gallons	3
Over 50,000 to 100,000 gallons	6
Over 100,000 to 200,000 gallons	12
Over 200,000 gallons	25

[3406.4.5.3] 5706.4.5.3 Height of aboveground storage tanks. The maximum height of aboveground flammable and combustible liquid storage tanks shall not exceed 40 feet (12 192 mm).

Exception: Aboveground vertical cylindrical tanks storing combustible liquids shall not exceed 48 feet (14 630 mm) in height.

[3406.4.5.4] 5706.4.5.4 Distance from aboveground tanks to buildings. The distance between any part of an aboveground storage tank and buildings or structures used for housing of fire extinguishing equipment, central heating plant or electrical distribution equipment shall not be less than 50 feet (15 240 mm).

[3406.4.5.5] 5706.4.5.5 Maximum capacity for aboveground tanks. The maximum capacity of any aboveground tank used for storage of a flammable liquid shall not exceed 500,000 gallons (1892 500 L). The maximum capacity of any aboveground tank used for storage of combustible liquid shall not exceed 6,000,000 gallons (22 710 000 L).

[3406.4.5.6] 5706.4.5.6 Distance from aboveground tanks to exposures. No aboveground tank shall be installed within:

1. 1,000 feet (304 800 mm) of the nearest wall of a building occupied as a school or hospital, or an entrance to or exit from a tunnel for motor vehicles, subway or railroad trains, or the ventilating buildings or shafts of such tunnels.

2. 250 feet (76 200 mm) of any point under a bridge for pedestrians, motor vehicles, subway or railroad trains, a public park or a land zoned for residential purposes.

[3406.4.5.7] 5706.4.5.7 Depth of underground storage tanks. The maximum distance between the top and bottom plates of an underground flammable and combustible liquid storage tank shall not exceed 40 feet (12 192 mm).

[3406.4.5.8] 5706.4.5.8 Underground tank location. Underground tanks shall be located such that the top plate thereof shall be at least 2 feet (610 mm) below the established grade. No such tank shall be buried within 10 feet (3048 mm) of any building or adjoining property line. Individual underground tanks shall be covered with 2 feet (610 mm) of earth or 4 inches (102 mm) of reinforced concrete extending 10 feet (3048 mm) beyond all the vertical walls of the tank, and the excavation made to receive the tank shall be backfilled with well-compacted clean sand or earth, free of any ash or other corrosive substance, and free from

stones larger than will pass through a 1-inch (25-mm) mesh. Underground tanks may be erected in groups of 2 or more, when such tanks are separated by a space of 1 foot (305 mm), and provided the reinforced concrete top cover extends unbroken over the open space between the tanks.

[3406.4.5.9] 5706.4.5.9 Mounded-over tanks. Mounded-over tanks shall be considered underground tanks. A mounded-over tank may be erected with its base at any desired elevation not higher than the grade plane of the premises. It shall be enclosed with a steel, reinforced-concrete, or closed-face-concrete cribbing wall extending from the established grade to the top of the top cover, with the exterior face of the wall at least 10 feet (3048 mm) from the exterior face of the wall of the tank, and backfilled between the tank and the enclosing wall with compacted clean earth or sand containing no ash or other corrosive substance. The wall and backfill may be replaced with compacted similar fill, extending from the established grade to the level of the top cover on the tank, at the normal angle of repose of the material so used, with the provision that the width of the sloped material at the level of the top of the top cover shall be at least 10 feet (3048 mm) wide. When two or more mounded-over tanks, either rectangular or vertical-cylindrical, are grouped together, the tanks shall be at least 1 foot (305 mm) apart from each other, and the group of tanks shall be enclosed around the periphery with the same type of wall and backfill described above for one mounded-over tank.

[3406.4.5.10] 5706.4.5.10 Maximum capacity of flammable liquid underground tanks. Underground storage tanks used for storage of a flammable liquid shall not exceed 500,000 gallons (1892 500 L), except that the commissioner may approve the installation of underground tanks with a capacity not to exceed 6,000,000 gallons (22 710 000 L) where such greater capacity is determined to be necessary because of the capacity of the marine vessel, watercraft, pipeline or tank car delivering such liquid and where such increased capacity does not endanger the public safety.

[3406.4.5.11] 5706.4.5.11 Maximum capacity of combustible liquid underground tanks. Underground storage tanks used for storage of a combustible liquid shall not exceed 6,000,000 gallons (22 710 000 L). Such tanks may be compartmented; however, in no case shall any compartment exceed 4,000,000 gallons (15 140 000 L).

[3406.4.6] 5706.4.6 Overfill protection. To prevent an overfill during the transfer of flammable or combustible liquid from a marine vessel, watercraft, pipeline, tank car, cargo tank or storage tank, each tank shall be equipped with an approved electrically operated overfill protection system. Such system shall be in accordance with API 2350.

[3406.4.6.1] 5706.4.6.1 Alarms. Audible and visible alarms shall be activated automatically when the liquid level in the tank approaches 95 percent of tank capacity and again when it attains a level of 98 percent of tank capacity. This alarm shall be connected to both the marine vessel, watercraft, pipeline, tank car or cargo tank receiving point, as applicable, and to the facility dispatcher's office.

[3406.4.6.2] 5706.4.6.2 Tanks filled from pipelines. Tanks filled by pipelines shall be provided with a shutoff valve in the fill line that will automatically shut off the flow to the tank when the liquid level in the tank approaches 95 percent.

[3406.4.7] 5706.4.7 Wharves. This section shall apply to all wharves, piers, bulkheads and other structures over or contiguous to navigable water having a primary function of transferring liquid cargo in bulk between shore installations and marine vessels and watercraft [ ]including barges, lighter boats or similar watercraft.

Exception: Marine liquid motor fuel-dispensing facilities designed, installed, operated and maintained in accordance with FC Chapter [22] 23.

[3406.4.7.1] 5706.4.7.1 Transferring approvals. Handling packaged cargo of liquids, including full and empty drums, bulk fuel and stores, over a wharf during cargo transfer shall be subject to the approval and under the personal supervision of the bulk plant or terminal certificate of fitness holder and the senior deck officer on duty.

[3406.4.7.2] 5706.4.7.2 Transferring location. Wharves at which liquid cargoes are to be transferred in bulk quantities to or from marine vessels and watercraft shall be at least 100 feet (30 480 mm) from any bridge over a navigable waterway; or from any entrance to, or superstructure of, any vehicular or railroad tunnel under a waterway. The termination of the fixed piping used for loading or unloading at a wharf shall be at least 200 feet (60 960 mm) from a bridge or from an entrance to, or superstructures of, a tunnel.

[3406.4.7.3] 5706.4.7.3 Superstructure and decking material. Superstructure and decking shall be designed for the intended use. Decking shall be constructed of materials that will afford the desired combination of flexibility, resistance to shock, durability, strength and fire resistance.

[3406.4.7.4] 5706.4.7.4 Wharf tanks prohibited. It shall be unlawful to install, operate or maintain on wharfs any tanks containing flammable and combustible liquids.

[3406.4.7.5] 5706.4.7.5 Transferring equipment. Loading pumps capable of building up pressures in excess of the safe working pressure of cargo hose or loading arms shall be provided with bypasses, relief valves or other arrangements to protect the loading facilities against excessive pressure. Relief devices shall be tested at least annually to determine that they function satisfactorily at their set pressure.

[3406.4.7.6] 5706.4.7.6 Piping, valves, fittings and ancillary equipment. Piping systems shall be in accordance with [FC3403.6] FC5703.6 except as otherwise provided as follows:

1. Piping systems shall be designed to protect against physical damage resulting from the motion of the wharf from wave action, currents, tides or the mooring of marine vessels and watercraft.

2. Pipe joints that depend on the friction characteristics of combustible materials or on the grooving of pipe ends for mechanical continuity of piping shall not be used.

3. Swivel joints may be used in piping to which hoses are connected and for articulated, swivel-joint transfer systems, provided that the design of the swivel joints is such that the mechanical strength of the joint will not be impaired if the packing materials fail such as by exposure to fire.

4. Each pipe used to convey Class I or II liquids leading to a wharf shall be provided with a readily accessible block valve located on shore near the approach to the wharf and outside of any diked area. Where more than one line is used to convey liquid, the valves shall be grouped in one location.

5. Means shall be provided for ready access to cargo line valves located below the wharf deck.

6. Piping systems shall contain a sufficient number of valves to operate the system properly and to control the flow of liquid both during normal operation and in the event of physical damage.

7. Piping on wharves shall be bonded and grounded where Class I and II liquids are transported. If excessive stray current conditions exist, insulating joints shall be installed. Bonding and grounding connections on piping shall be located on the wharf side of hose riser insulating flanges, where used, and shall be accessible for inspection.

8. Hose or articulated swivel-joint pipe connections used for cargo transfer shall be capable of accommodating the combined effects of change in draft and maximum tidal range, and mooring lines shall be kept adjusted to prevent surge of the marine vessel or watercraft from placing stress on the cargo transfer system.

9. Hoses shall be supported to avoid kinking and physical damage, including damage from chafing.

10. Piping, hoses, valves and fittings shall be constructed of steel. Valves shall be rated for not less than 150 pounds per square inch (psig)(1034 kPa).

[3406.4.7.7] 5706.4.7.7 Loading and unloading. Loading or unloading shall not commence until the bulk plant or terminal certificate of fitness holder and officer in charge of the marine vessel or watercraft agree that the marine vessel or watercraft has been properly moored and connections have been properly made.

[3406.4.7.8] 5706.4.7.8 Construction work. Construction work shall not be performed on the wharf except as approved by the commissioner upon a determination that such work can be safely performed, and subject to such terms and conditions as the commissioner may prescribe in the interest of public safety.

[3406.4.8] 5706.4.8 Sources of ignition. Class I, II or IIIA liquids shall not be used, drawn or dispensed where flammable vapors can reach a source of ignition.

[3406.4.9] 5706.4.9 Drainage control. Loading and unloading areas shall be provided with drainage control in accordance with [FC3404.2.10] FC5704.2.10.

[3406.4.10] 5706.4.10 Fire protection. Fire protection shall be in accordance with FC Chapter 9 and FC [3406.4.10.1] 5706.4.10.1 through [3406.4.10.8] 5706.4.10.8.

[3406.4.10.1] 5706.4.10.1 Portable fire extinguishers. Portable fire extinguishers with a rating of not less than 20-B and complying with the requirements of FC906 shall be located within 75 feet (22 860 mm) of hose connections, pumps and separator tanks.

[3406.4.10.2] 5706.4.10.2 Fire hoses. Fire hose connected to a water supply in a size appropriate for the water supply shall be provided in accordance with FC905 and the construction codes, including the Building Code, so that manifolds where connections are made and broken can be reached by at least one hose stream.

[3406.4.10.3] 5706.4.10.3 Obstruction of equipment. Material shall not be placed on wharves in such a manner that would obstruct access to firefighting apparatus or equipment or important pipeline or other delivery control valves.

[3406.4.10.4] 5706.4.10.4 Fire apparatus access. An unobstructed fire apparatus access road to the shore end of the wharf shall be maintained in accordance with FC Chapter 5.

[3406.4.10.5] 5706.4.10.5 Fire protection systems. Aboveground tanks, mounded-over tanks, underground tanks, tank car loading and unloading racks, cargo tank loading racks, cargo tank unloading areas, marine vessel and watercraft loading and unloading areas and all other portions of a bulk plant or terminal shall be provided with fire extinguishing systems that are approved by the commissioner, inspected by a representative of the department and tested at the owner's risk by his or her representative before a representative of the department. Such systems shall include an approved yard hydrant system and tank monitor nozzles.

[3406.4.10.5.1] 5706.4.10.5.1 Cargo tank loading racks. A fire extinguishing system shall be provided over and under each cargo tank loading position. At least one remote control valve shall be provided to control the extinguishing agent for each three loading positions. Piping systems shall be installed so they can be thoroughly drained. The fire extinguishing system shall be sized to provide protection for the three largest adjacent loading positions.

[3406.4.10.6] 5706.4.10.6 Emergency alarm transmission. Manual pull stations shall be provided at one or more approved locations that will automatically transmit a signal to the department via an approved central station.

[3406.4.10.7] 5706.4.10.7 Periodic tests. Fire extinguishing systems, fire protection systems and tank overfill protection shall be tested once every 2 years at the owner's risk by his or her representative before a representative of the department. Tests of foam extinguishing systems shall produce foam at the most remote tank and produce water flow at each tank. In the event that the discharge of foam to the most remote tank would result in a reportable hazardous material release in accordance with federal, state or local laws, rules or regulations, such other test acceptable to the commissioner may be conducted.

[3406.4.10.8] 5706.4.10.8 Color coding and labeling. Fire protection systems shall be color-coded and labeled in accordance with FC [3406.4.10.8.1] 5706.4.10.8.1 through [3406.4.10.8.2] 5706.4.10.8.2. Copies of the color code shall be posted in all central locations for fire extinguishing media, such as the foam house location.

[3406.4.10.8.1] 5706.4.10.8.1 Color coding. Fire protection systems shall be color-coded as follows:

1. Standpipe and/or yard hydrant systems:

    1.1. Piping, valve bodies and handles, hydrants and hydrant or hose houses: Red with contrasting white bands.

    1.2. Fire department connections: Red.

2. Sprinkler systems (wet or dry):

    2.1. Piping and valve bodies and handles: Red with contrasting bright green bands.

    2.2. Fire department connections: Red with green caps.

3. Nonautomatic sprinkler systems (including fog spray systems):

    3.1. Piping and valve bodies and handles: Red with contrasting aluminum bands.

    3.2. Fire department connections: Aluminum.

4. Carbon dioxide extinguishing systems—piping, valve bodies and handles: Red with contrasting brown bands.

5. Steam extinguishing systems—piping, valve bodies and handles: Red with contrasting black bands.

6. Foam extinguishing systems:

    6.1. Piping, valve bodies and handles, hydrants and hydrant or hose houses: Red with contrasting bright orange bands.

6.2. Department water connections: Red. A durable sign that reads "WATER FOR FOAM SYSTEM," shall be conspicuously posted immediately adjacent to such connections.

6.3. Department foam connection: Red with contrasting bright orange band or caps. [ ]A durable sign that reads "CHEMICAL FOAM DIRECT TO TANKS" or "...% MECHANICAL FOAM SOLUTION DIRECT TO TANKS," shall be conspicuously posted immediately adjacent to such connections.

[3406.4.10.8.2] 5706.4.10.8.2 Labeling. Bands, or piping immediately adjacent to bands, shall be labeled to indicate the names of the extinguishing media. The letters shall be in a contrasting color of a suitable size in proportion to the pipe diameters. The width of each band shall be not less than the pipe diameter and shall be spaced not more than 30 feet (9144 mm) apart. Bands, lettering and piping shall be painted in sun- and weather-resistant colors and paint; but bands and lettering may be applied by means of pressure sensitive tape that is sun- and weather-resistant.

[3406.4.11] 5706.4.11 Interconnected piping. All tanks shall be connected by a system of steel pipes in a manner that the contents of each tank may be transferred to another tank without resulting in product contamination, or flash point reduction of the stored liquid.

[3406.4.12] 5706.4.12 Supervision. Bulk plants and terminals, including transfer operations, shall be continuously under the personal supervision of a person holding a certificate of fitness for such facility. Such supervision shall satisfy the certificate of fitness supervision requirements of this code for all fire protection systems at the facility, including standpipe systems, sprinkler systems, yard hydrant systems and foam systems.

[3406.4.13] 5706.4.13 Oil spills. Bulk plants and terminals storing petroleum products and petroleum product pipelines operating within the city shall provide oil-absorbent material, oil-dispersant material, booms and other such material and equipment for the control and remediation of oil spills in such quantity and at such locations as set forth in FC [3406.4.13.1] 5706.4.13.1 through [3406.4.13.4] 5706.4.13.4.

Exceptions:

1. Bulk plants and terminals storing petroleum products when such facility has in place a spill prevention control and countermeasure plan meeting the requirements of United States [Department of Transportation] Environmental Protection Agency regulations, as set forth in 40 CFR Part 112.

2. Petroleum product pipelines when such pipeline operator has in place for its New York City operations a response plan for onshore oil pipelines meeting the requirements of United States Department of Transportation regulations, as set forth in 49 CFR Part 194.

[3406.4.13.1] 5706.4.13.1 Quantities of clean-up materials and equipment. Oil spill clean-up materials and equipment shall be stored for use at each bulk plant and terminal and locations designated for pipeline operations in accordance with FC Table [3406.4.13.1] 5706.4.13.1, the rules or as a condition of the permit for the facility.

FC TABLE [3406.4.13.1] 5706.4.13.1
OIL SPILL MATERIALS AND EQUIPMENT TO BE STORED AT EACH BULK PLANT AND TERMINAL OR PIPELINE

MATERIAL OR EQUIPMENT	TOTAL PETROLEUM PRODUCT STORAGE			
	1,000,000 GALLONS OR LESS	5,000,000 GALLONS OR LESS	10,000,000 GALLONS OR LESS OR PIPELINE OPERATION	OVER 10,000,000 GALLONS
Absorbent material to recover	3,000 gallons	5,000 gallons	10,000 gallons	20,000 gallons
Boom	300 feet	300 feet plus enough to encircle marine vessel or watercraft, including barges which may be loading or unloading at the premises		

[3406.4.13.2] 5706.4.13.2 Availability. Adequate storage facilities, materials-handling equipment and personnel shall be provided by the bulk plant and terminal or pipeline operator. Such materials-handling equipment and personnel shall be continuously available to properly deploy and apply the materials and equipment specified in [FC3406.4.13.1] FC5706.4.13.1.

[3406.4.13.3] 5706.4.13.3 Use of clean-up service. The commissioner may approve the utilization of an oil spill clean-up service as a "back-up" spill mitigation measure, authorizing the material quantities to be reduced by 2/3 of those specified in FC Table [3406.4.13.1] 5706.4.13.1, but to a quantity not less than 3,000 gallons (11 356 L) of absorbent material and 300 feet (91 440 mm) of boom, and subject to the following conditions:

1. A responsible officer of the bulk plant and terminal or pipeline operation shall submit a sworn affidavit identifying the oil spill clean-up service with which it has contracted to perform such services, averring that such oil spill clean-up service meets the standards set forth in [FC3406.4.13.4] FC5706.4.13.4 and setting forth the nature of the services to be rendered.

2. The department shall be notified, in writing, within 10 business days of the date when the utilization of the clean-up service is cancelled or the service goes out of business.

3. Such approval may be rescinded by the commissioner for good cause for failure of the spill clean-up service to timely respond to an oil spill, to have adequate equipment, materials or personnel, or to obey or cooperate with the department representatives in charge of the scene of the oil spill.

[3406.4.13.4] 5706.4.13.4 Oil spill clean-up service standards. An oil spill clean-up service may be retained by a bulk plant, bulk terminal or pipeline operation pursuant to [FC3406.4.13.3] FC5706.4.13.3 provided it is capable of meeting the following standards:

1. It maintains the stockpile of material and equipment required by [FC3406.4.13.1] FC5706.4.13.1 for storage of over 10,000,000 gallons (37 850 000 L) of petroleum products, regardless of the amount of petroleum products actually stored at the contracting bulk plants, bulk terminals or pipelines.

2. A supervisor will respond to the spill site within 1 hour from time of notification.

3. It is capable of delivering, on a 24-hour, 7-day-a-week basis, sufficient materials, equipment and personnel to the contracting bulk plant, bulk terminal or pipeline within 2 hours from time of notification.

4. Such service is licensed and operated in accordance with all applicable federal, state and local laws.

[3406.4.14] 5706.4.14 Valves. All inlet and outlet nozzles of tanks shall be provided with a valve of steel construction of a 150 pounds per square inch (psig)(1034 kPa) rating located as close as practicable to the tank.

[3406.4.15] 5706.4.15 Dike construction. All dike walls shall be of steel or reinforced concrete, designed to be liquid-tight and to withstand a full hydraulic head, and constructed so as to afford ready access. Where stairways or other similar means are required to afford such access, they shall be constructed of steel or other approved noncombustible material.

[3406.4.16] 5706.4.16 Dike capacity. Each single dike wall enclosure shall have a capacity equal to 110 percent of the tank's capacity. Tanks arranged in groups with a total capacity not exceeding 500,000 gallons (1892 500 L) may be enclosed in a single dike wall enclosure. Each group tank dike area shall have a net capacity not less than that of the largest tank plus 10 percent of the aggregate capacity of all other tanks served by the dike enclosure. That portion of the surface occupied by tank or tanks shall be included when computing the diked area.

[3406.4.17] 5706.4.17 Tank and piping test. Tank and piping shall be tested at the time of installation at the owner's risk by his or her representative before a representative of the department as follows:

1. Aboveground, underground and mounded-over tanks shall be filled to capacity with water and maintained for not less than 24 hours.

2. Piping shall be hydrostatically tested to a pressure of 100 pounds per square inch (psig)(689.5 kPa) or 150 percent of the maximum operating pressure, whichever is greater, for 30 minutes.

[3406.4.17.1] 5706.4.17.1 Periodic test. Underground piping shall be tested once every 10 years at the owner's risk by his or her representative before a representative of the department. Such test shall be made at 100 pounds per square inch (psig)(689.5 kPa) or 150 percent of the maximum operating pressure, whichever is greater, for 30 minutes.

[3406.5] 5706.5 Bulk transfer and process transfer operations. Bulk transfer and process transfer operations shall be subject to the approval of the commissioner and be conducted in compliance with the requirements of FC [3406.5.1] 5706.5.1 through [3406.5.18.3] 5706.5.18.3, except that liquid motor fuel-dispensing facilities shall comply with the requirements of FC Chapter [22] 23.

[3406.5.1] 5706.5.1 Location. Bulk transfer and process transfer operations shall be conducted in approved locations. Tank cars shall be unloaded only on private sidings or railroad-siding facilities equipped for transferring flammable or combustible liquids. Cargo tank and tank car transfer facilities shall be separated from buildings, aboveground tanks, combustible materials, lot lines, public streets and private roads by a distance of 25 feet (7620 mm) for flammable liquids and 15 feet (4572 mm) for combustible liquids measured from the nearest position of any loading or unloading valve or connection. Buildings for pumps or shelters for personnel shall be considered part of the transfer facility.

[3406.5.2] 5706.5.2 Weather protection canopies. Where weather protection canopies are provided, they shall be constructed in accordance with [FC2704.13] FC5004.13. Weather protection canopies shall not be located within 15 feet (4572 mm) of a building or combustible material or within 25 feet (7620 mm) of building openings, lot lines, public streets or private roads.

[3406.5.3] 5706.5.3 Ventilation. Ventilation shall be provided to prevent accumulation of vapors in accordance with [FC3405.3.7.5.1] FC5705.3.7.5.1.

[3406.5.4] 5706.5.4 Sources of ignition. Sources of ignition shall be controlled or eliminated in accordance with [FC2703.7] FC5003.7.

[3406.5.5] 5706.5.5 Spill control and secondary containment. Areas where transfer operations are located shall be provided with spill control and secondary containment in accordance with [FC3403.4] FC5703.4. The spill control and secondary containment system shall have a design capacity capable of containing the capacity of the largest tank compartment located in the area where transfer operations are conducted. Containment of the rainfall volume specified in [FC2704.2.2.6] FC5004.2.2.6 is not required.

[3406.5.6] 5706.5.6 Fire protection. Fire protection shall be in accordance with [FC3406.4.10.5] FC5706.4.10.5.

[3406.5.7] 5706.5.7 Static protection. Static protection shall be provided to prevent the accumulation of static charges during transfer operations. Bonding facilities shall be provided during the transfer through open domes where flammable liquids are transferred, or where combustible liquids are transferred into cargo tanks or tank cars which could contain vapors from previous cargoes of flammable liquids. Protection shall consist of a metallic bond wire permanently electrically connected to the fill stem. The fill pipe assembly shall form a continuous electrically conductive path downstream from the point of bonding. The free end of such bond wire shall be provided with a clamp or equivalent device for convenient attachment to a metallic part in electrical contact with the cargo tank or tank car. For cargo tanks, protection shall consist of a flexible bond wire of adequate strength for the intended service and the electrical resistance shall not exceed 1 megohm. For tank cars, bonding shall be provided where the resistance of a tank car to ground through the rails is 25 ohms or greater. Such bonding connection shall be fastened to the cargo tank or tank car before dome covers are raised and shall remain in place until filling is complete and all dome covers have been closed and secured.

Exceptions:

1. Where cargo tanks or tank cars are loaded exclusively with products not having a static-accumulating tendency, such as asphalt, cutback asphalt, most crude oils, residual oils and water-miscible liquids.

2. When flammable liquids are not handled at the transfer facility and the cargo tanks are used exclusively for combustible liquids.

3. Where cargo tanks or tank cars are loaded or unloaded through closed top or bottom connections when the hose is conductive.

[3406.5.7.1] 5706.5.7.1 Filling through open domes. Filling through open domes into the tanks of cargo tanks or tank cars that contain vapor-air mixtures within the flammable range, or where the liquid being filled can form such a mixture, shall be by means of a downspout which extends to near the bottom of the tank. It shall be unlawful to fill a cargo tank or tank car with gasoline through an open dome.

[3406.5.8] 5706.5.8 Stray current protection. Tank car loading facilities where Class I, II or IIIA liquids are transferred through open domes shall be protected against stray currents by permanently bonding the pipe to at least one rail and to the transfer apparatus. Multiple pipes entering the transfer areas shall be permanently electrically bonded together. In areas where excessive stray currents are known to exist, all pipes entering the transfer area shall be provided with insulating sections to isolate electrically the transfer apparatus from the pipelines.

[3406.5.9] 5706.5.9 Top loading. When top loading a cargo tank with Class I and II liquids without vapor control, valves used for the final control of flow shall be of the self-closing type and shall be manually held open except where automatic means are provided for shutting off the flow when the tank is full. When used, automatic shutoff systems shall be provided with a manual shutoff valve located at a safe distance from the loading nozzle to stop the flow if the automatic system fails. When top loading a cargo tank with vapor control, flow control shall be in accordance with [FC3406.5.10] FC5706.5.10. Self-closing valves shall not be tied or locked in the open position.

[3406.5.10] 5706.5.10 Bottom loading. When bottom loading a cargo tank or tank car with or without vapor control, a positive means shall be provided for loading a predetermined quantity of liquid, together with an automatic secondary shutoff control to prevent overfill. The connecting components between the transfer equipment and the cargo tank or tank car required to operate the secondary control shall be functionally compatible.

[3406.5.10.1] 5706.5.10.1 Dry disconnect coupling. When bottom loading a cargo tank, the coupling between the liquid loading hose or pipe and the cargo tank piping shall be a dry disconnect coupling.

[3406.5.10.2] 5706.5.10.2 Venting. When bottom loading a cargo tank or tank car that is equipped for vapor control and vapor control is not required or used for the product being

loaded, the tank shall be vented to the atmosphere to prevent pressurization of the tank. Such venting shall be at a height equal to or greater than the top of the cargo tank or tank car.

[3406.5.10.3] 5706.5.10.3 Vapor-tight connection. Connections to the plant vapor control system shall be designed to prevent the escape of vapor to the atmosphere when not connected to a cargo tank or tank car.

[3406.5.10.4] 5706.5.10.4 Vapor recovery and processing equipment. Vapor recovery and processing equipment at bulk plants and terminals shall comply with the requirements of [FC3406.8] FC5706.8.

[3406.5.11] 5706.5.11 Switch loading. Cargo tanks or tank cars which have previously contained flammable liquids shall not be loaded with combustible liquids until such tanks or cars and all piping, pumps, hoses and meters connected thereto have been completely drained and flushed.

[3406.5.12] 5706.5.12 Loading racks. Where provided, loading racks, stairs or platforms shall be constructed of noncombustible materials. Buildings for pumps or for shelter of loading personnel are allowed to be part of the loading rack. Wiring and electrical equipment located within 25 feet (7620 mm) of any portion of the loading rack shall be in accordance with [FC3403.1.1] FC5703.1.1.

[3406.5.13] 5706.5.13 Transfer apparatus. Bulk and process transfer apparatus shall be of an approved type.

[3406.5.14] 5706.5.14 Indoor transfers. Cargo tanks and tank cars shall not be located indoors while transferring flammable or combustible liquids.

Exception: Cargo tanks are allowed under weather protection canopies and canopies of automotive liquid motor fuel-dispensing facilities.

[3406.5.15] 5706.5.15 Cargo tank and tank car. Cargo tanks and tank cars shall be certified and permitted in accordance with this section.

[3406.5.15.1] 5706.5.15.1 DOTn certification. Certification shall be maintained for cargo tanks and tank cars in accordance with the regulations of the United States Department of Transportation, as set forth in Parts 100-180.

[3406.5.15.2] 5706.5.15.2 Department permit. It shall be unlawful for any person to load a cargo tank with any flammable liquid or Class II or IIIA combustible liquid or to receive or accept delivery of such products in or from a cargo tank, except in or from a cargo tank for which a department permit has been issued and is displayed pursuant to the provisions of FC Chapter [27] 50. The provisions of this section shall not prohibit the loading of a cargo tank with any liquid products with a flash point over 200°F (93°C) nor the receiving or acceptance of delivery from a cargo tank of any liquid products with a flash point over 200°F (93°C), provided that such cargo tank is designed, constructed, and equipped in

accordance with the regulations of the United States Department of Transportation governing the transportation of dangerous articles by common, contract, private and proprietary carriers engaged in interstate commerce.

[3406.5.16] 5706.5.16 Securing cargo tanks and tank cars from movement. Cargo tanks and tank cars shall be secured from movement during loading and unloading operations by setting the cargo tank's or tank car's brakes and by chocking or blocking the wheels. At least two wheel chocks not less than 5 inches by 5 inches by 12 inches (127 mm by 127 mm by 305 mm) in size and dished to fit the contour of the tires shall be used for cargo tanks.

[3406.5.17] 5706.5.17 Vehicle motor. Motors of cargo tanks or tank cars shall be shut off during the making and breaking of hose connections and during the unloading operation except when unloading is performed with a pump deriving its power from the cargo tank motor.

[3406.5.18] 5706.5.18 Piping, valves, hoses and fittings. During process transfers, piping, valves, hoses and fittings which are not a part of the cargo tank or tank car shall be designed and installed in accordance with [FC3403.6] FC5703.6. Caps or plugs which prevent leakage or spillage shall be provided at all points of connection to transfer piping.

[3406.5.18.1] 5706.5.18.1 Shutoff valves. Approved automatically or manually activated shutoff valves shall be provided where the transfer hose connects to the process piping, and on both sides of any exterior fire-resistance-rated wall through which the piping passes. Manual shutoff valves shall be arranged such that they are readily accessible from grade. Valves shall not be locked in the open position.

[3406.5.18.2] 5706.5.18.2 Hydrostatic relief. Hydrostatic pressure-limiting or relief devices shall be provided where pressure buildup in trapped sections of the system could exceed the design pressure of the components of the system. Devices shall relieve to other portions of the system or to another approved location.

[3406.5.18.3] 5706.5.18.3 Antisiphon valves. Antisiphon valves shall be provided when the system design would allow siphonage.

[3406.6] 5706.6 Reserved.

[3406.7] 5706.7 Reserved.

[3406.8] 5706.8 Vapor recovery and processing systems for use in bulk plants and terminals. Vapor recovery and processing systems installed at bulk plants and terminals, including systems associated with piping, loading racks, dikes, fire detection and fire protection equipment, shall be designed, installed, operated and maintained in accordance with FC [3406.8.1] 5706.8.1 through [3406.8.3] 5706.8.3. Such compliance shall be required for all vapor recovery processing systems, whether installed voluntarily or pursuant to the requirements of the United States Environmental Protection Agency, United States Coast Guard or New York State Department of Environmental Conservation. The requirements of FC [3406.8] 5706.8 through [3406.8.3] 5706.8.3 apply to both new and existing facilities.

[3406.8.1] 5706.8.1 General. Vapor recovery and processing systems shall comply with the requirements of NFPA 30, except as otherwise provided in this section, the regulations of the United States Environmental Protection Agency, United States Coast Guard and New York State Department of Environmental Conservation, as applicable, and the following general requirements:

1. Electrical equipment shall comply with the requirements of the Electrical Code. Upon request, proof of compliance with the Electrical Code shall be filed with the department.

2. The installation of any refrigerating system shall comply with the requirements of FC Chapter 6 and the Mechanical Code.

3. All tanks and piping shall be grounded. Static bonding connections shall be made between loading arm, vehicle and vapor recovery unit. An interlock shall be provided to prevent pumping operations until properly grounded.

4. All product pumps and compressors shall be of a type approved for such use.

5. Pressure vessels shall conform to the ASME Boiler and Pressure Vessel Code. The manufacturer data sheet for the pressure vessel shall be maintained on the premises and made available for inspection to any representative of the department.

6. Knock-out vessels shall be provided with a high liquid level sensor that will initiate shutdown of the liquid transfer into the vessel and the vapor recovery or processing system.

7. A flame arrestor and mist eliminator element shall be provided at final emission vent.

8. A fire detection system shall be provided that will initiate shutdown of the vapor recovery and processing system in the event of fire.

9. An annunciator panel with audible and visible alarms shall be provided in the dispatcher's office. The annunciator panel shall monitor and shut down the vapor recovery and processing system upon any equipment malfunction, including a malfunction of the fire detection system.

10. Insulation material shall be noncombustible.

11. Lightning protection shall be provided in accordance with NFPA 780.

12. Pressure relief valves shall be provided on all pressure vessels and wherever else required by the system design, and shall be sized in accordance with the ASME Boiler and Pressure Vessel Code. Pressure relief valves shall discharge to a safe location. No shutoff valve shall be installed in the line of relief. Tanks and equipment shall have

independent venting for over-pressure or vacuum conditions that might occur from malfunction of the vapor recovery or recovery unit.

13. A reinforced concrete base shall be provided and approved by the agency having jurisdiction.

14. Vapor recovery and processing systems shall be placed in an unpierced dike of such construction and capacity as the commissioner may prescribe. No drains shall be allowed, and any drain pump used shall be manually activated.

15. Vapor recovery and processing systems shall be installed at least 25 feet (7620 mm) from bulk storage tanks, warehouses, loading racks, dispatchers' offices, transfer facilities, buildings housing fire protection systems, central heating plants or electrical distribution systems, other plant buildings, building lines and adjoining lot lines. When [ ]vessels in the vapor recovery and processing system operate in excess of 50 pounds per square inch gauge (psig)(345 kPa), but less than 150 pounds per square inch gauge (psig)(1034 kPa), the minimum distance shall be 50 feet (15 240 mm), unless a protective structure, such as masonry or concrete fire wall, is installed in the line of sight between such vessel and the exposure, in which case the minimum distance of 25 feet (7620 mm) shall be applicable.

16. Vents on vapor-processing equipment shall be not less than 15 feet (4572 mm) from ground level, with outlets located and directed so that flammable vapors will disperse to below the lower flammable limit (LFL) before reaching a potential ignition source.

17. The vapor recovery and processing system shall be protected from physical damage, including damage by motor vehicles utilizing dikes, posts, or other approved means.

18. The entire vapor recovery and processing system shall be inspected for proper operation on a periodic basis, but not less than once every 6 months, by a qualified person. [ ]Such inspection shall be documented in a log book maintained at the facility for such purpose.

19. Durable signs reading “DANGER—NO SMOKING, MATCHES, OPEN LIGHTS OR SPARKING DEVICES AT THIS EQUIPMENT” shall be conspicuously posted at or near the vapor recovery and processing system in addition to the “No Smoking” signs required throughout the facility.

20. One or more foam hydrants, yard hydrants, monitor nozzles and portable fire extinguishers having a minimum 40-B:C rating, shall be provided within 50 feet (15 240 mm) of the vapor recovery and processing system and shall be readily available for use.

21. All piping associated with a vapor recovery and processing system, including piping connecting such system to storage tanks, shall be hydrostatically tested to a pressure of 100 pounds per square inch gauge (psig)(690 kPa) or one and one-half (1.5) times the maximum working pressure, whichever is greater, for a period of 2 hours, and shall show no leaks. Such hydrostatic testing shall be conducted at the owner’s risk by his or her

representative before a representative of the department. In lieu of such hydrostatic testing, the commissioner may accept an affidavit from the manufacturer attesting to the integrity of piping integral to the vapor recovery and processing system.

22. Where a storage tank is connected to a vapor recovery and processing system, a mist eliminator shall be provided in the vapor line at or adjacent to the tank to remove entrained liquid and return same to the tank or an approved collection system.

23. The vapor recovery and processing system shall be designed to minimize and dissipate static electricity in accordance with NFPA 77.

[3406.8.2] 5706.8.2 Atmospheric condensation and refrigeration vapor recovery and processing systems. A vapor condenser system shall be placed in an unpierced dike or within a concrete trench of adequate width and depth to hold at least 1 hour's vapor recovery.

[3406.8.3] 5706.8.3 Absorption vapor recovery and processing systems. Absorption vapor recovery and processing systems shall comply with the following requirements:

1. A lean oil storage tank shall be protected by a foam fire extinguishing system.

2. The entire vapor recovery and processing system, including the lean oil storage tank, shall be placed in an unpierced dike. The height of the dike shall be based upon the size of the lean oil storage tank and shall have a capacity of at least 110 percent of such tank, but in any event not less than the maximum pumping capacity of the system for 20 minutes of operation.

3. Heaters used shall be of a type approved for such use and shall be equipped with an automatic shutoff device that activates upon reaching the high temperature limit for the absorption vapor recovery and processing system.

4. All absorbers, saturators, heat exchangers and condensers shall conform to ASME Boiler and Pressure Vessel Code and the provisions of FC Chapter [30] 53.

5. A relief valve shall be provided for compressors, stripper columns and other pressure vessels.

6. Lean oil tanks and vapor vessels shall be constructed and installed in accordance with this chapter and API 650.

7. Upon installation, a vapor vessel bladder shall be pneumatically tested at one and one quarter times the maximum operating pressure for 4 hours without leakage. A retest shall be performed annually. All such tests shall be conducted at the owner’s risk by his or her representative before a representative of the department.

[3406.9] 5706.9 Cargo tank loading rack systems. Loading rack systems shall be designed, installed, operated and maintained in accordance with the following requirements:

1. Any vapor recovery and processing system used in connection with a loading rack system shall comply with the requirements of FC [3406.8.1] 5706.8.1 through [3406.8.3] 5706.8.3.

2. Loading racks shall be protected throughout by a fire extinguishing system as set forth in [FC3406.4.10.5.1] FC5706.4.10.5.1.

3. Cargo tanks loaded at bulk plants or terminals shall be compatible with all safety features incorporated into the loading rack.

4. Dry-break adapters conforming to API standards shall be provided on the fill and vapor recovery lines. During loading, each cargo tank compartment shall be sealed except for the dry-break fill coupling and vapor recovery line.

5. An interlock shall be provided to prevent loading when the cargo tank vehicle motor is running and to prevent start up of the cargo tank vehicle motor during loading. Such interlock device shall further prevent the vehicle motor from starting before the product fill line and vapor return line have been disconnected.

6. An interlock device shall be provided so that no loading may take place unless the vapor recovery line is properly connected to the cargo tank.

7. Except when loading, protective caps shall cover all dry-break adapters as protection against the elements and physical damage from impact.

8. No more than three compartments shall be loaded at a time.

9. A two-stage preset meter shall be provided for each loading arm. Loading arms shall be equipped with manual or electronic dead-man control valves.

10. All electrical equipment shall be suitable for use in hazardous locations. The design of the electronic sending device shall be such that a source of higher voltage or current cannot be connected to same.

11. An approved overfill prevention system shall be provided at the loading rack and shall be designed to ensure at least 1 percent vapor space per compartment. In no event shall the vapor space in a compartment be less than 40 gallons (151 L) in capacity.

12. A liquid detector shall be provided in the vapor return line, to automatically shut off the loading system if liquid reaches the vapor line.

13. All components of the fill and vapor recovery loading arm assemblies making contact with the cargo tank, including the loading head, shall be constructed of sparkproof material.

14. The fill line and the vapor recovery line in loading arm assemblies shall be of the same diameter. The maximum velocity in any liquid line shall not exceed 15 feet per second (4572 mm per second).

15. The fill line and vapor recovery line in loading arm assemblies shall be constructed of rigid steel, except that flexible hose may be used for fill or vapor recovery loading assemblies provided that such hose is no longer in length than necessary, has an inner diameter no greater than 4 inches (102 mm), is of steel construction and is rated for not less than 800 pounds per square inch gauge (psig)(5617 kPa).

16. Cargo tanks shall not be filled with flammable or combustible liquids unless one or more devices, equipment or systems are provided to immediately shut down the flow of such liquid in the event of cargo tank overfilling, faulty dome seal, cargo tank pressure exceeding 3 pounds per square inch gauge (psig)(21.7 kPa) and electrical grounding fault.

17. The loading arm assembly shall be grounded.

18. The loading arm assembly shall be designed to break away from the cargo tank without rupture should the cargo tank move with the loading arm still in place.

19. All liquid and vapor piping at the loading arm assembly shall be hydrostatically tested to a pressure of 100 pounds per square inch gauge (psig)(690 kPa) or one and one-half (1.5) times the maximum working pressure, whichever is greater, for a period of 2 hours. Such test shall be conducted at the owner's risk by his or her representative before a representative of the department.

20. The loading head unit seal against the cargo tank shall not exceed a force of 200 pounds (90.8 kg) or a pressure of 5 pounds per square inch gauge (psig)(34.5 kPa).

21. A mist eliminator shall be provided in the vapor line at or adjacent to the loading arm to remove entrained liquid and return same to the cargo tank, or to an approved collection system.

22. Cargo tanks containing flammable liquids in any compartment shall not be loaded with combustible liquids unless the loading rack is protected by a fire extinguishing system in accordance with this chapter.

23. The loading rate of combustible liquids into cargo tanks shall be such that the initial velocity in the liquid line is 3 feet per second (914 mm per second) and the final rate does not exceed 15 feet per second (4572 mm per second).

SECTION 5707
FLEET FUELING OPERATIONS

5707.1 General. Fleet fueling operations shall be conducted in accordance with this section.

5707.2 Site plan. A site plan shall be prepared and maintained at each fleet fueling location or other approved location identifying all buildings, structures and property lines; adjoining property uses; proposed fueling locations; and slope, drainage, storm drains and other relevant site conditions. The site plan shall be made available for inspection by any department representative.

5707.3 Scope and duration of fleet fueling operations. Cargo tanks used to conduct fleet fueling operations shall be used solely for that purpose. Fleet fueling operations shall be conducted during approved hours and the cargo tank shall leave the fleet facility after completing such operations.

5707.4 Location of dispensing at fleet facility. Fleet fueling may be conducted at a designated location at the fleet facility and/or by proceeding from vehicle to vehicle, as approved by the department. Fleet fueling shall not be conducted at the following locations:

1. On public streets;

2. On fire apparatus access roads;

3. Inside buildings;

4. On the roof level of parking structures or other buildings;

5. Less than 10 feet (3048 mm) from buildings or property lines;

6. Less than 15 feet (4572 mm) from combustible material or waste;

7. Less than 25 feet (7620 mm) from any flammable gas storage area; and

8. Less than 25 feet (7620 mm) from any smoking, open flames or other source of ignition.

9. Less than 10 feet (3048 mm) from overhead powerlines or other aboveground electrical installation, measured from the boundary of the utility easement, or, if there is no easement, from the vertical plane of the installation at its widest point; or

10. Less than 10 feet (3048 mm) from the boundary of any transportation easement, including bridges and tunnels, as measured from the vertical plane of the easement at its widest point.

5707.5 Cargo tank and dispensing equipment. Fleet fueling shall be conducted from a cargo tank complying with DOTn regulations or other approved vehicle, subject to the following requirements:

1. The capacity of the cargo tank shall not exceed 5500 gallons (20 818 L), except as otherwise approved by the department.

2. The cargo tank shall be designed for fleet fueling operations, including a fuel limit switch set to a maximum of 50 gallons (189 L).

3. The dispensing hose does not exceed 100 feet (30 480 mm) in length and shall be mounted on a reel.

4. Dispensing hoses and nozzles shall be listed. The dispensing hose shall be provided with a breakaway device designed to prevent release of the combustible liquid on both sides of the breakaway point.

5707.6 Fleet fueling procedures. Fleet fueling operations shall be conducted in accordance with the following procedures:

1. The cargo tank shall be positioned so as to prevent vehicular traffic from driving over the dispensing hose.

2. The cargo tank shall be secured from movement by setting the cargo tank's brakes and chocking the wheels, and the cargo tank's warning lights shall be activated.

3. The engines of the motor vehicles being fueled shall be shut off.

4. The dispensing nozzle shall be maintained in contact with the motor vehicle fuel tank at all times.

5. The dispensing hose and nozzle shall be placed back on the reel before moving the cargo tank.

6. Signs prohibiting smoking and open flames within 25 feet (7620 mm) of the cargo tank and the motor vehicle being fueled shall be prominently posted on the cargo tank.

7. Nighttime fueling operations shall only be conducted in adequately lighted areas.

8. Cargo tank operators shall have in their possession at all times an approved means of notifying the department of a fire or other emergency.

5707.7 Emergency procedures. The fleet owner and the provider of fleet fueling services shall comply with the requirements of FC 5707.7.1 through 5707.7.2.

5707.7.1 Emergency response plan. A written fire safety and emergency response plan that sets forth policies and procedures for compliance with the requirements of this section and other fire safety measures, including spill prevention and control, shall be prepared and maintained by the fleet facility and the provider of fleet fueling services and made available for inspection to any department representative.

5707.7.2 Spill Control. A catchment basin with a capacity of not less than 5 gallons (19 L) shall be provided under the cargo tank hose nozzle/motor vehicle fuel tank connection during fuel dispensing. Spill absorbing materials, such as absorbent socks, pads or powders, in quantities sufficient to handle at least 200 gallon (757 L) spill, shall be available for immediate use. Where dispensing operations occur within 15 feet (4572 mm) of a storm drain, an approved storm drain

cover or approved equivalent method shall be used to prevent any fuel spill from reaching the drain. Non-water-absorbent pads, a 10-foot-long (3048 mm) containment boom, an approved container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5 gallon (19 L) fuel spill.

5707.8 Portable fire extinguisher. A portable fire extinguisher complying with FC906 with a minimum rating of 40-B:C shall be provided on the cargo tank with signage clearly indicating its location.

APPENDIX E. FIRE RULE CHAPTER 22

Rule Section § 2204-01

Self-Service Automotive Liquid Motor Fuel-Dispensing Facilities

(a) Scope. This section sets forth requirements for the operation and maintenance of *self-service automotive liquid motor fuel-dispensing facilities*.

(b) General Provisions

(1) Facility operation and maintenance. All *self-service automotive liquid motor fuel dispensing facilities* shall be operated and maintained in accordance with FC Chapter 22 and this section.

(c) Operational and Maintenance Requirements

(1) Movement of motor vehicles. The facility shall be operated so that movement of motor vehicles is orderly and consistent with the safe operation of the facility.

(2) Repairs. Motor vehicles shall not be repaired in dispensing areas.

(3) Control booth requirements

(A) Housekeeping. The control booth shall be kept clean and orderly. The glass panels of the control booth shall be kept clean and unobstructed at all times. Access to the controls in the booth shall be kept unobstructed by equipment, merchandise or litter.

(B) Operating manual. An operating manual consisting of a copy of this section, emergency procedures, and *facility* operating procedures (including the operation of the *fire extinguishing system*) shall be maintained in the control booth.

(C) Portable fire extinguisher requirements. In addition to the portable fire extinguishers required by FC2205.5 to be provided in the dispensing area, two (2) portable fire extinguishers with at least a 40-B:C rating shall be provided within the control booth.

(4) Daily inspections. The certified attendant shall conduct an inspection of the facility on at least a daily basis, and document such inspection in the log book required by R2204-01(c)(5). The inspection shall verify that:

(A) The fire extinguishing system is properly pressurized, nozzles are clear and unobstructed, and heat detectors are undamaged and unobstructed.

(B) Portable fire extinguishers have been serviced and have adequate pressure.

(C) The fire extinguishing system remote manual pull station and the pump shutdown are clear of obstructions.

(D) Leak detection systems and other alarms are in good working order.

(E) Emergency procedures signage is posted, unobstructed and legible.

(F) Required lighting is in good working order.

(G) Any mirrors and/or approved closed-circuit television used to monitor dispensing operations are in good working order.
(H) The voice communications system is in good working order.

(5) Maintenance log book. A maintenance log shall be kept on the premises for inspection by any Department representative. Such log shall list all certified attendants and other persons on the premises who hold certificates of fitness, with their numbers and expiration dates. Entries shall be made in such log book of the daily inspections required by this section, any maintenance or repair of any system, and any fires, spills or other unusual occurrences.

(6) Fuel Dispensing

(A) The certified attendant shall not dispense liquid motor fuel into a portable container in quantities requiring a permit unless the certified attendant verifies that the customer possesses all such permits.

(B) Persons dispensing motor fuel at a self-service motor fuel-dispensing facility shall hold a valid driver's license or be at least 18 years of age. The certified attendant or other facility personnel may require any member of the public to produce evidence of same.

Rule Section § 2205-01

Underground Liquid Motor Fuel Storage Tanks at Motor Fuel-Dispensing Facilities

(a) Scope. This section sets forth standards, requirements and procedures for the maintenance of underground motor fuel storage tanks at liquid motor fuel-dispensing facilities.

(b) General Provisions. Underground storage tanks for liquid motor fuel at liquid motor fuel-dispensing facilities shall be periodically inspected, tested and otherwise maintained in accordance with FC2205 and this section.

(c) Periodic Maintenance Requirements. Underground storage tanks at liquid motor fuel dispensing facilities shall be maintained in accordance with the following procedures:

(1) Overfill prevention devices. The overfill prevention devices required by FC2206.10(18) shall be inspected for proper operation at least once every two (2) years by a person holding a certificate of license. Records of such inspection shall be maintained on the premises as set forth in FC107.7.

(2) Cathodic protection systems. Tanks and piping systems provided with cathodic protection systems shall be inspected, tested and otherwise maintained to ensure continuous corrosion protection. Cathodic protection systems shall be inspected for proper operation by a trained person knowledgeable of the requirements of the United States Environmental Protection Agency for such systems. Cathodic protection systems other than impressed current cathodic protection systems shall be inspected within six (6) months of installation and at least once a year thereafter. Impressed current cathodic protection systems shall be inspected at least once every 60 days.

(3) Leak detection systems. Leak detection systems shall be inspected for proper operation at least once a month by a certificate of fitness holder responsible for the supervision of the motor fuel-dispensing facility.

Rule Section § 2206-01

Design and Installation of Liquid Motor Fuel-Dispensing Systems at Motor Fuel-Dispensing Facilities

(a) Scope. This section sets forth standards, requirements and procedures for the design, installation, and installation acceptance testing of the following devices, equipment and systems at liquid motor fuel-dispensing facilities:
(1) cathodic protection systems and coatings for underground storage tanks and piping; and
(2) liquid motor fuel dispensers and pumps.

(b) General Provisions. Cathodic protection systems and motor fuel dispensers and pumps at liquid motor fuel-dispensing facilities shall be designed and installed in accordance with FC Chapter 22 and this section.

(c) Cathodic Protection Systems. Cathodic protection systems for underground storage tanks and piping for liquid motor fuel at liquid motor fuel-dispensing facilities shall be designed and installed in compliance with the following requirements:
(1) Steel storage tanks and piping systems shall be protected against exterior corrosion by either a sacrificial anode or an impressed current cathodic protection system designed in accordance with the applicable National Association of Corrosion Engineers (NACE) standard or other approved standard. Such system shall be designed to provide corrosion protection for not less than 30 years.
(2) Tanks protected by sacrificial anodes shall be electrically isolated from the piping system.
(3) Cathodic protection systems shall be designed by a trained person knowledgeable of the requirements of the United States Environmental Protection Agency for such systems. Such person shall first inspect the site and test the site for soil resistivity and the presence of stray currents. Such cathodic protection systems shall be installed under the personal supervision of such person.
(4) Cathodic protection systems shall be inspected and tested in the presence of a representative of the Department at the time of installation in compliance with the applicable National Association of Corrosion Engineers standard and the following procedures:
(A) All piping shall be subjected to a holiday test and tanks and associated piping shall be subjected to an electrical continuity test. Any holiday located during a spark test shall be repaired as per coating specifications before the tank or piping excavation is backfilled.
(B) Upon completion of the underground motor fuel storage tank installation, the following information and documentation shall be submitted to the Department:
(1) An "as-built" drawing showing number, size (weight) and location of all anodes and test stations.
(2) An affidavit in a form satisfactory to the Department, executed by the person who designed and supervised the installation of the cathodic protection system, setting forth the type of cathodic protection system installed, a description of the system and its location, the date of final inspection of the installed system, and such person's certification that the system has been installed and is functioning properly and that the system is designed to provide corrosion protection for at least 30 years.

(d) Coatings. Coatings steel underground storage tanks and piping at motor fuel dispensing facilities shall be designed and installed in compliance with the following requirements:
(1) Types of coatings. Steel tanks shall be factory-coated with a dielectric material acceptable to the Department. The coating's coefficient of thermal expansion must be compatible with steel so that stresses due to temperature changes do not affect

the soundness of the coating and the permanent bond which exists between the coating and the steel. The coating must be of sufficient density and strength so that it will not crack, wear, soften or disbond under normal service conditions. The coating must be stable under adverse underground electrolytic conditions and shall be chemically resistant to the products stored. The coating shall have been factory inspected for air pockets, cracks, blisters and electrically tested with a holiday detector at a minimum of 10,000 volts for coating defects such as pinholes.

(2) Site inspection. All coated tanks shall be inspected on site for coating defects prior to installation. An affidavit attesting to the integrity of the tank coating shall be submitted by a certificate of license holder upon the request of the Department.

(e) Dispensers and Pumps. Upon completion of the installation of a motor fuel dispenser or motor fuel-dispensing pump, such dispenser and pump shall be tested for proper operation by a certificate of license holder. All readily accessible piping shall be inspected for any evidence of leaks. An affidavit executed by such installer attesting to compliance with this requirement shall be submitted to the Bulk Fuel Unit of the Bureau of Fire Prevention.

Rule Section § 2206-02

Leak Detection System Functionality Testing

(a) Scope. This section sets forth standards, requirements and procedures for the periodic testing of underground liquid motor fuel storage and dispensing systems leak detection systems pursuant to FC2206.9.3.

(b) General Provisions

(1) Frequency. Pursuant to FC2206.9.3, a functionality test of the leak detection system shall be conducted, at the owner's risk, before a representative of the Department at least once every two (2) years.

(2) Supervision. The leak detection system functionality test shall be conducted by a holder of a certificate of license for liquid motor fuel storage and dispensing systems, or a person employed and supervised by such certificate of license holder. The individual conducting the test shall remain on the premises while such test is being conducted and until the system has been returned to normal operation in accordance with R2206-02(c)(5). The Department may require individuals performing such leak detection test to be trained and/or certified by the manufacturer to conduct such test. Upon request, proof satisfactory to the Department shall be submitted attesting to the individual's training/certification for such leak detection system.

(3) Scheduling. A leak detection system functionality test shall be scheduled with the Bulk Fuel Unit of the Bureau of Fire Prevention.

(4) Fire extinguishing system operational. No leak detection system functionality test shall be conducted if the fire extinguishing system required to protect the dispensers is out-of-service or not in good working order.

(5) Smoking and ignition sources. All sources of ignition in the test area shall be eliminated from the area in which a leak detection system functionality test is to be conducted. Signs reading "NO SMOKING - NO OPEN FLAMES" shall be conspicuously posted in such area.

(6) Testing area security. The areas surrounding the dispensers, tanks or other equipment or systems tested shall be cordoned off by portable barricades or signs,

rope or tape to prevent unauthorized persons or motor vehicles from entering the area.

(7) Electrical equipment. All electrical equipment used for testing shall be of a type listed as intrinsically safe or suitable for use in hazardous locations. Interlocks shall be provided to ensure that grounding is made prior to electrical contact. Power to electrical equipment shall not be turned on until all electrical connections are made. Connection to power source shall be the final connection made.

(c) Leak Detection System Testing Requirements. Functionality tests of leak detection systems shall be conducted in accordance with the manufacturer's instructions and the following standards and procedures:

(1) Testing of probes. Except as provided in R2206-02(c)(2), leak detection probes shall be removed from their installed location, and manually tested by exposing such probes to liquid motor fuel. Probes capable of discriminating liquid motor fuel from water shall also be exposed to water. Leak detection probes which cannot be removed from their installed location may be tested by a method recommended by the manufacturer and acceptable to the Department.

(2) Testing of discharge line leak detectors. Discharge line leak detectors shall be tested by withdrawing liquid motor fuel from the impact valve port. Liquid motor fuel shall be withdrawn at a rate equal to the minimum rate that the line leak detector is required to activate.

(3) Dispensing of fuel for testing purposes. The liquid motor fuel to be used for testing purposes shall be dispensed from the liquid motor fuel storage system into a metal safety can of a capacity not exceeding 2½ gallons. Except as provided in R2206-02(c)(2), such liquid motor fuel shall be withdrawn through the storage system dispenser. Liquid motor fuel withdrawn from the storage system shall be returned to the storage system through the fill connection.

(4) Standard for successful test. A leak detection system test shall be deemed successful if:

(A) each tank-interstitial leak detection probe in the system, when exposed to liquid motor fuel and, if designed for such purpose, water, causes the activation of the audible and visible alarm.

(B) each pump sump leak detection probe in the system, when exposed to liquid motor fuel and, if designed for such purpose, water, causes:
(1) the activation of the audible and visible alarm, and
(2) the shutdown of the liquid motor fuel pump.

(C) each dispenser pan leak detection probe in the system, when exposed to liquid motor fuel and, if designed for such purpose, water, causes:
(1) the activation of the audible and visible alarm, and
(2) the shutdown of the affected dispenser or liquid motor fuel pump.

(D) each electronic line leak detector in the system, upon detection of liquid motor fuel leak, causes:
(1) the activation of the audible and visible alarm, and
(2) the shutdown of the liquid motor fuel pump or a significant restriction of liquid motor fuel flow.

(E) each mechanical line leak detector in the system, upon detection of a liquid motor fuel leak, causes the shutdown of the liquid motor fuel pump or the stopping of liquid motor fuel flow at any rate exceeding three (3) gallons per hour.

(5) Restoration of system. Upon successful completion of a leak detection system functionality test, liquid motor fuel storage and dispensing system, including the leak detection system, shall be returned to normal operation and checked to ensure that it is in good working order.

(d) Portable Fire Extinguisher Requirements. A portable fire extinguisher having at least a 40-B:C rating shall be readily available for use.

Rule Section § 2211-01

Repair Garages For Vehicles Fueled by Lighter-Than-Air Fuels

(a) Scope. This section sets forth standards, requirements and procedures for the issuance of permits to repair garages that repair and/or convert CNG, LNG, hydrogen and/or other vehicles fueled by lighter-than-air fuels.

(b) General Provisions. Pursuant to FC105.6, a permit must be obtained for the operation of any repair garage.

(c) Permit issuance. No original or renewal permit shall be issued to any repair garage that repairs and/or converts vehicles fueled by CNG, LNG, hydrogen or other lighter-than-air fuels, including facilities formerly permitted by the Department as a motor vehicle repair shop, unless such repair garage is in compliance with the requirements of FC2211.7, or documentation is submitted to the Department confirming that such repair garage was approved for the repair or conversion of such vehicles by the Department of Buildings pursuant to the 1968 Building Code.

APPENDIX F. FIRE RULE CHAPTER 34

Rule Section § 3404-01

Out-of-Service Storage Systems

(a) Scope. This section sets forth requirements for out-of-service storage systems for gasoline, diesel, fuel oil and other flammable or combustible liquids that are not in use for 30 days or more, except when such systems are used for seasonal or standby storage and are not otherwise permanently out of service.

(b) Definitions. The following terms shall, for purposes of this section and as used elsewhere in the rules, have the meanings shown herein:

Permanently out-of-service storage systems. Storage systems that are no longer to be used for storing gasoline, diesel, fuel oil or other *flammable* or *combustible liquids* or that have not been used for one (1) year or more. The *Department* may deem a storage system permanently out of service and require that it be closed accordingly where it has not been closed and maintained as a *temporarily out-of-service storage system* and the circumstances of an actual or anticipated change in use or occupancy of the *premises* at which the storage system is located indicate that any further use of such storage system cannot be reasonably anticipated.

Temporarily out-of-service storage systems. Storage systems for gasoline, diesel, fuel oil or other *flammable* or *combustible liquids* that have not been used for 30 days or more, but less than one (1) year.

(c) Temporarily Out-of-Service Storage Systems

(1) Supervision

(A) For motor fuel or other flammable or combustible liquid storage systems, the closure shall be performed by a person holding a certificate of license or by a person who is employed and supervised by a person holding such certificate.

(B) For fuel oil storage systems with a total capacity exceeding 330 gallons, the closure shall be performed by a person holding a certificate of license or by a person who is employed and supervised by a person holding such certificate, or a person holding an oil-burning equipment installer license issued by the Department of Buildings or by a person who is employed by and under the direct supervision of a person holding such license.

(C) For fuel oil storage systems with a total capacity of 330 gallons or less, the closure shall be performed by a person holding a certificate of license or by a person who is employed and supervised by a person holding such certificate, by a person holding an oil-burning equipment installer license issued by the Department of Buildings or by a person who is employed by and under the direct supervision of a person holding such license, or a plumber licensed by the Department of Buildings.

(2) Affidavit of compliance. The owner or operator of a temporarily out-of-service storage system or the permit holder for such system shall file with the Department an affidavit certifying that such system has been safeguarded in compliance with the requirements of FC Chapter 34 and this section. Such affidavit shall be executed by a person with the requisite qualifications to supervise the closure of such tanks.

(3) Permits and testing

(A) All storage systems which have been rendered temporarily out of service shall continue to be subject to the Department's permit and testing requirements and the registration, reporting, inspection and testing regulations of the New York State Department of Environmental Conservation.

(B) Before a temporarily out-of-service storage system may be restored to service, an affidavit of compliance shall be filed with the Department in accordance with R3404-01(c)(2), certifying the integrity of the tank and piping, and the proper functioning of any leak detection and cathodic protection systems.

(d) Permanently Out-of-Service Storage Systems

(1) Supervision

(A) For motor fuel or other flammable or combustible liquid storage systems, the closure shall be performed by a person holding a certificate of license or by a person who is employed and supervised by a person holding such certificate.

(B) For fuel oil storage systems with a total capacity exceeding 330 gallons, the closure shall be performed by a person holding a certificate of license or by a person who is employed and supervised by a person holding such certificate, or a person holding an oil-burning equipment installer license issued by the Department of Buildings or by a person who is employed by and under the direct supervision of a person holding such license.

(C) For fuel oil storage systems with a total capacity of 330 gallons or less, the closure shall be performed by a person holding a certificate of license or by a person who is employed and supervised by a person holding such certificate, by a person holding an oil-burning equipment installer license issued by the Department of Buildings or by a person who is employed by and under the direct supervision of a person holding such license, or a plumber licensed by the Department of Buildings.

(2) Affidavit of compliance. The owner or operator of a permanently out-of-service storage system or the permit holder for such system shall file with the Department an affidavit certifying that such system was removed and disposed of, or abandoned in place, in compliance with the requirements of FC Chapter 34 and this section. Such affidavit shall be executed by a person with the requisite qualifications to supervise the closure of such tanks.

(3) Environmental site assessment. If an environmental site assessment is required by federal or state law or regulations, the owner or operator of the storage system, the permit holder for such system, or the person filing the affidavit of compliance for such system, shall submit to the Department a written statement that such environmental site assessment has been performed in accordance with such law and regulations.

Rule Section § 3404-02

Precision Testing of Certain Underground Storage Systems

(a) Scope. This section sets forth standards, requirements and procedures for precision testing pursuant to FC3404.2.11.6 of underground storage systems for motor fuels or other flammable and combustible liquids when such systems utilize single-walled tanks, or other tanks not provided with a leak detection system meeting Fire Code requirements.

(b) General Provisions

(1) Applicability. Precision testing of underground storage systems for motor fuels or other flammable and combustible liquids that utilize single-walled tanks, or other tanks not provided with a leak detection system meeting Fire Code requirements, shall be conducted in compliance with the requirements of FC Chapters 22 and 34 and this section.

(2) Precision testing standard. Precision testing of underground storage systems shall be conducted in accordance with National Fire Protection Association (NFPA) Standard 329 (2005 edition).

(3) Supervision.

(A) Certificate requirements. Precision testing of underground storage systems shall be conducted by a person holding a certificate of license or under the general supervision of a certificate of license holder. Such person shall be trained and knowledgeable in the use of the precision test equipment and procedures for the conduct of the particular precision test. Any person conducting such test under the supervision of a certificate of license holder shall hold a certificate of fitness for such precision test. A separate certificate of fitness shall be obtained for each type of precision test system.

(B) Presence on premises. The certificate holder conducting the precision test shall remain on the premises while such test is being conducted and until the system has been returned to good working order in accordance with R3402-02(c)(1)(C).

(c) Operational Requirements

(1) Administrative requirements

(A) Notification of tests. Prior to conducting a precision test of a underground storage system, notification shall be made to the Bureau of Fire Prevention by calling the telephone number designated by the Bulk Fuel Unit. Tests may be witnessed by a Department representative. Tanks located within buildings shall not be tested unless prior Department approval is received.

(B) Submission of test results. A report of the results of the precision test shall be submitted to the Bulk Fuel Unit of the Bureau of Fire Prevention on an approved form no later than 30 days after conducting the test. Such test report shall include the name and certificate of fitness number of the person who conducted the test, as well as the name and signature of the certificate of license holder under whose supervision the test was conducted.

(C) Notification of defective storage systems. Underground storage systems shall be returned to service in good working order upon completion of the precision testing. Storage systems determined to be defective shall be removed from service in accordance with applicable laws, rules and regulations. If hazardous material has been released to the environment, notification shall be immediately made to the Department and the New York State Department of Environmental Conservation.

(2) Testing equipment requirements

(A) Only approved precision testing systems shall be used for precision testing of underground storage systems. Such testing systems, including hoses and other devices and components, shall be designed for twice the maximum operating pressures of the pressures generated by the precision test system, and shall be compatible with the hazardous material stored in the tank to be precision tested.

(B) All testing equipment to be placed in the storage tank, or used in the vicinity of the test area, shall be intrinsically safe or suitable for use in hazardous locations.

(C) Interlocks shall be provided for all electrical connections to ensure that the system is grounded before power can be supplied.

(3) Testing procedures

(A) The test area shall be cordoned off by portable barricades, signs, rope or tape to prevent unauthorized persons and motor vehicles from entering the area. Signs posted at the barricade perimeter shall be provided to read "NO SMOKING-NO OPEN FLAMES".

(B) All sources of ignition, including all motor vehicles, shall be removed from the testing area.

(C) Approved procedures shall be used in filling tanks and piping for precision testing, to ensure safety and prevent overfilling. Filling of tanks shall only be conducted through approved fill boxes from approved cargo tanks and/or approved safety cans. For purposes of topping off the tank or the test equipment, flammable and combustible liquids shall be drawn from an approved storage system on the premises into an approved safety can not exceeding a capacity of two and one half (2½) gallons. Flammable and combustible liquids may not be withdrawn from the fuel tanks of motor vehicles.

(D) To avoid erroneous results, each precision test shall compensate for temperature changes, tank-end deflection, air pockets, water tables and other variables, as set forth in NFPA 329, to avoid erroneous results.

(E) Tests shall be conducted for the period of time recommended by the manufacturer of the particular precision testing system, or until accurate results can be obtained.

(F) If test wells must be drilled on the site to locate the water table, the certificate of license holder shall take all necessary steps to ensure that such test wells do not disturb utility infrastructure.

(G) When underground storage systems storing liquid of varying or unknown coefficients of thermal expansion are to be tested, the liquid shall be removed, the tank cleaned, and the test conducted using a material of similar viscosity and a known coefficient of expansion.

(H) Power to electrical equipment shall not be turned on until all electrical connections have been made. The connection to the power source shall be the final connection made.

(I) Precision testing systems shall be arranged such that rain water cannot enter the tank through the tank openings.

(d) Portable Fire Extinguisher Requirements

(1) A portable fire extinguisher having at least a 40-B:C rating shall be readily accessible during testing. The maximum travel distance to the fire extinguisher shall be 30 feet and the portable fire extinguisher shall be positioned at a safe location within the testing area.

Rule Section § 3404-03

Indoor and Aboveground Combustible Liquid Storage Systems

(a) Scope. This section sets forth requirements for the design and installation of indoor, aboveground combustible liquid storage systems, except fuel oil storage tanks and auxiliary storage tanks for oil-burning equipment regulated by the Mechanical Code, or to the installation of liquid motor fuel-dispensing storage tanks.

(b) General Provisions. Indoor aboveground combustible liquid storage tanks shall comply with the requirements of FC Chapters 27 and 34 and this section.

(c) Design and Installation Requirements

(1) Location of tanks. Combustible liquid storage tanks shall preferably be installed on the floor at grade level. Combustible liquid storage tanks may also be installed on floors not more than two (2) floors below grade level.
(2) Fire-rated separation of tanks
  (A) Combustible liquid storage tanks having an individual or aggregate capacity of more than 550 gallons but less than 1,100 gallons in a single control area shall be completely enclosed within noncombustible construction having at least a two (2) hour fire resistance rating.
  (B) Combustible liquid storage tanks having an individual or aggregate capacity of 1,100 gallons or more in a single control area shall be completely enclosed within noncombustible construction having at least a three (3) hour fire resistance rating.
(3) Sprinkler system protection
  (A) Any floor below grade level upon which a combustible liquid storage tank is installed shall be protected throughout by a sprinkler system, except that that when the combustible liquid storage tank will only store a combustible liquid with a flash point of 200°F or greater, and the room or area is segregated, vertically and horizontally, from surrounding spaces by a fire separation of not less than two (2) hour fire resistance rating, only the room or area housing such tank need be protected by a sprinkler system.
(4) Piping systems
  (A) General requirements
    (1) Exposed piping shall be protected against mechanical damage and shall be adequately supported with rigid metal fasteners or hangers.
    (2) Only new wrought iron, steel, or brass pipe, or type K or heavier copper tubing shall be used. Metal tubing used as transfer piping shall be adequately protected.
    (3) Overflow pipes, where installed, shall not be smaller in size than the supply pipe.
    (4) Pipe shall be connected with standard components, and tubing with components listed or approved for the same material as the pipe, except that malleable iron fittings may be used with steel pipe. Cast iron fittings shall not be used. All threaded joints and connections shall be made liquid-tight with suitable pipe compound. Unions requiring gaskets or packing, right or left couplings and sweat fittings employing solder having a melting point of less than 1,000°F shall not be used.
  (B) Piping from storage tank to equipment on other floors
    (1) Piping from a transfer pump to manufacturing, process or other equipment installed on other floors, including combustible liquid return and vent piping, shall comply with the applicable provisions of R3404-03(c)(4) and shall be enclosed in a shaft constructed of four (4) inch concrete or masonry, having a four (4) inch clearance from all pipe or pipe covering, except that no such enclosure shall be required within the room containing the pump, tank, or equipment where such room is itself enclosed with construction and materials having at least a 2-hour fire-resistance rating. Provisions shall be made for expansion in piping without the use of expansion joints.
    (2) Where it is necessary to make horizontal offsets in supply piping, upon exiting the shaft, such piping shall be enclosed in a sleeve of other piping of at least number ten (10) gauge steel, two (2) sizes larger and arranged to

drain into the shaft. Horizontal piping offsets shall be further enclosed in construction having a two (2) hour fire resistance rating, except that no such enclosure shall be required within the room containing the pump, tank, o equipment where such room is itself enclosed with construction and materials having at least a 2-hour fire-resistance rating.

(3) A drain pipe shall be installed at the base of the shaft enclosing the supply and overflow piping. The pipe shall lead to a dedicated sump or container with a capacity of at least 55 gallons. Such sump or container shall be equipped with a leak detection system alarm, arranged so as to sound an alarm and stop the transfer pump. The alarm shall be connected to a local audible alarm and to a remote alarm located at a supervising station. The wiring shall comply with the Electrical Code.

(4) Piping shall be seamless steel pipe of a weight not less than ASA Schedule 40, with welded connections up to the equipment, except that fittings at the tank or equipment, shutoff valves and other combustible liquid flow and control devices may be screwed or flanged.

(5) Pipe shafts shall not be penetrated by or contain other piping or ducts.

(5) Transfer of combustible liquids between floors

(A) A clearly identified and readily accessible remote control switch shall be provided on each floor to which combustible liquid is transferred. Such switch, when manually activated, shall cause shut down of the transfer.

(B) A visual indicating device shall be provided in the discharge area that indicates when the pump is running.

APPENDIX G. FIRE RULE CHAPTER 48

Rule Section § 4802-01

Pre-Existing Definitions

(a) Scope. This section sets forth definitions of terms used in the Fire Prevention Code and former Fire Department rules in effect on June 30, 2008 that are consolidated in Chapter 48 of the rules.

(b) Definitions

Board of Standards and Appeals. New York City Board of Standards and Appeals.

Department of Buildings. New York City Department of Buildings.

Department of Small Business Services. New York City Department of Small Business Services.

Multiple dwelling. A multiple dwelling, as defined in subdivision seven of section four of the multiple dwelling law, including any portion of such dwelling used for other than living or sleeping purposes, or for any business, commercial or other non-residential purpose. (Fire Prevention Code, former Administrative Code §27-4002(27a))

Structure. Any building or construction of any kind. (Fire Prevention Code, former Administrative Code §27-4002(38)(c))

Rule Section § 4822-01(3 RCNY §21-14)

Pre-Existing Motor Fuel-Dispensing Facilities and Repair Garages

(a) Scope. This section consolidates the Fire Prevention Code and Fire Department rules in effect on June 30, 2008, that are applicable to the design and installation of pre-existing motor fuel-dispensing facilities and repair garages.

(b) Definitions. Reserved

(c) Facilities in Compliance With Former Fire Department Rules in Effect on June 30, 2008. Liquid motor fuel storage and dispensing facilities, marine liquid motor fuel-dispensing facilities, compressed natural gas motor fuel-dispensing facilities, and repair garages in compliance with former Fire Department rules 3 RCNY §21-20, 21-21, 23-01, and/or 26-01, as applicable, in effect on June 30, 2008, are allowed and would be approved under the provisions of the Fire Code and the rules, and accordingly, such facilities shall be designed and installed in compliance with the requirements of FC Chapter 22 and the rules, except that where the distance of vent lines and fill and vapor recovery connections to lot lines in pre-existing liquid motor fuel-dispensing facilities and marine motor fueldispensing facilities is not in compliance with FC 3404.2.7.3.3 and 3404.2.7.5.2, compliance with such clearance distance requirements is not required until such time as such facilities are required to comply with the Fire Code and the rules with respect to such clearance distances.

(d) Pre-Existing Facilities. Liquid motor fuel-dispensing facilities, marine fuel-dispensing facilities and CNG motor fuel-dispensing facilities lawfully not in compliance with former Fire Department rules 3 RCNY §21-20, 21-21 and/or 23-01, as applicable, in effect on June 30, 2008, shall be designed and installed in compliance with applicable laws, rules and regulations, as set forth in R102-01(c)(3). Pre-existing firehouses with diesel motor fuel dispensing systems shall continue to comply with the requirements set forth in former Fire Department rule 3 RCNY §21-14 until such time as such facilities are required to comply with the Fire Code and the rules with respect to the design and installation of such motor fuel dispensing systems.

(e) Diesel Liquid Motor Fuel Dispensing Systems in Existing Firehouses

Former Fire Department Rule 3 RCNY §21-14

§21-14 Installation of Diesel Fuel Storage Systems in Existing Firehouses

(a) Scope

(1) No person or agency shall install diesel fuel oil storage equipment for use in existing firehouses except as provided in these rules.

(2) These rules shall not apply to installations in other than existing firehouses.

(3) All installations made under these rules shall be made by a licensed installer.

(4) For the purpose of these rules the term "licensed installer" shall be interpreted to mean a person licensed to install fuel oil systems or gasoline storage systems or a licensed plumber.

(b) General requirements

(1) Diesel storage systems for existing firehouses shall consist of two (2) tanks of 275 gallons capacity or one (1) tank of 550 gallons capacity. See subdivision (m) of this section for schematic drawing of installation.

(2) Two (2) tank systems shall be equipped with valves to permit each tank to be isolated from the other.

(3) All installations shall conform with the provisions of Article 17 of Subchapter 14 of Chapter 1 of Title 27 of the Administrative Code insofar as they apply to the installation of storage tanks except as hereinafter provided for.

(c) Oil permitted. Oil stored in storage systems installed under these rules shall be diesel fuel oil as defined in § 27-4002(10)(b) of the Administrative Code of the City of New York.

(d) Material and construction of tanks

(1) All tanks for the storage of diesel fuel oil shall be built of steel plates made by the open hearth or basic oxygen process. Such plates shall be free from physical imperfections, such as laminations, cracks, mill scale, etc. All steel must be new, in good condition and free from rust.

(2) All tanks shall be welded. Flanges or other pipe connections shall be sealed. Filler of any kind between plates is prohibited.

(3) Plate thickness

(i) Tanks of 275 gallons capacity shall have a minimum thickness of shell and head plate No. 10 manufacturer's standard gauge (.134") steel plate.

(ii) Tanks of 550 gallons capacity shall be subject to the following requirements:

(A) Tanks 36" in diameter and less-at least 1/4" shell and 1/4" heads.

(B) Tanks 37" to 72" in diameter-at least 1/4" shell and 5/16" heads.

(4) Tanks shall be cylindrical, oval, elongated oval or round and shall have dished heads with a curvature the radius of which is not greater than the diameter of the tank. Dished heads shall be formed with an adequate cylindrical extension rim to provide a welding surface.

(5) At time of installation all storage tanks shall bear a permanently fixed plate, spot-welded or equivalent, bearing the name of tank manufacturer, the gauge of material and capacity of tank. All shop fabricated storage tanks shall be installed without structural alteration.

(6) All openings shall be through the top of the storage tanks except that tanks shall be provided with a 1" capped opening in the bottom for cleaning and protection against corrosion.

(7) Tanks shall be painted with two (2) coats black asphaltum and stenciled with the lettering "Diesel Fuel Only." Letters to be white and 4" high.

(e) Location of tanks

(1) Storage tanks shall be installed in the cellar above ground. Bottom of tanks shall be 12" above slab mounted on substantial incombustible supports and located not less than seven feet (7') of clear unobstructed space measured horizontally from any furnace or source of exposed flame unless protected as provided in §§27-829(a)(2) or (3) of the Administrative Code and at least two feet (2') from any surface where the temperature exceeds 165 deg. F.

(2) Tanks shall be located as near as practicable below the location of the dispensing pump which shall be located on the apparatus floor.

(f) Piping

(1) Materials.

(i) All piping shall be new, standard, full-weight black steel, properly marked and duly approved.

(ii) Fittings shall be malleable iron.

(2) Installation

(i) Piping shall be run in a substantial and workmanlike manner. Exposed piping shall be protected against mechanical injury and shall be securely supported with rigid metal fasteners or hangers. Pitch shall be a minimum 1/2" per 10' to tanks.

(ii) Fill suction and vent line connections to tanks shall have swing joints.

(iii) All joints shall be made with Litharge and Glycerine or Board of Standards and Appeals approved pipe joint compound.

(3) Vent pipe

(i) An open vent of steel, without trap and draining to the tank, shall be provided for each storage tank. The lower end of the vent pipe shall not extend through the top of the storage tank more than one inch (1"). Cross connection between vent pipe and fill pipe is prohibited.

(ii) Vent pipes may not be run into a common header.

(iii) Vent pipes shall not be less than one and one quarter inches (1 1/4") in diameter.

(iv) Vent pipes shall be provided with an approved weatherproof hood having a free area of not less than the pipe size area and shall terminate not less than two feet (2') nor more than twelve feet (12') above the fill pipe terminal. Vent pipe terminal shall be visible from location of the fill pipe terminal.

(v) Each tank shall be equipped with a "Scully Vent Alarm" or equal and shall be audible from the location of the fill pipe terminal.

(4) Fill pipe

(i) Fill pipe shall terminate outside the building. The fill pipe terminal shall be located on the building wall a minimum eighteen inches (18") and a maximum two feet (2') above grade and at least (2') from any building opening and five feet (5') from any subway grating at or below the level of the fill pipe terminal.

(ii) A common fill pipe and header shall be installed in two (2) tank systems. The area of a common header pipe shall be no smaller than the largest branch fill pipe. Where a common fill pipe and header is installed, a shut-off valve shall be installed at each tank. Valve shall be sealed open. See §21-14(m) for schematic drawing of installation.

(iii) Fill pipe terminal shall be 2" or 3" left hand thread "Flagg Fill Pipe Terminal," Board of Standards and Appeals Calendar No.345-35-SA or approved equal. The outer flange of the fill pipe terminal or the seal cap shall be provided with letters reading "Diesel Oil" and the calendar number under which the fill pipe terminal and the seal cap have been approved. Where there is a storage system

of a volatile flammable oil and/or a storage system for fuel oil and a storage system for diesel fuel oil is to be used in the same premises, the terminal of the diesel oil fill pipe shall be provided with a left hand thread and the fill pipe fitting shall be a different size than the fill pipe(s) for the volatile flammable oil system and/or the fuel oil system. In lieu of the foregoing fill boxes may be of a type approved by the Board of Standards and Appeals and shall have cast in its cover an identifying name or symbol to differentiate between fuel oil for heating and diesel oil as motor fuel.

(iv) A porcelain enameled metal sign with 2" lettering reading "Diesel Oil" shall be permanently attached two feet (2') above the fill box on an adjacent wall.

(v) Where the top of the storage tank is above the fill pipe terminal, the fill pipe shall have connected to the top of the tank and be provided with a shut-off valve and swing check valve which shall be located at the fill pipe terminal, or the shut-off valve may be located inside the building at or below the level of the fill pipe terminal, in an accessible location.

(5) Suction lines

(i) Suction lines shall be one and one-half inch (1 1/2") black steel.

(ii) Suction lines shall extend to within four inches (4") of the bottom of each tank.

(iii) In two (2) tank systems suction lines from each tank shall be run into a common header. Where a common suction line and header is installed, a check valve and a shut-off valve shall be installed at each tank. See §21-14(m) for schematic drawing of installation.

(g) Valves and control of oil flow

(1) All valves shall be brass gate type suitable for use with oil.

(2) In a two (2) tank system, a shut-off valve shall be installed in the suction line and in the fill line to each tank. Valves shall be sealed open. See § 21-14(m) for schematic drawing of installation.

(3) A check valve shall be installed in the suction line to each tank. See §21-14(m) for schematic drawing of installation. All check valves shall be angle check double poppet, similar to Buckeye No. 464 or approved equal.

(h) Oil level indicating devices and test wells

(1) Oil level indicating devices

(i) Individual approved direct reading liquid level gauges shall be mounted on each tank calibrated in gallons to the rated capacity of each tank.

(ii) Oil level indicating devices shall be constructed of substantial materials so designed that there can be no leakage of oil or oil vapor.

(2) Test wells shall not be permitted. Unused tank openings shall be permanently sealed to prevent removal of plugs or cover

(i) Dispensing pump.

(1) Specifications.

(i) Pump shall be electric, not-computer, explosion proof type, model #U535 of the A.O.Smith Corporation (Board of Standards and Appeals Calendar No. 483-55-SA) or approved equal. All parts of pumps coming in contact with liquid shall be either galvanized or brass.

(ii) Pump shall be equipped with a discharge register and fitted with a tumbler lock equipped with two (2) keys.

(iii) Pump shall be equipped with a filter having a replaceable element (WIX or equivalent), fifteen feet (15') of hose and an automatic shut-off nozzle. Hose and nozzle shall be of a type approved by the Board of Standards and Appeals for use in dispensing diesel fuel.

(iv) Pump shall be equipped with a crank for manual operation in case of power failure.

(v) Pump to have words "Diesel Fuel" stenciled across the front panel in white letters 1" high.

(2) Location.

(i) Pump shall be located on the apparatus floor in a location near apparatus doors and convenient for supplying tanks of motor vehicles directly by means of dispensing hose.

(ii) Where practicable, pump shall be located above the storage tank which shall be located in the cellar.

(iii) Pump shall be mounted on a concrete pad 30" long by 18" wide by 12" high.

(j) Permits, plans and inspection of storage tanks and piping

(1) Permits. No diesel fuel oil storage system installed under these rules shall be operated until it is inspected and approved by a representative of the fire commissioner except that temporary operation shall be permitted upon the filing by the licensed installer of a certified statement that such equipment and the installation conforms with the plan for the installation and with applicable provisions of law.

(2) Plans

(i) Plans for the installation of diesel fuel oil storage tanks in existing firehouses shall be prepared by the Fire Department buildings unit and submitted to the Bureau of Fire Prevention for approval before installation of the system. All such plans shall show compliance with these rules.

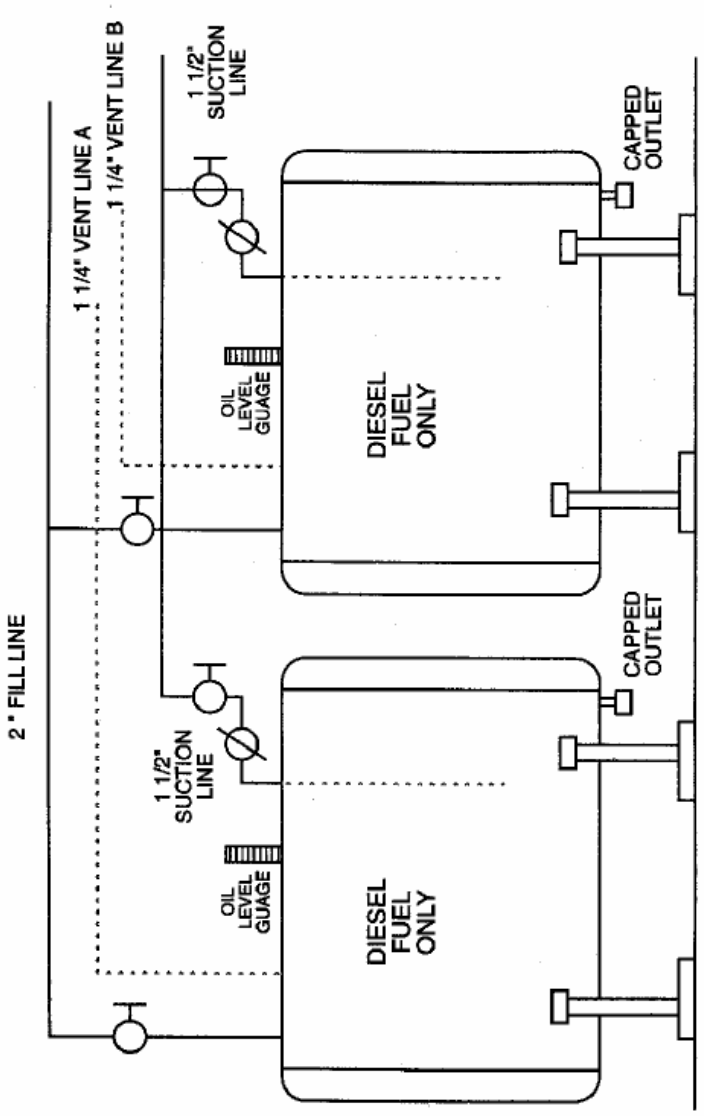
(ii) Plans for the installation of diesel fuel storage tanks in existing firehouses being remodeled under a modernization program shall be prepared by the agency charged with the modernization and shall be submitted by such agency to the Bureau of Fire Prevention for approval before installation of the system. All such plans shall show compliance with these rules.

(k) Fire protection. Tanks, pumps and piping shall be maintained oil tight and kept clear at all times.

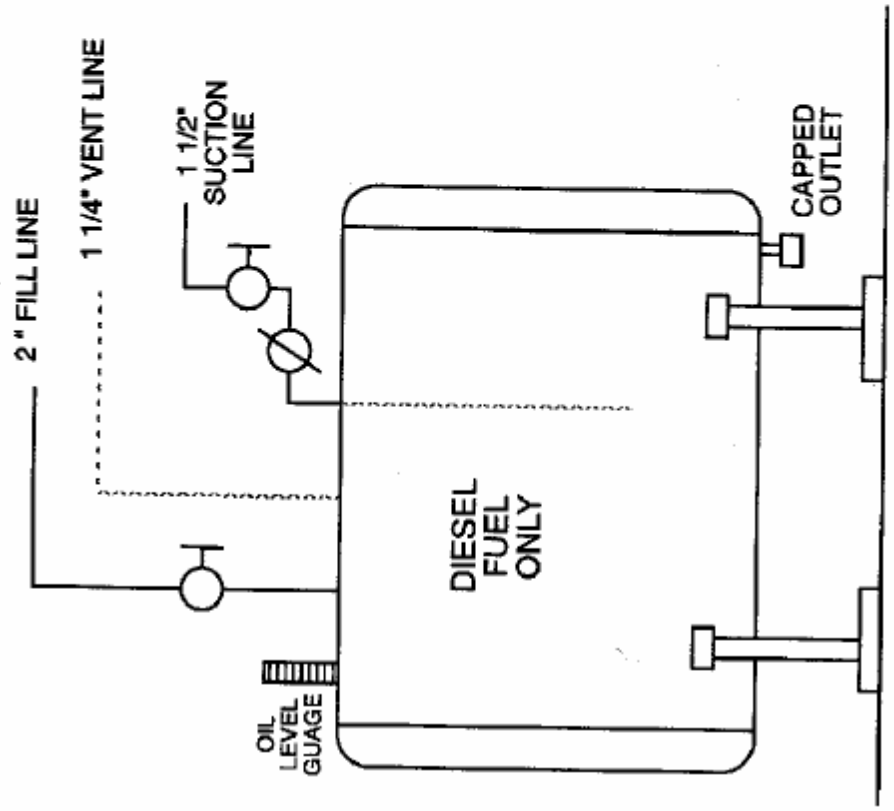
* * *

(m) Schematic drawings

(1) *Schematic drawing for two (2) 275 gallon tanks.*



(2) *Schematic drawing for 550 gallon tank.*



Rule Section § 4834-01

Storage of Flammable and Combustible Liquids in Pre-Existing Facilities

(a) Scope. This section consolidates the New York City Fire Prevention Code and former Fire Department rules in effect on June 30, 2008, that are applicable to the design and installation of flammable and combustible liquid installations in pre-existing facilities.

(b) Definitions. The following terms shall, for purposes of this section and as used elsewhere in Chapter 48 of the rules, have the meanings shown herein:

Apartment. An apartment, as defined in subdivision fifteen of section four of the multiple dwelling law. (Fire Prevention Code, former Administrative Code §27-4002(1a))

Bulk oil storage plant. A building, shed, enclosure or premises, or any portion thereof, in which petroleum or coal tar, or the liquid products thereof, are stored or kept for sale in large quantities. (Fire Prevention Code, former Administrative Code §27-4002(31))

Combustible mixture. A liquid or mixture having a closed-cup flashpoint at or above a temperature of one hundred degrees Fahrenheit, except that, for purposes of transportation, a combustible mixture shall mean a liquid or mixture defined as a combustible liquid by the United States Department of Transportation. (Fire Prevention Code, former Administrative Code §27-4002(10))

Diesel fuel oil. Any liquid, used as a motor fuel which does not emit a flammable vapor below a temperature of one hundred degrees Fahrenheit when tested in a Tagliabue open cup tester. (Fire Prevention Code, former Administrative Code §27-4002(10b))

Flammable mixture. A liquid or mixture having a closed-cup flashpoint at a temperature below one hundred degrees Fahrenheit, except that, for purposes of transportation, a flammable mixture shall mean a liquid or mixture defined as a flammable liquid by the United States Department of Transportation. (Fire Prevention Code, former Administrative Code §27-4002(22))

Essential oil. An oil used for flavoring or perfuming purposes. (Fire Prevention Code, former Administrative Code §27-4002(13))

Fire retarding material. Asbestos board in two layers, each one-fourth inch in thickness, the second layer breaking joints in all directions with the first, or plaster boards cocoa fibre filled, covered with lap jointed metal not less than 26 B. & S. gauge in thickness, and any other material that has successfully passed the one hour fire test prescribed by the industrial board of appeals of the state labor department on the twentyninth day of October, nineteen hundred fourteen. (Fire Prevention Code, former Administrative Code §27-4002(16))

Fuel oil. Any liquid mixture, substance or compound, derived from petroleum, which does not emit a flammable vapor below a temperature of one hundred twenty-five degrees Fahrenheit, when tested in a Tagliabue open cup tester. (Fire Prevention Code, former Administrative Code §27-4002(18))

Garage. A building, shed or enclosure, or any portion thereof, in which a motor vehicle other than one the fuel storage tank of which is empty, is stored, housed or kept. (Fire Prevention Code, former Administrative Code §27-4002(19))

Kerosene. Any liquid product of petroleum, commonly used for illuminating purposes, which does not emit a flammable vapor below a temperature of one hundred degrees Fahrenheit, when tested in a Tagliabue open cup tester. (Fire Prevention Code, formerAdministrative Code §27-4002(23))

Motor fuel. Gasoline, diesel fuel oil or other flammable or combustible liquids or mixtures used as fuel in the operation of motor vehicles, motorcycles, motor boats and aircraft. (Fire Prevention Code, former Administrative Code §27-4002(26a))

Oil and fat or fat and oil. Any oil, fat or grease, of animal, vegetable or mineral origin, except essential oils. (Fire Prevention Code, former Administrative Code §27-4002(29))

Vault. A covered excavation or chamber, below the street level, with masonry walls and roof, constructed outside the foundation walls of a building, and with but one entrance, fitted with a self-closing fireproof door. (Fire Prevention Code, former Administrative Code §27-4002(42))

Volatile flammable oil. Any oil or liquid that will generate a flammable vapor at a temperature below one hundred degrees Fahrenheit when tested in a Tagliabue open cup tester. (Fire Prevention Code, former Administrative Code §27-4002(43))

(c) General Provisions. Pre-existing facilities with flammable and combustible liquid installations the design and installation of which would not be allowed or approved under the Fire Code, but which, pursuant to FC102.3 and R102-01, may be continued with respect to such flammable and combustible liquid installations under the applicable laws, rules and regulations in effect prior to the Fire Code, shall continue to comply with the provisions of such laws, rules and regulations, including former Administrative Code §§27-4053, 27-4055, 27-4065, 27-4066, 27-4069, 27-4070, 27-4094, 27-4227, 27-4231 and 27-4265, and former Fire Department rules 3 RCNY §§8-01, 8-02, 20-07,
21-05, 21-06, 21-17, 28-01 and 28-04, as applicable, until such time as such facilities may be required to comply with the Fire Code and the rules with respect to their design and installation.

(d) Flammable Liquid Manufacture, Storage and Use
Former Administrative Code §27-4066

§27-4066 Requirements for below-grade storage in mercantile occupancies

A system of automatic sprinklers shall be provided in each basement, cellar or other location below grade, regardless of the floor area of such space, in any mercantile establishment in which the commissioner permits the storage of flammable mixtures, except that, where flammable mixtures are stored in such basement, cellar or other location below grade, in a room or other area that is segregated, vertically and horizontally, from surrounding spaces by a fire separation of not less than a two-hour fire-resistance rating, such system of automatic sprinklers shall be required only within such room or other area. Such system of automatic sprinklers shall conform to the requirements for automatic sprinklers for spaces classified in storage occupancy group B-1 pursuant to subdivision d of section 27-954 of the building code.

(e) Combustible Liquid Manufacture and Storage
(1) Former Administrative Code §27-4070

§27-4070 Requirements for below-grade storage in mercantile occupancies

A system of automatic sprinklers shall be provided in each basement, cellar or other location below grade, regardless of the floor area of such space, in any mercantile establishment in which the commissioner permits the storage of combustible mixtures, except that, where combustible mixtures are stored in such basement, cellar or other location below grade, in a room or other area that is segregated, vertically and horizontally, from surrounding spaces by a fire separation of not less than a two-hour fire-resistance rating, such system of automatic sprinklers shall be required only within such room or other area. Such system of automatic sprinklers shall conform to the requirements for automatic sprinklers for spaces classified in storage occupancy group B-1 pursuant to subdivision d of section 27-954 of the building code.

(f) Distilled Liquors and Alcohols
Former Administrative Code §27-4227

§27-4227 Restrictions

a. No permit shall be issued for the manufacture, distillation, rectification, or storage of distilled liquor, spirits or alcohols, in quantities exceeding the amounts set forth in subdivision b of this section, in any building:

1. Which is situated within fifty feet of the nearest wall of any building occupied as a hospital, school, theatre or other place of public amusement or assembly;
2. Where the occupancy within the building in which the distilled liquor, spirits or alcohols are manufactured, distilled, rectified or stored does not comply with the requirements of the building code regulating high hazard occupancies for buildings erected after the sixth day of December, nineteen hundred sixty-eight; or where [a] such occupancy is located in a building [or building section] erected prior thereto and such occupancy is not fully equipped with an approved automatic sprinkler system.

b. The provisions of subdivision a of this section shall apply where the combined total amount of distilled liquor, spirits or alcohols being manufactured, distilled, rectified or stored exceeds:

1. 5,000 gallons, if such distilled liquor, spirits or alcohols is kept stored in the manufacturer's original sealed containers, and is not dispensed or used on the premises.
2. 3,000 gallons, if such distilled liquor, spirits or alcohols is dispensed or used on the premises.

(g) Petroleum, Shale Oils and the Liquid Products thereof

Former Administrative Code §27-4055

§27-4055 Limited Storage Permit

a. Permits may be issued for the storage of petroleum and shale oil, and the liquid products thereof, and of coal tar, in a manner satisfactory to the commissioner, in buildings or premises other than storage plants, approved tank trucks or other vehicles, or approved buried tank systems, in quantities not to exceed the following:

1. Volatile flammable oils five hundred fifty gallons, except that such oils may be stored in larger quantities in fire department approved tank trucks or other vehicles, pending deliveries, in outdoor spaces, when permitted by the zoning resolution, when provided with portable fire fighting appliances as the commissioner may direct, or, when such trucks or other vehicles are equipped with battery cutoff switches, within fully sprinklered buildings complying with the building code and the zoning resolution of the city of New York.
2. Other oils that do not emit a flammable vapor at a temperature below one hundred degrees Fahrenheit, when tested in a Tagliabue open cup tester--one thousand one hundred gallons, except that such oils may be stored in larger quantities in fire department approved tank trucks or other vehicles, pending deliveries, in outdoor spaces or within buildings complying with the zoning resolution and the building code, when provided with the following minimum fire protection:
   i. In outdoor spaces portable fire fighting appliances as the commissioner may direct.
   ii. Within buildings portable fire fighting appliances as the commissioner may direct, battery cutoff switches, and sprinkler protection as required by the building code, except that for existing buildings lawfully occupied as a garage prior to the sixth of December, nineteen hundred sixtyeight, sprinkler protection shall be provided for storage of over forty-five thousand (45,000) gallons, and sprinkler protection, or smoke detection or thermostatic alarm system with connection to central office, shall be provided for storage of between twenty-two thousand five hundred (22,500)

and forty-five thousand (45,000) gallons, all in accord with subdivision (a) of section 27-243, subdivisions (a) and (b) of section 27-455, subchapter seventeen of chapter one of this title and reference standard RS 17-3 of the code. For storage of less than twenty-two thousand five hundred (22,500) gallons—portable fire fighting appliances, as the commissioner may direct, shall be provided, in accord with subdivision (c) of section 27-455 of this title of the code. A permit shall be required for storage of product pending delivery except when such storage is on the site of, or in the immediate proximity of, a bulk oil storage plant.

b. Restrictions. No permit shall be issued for the storage or sale of volatile flammable oil in any building:

1. Where the building does not comply with the requirements of the building code regulating high hazard occupancies for buildings erected after the sixth day of December, nineteen hundred sixty-eight; or where a building or building section erected prior thereto is not fully equipped with an approved automatic sprinkler system; or where the building is occupied as a multiple dwelling, dwelling, school, theatre or other place of public amusement or assembly; except that group one public garages, as defined and classified in the building code shall be permitted. The commissioner may issue a permit for the storage and use of such volatile flammable oil in buildings occupied as schools, colleges, universities, hospitals and/or related facilities, when such oil is required for educational, instructional, clinical, diagnostic, research or testing purposes. Such use and storage shall be in such amounts and under such conditions as the commissioner shall prescribe;
2. Where explosives are stored or kept for sale or use;
3. Where dry goods or other material of a highly flammable nature are manufactured, stored or kept for sale;
4. Where the portion of the building occupied or used for the storage of volatile flammable oil is lighted by any means other than electricity;
5. Upon any floor above the ground floor of a building, except in an approved safety can in quantities of five gallons or less and for use only.

* * *

(j) Bulk Plants and Terminals

Former Administrative Code §27-4053

§27-4053 Bulk oil storage plants

* * *

b. Bulk oil storage

1. Tank construction. All tanks, as to thickness and quality of material, dike wall enclosures, foundations, piping, valves and other related devices or equipment, comprising or forming part of a bulk oil storage plant, shall be designed and constructed in accordance with all applicable provisions of the building code.
2. Tank locations

A. Adjoining properties. The distance between any part of an above ground storage tank and the nearest line of adjoining property which may be built upon, shall be in accordance with the following distance table: (For the purpose of determining nearest line of adjoining property which may be built upon, the width of any abutting public thoroughfare shall be included.)

Tank capacity	Minimum distance
1,000 to 12,000 gallons	10 feet
12,001 to 30,000 gallons	20 feet
30,001 to 50,000 gallons	25 feet
Vertical cylindrical tanks (for storage of oil having a flash point below one hundred (100) degrees Fahrenheit).	
Over 50,000 gallons:	Not less than the greater dimension of height or diameter of tank, except that such distance need not exceed one hundred twenty (120) feet, and in no case closer than twenty-five (25) feet. No such tank shall exceed forty (40) feet in height.
Rectangular tanks (for storage of oil having a flash point below one hundred (100) degrees Fahrenheit).	
Over 50,000 gallons:	Not less than the total of the length and the width of the tank divided by two (2) except that such distance need not exceed one hundred twenty (120) feet, and in no case closer than twenty-five (25) feet. No such tank shall exceed forty (40) feet in height.
Vertical cylindrical tanks (for storage of oil having a flash point of one hundred (100) degrees Fahrenheit or above).	
Over 50,000 gallons:	Not less than one-half (1/2) the greater dimension of height or diameter of tank, except that such distance need not exceed one hundred twenty (120) feet, and in no case closer than twenty-five (25) feet. No such tank shall exceed forty (40) feet in height. However, the commissioner may modify the height limitation to such extent as he or she may deem necessary in the interest of public safety. In no case sham such notification authorize the erection of vertical cylindrical tanks exceeding the height of sixty-four(64) feet.
Rectangular tanks (for storage of oil having a flash point below one hundred (100) degrees Fahrenheit).	
Over 50,000 gallons:	Not less than the total of the length and the width of the tank divided by four(4) except that such distance need not exceed one hundred twenty (120) feet, and in no case closer than twenty-five (25) feet. No such tank shall exceed forty (40) feet in height.

5. Truck loading racks

* * *

B. Each truck loading rack shall be equipped with a remote manually controlled water spray system.

Spray nozzles shall be required over each tank truck loading position immediately below the roof

beams of the loading rack and installed in a manner to adequately protect the entire loading rack area. At least one remote control valve shall be provided for the control of the water supply for each four loading positions. Piping and fitting shall be so installed that they can be thoroughly drained. An approved pump for such system shall receive

water supply from an independent suction tank or direct connection to the city water main. The rated capacity of the pump shall be at least five hundred (500) gallons per minute at one hundred fifty (150) p.s.i. Liquid Tank Storage Systems

Former Fire Department Rule 3 RCNY §21-06

§21-06 Safeguards for Filling Above Ground Storage Tanks in Paint Stores

(a) Flammable liquids which flash below 100°F shall be stored in sealed containers which shall not be opened on the premises, or in approved buried storage systems. When tanks cannot be buried, they may be vaulted in masonry at least 8" thick with a 24" access door. The vault is to be provided with mechanical ventilation to the outer air. Tanks are to be approved 275 or 550 gallon capacity. Electrical equipment is to be explosion-proof.

(b) Combustible liquids which flash over 100(degrees)F may be stored in Bowser or similar type above ground tanks which shall not exceed one hundred and ten (110) gallons in capacity.

(c) Fill lines shall terminate at curb in approved type fill boxes with means for locking.

(d) Vent lines shall terminate in the outer air with weatherproof hoods, screened, two (2) feet above the fill terminal and two (2) feet from any building opening. Vent lines shall be visible from fill line terminal.

(e) No other filling method shall be employed.

(f) Pumps shall be of approved type.

(g) A minimum of 64 square inches of fixed ventilation shall be provided for the storage and filling areas.

(h) The boiler room shall be separated from the tank location area by approved masonry.

(i) A fireproof self-closing door and 6" masonry sill to be provided at the opening of the boiler room.

(j) A catch basin shall be provided with a return line to the storage tank. A check valve to prevent escape of vapors shall be installed in the return line.

(k) The number of Bowser or similar type tanks shall not exceed five (5).

* * *

Former Fire Department Rule 3 RCNY §21-17

§21-17 Installation of Storage Tanks and Piping for Liquids Having Flashpoints of 100 Degrees Fahrenheit or Higher Tag[.]liabue Open Cup

* * *

(d)

(1) Construction of tanks. All storage tanks shall be designed in accordance with the following provisions:

(i) All storage tanks shall be built of steel plates or sheets, made by the open hearth or basic oxygen process. Such steel shall be free from physical imperfections, and shall be new, in good condition, and free from rust.

(ii) Tanks shall be welded, riveted and caulked, or riveted and welded. Flanges or other pipe connections may be welded. All caulking shall be placed with round nose tools and without damage to the plates. Filler of any kind between plates shall be prohibited.

(iii) Tanks to be buried shall be cleaned and then coated on the outside with two coats of red lead, or equivalent. They shall be further protected by a coating of hot tar, asphalt, or equivalent rust resistive material, applied at the work site. Tanks installed above ground shall be coated with one coat of red lead, or equivalent.

(iv) All buried storage tanks shall be constructed of at least 1/4-inch thick metal and shall be designed to withstand any external loads to which the tank may be subjected.

(v) At the time of installation all storage tanks shall bear a permanently fixed plate, spot welded or equivalent, bearing the name of the tank manufacturer, the gauge of the materials, and capacity of the tank. Shop fabricated storage tanks shall be installed without structural alteration.

(vi) All openings shall be through the top of the storage tank, except that storage tanks of 275-gallon capacity or less, located above ground but below the lowest story, may be provided with a 3/4-inch opening for gravity discharge and a l-inch opening in the bottom for cleaning and protection against corrosion.

(vii) Above ground tanks outside of buildings shall be electrically grounded in accordance with the requirements for equipment grounding of the Electrical Code of the City of New York.

(2) Construction requirements. Cylindrical tanks, of more than 275 gallon capacity, except vertical tanks above ground outside of buildings:

(i) The thickness of cylindrical tanks, including oval, elongated oval, or round tanks of more than 275-gallon capacity shall be subject to the following requirements:

(A) Tanks 36 inches in diameter and less-at least 1/4-inch shell and 1/4-inch heads.

(B) Tanks 37 to 72 inches in diameter-at least 1/4-inch shell and 5/16-inch heads.

(C) Tanks 73 to 120 inches in diameter-at least 5/16-inch steel and 3/8-inch head.

(D) Tanks over 120 inches in diameter shall be of at least 3/8-inch steel and shall be stiffened by angle rings or equivalent members so as to retain their cylindrical form.

(ii) Dished heads for such tanks shall have a curvature the radius of which is not greater than the diameter of the tank. Dished heads shall be formed with an adequate cylindrical extension rim to provide a welding or riveting surface. If flat heads are used, they shall be braced in the same manner as described for the bracing of flat sides of rectangular tanks.

(iii) Riveting in single lap seams shall not exceed a pitch as follows:

(A) Shell 1/4-inch thick-5/8-inch diameter rivets, 2 1/4-inch pitch.

(B) Shell 5/16-inch thick-5/8-inch diameter rivets, 2 3/8-inch pitch.

(C) Shell 3/8-inch thick-3/4-inch diameter rivets, 2 1/2-inch pitch.

(3) Rectangular tanks, of more than 275-gallon capacity

(i) Plates for rectangular tanks of more than 275-gallon capacity shall be at least 5/16-inch thick.

(ii) Corners may be made up by bending the plates or by using angles.

(iii) Minimum rivet diameter in seams shall be 5/8-inch and rivets shall be spaced not more than 2 1/4-inch center-to-center.

(iv) All flat surfaces of rectangular tanks shall be braced by structural members or rods.

(v) When structural members are used, the rivet pitch shall not exceed 6 inches.

(vi) All structural members shall be designed in accordance with the requirements of Subchapter 10 of Chapter 1 of Title 27 of the Administrative Code.

(vii) Connections between bracing members and the sides of the tank shall be designed so that the connections will not fail before the member will fail.

(4) All tanks except vertical tanks above ground 275 gallons or less capacity. All storage tanks of 275-gallon capacity or less that are not buried shall have a minimum thickness of shell and head plated of number 10 manufacturer's standard gauge steel plate. Storage tanks of 60-gallon capacity or less shall be similarly constructed but need not be thicker than No. 14 manufacturer's standard gauge.

(5) Vertical storage tanks over 1,000-gallon capacity located outside of building above ground

(i) Vertical tanks located outside of buildings above ground shall be built of steel plates of the quality required for cylindrical tanks.

(ii) The minimum thickness of roof plates shall be 1/8-inch. The thickness of shell plates shall be determined in accordance with the following formula:

$$t = \frac{TE}{PRF}$$

Where: t=thickness of shell plate in inches
P=head pressure at bottom of ring under consideration in p.s.i.
R=radius of shell, in inches
F=factor of safety (taken as 5)
T=tensile strength of plate, in p.s.i. as verified by mill test certificate
E=efficiency of vertical joint in pipe under consideration
E shall in no case be taken greater than 1.00.
Roof plates shall have single lap-riveted or welded water-tight seams, and the roof shall be built to shed water. Bottom plates shall have single lap riveted or welded seams. Shell plate seams shall be designed to develop the full strength of the plate.

(e)

(1) Location of tanks. Inside of building, above ground on the lowest floor

(i) Tank Capacity of 550 gallons or less. Storage tanks having a capacity of 550 gallons or less may be installed above ground on the lowest floor of a building, provided that such tanks are mounted on adequate noncombustible supports, with the tank anchored thereto. No more than 550 gallons of total storage capacity may be installed without protection provided in subparagraph (ii) or (iii) below.

(ii) Tank capacity more than 500 gallons but less than 1,100 gallons. Storage tanks having a capacity of more than 550 gallons but less than 1,100 gallons may be installed above ground on the lowest floor of a building, provided that all portions of such tanks above the floor are completely enclosed with noncombustible construction having at least a 2-hour fire resistance rating. Weep holes l-inch in diameter shall be provided at least every 3 feet along the bottom of the enclosure unless at least 15 inches of clearance, together with access door, is provided between the tank and the enclosure.

(iii) Tank capacity 1,100 gallons or more. Storage tanks having a capacity of 1,100 gallons or more may be installed above ground on the lowest floor of a building, provided that all portions of such tanks above the floor are completely enclosed with non-combustible construction having at least a 3-hour resistance rating. At least 15-inch clearance shall be provided over the tanks and on all sides between the tanks and the enclosure. A noncombustible access door, constructed so as to preserve the integrity of the fire resistive enclosure, shall be installed in the enclosure above the point where the capacity of the enclosure below the door sill

would be equal to the capacity of the largest tank installed. When the longest inside dimension of the enclosure exceeds 35 feet, access doors shall be installed at intervals not exceeding 12 feet. Columns, pipes, or similar obstructions may project into the required 15 inches of space within the enclosure, provided that access door or doors are so arranged that all portions of the enclosure are accessible for servicing.

(iv) Maximum tank size. The capacity of individual storage tanks in no case shall exceed 20,000 gallons.

(2) Inside of buildings, below ground

(i) Storage tanks having a capacity greater than 275 gallons may be buried inside of a building provided that the top of the tank is at least 2 feet below floor level. In lieu of 2 feet of earth over the tank, the tank may be covered by concrete flooring having the same thickness as the basement floor, but not less than 4 inches concrete meeting the requirements of Subchapter 10 of Chapter 1 of Title 27 of the Administrative Code and reinforced with 2-inch by 2-inch mesh of at least No. 20 U.S. Standard Gauge Steel Wire. Tanks shall be placed in firm soil and shall be surrounded by clean sand or well-tamped earth, free from ashes and other corrosive substances, and free from stones that will not pass through a linch mesh. When necessary to prevent floating, tanks shall be securely anchored.

(ii) No tank shall be buried within 3 feet of any foundation wall or footing.

(3) Outside of building, below ground

(i) Storage tanks located outside of buildings and below ground, shall be buried with the top of the tank at least 2 feet below ground. Tanks shall be placed in firm soil and shall be surrounded by clean sand or well tamped earth, free from ashes or other corrosive substances, and free from stones that will not pass a l-inch mesh. When necessary to prevent floating, tanks shall be securely anchored.

(ii) No tank shall be buried within 3 feet of any foundation wall or footing.

(4) Outside building, above ground

(i) Storage tanks of a capacity greater than 275 gallons located outside of buildings above ground shall be not less than one and one-quarter (1/4) tank diameters and in no case less than 10 feet from the line of adjoining property, the nearest building or adjacent tank. The minimum clearance between individual tanks located outside of buildings above ground and the line of adjoining property which may be built upon shall be fixed by the following formula:

$$M.C. = 10 + 4 \frac{G\ 275}{5000}$$

Where: M.C. = minimum clearance from nearest surface of tank to adjoining property in feet.
G = capacity of tank, in gallons.

The maximum allowable capacity of tanks for storage of liquids or solvents having a flashpoint of 100 degrees Fahrenheit or higher located
outside of building above ground shall be 100,000 gallons.

(ii) Tanks shall be located so as not to obstruct or interfere with any means of egress.

(iii) Each storage tank shall be protected by an embankment or dike. Such protection shall have a capacity at least 1 1/2 times the capacity of the tank so surrounded

and shall be at least 4 feet high, but in no case shall the protection be higher than 1/4 the height of the tank when the height of the tank exceeds 16 feet. Embankments or dikes shall be made of earth work with clay core, of masonry, or reinforced concrete or of steel. Earth work embankments shall be firmly and compactly built of good earth free from stones, vegetable matter, etc., and shall have a flat section of at least 3 feet at the top and slope of at least 1 1/2 to 2 feet on all sides. Concrete, masonry or steel dikes shall be designed so as to confine safely all of the oil in the tank so surrounded. Embankments or dikes shall be continuous and unpierced, and the outside toe shall be located at least 5 feet inside of the property line, and no less than 5 feet from a driveway or parking area.

(5) Tanks located along line of subways

(i) No buried tank shall be placed within 20 feet of the outside line of a subway wall. Where an above ground tank within a building is located within the outer lines of the subway, or within 20 feet of the outside line of the subway wall, such tank shall be placed within a welded steel oil-tight pan of not less than number 18 manufacturer's standard gauge metal suitably reinforced and of capacity to contain the contents of the tank.

(ii) For the purpose of the foregoing requirement, a subway shall be deemed to include any subsurface railroad or rapid transit roadbed.

(f)

(1) Installation of piping and tubing

(i) Exposed piping shall be protected against mechanical damage and shall be adequately supported with rigid metal fasteners or hangers. All pipes connected to buried tanks, except test well piping, shall be provided with double swing joints at the tank.

(ii) Only new wrought iron, steel, or brass pipe, or type K or heavier copper tubing shall be used.

Metal tubing when used for conveying material shall be adequately protected.

(iii) Overflow pipes, where installed, shall not be smaller in size than the supply pipe.

(iv) Pipe shall be connected with standard fittings and tubing with fittings of listed or approved type all of the same material as the pipe, except that malleable iron fittings may be used with steel pipe. Cast iron fittings shall not be used. All threaded joints and connections shall be made tight with suitable pipe compound. Unions requiring gaskets or packing, right or left couplings and sweat fittings employing solder having a melting point of less than 1,000 F. shall not be used.

(2) Relief valves

(i) Where a shut-off valve is installed in the discharge line from a material pump, a relief valve shall be installed in the discharge line between the pump and the first shut-off valve.

(ii) Relief valves shall be set to discharge at not more than 1 1/2 times the maximum working pressure of the system. The discharge from relief valves shall be returned to the storage tank or to the supply line. There shall be no shut-off valve in the line of relief.

(3) Vent pipes

(i) A vent pipe of iron or steel, without trap, draining to the tank, shall be provided for each storage tank. The lower end of the vent pipe shall not extend more than 1 inch through the top of the storage tank. Cross-connection between a vent pipe and fill pipe is prohibited.

(ii) Where a battery of storage tanks designed to hold identical material is installed, vent pipes may be run into a main header.

(iii) Vent shall be at least 1 1/4 inch in diameter for storage tanks not exceeding 1,100 gallon capacity and at least 2 inches in diameter for storage tanks of 1,100 gallons or more.

(iv) Vent pipes shall be provided with an approved weatherproof hood having a free area of at least the pipe size area. Vent pipes shall terminate outside the building in a non-hazardous location, at least 2 feet from any building opening and not less than 2 feet nor more than 12 feet above the fill pipe terminal unless otherwise permitted by the Commissioner. If the vent pipe terminal is not visible from the fill pipe terminal location, a one inch tell-tale line shall be connected to the tank and shall parallel the fill pipe and terminate at the fill terminal with an unthreaded end. Such telltale lines shall be provided with a check valve set to prevent flow of surface water to the storage tank.

(4) Fill pipes

(i) Fill pipes shall terminate outside the buildings, with the fill pipe terminal located at or above grade, at least 2 feet from any building opening and 5 feet from any subway grating at or below the level of the pipe terminal. No fill pipe shall be less than 2 inches in diameter.

(ii) Each storage tank shall be provided with a separate fill pipe, except that where a battery of tanks is installed containing identical materials, a common fill and header pipe may be installed.

(iii) Where the top of the storage tank is above the fill pipe terminal, the fill pipe shall be connected to the top of the tank and provided with a shut-off valve and swing check valve both of which shall be located at the fill pipe terminal. However, the shut-off and check valves may be installed in an accessible location inside the building at or below the level of the fill pipe terminal.

(iv) All fill pipe terminals shall be of a type identical to that approved for fuel oil service, and shall be provided with lugs for embedding concrete. In lieu of lugs, a set screw or threads to fasten the terminal to the fill pipe may be used. The outer flange of the fill pipe terminal or the seal cap shall be permanently marked to identify contents. The fill pipe terminal shall be threaded or provided with other equivalent means to receive the seal cap. The seal cap shall be suitably slotted for receiving an opening wrench, and an oil proof gasket inserted in a groove in the fill pipe terminal shall be provided so as to make the seal cap leakproof. A strainer shall not be required but, if used, shall be of at least 1/8-inch mesh. Where a storage system for volatile flammable oil and a storage system for liquid flashing at 100 degrees Fahrenheit or higher is to be used in the same premises, the terminal of liquid flashing 100 degrees Fahrenheit or higher storage system shall be provided with a left-headed thread and the fill pipe fitting shall be of a different size than that required for the fill pipes to the tanks containing the volatile flammable oil.

(5) Piping from transfer pump to manufacturing equipment above the lowest floor

(i) The piping from a transfer pump to "manufacturing equipment" at levels above the lowest floor in buildings, the return piping, and vent piping shall comply with the applicable provisions of paragraphs (1), (3) and (4) of this subdivision (f) and shall be enclosed in a shaft constructed of 4 inch concrete or masonry having a 4 inch clearance from all pipe or pipe covering. Provisions shall be made for expansion in piping without the use of expansion joints.

(ii) Where it is necessary to make horizontal offsets in the supply piping and pipe shafts such piping shall be enclosed in a sleeve of other piping of at least number 10 manufacturer's standard gauge steel, two sizes larger and arranged to drain into the shaft. Horizontal piping offsets shall be further enclosed in construction having a 2-hour fire resistance rating.

(iii) A drain pipe shall be installed at the base of shafts enclosing the supply and overflow piping. The pipe shall lead to an open sight drain or to an open sump.

(iv) Pipe lines for manufacturing equipment above the level of the lowest floor shall be seamless steel pipe of a weight not less than ASA schedule 40 with welded connections.

(v) Pipe shafts shall not be penetrated by or contain other piping or ducts.

(g) Valves and devices to control the flow of materials

(1) Approved leak detectors on discharge piping shall be provided for submerged or remote control pumps.

(2) A clearly identified remote control switch readily accessible, shall be provided on each floor to which material is pumped to shut-off the power to the pump motors.

(3) A visible means shall be provided for each discharge area to indicate when pump is operating.

(4) Pumps shall be of a type approved by Board of Standards and Appeals.

(5) Pressure in storage tanks for the purpose of discharging materials is prohibited.

(h) Material level indicating devices and test wells

(1) All tanks located inside buildings shall be provided with a material level indicating device. Test wells shall be prohibited in tanks located inside of buildings. Unused tank openings shall be permanently sealed to prevent the removal of plugs or cover.

(2) Material level indicating devices shall be designed and constructed of substantial materials so that there can be no leakage of materials or vapor from the material.

(3) Test wells in storage tanks located outside of buildings shall be capped oil tight and kept closed when not in use.

(i) Tests. All piping and storage tanks for materials flashing at 100 degrees Fahrenheit or higher shall be tested hydrostatically in the presence of a Fire Department representative before work is closed in. The hydrostatic pressure shall be maintained until all joints and connections have been visually inspected, for leaks but in no case for less than one-half hour. The minimum pressure for testing tanks shall be at least 25 pounds per square inch. The piping shall be tested at 1 1/2 times maximum work pressure applicable to that part of the piping system but in no case less than 25 pounds per square inch. For storage systems for materials flashing above 300 degrees Fahrenheit contractor may submit a notarized affidavit attesting to testing of tank and piping as prescribed above, in lieu of the Fire Department witnessed test.