FIRE DEPARTMENT • CITY OF NEW YORK

STUDY MATERIAL FOR THE
CERTIFICATE OF FITNESS EXAMINATION

SUPERVISION OF STORAGE, HANDLING, AND USE OF FLAMMABLE OR COMBUSTIBLE LIQUIDS

C-92

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

Note: The C-92 Certificate of Fitness is premises related. **If you deal with temporary storage and dispensing flammable and combustible liquids (e.g. construction sites applicants), and you work citywide, you should take the S-93/S-94 test.**

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EXAM SPECIFIC INFORMATION FOR C-92 CERTIFICATE OF FITNESS

Save time and submit application online!

Applicants who submitted and paid online for an exam before arriving at the FDNY will not need to wait in line to enter the FDNY.

It can take about 30 minutes to complete. Completing application and paying online will eliminate waiting outside in the long lines.

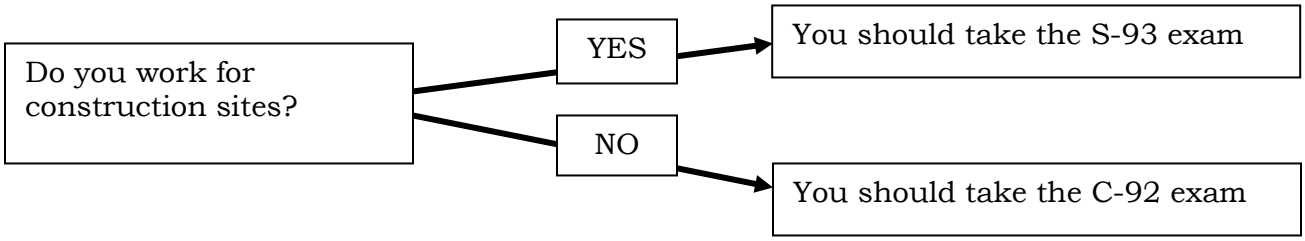
Instructions for online application and payment can be found here:
http://www1.nyc.gov/assets/fdny/downloads/pdf/business/fdny-business-cof-individuals.pdf

Create an Account and Log in to:
http://fires.fdnycloud.org/CitizenAccess/SAML/NYCIDLogin.aspx

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 C-92 Certificate of Fitness:
The applicants who pass the C-92 Certificate of Fitness exam are allowed to pay the additional $25 fee to obtain the S-94(supervising handling and dispensing flammable or combustible liquids in portable containers) /C-93 (supervise of dry cleaning facilities) Certificate of Fitness without taking the exam(s).



Application fee (Cash is NO LONGER ACCEPTED):
Pay the **$25** application fee online or in person by one of the following methods:

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

A convenience fee of 2% will be applied to all credit card payments.

For fee waivers submit: ***(Only government employees who will use their COF 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)

This Certificate of Fitness can be obtained by the alternative issuance procedure. Qualified applicants should review and complete the C-92 Certificate of Fitness Alternative Issuance Procedure Application Affirmation Form:

https://www1.nyc.gov/assets/fdny/downloads/pdf/business/cof-c92-aip.pdf

The AIP applicants must submit the application, required documents and payment on **FDNY Business**:

https://fires.fdnycloud.org/

EXAM INFORMATION

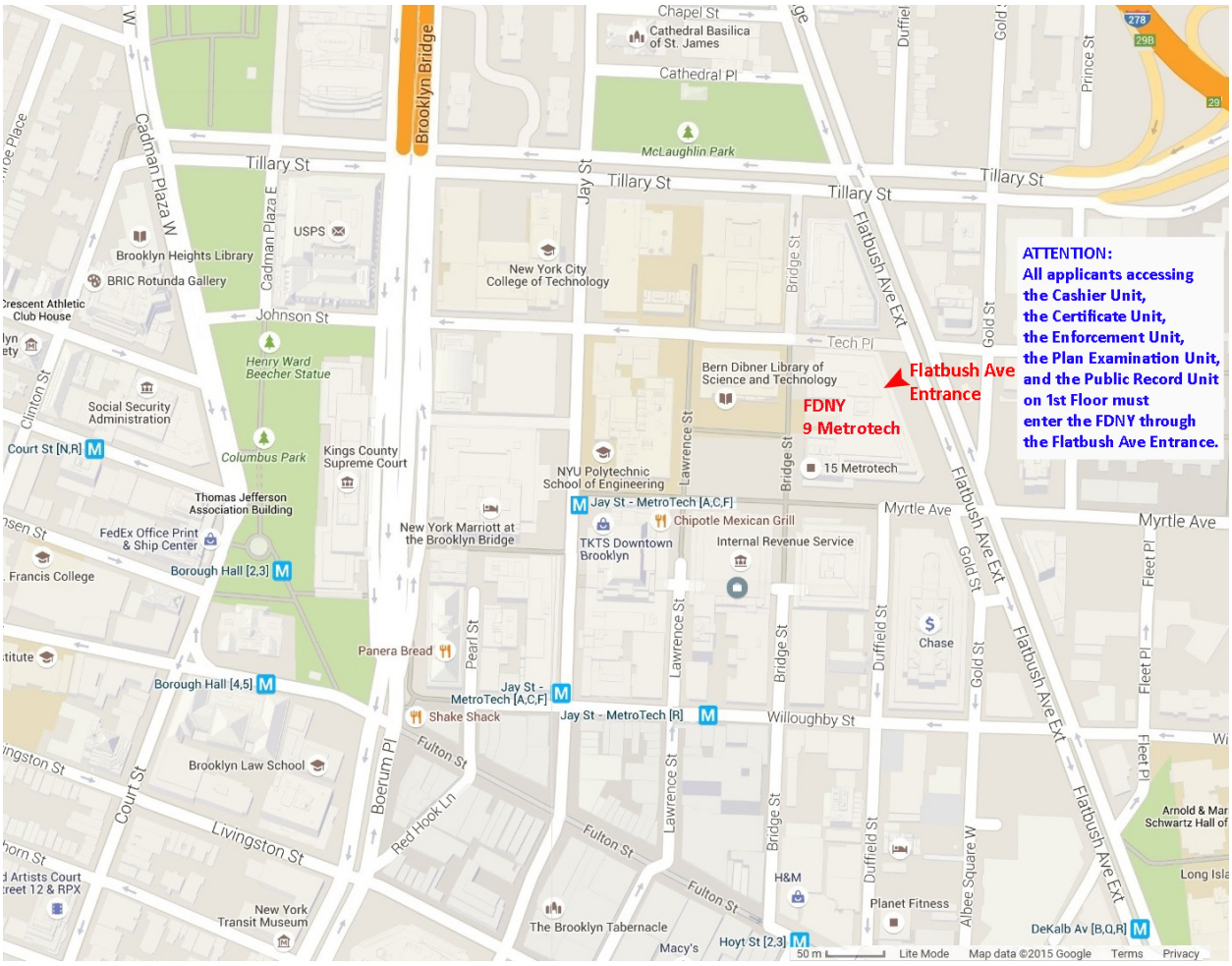
The **C-92** exam will consist of **50** multiple-choice questions, administered on a "touch screen" computer monitor. It is a time-limit exam. Based on the amount of the questions and reference material provided, you will have **76** minutes to complete the test. A passing score of at least 70% is required in order to secure a Certificate of Fitness.

Call (718) 999-1988 for additional information and forms.

> ***Special material provided during the exam:*** *The tables which appear in the booklet will be provided to you as a reference material when you take the exam at MetroTech, however, the booklet will not provide to you during the exam.*

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-c92-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)**.



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. C-92 Certificate of Fitness: None

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 DECRIPTION

This study material contains the information you will need to prepare for supervising storage, handling and use of flammable or combustible liquids. **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 to supervise the storage, handling and use of flammable or combustible liquids. 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 Fire Code Chapter 27 and Chapter 34, and NFPA 30 which regulate the storage, handling and use of flammable or combustible liquids in order to adequately prepare for the exam.

About the Test

The C-92 test will consist of **50** multiple-choice questions, administered on a "touch screen" computer monitor. It is a time-limit test. 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 EXAM 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/displayed while taking a Certificate of Fitness 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 Fitness examinations. Therefore, the correct answer would be A. You would touch "A" on the computer terminal screen.

2. 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
C. the examiner in the testing room
D. you should not ask about test questions since FDNY staff cannot 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.

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

A. the person next to you
B. the firefighters
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.

INTRODUCTION

This document outlines New York City Fire Department regulations for the safe use, handling and storage of flammable/combustible liquids. One primary regulation is that at least one Certificate of Fitness holder must be on duty at all times when these chemicals or materials are being handled or used. The Certificate of Fitness holders are responsible for ensuring that all Fire Department regulations related to the safe using, handling and storage of flammable/combustible liquids are obeyed on the premises. Some of the regulations related to storage dictate that all bulk storage tanks must be designed, constructed and installed in accordance with NFPA 30 and that all storage and shipping containers must meet the US Department of Transportation (DOT) design specifications.

This booklet consists of two parts and four appendixes. The two parts consist of general requirements for all installations and specific requirements for new installations. The first part (general requirements) is applicable to the storage, handling and/or use of flammable or combustible liquids. The second part (specific requirements for the new installations) addresses the 2014 New York City Fire Code applicable for **new or modified installations/facilities approved by the Fire Department on or after July 1st, 2008.** It also applies to any pre-existing installations that are requesting an increase of their previously **permitted storage quantities when the aggregate quantity will be in excess of the maximum allowable quantity (MAQ) listed in this session.**

The test covers the main body (general and specific requirements) of the booklet only. The four appendixes are provided for your reference only. **The tables which appear in the main body of this booklet will be provided to you when you take the test at Metrotech, however, this booklet will not be provided to you during the test.**

Pre-existing and New Installations

In July of 2014, a new Fire Code was adopted in New York City. Unlike the former code, this new code set forth specific regulations regarding the storage, use, handling and manufacturing of flammable and combustible liquids, including references to design, repair, testing and fire suppression requirements of National Fire Protection Association Standard (NFPA) 30, entitled "Flammable and Combustible Liquids Code".

In this study material you will see references and requirements that are applicable to "pre-existing" installations. It is important that you understand what this means. All installations approved by the NYC Fire Department (FDNY) on or after July 1, 2008 are required to be in full compliance with the 2014 Fire Code. However, installations approved by the NYC Fire Department prior to July 1, 2008 do not have to, and in some case could not, comply with the design and installation requirements of the 2014 Fire Code, including limitations on maximum allowable quantities. Such installations are considered to be "pre-existing" installations and as such are only required to comply with the design and installation requirements in effect at the time the installation was established. Installations that were in existence prior to July 1, 2008 but operating without a FDNY permit may also be considered "pre-existing" installations provided they were in compliance with nationally recognized standards and the NYC Building Code at the time of installation.

On the other hand, all installations are required to comply with the operational and maintenance requirements of the 2014 Fire Code. Operational and maintenance requirements include such things as securing permits and certificates of fitness, posting signage, proper housekeeping, periodic testing, periodic maintenance, keeping logs and providing portable fire extinguishers.

More often than not, "pre-existing" installations will be storing flammable and/or combustible liquids in quantities exceeding those that are allowed by the new code. For "pre-existing" installations that have been operating with a valid FDNY permit, the maximum allowable quantity of flammable and combustible liquids would be established by that permit. However, for "pre-existing" installations that have been operating without a FDNY permit, the burden of proof is on the owner to provide the FDNY with records establishing their need for those flammables and combustible liquids in the quantities stored. Records acceptable to the FDNY include true copies of the annual inventory forms filed with the City of New York as required by New York State General Municipal Law Section 209-u and/or the annual facility inventory forms filed with the City of New York as required by the NYC Right to Know Law. The forms would then be reviewed and a determination made accordingly.

For the most part, permits issued for installations established prior to July 1, 2008 are subject to compliance with the former code requirements while those issued for installations established after July 1, 2008 are subject to compliance with the new fire code. It is, therefore, possible that there could be two different installations in the same building, covered by separate permits, both supervised by the same certificate of fitness holder. The certificate of fitness holder will have the responsibility of distinguishing and ensuring compliance with the different code requirements.

Please note that installations that were "lawfully" existing prior to July 1, 2008 but not under the purview of the FDNY (no FDNY permit established) may be considered "pre-existing" installations provided they were in compliance with nationally recognized standards and the NYC Building Code at the time of installation. More often than not most "pre-existing" installations will be storing flammable and/or combustible liquids in quantities exceeding the maximum allowable quantities set forth in the new code. In these cases, the maximum allowable quantity of flammable and combustible liquids would have to be established via the annual inventory form required by New York State General Municipal Law Section 209-u and/or the annual Facility Inventory Form filed with NYCDEP (Tier II).

On the other hand, both new and pre-existing installations are required to comply with the operational and maintenance requirements of the 2014 Fire Code. Operational and maintenance requirements include such things as permits, certificate of fitness, signage, housekeeping, periodic testing and portable fire extinguishers.

Types of Permits

(1) Site-specific permit

Such permit authorizes the permit holder to store, handle and use flammable and combustible liquids at a specific premises or location. A site-specific permit may be a permanent permit or a temporary permit. Permanent permits are valid for 12 months only. Every permit or renewal shall require an inspection and shall expire after twelve months. Temporary permits may be valid from one day to 12 months depending on the construction/operation needed. For example, a 3-month temporary permit may be issued to a construction site.

(2) Citywide permit

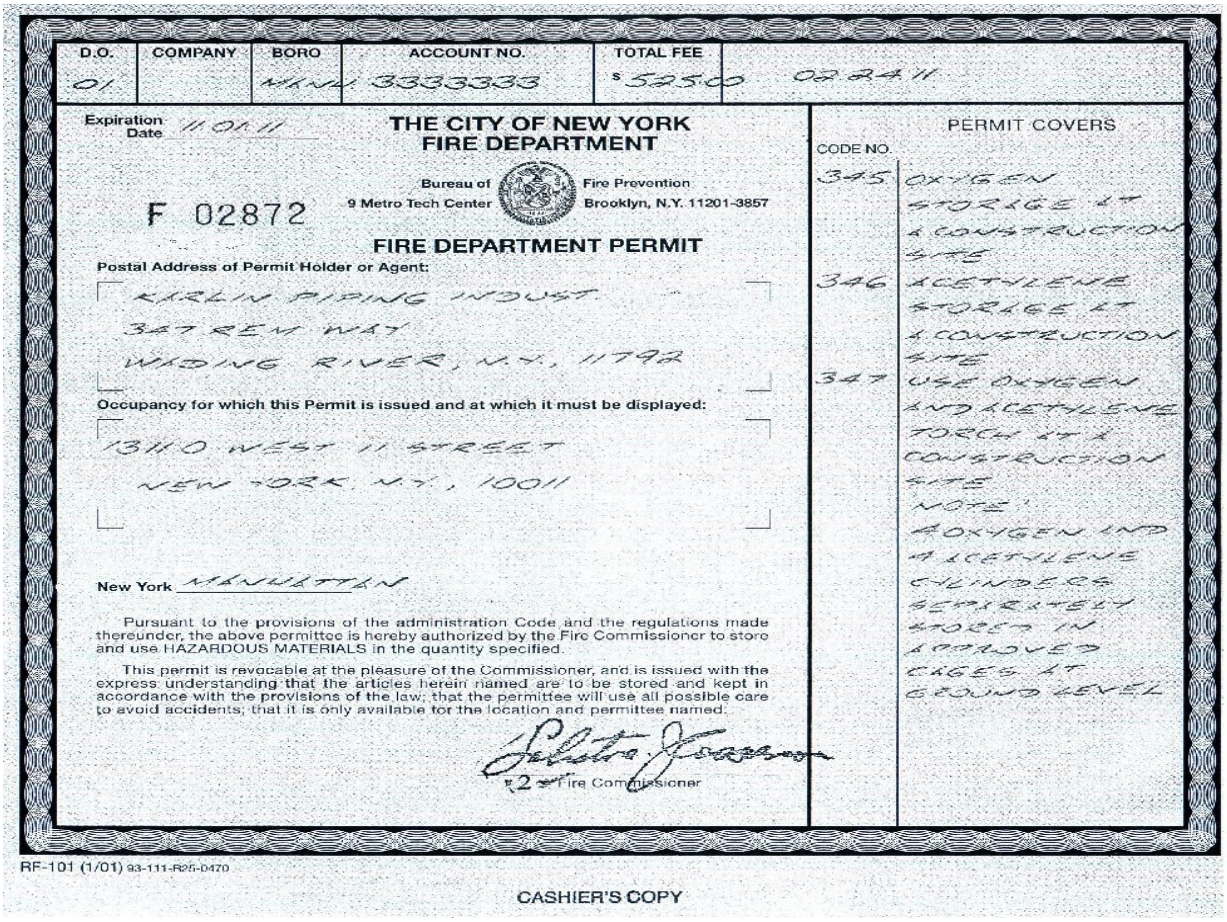
Such permit authorizes the permit holder to store, handle, use, sell or transport hazardous materials, or conduct an operation on a citywide basis, for which a permit is required by

Fire Department. A citywide permit is valid to store, handle, use, sell or transport hazardous materials or to conduct an operation at one or more locations provided the duration of such activity at any individual location does not exceed 30 days. Periods of activity in excess of 30 days at any one location shall require a site-specific permit.

Permits are not transferable and any change in occupancy, operation, tenancy or ownership must require that a new permit be issued. The Certificate of Fitness holder is responsible for making sure that all fire safety regulations and procedures are obeyed on the premises. Permits and Certificates of Fitness shall be readily available on the premises for inspection by Fire Department representatives.

A permit is required for the following situation:

1. To store, handle or use amounts of **Class I liquids**, other than paints, varnishes, lacquers, gasoline and other petroleum-based Class I liquids, in excess of **5 gallons**, except that a permit is not required for the storage or use of Class I liquids in the fuel tank of a motor vehicle, aircraft, or watercraft.
2. 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.
3. 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.
4. To store, handle or use amounts in excess of **20 gallons of Class I, Class II or Class III liquids** having a flash point of 300°F or less that are commonly used for **painting, varnishing, staining or other similar purposes**, including paint, varnish and lacquer.
5. To store, handle or use amounts in excess of **70 gallons of petroleum based Class III liquids** with a flash point exceeding 300°F.
6. To operate **a bulk plant or terminal or bulk transfer facility** where flammable and combustible liquids are blended, produced, processed, transported, stored, dispensed or used.
7. To **manufacture** flammable or combustible liquids.
8. To store and/or use fuel oil stored on a barge or marine vessel moored to or anchored at **privately owned waterfront property**.
9. To store and use fuel oil on **mobile heating trailers**.



D.O.	COMPANY	BORO	ACCOUNT NO.	TOTAL FEE	
01		MANH	3333333	$525.00	03 24 11

Expiration Date 11 01 11

THE CITY OF NEW YORK
FIRE DEPARTMENT

Bureau of Fire Prevention
9 Metro Tech Center Brooklyn, N.Y. 11201-3857

F 02872

FIRE DEPARTMENT PERMIT

Postal Address of Permit Holder or Agent:

KARLIN PIPING INDUST.
347 REM WAY
WIDING RIVER, N.Y., 11792

Occupancy for which this Permit is issued and at which it must be displayed:

1310 WEST 11 STREET
NEW YORK N.Y., 10011

New York MANHATTAN

Pursuant to the provisions of the administration Code and the regulations made thereunder, the above permittee is hereby authorized by the Fire Commissioner to store and use HAZARDOUS MATERIALS in the quantity specified.

This permit is revocable at the pleasure of the Commissioner, and is issued with the express understanding that the articles herein named are to be stored and kept in accordance with the provisions of the law; that the permittee will use all possible care to avoid accidents; that it is only available for the location and permittee named.

Salvatore Cassano
Fire Commissioner

PERMIT COVERS

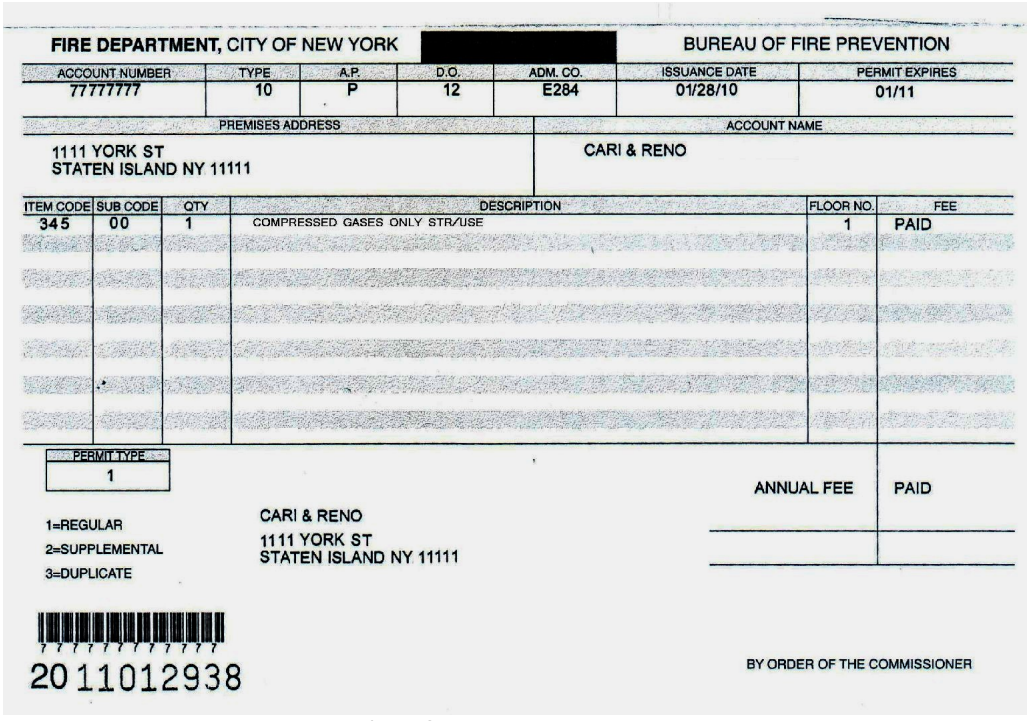
CODE NO.	
345	OXYGEN STORAGE AT A CONSTRUCTION SITE
346	ACETYLENE STORAGE AT A CONSTRUCTION SITE
347	USE OXYGEN AND ACETYLENE TORCH AT A CONSTRUCTION SITE

NOTE: OXYGEN AND ACETYLENE CYLINDERS SEPARATELY STORED IN APPROVED CAGES AT GROUND LEVEL

RF-101 (1/01) 93-111-R25-0470

CASHIER'S COPY

An example of FDNY temporary permit



FIRE DEPARTMENT, CITY OF NEW YORK [redacted] BUREAU OF FIRE PREVENTION

ACCOUNT NUMBER	TYPE	A.P.	D.O.	ADM. CO.	ISSUANCE DATE	PERMIT EXPIRES
77777777	10	P	12	E284	01/28/10	01/11

PREMISES ADDRESS	ACCOUNT NAME
1111 YORK ST STATEN ISLAND NY 11111	CARI & RENO

ITEM CODE	SUB CODE	QTY	DESCRIPTION	FLOOR NO.	FEE
345	00	1	COMPRESSED GASES ONLY STR/USE	1	PAID

PERMIT TYPE
1

1=REGULAR
2=SUPPLEMENTAL
3=DUPLICATE

CARI & RENO
1111 YORK ST
STATEN ISLAND NY 11111

ANNUAL FEE PAID

20 11012938

BY ORDER OF THE COMMISSIONER

An example of FDNY permanent permit

No citywide permit authorizing the storage and use of flammable or combustible liquids shall be valid for:

1. The storage, handling or use of gasoline in quantities exceeding 5 gallons.
2. The storage, handling or use of flammable liquids in quantities exceeding 250 gallons.
3. The storage, handling or use of combustible liquids in quantities exceeding 300 gallons.
4. The storage, handling or use of any paint, varnish, or other flammable or combustible liquid commonly used for painting, varnishing, lacquering, staining, waxing or other finishing operations in quantities exceeding 200 gallons, except as otherwise limited in Fire Code Chapter 15 for floor finishing operations.

Hazardous Materials Reporting

The storage of hazardous materials shall be reported as required by the New York State General Municipal Law Section 209-u. The commissioner may require an application for a permit pursuant to this code to include a copy of the current filing pursuant to such New York State General Municipal Law for the facility or premises for which a permit is sought. (see Appendix A of a "Hazardous Materials Report Forms")

Certificate of Fitness

The manufacturing, storage, handling and use of flammable and combustible liquids in certain quantities, including the dispensing of such liquids, shall be supervised by the C-92 Certificate of Fitness holder.

- The manufacture, handling and use of flammable and combustible liquids shall be under the personal supervision of a C-92 C of F holder.
- When the quantity of such stored liquids exceeds the following amounts, the storage of flammable and combustible liquids shall be under the general supervision of a C-92 C of F holder and the handling and use of flammable liquids and combustible liquids shall be under the personal supervision of a C-92 C of F holder:
    - 275 gallons in a closed system;
    - 275 gallons of alcohol-based hand rubs;
    - 20 gallons of combustible liquid in portable containers;
    - 2.5 gallons of gasoline;
    - 10 gallons of flammable liquid In portable containers, except alcohol-based hand rubs and gasoline

Exception: The storage, handling and use of combustible liquids with a flash point over 300°F is not required to be supervised by a C of F holder.

Safety Data Sheets (SDS)

Safety Data Sheet (SDS) information should be readily available. The safety data sheet (SDS) contains specific information about the health and physical hazards of the material used, as well as safe work practices and required protective equipment. It may also describe the material's physical characteristics and procedures that should be followed in case of an emergency. For example, the SDS may list appropriate and inappropriate extinguishing agents. The Certificate of Fitness holder must refer to the SDS when questions arise about how to handle, use, or store hazardous chemicals or materials. The SDS may also be requested by health care personnel to facilitate proper medical care in the event of chemical exposure.

Class of Flammable and Combustible Liquids

For the pre-existing installations, there are only two categories of flammable and combustible liquids separated by their flash point, one is flammable liquids (flash point is below 100°F) and the other is combustible liquids (flash point is at or above 100°F). However, for the new fire code, there are 3 classes of flammable liquids and 3 classes of combustible liquids defined as the following table.

Class of Flammable and Combustible Liquids

		Flash point	Boiling point	Examples
Flammable liquids (Class I liquids)	**Class IA**	< 73°F	< 100°F	Gasoline, Acetaldehyde, Ethyl ether, formate, Pentane
	Class IB	< 73°F	≥ 100°F	Acetone, Ethanol, Methyl alcohol, Propyl alcohol
	Class IC	≥ 73°F but < 100°F	Not Applicable	Turpentine, Butyl alcohol, Hydrazine, Styrene, Xylene
Combustible liquids (Class II & III liquids)	**Class II**	≥ 100°F but < 140°F	Not Applicable	Kerosene, Diesel, WD-40 lubricant
	Class IIIA	≥ 140°F but < 200°F	Not Applicable	Butyric Acid, Creostoe Oil
	Class IIIB	≥ 200°F	Not Applicable	Formalin, Glycerine, Picric acid, Propylene glycol

PART I. GENERAL REQUIREMENTS

1. DEFINITION

AFFF. Aqueous film-forming foam fire extinguishing system.

BOILING POINT. The temperature at which the vapor pressure of a liquid equals the atmospheric pressure of 14.7 pounds per square inch (psia) (101 kPa) or 760 mm of mercury. Where a boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for the purposes of this classification, the 20-percent evaporated point of a distillation performed in accordance with ASTM D 86 shall be used as the boiling point of the liquid.

CARGO TANK. A vehicle other than a railroad tank car or marine vessel, with a tank mounted thereon or built as an integral part thereof, used for the transportation of flammable or combustible liquids, LPG or other hazardous materials, including self-propelled vehicles and full trailers and semi-trailers, with or without motive power, and carrying part or all of the load.

CHEMICAL NAME. The scientific designation of a chemical in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry, the Chemical Abstracts Service rules of nomenclature, or a name that will clearly identify a chemical for the purpose of conducting an evaluation.

CLOSED CONTAINER. A container sealed by means of a lid or other device capable of preventing the escape of liquid, vapor or dusts in the ordinary course of storage, handling or use.

CLOSED SYSTEM. The use of any compressed gas, and the use of a solid or liquid hazardous material in equipment or a vessel or system that remains closed during normal operation, such that vapors emitted during the operation of such equipment, vessel, or system are not liberated outside of the equipment, vessel or system and the gas or hazardous material is not exposed to the atmosphere during such operation. Examples of closed systems include hazardous materials conveyed through a piping system into closed equipment or a closed vessel or system.

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).

CONCENTRATED ALCOHOL-BASED HAND RUB. An alcohol-containing preparation designed for application to the hands for anti-microbacterial or other medicinal purpose and containing ethanol or isopropanol in an amount exceeding 70 percent by volume but not exceeding 95 percent by volume.

CONTAINER. For solid and liquid hazardous materials, a vessel of 60 gallons (227 L) or less in capacity used for storage or transportation. For compressed gases, a cylinder, pressure vessel or tank designed for pressures greater than one atmosphere at 68°F (20°C). Pipes, piping systems, engines and engine fuel tanks associated with solid or liquid hazardous materials or compressed gases, shall not be deemed to be containers if in active use.

CONTROL AREA. Spaces within a building that are enclosed and bounded by exterior walls, fire walls, fire barriers and roofs, or a combination thereof, where quantities of hazardous materials not exceeding the maximum allowable quantities per control area are stored, handled or used, including any dispensing.

DEFLAGRATION. An exothermic reaction, such as the extremely rapid oxidation of a flammable dust or vapor in air, in which the reaction progresses through the unburned material at a rate less than the velocity of sound. A deflagration can have an explosive effect.

DISPENSING. The pouring or transferring by other means of any material from a container, tank or similar vessel, which would release dusts, fumes, mists, vapors or gases to the atmosphere, unless such release is prevented by a device, equipment or system designed for that purpose.

DRY CLEANING. The process of removing dirt and stains or otherwise cleaning apparel, textiles, rugs and other items with nonaqueous liquid solvents.

DRY CLEANING FACILITY. A facility in which dry cleaning and associated operations are conducted, including the office, receiving area and storage rooms.

DRY CLEANING ROOM. An occupiable space within a building used for dry cleaning, the installation, storage and/or use of dry cleaning equipment and/or the storage of dry cleaning solvents.

DRY CLEANING SYSTEM. Equipment used to perform dry cleaning, including immersion or agitation in solvent of the items to be cleaned, and the extraction of solvent from such items.

EXPLOSION. An effect produced by the sudden violent expansion of gases, whether or not accompanied by a shock wave or disruption, of enclosing materials, including the effects of the following sources of explosion:

1. Chemical changes such as rapid oxidation, deflagration or detonation, decomposition of molecules and runaway polymerization (usually detonations).
2. Physical changes such as pressure tank ruptures.
3. Atomic changes (nuclear fission or fusion).

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).

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).

FLAMMABLE VAPORS OR FUMES. The concentration of flammable constituents in air that exceeds 25 percent of their lower flammable limit (LFL).

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.

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.

HANDLING. The movement of a material in its container, the removal of the material from its container, or any other action or process that may affect the material, other than its storage or use.

HAZARDOUS MATERIALS. Those chemicals or substances that are physical hazards or health hazards as defined and classified in this chapter, whether the materials are in usable or waste condition.

HEALTH HAZARD. A classification of a chemical for which there is statistically significant evidence that acute or chronic health effects are capable of occurring in exposed persons. The term "health hazard" includes chemicals that are toxic, highly toxic and corrosive.

HIGH-PILED COMBUSTIBLE STORAGE. Storage of combustible materials in closely packed piles or combustible materials on pallets, in racks or on shelves where the top of storage is greater than 12 feet in height. High-piled combustible storage also includes certain high-hazard commodities, such as rubber tires, Group A plastics, flammable liquids, idle pallets and similar commodities, where the top of storage is greater than 6 feet in height.

HIGH-PILED STORAGE AREA. An area within a building, structure or premises that is designed or used for high-piled combustible storage.

INCOMPATIBLE MATERIALS. Materials that, if mixed or combined, could explode, generate heat, gases or other byproducts, or react in a way hazardous to life or property.

LIQUID. A material having a melting point that is equal to or less than 68°F (20°C) and a boiling point that is greater than 68°F (20°C) at 14.7 psia (101 kPa). When not otherwise identified, the term "liquid" includes both flammable and combustible liquids.

LIQUID STORAGE ROOM. A room classified as a Group H-3 occupancy (i.e. high-hazard occupancy with materials that readily support combustion or present a physical hazard) used for the storage of flammable or combustible liquids.

LOWER EXPLOSIVE LIMIT (LEL). See "Lower flammable limit."

LOWER FLAMMABLE LIMIT (LFL). The minimum concentration of vapor in air at which propagation of flame will occur in the presence of an ignition source. The LFL is sometimes referred to as LEL or lower explosive limit.

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA. The maximum amount of a hazardous material allowed to be stored or used within a control area inside a building or structure or an outdoor control area.

NORMAL TEMPERATURE AND PRESSURE (NTP). A temperature of 70°F (21°C) and a pressure of 1 atmosphere.

OCCUPANCY. The purpose or activity for which a building or space is used or designed to be used. References to occupancy classification shall be deemed to include the equivalent occupancy classifications under the 1968 Building Code and all prior Building Codes or other applicable laws, rules and regulations. The occupancy classifications used in this code are defined as follows:

Group A. An assembly occupancy, including Groups A-1, A-2, A-3, A-4 and A-5, as defined in Section 303 of the Building Code.

Group B. A business occupancy, as defined in Section 304 of the Building Code.

Group E. An educational occupancy, as defined in Section 305 of the Building Code.

Group F. A factory and industrial occupancy, including Groups F-1 and F-2, as defined in Section 306 of the Building Code.

Group H. A high-hazard occupancy, including H-1, H-2, H-3, H-4 and H-5, as defined in Section 307 of the Building Code.

Group I. An institutional occupancy, including Groups I-1, I-2, I-3 and I-4, as defined in Section 308 of the Building Code.

Group M. A mercantile occupancy, as defined in Section 309 of the Building Code.

Group R. A residential occupancy, including Groups R-1, R-2 and R-3, as defined in Section 310 of the Building Code.

Group S. A storage occupancy, including Groups S-1 and S-2, as defined in Section 311 of the Building Code.

Group U. A utility and miscellaneous occupancy, as defined in Section 312 of the Building Code.

OPEN SYSTEM. The use of a solid or liquid hazardous material in equipment or a vessel, or system that remains open during normal operation, such that vapors are emitted during the operation of such equipment, vessel or system and the material is exposed to the atmosphere during such operation. Examples of open systems for solids and liquids include dispensing from or into open beakers or containers, dip tank and plating tank operations.

OUTDOOR CONTROL AREA. An outdoor area that contains hazardous materials in amounts not exceeding the maximum allowable quantities of Fire Code Table 2703.1.1(3) or 2703.1.1(4).

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.

PRESSURE VESSEL. A closed vessel designed to operate at pressures above 15 psig (103 kPa).

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.

RACK STORAGE. Any storage system, except shelf storage.

REFINERY. A plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, gasoline or other hydrocarbon sources.

SAFETY CAN. An approved container with a capacity of not more than 5-gallons (19 L) and equipped with a spring-closing lid and spout cover designed to relieve internal pressure when exposed to fire.

SECONDARY CONTAINMENT. A device, equipment or system designed to contain liquid or solid, that is external to and separate from the primary containment device, equipment or system.

SHELF STORAGE. Storage on shelves less than 30 inches (762 mm) deep with the distance between shelves not exceeding 3 feet (914 mm) vertically.

SOLVENT DISTILLATION UNIT. An appliance that receives contaminated flammable or combustible liquids and which distills the contents to remove contaminants and recover the solvents.

SYSTEM. An assembly of devices, equipment, containers, appurtenances, pumps, compressors and connecting piping that is designed to perform a complex and/or complete function.

TANK, ATMOSPHERIC. A storage tank designed to operate at pressures from atmospheric through 1.0 pound per square inch gauge (760 mm Hg through 812 mm Hg) measured at the top of the tank.

TANK, PORTABLE. A container of more than 60-gallon (227 L) capacity, and designed to be loaded into or on or temporarily attached to a transport vehicle or marine vessel and equipped with skids, mountings or accessories to facilitate handling of the tank by mechanical means. It does not include any cargo tank or tank car.

TANK, PRIMARY. A listed atmospheric tank used to store liquid.

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.

TANK, STATIONARY. A container having not less than 1,000-pound (454 kg) water capacity, designed primarily for stationary installations, and not intended to be moved in the course of normal use.

VAPOR PRESSURE. The pressure exerted by a volatile fluid, as determined in accordance with ASTM D 323.

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.

2. STORAGE

2.1 Container Storage and Indoor Storage

2.1.1 Storage below grade.

Class I liquids shall not be permitted in basements, cellars or other areas below grade. Class II and III liquids shall be allowed to be stored in basements, cellars or other areas below grade provided that such basement, cellar or other below grade area is protected throughout by a sprinkler system, and other fire protection required by the Fire Department and Building Department.

Exception: Class IIIB 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.

Exception: Flammable mixtures may be permitted for below-grade storage in pre-existing Group M occupancies. The detailed information is addressed in the Appendix C.

2.1.2 Quantity limits for indoor container storage

It shall be unlawful to store flammable and combustible liquids in containers with an individual capacity of greater than 60 gallons. Only the approved containers complied with NFPA 30 must be used for Class I, Class II, and Class IIIA liquids. It shall be unlawful to store flammable and combustible liquids in portable tanks, intermediate bulk containers and fiber drums.

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.

A. Maximum allowable container capacity

Table 2- 1. The maximum allowable container capacity

	Flammable Liquids[b]			Combustible Liquids	
Container Type[a]	**IA**	**IB**	**IC**	**II**	**IIIA**
Glass[c]	1 pt	1 qt	1.3 gal	1.3 gal	5.3 gal
Metal (other than DOT drums) or approved plastic	1.3 gal	5.3 gal	5.3 gal	5.3 gal	5.3 gal
Safety cans	2.6 gal	5.3 gal	5.3 gal	5.3 gal	5.3 gal
Metal container (DOT specification)	60 gal	60 gal	60 gal	60 gal	60 gal
Polyethylene (DOT specification)	1.3 gal	5.3 gal	5.3 gal	60 gal	60 gal

a. *See p.59 for the special regulations for containers in Group M occupancy (i.e. mercantile occupancy) wholesale and retail sales.*
b. *Liquid motor fuel shall be dispensed into approved containers with an individual capacity not greater than 2½ gallons.*
c. Class IA and Class IB liquids shall be permitted to be stored in glass containers of not more than 1 gal capacity, if the required liquid purity (such as ACS analytical reagent grade or higher) would be affected by storage in metal containers or if the liquids can cause excessive corrosion of the metal container.

B. Maximum allowable quantity (MAQ) per control area

(I) 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.

(II) 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.

2.1.3 Liquid storage cabinets

Where the Fire Department requires that liquid containers be stored in storage cabinet, such cabinets and storage shall be in accordance with the followings:

The cabinet must be listed in accordance with UL 1275. All cabinets must be provided with a conspicuous label in red letters on contrasting background which reads: FLAMMABLE-KEEP FIRE AWAY. The door must be well fitted, self-closing and equipped with a three-point latch. The bottom of the cabinet must be liquid-tight to a height of at least 2 inches.

The combined total quantity of liquids in a cabinet must not exceed 120 gallons. Maximum 3 cabinets is allowed to be located in a single fire area, except that in a Group F occupancy (e.g. a factory and industrial occupancy or repair garage), additional cabinets are allowed to be located in the same fire area if the additional cabinets (or groups of up to 3 cabinets) are separated from other cabinets or groups of cabinets by at least 100 feet.

In all occupancies, quantities of flammable and combustible liquids requiring a permit, used for maintenance purposes and the operation of equipment, shall be stored in liquid storage cabinet. Quantities not requiring a permit are allowed to be stored outside of a cabinet when in approved containers and locations.

2.1.4 General requirements for containers stored indoors.

A. Empty containers

Empty containers and tanks previously used for the storage of flammable or combustible liquids shall be free from residual material and vapor in compliance with the requirements

of DOTn, the Resource Conservation and Recovery Act (RCRA) or other governmental agencies having jurisdiction, or shall be stored, handled and used in compliance with the requirements of the Fire Code.

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.

B. Combustible materials
Limited quantities of combustible commodities are allowed to be stored in liquid storage areas where the ordinary combustibles, other than those used for packaging the liquids, are separated from the liquids in storage by a minimum of **8 feet horizontally**, either by open aisles or by open racks, and where fire protection is required by the Fire Department. For Group M occupancy wholesale and retail sales, combustible commodities shall not be stored above flammable and combustible liquids. The examples of combustible commodities are listed in Appendix B.

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 and to a maximum storage height of 6 feet. Storage of empty or idle combustible pallets inside a protected liquid storage area shall comply with the requirements of Fire Department. Pallet storage shall be separated from liquid storage by aisles that are **at least 8 feet**.

In control 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.

2.1.5 Containers storage arrangement

Shelf storage of flammable and combustible liquids shall be maintained in an orderly manner. 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. Except the shelves in storage cabinets or on laboratory furniture specifically designed for such use, all shelves shall be of sufficient depth and provided with a lip or guard to prevent individual containers from being displaced.

Where storage on racks is allowed, **a minimum 4-foot-wide aisle** shall be provided between adjacent rack sections and any adjacent storage of liquids. **Main aisles shall be a minimum of 8 feet wide.**

Solid pile and palletized storage in liquid warehouses shall be arranged so that piles are separated from each other by at least 4 feet. Aisles shall be provided and arranged so that no container is more than 20 feet from an aisle. Main aisles shall be a minimum of 8 feet wide.

Containers having less than a 30-gallon capacity which contain Class I or II liquids shall not be stacked more than 3 feet 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 or more shall not be stored more than one container high. Containers shall be stored in an upright position.

Piles of containers shall not be stored closer than 3 feet to the nearest beam, chord, girder or other obstruction, and shall be 3 feet below sprinkler deflectors or discharge orifices of water spray or other overhead fire extinguishing system.

2.2 Outdoor Storage of Containers

2.2.1 Protections and clearance from combustibles

Storage areas shall be protected against tampering or trespassers other approved control measures. Posts or other means shall be provided to protect outdoor storage tanks from vehicular damage.

The storage location shall be kept free from vegetation and other combustible waste. Rubbish and other combustible waste shall not be allowed to accumulate within 15 feet of a flammable or combustible liquid storage location. Brush, grass, vines, weeds and other vegetation capable of being ignited that is located within 15 feet of a flammable or combustible liquid storage location shall be regularly mowed or pruned and the clippings removed from the premises.

2.2.2 Empty containers storage

Empty containers and tanks previously used for the storage of flammable or combustible liquids shall be free from residual material and vapor in compliance with the requirements of DOTn, the Resource Conservation and Recovery Act (RCRA) or other governmental agencies having jurisdiction, or shall be stored, handled and used in compliance with the requirements of the Fire Code.

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.

2.3 General Storage Requirements

2.3.1 Clearance from incompatible materials

The SDS's should be consulted regarding specific incompatibilities. Materials that will react with water or other liquids to produce a hazard shall not be stored in the same room/cabinet with flammable and combustible liquids. Incompatible materials, shall be separated while in storage except for stored materials in individual containers each having a capacity of not more than 5 pounds or 0.5 gallon. Separation shall be accomplished by:

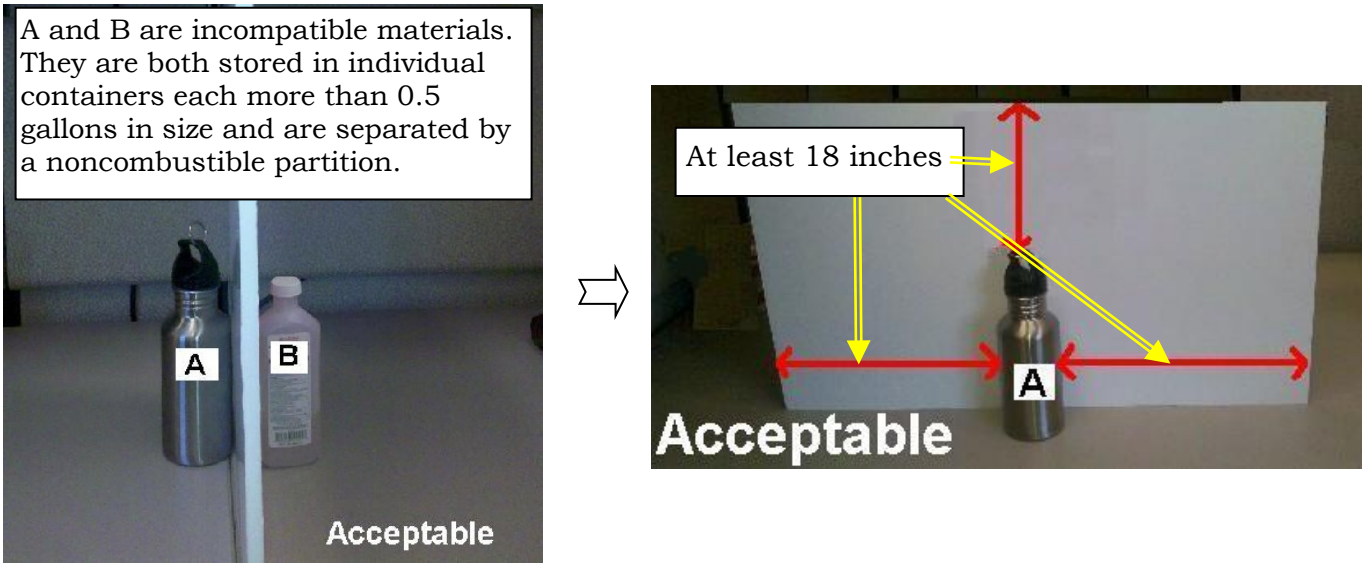
- Segregating incompatible materials in storage by a distance of not less than 20 feet.

Or

- Storing liquid and solid materials in hazardous material storage cabinets. Materials that are incompatible shall not be stored in the same cabinet.

Or

- Isolating incompatible materials in storage by a noncombustible partition extending not less than 18 inches above and to the sides of the stored material.



2.3.2 Means of access to an exit

It shall be unlawful to obstruct or impede access to any required means of egress. All required means of egress, including each exit, exit access and exit discharge, shall be continuously maintained free from obstructions and impediments to immediate use in the event of fire or other emergency. Storage of any liquids, including stock for sale, shall not be stored near or be allowed to physically obstruct the route of egress.

2.4 Tank Storage

2.4.1 Change of tank contents

Prior to a change in contents, the commissioner may require testing of a tank for leaks and documentation of compatibility. Tanks that have previously contained Class I liquids shall not be loaded 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.

2.4.2 Protections

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.

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.

Where protected aboveground tanks, piping, electrical conduit or dispensers are subject to vehicular impact, they shall be protected there from, 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.

2.4.3 Overfill prevention

(1) Aboveground tanks

Aboveground 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. 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.

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 from the fill hose connection.

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.

(2) Underground tanks

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. Fill pipes shall be equipped with a spill container of not less than 15-gallon capacity.

Underground 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.

The overfill prevention system should automatically shut off the flow of liquid into the tank when the tanks is no more than 95% fill and alert the transfer operator when the tank is no more than 90% full by restricting the flow of liquid into the tank or triggering the high-level alarm. (NFPA 30 2.6.1.4,2000 edition)

2.4.4 Leaking detection for underground tanks

Underground storage tank systems shall be provided with an approved method of leak detection from any component. 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.

Any underground flammable or combustible liquid storage tank existing prior to July 1st, 2008 that is single-walled or is not provided with a leak detection system meeting the requirements of Section FC3404.2.11.5.2 shall be precision tested at least once every 5 years. The commissioner may require a tank and piping system to be precision tested, pressure tested or tested by other approved method 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.

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 Fire Department and other authorities having jurisdiction. Leaking tanks shall be promptly emptied, repaired and returned to service, sealed in place or removed in accordance with the regulations.

2.4.5 Out of service storage systems

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.

Stationary tanks not used for a period of 30 days or more shall be properly safeguarded or removed in an approved manner. Such tanks shall have the fill line, gauge opening and pump connection secured against tampering. Vent lines shall be properly maintained.

Supervision
The closure of the system should be under supervision by a certified person as described below:

(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.

The owner or operator of an 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. Such affidavit shall be executed by a person with the requisite qualifications to supervise the closure of such tanks.

(1) Temporarily out-of-service storage systems.
Temporarily out-of-service storage systems are the 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 1 year.**

Underground tanks: Underground tanks 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.

Aboveground tanks: Aboveground tanks 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.

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.

Before a temporarily out-of-service storage system may be restored to service, an affidavit of compliance shall also be filed with the Fire Department), certifying the integrity of the tank and piping, and the proper functioning of any leak detection and cathodic protection systems.

(2) Permanently out-of-service storage systems.
Permanently out-of-service storage systems are the 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 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.

Underground tanks: Underground tanks shall be removed from the premises or safeguarded 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 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.
4. The tank shall be filled completely with an approved, inert solid material.

Aboveground tanks: Aboveground tanks 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.

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.

(3) Removal of Tanks

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.

3. HANDLING AND USE

3.1 Liquid Transfer

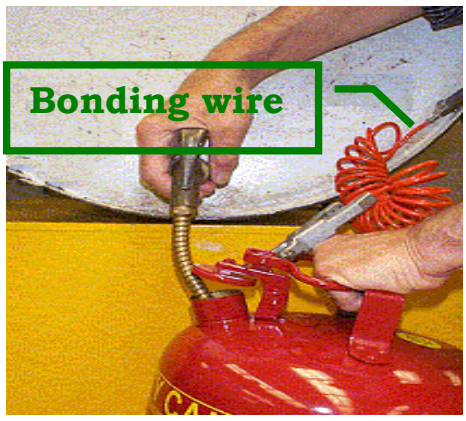
Liquid transfer equipment and methods for transfer of Class I, II and IIIA liquids shall be subject to the approval of the commissioner.(definition, FC104.2)(Department representatives) Positive-displacement pumps shall be provided with pressure relief discharging back to the tank, pump suction or other approved location, or shall be provided with interlocks to prevent over-pressure. Any piping, hoses and valves used in liquid transfer operations shall be subject to the approval of the commissioner or listed for the intended use. **Compressed gases shall not be used to pressurize containers or tanks to provide for transfer**. Container-filling operations for Class I liquids involving conveyor belts or other automatic-feeding operations shall be designed to prevent static accumulations.

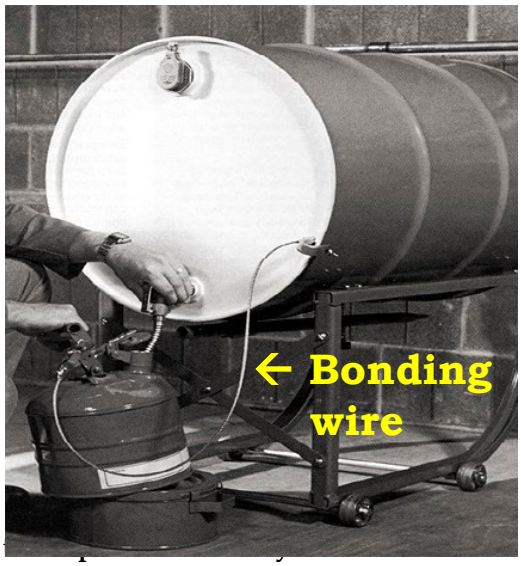
A. **Class I and II liquids or Class III liquids in containers exceeding 5.3 gallons capacity** that are at a temperature higher than 20°F less than their flash points shall **not be dispensed by gravity**, but shall be transferred by one of the following methods:
    1. From safety cans complying with 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.

    Example: Turpentine having a flash point of 95°F would NOT be allowed to be dispensed by gravity if the material temperature was to exceed 75°F.

B. The following liquids shall not be transferred into containers unless the nozzle and containers are **electrically interconnected**:
    (1) Any Class I liquids;
    (2) The Class II or III liquids at a temperature higher than 20°F less than their flash points

    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.





3.2 Indoor Use

Indoor use of flammable and combustible liquids includes the dispensing and mixing of such liquids.

3.2.1 Limitations on handling and use

Gasoline and other flammable liquid motor fuels in portable containers in quantities requiring a permit are subject to the approval of the commissioner, regardless of the occupancy classification of the premises. The quantity of all other flammable or combustible liquid handled and used, including the quantity dispensed and mixed, shall be limited by occupancy as follows:

(I) Group A, B, E, F, I, M 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.

(II) 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.

3.3 Concentrated Alcohol-Based Hand Rubs

The storage, handling and use of dispensers containing alcohol-based hand rubs classified as Class I or Class II liquids shall be in compliance with the following requirements:

1. Dispensers shall be of the non-aerosol, disposable and non-refillable type.
2. The maximum capacity of each dispenser shall be 34 ounces.
3. The minimum separation between dispensers shall be 48 inches.
4. Dispensers shall not be installed 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.
5. Dispensers shall be wall mounted with the bottom of each dispenser a minimum of 42 inches and a maximum of 48 inches above the finished floor.
6. Dispensers shall not release their contents except when the dispenser is manually activated.
7. The storage of dispensers shall be in compliance with the applicable Fire Department requirements of flammable or combustible liquid storage.
8. In occupancies with carpeted floors, dispensers may only be installed in smoke compartments or fire areas protected throughout by a sprinkler system.

Dispensers installed in corridors shall additionally comply with the following requirements:

1. The maximum quantity allowed in a corridor within a control area shall be 10 gallons.
2. The minimum corridor width shall be 72 inches.
3. Projections into a corridor shall be in accordance with the construction codes, including the Building Code.
4. The corridor shall be protected throughout by a sprinkler system or smoke detection system.

3.4 Manual Transfer of Fuel Oil for Emergency Generators in Buildings

The Department of Building (DOB) may approve the manual means of transfer of diesel fuel oil to fill emergency generator diesel fuel storage tanks in buildings lawfully constructed prior to December 6, 1968, provided that all of the following conditions are satisfied:

1. The emergency generator and diesel fuel storage tanks must be authorized for use by a valid Fire Department fuel oil permit.

2. The combined total quantity of diesel fuel stored in the emergency generator storage tank(s) and any diesel fuel stored in reserve portable drums or containers shall not exceed 330 gallons on any given story.

3. The maximum diesel fuel reserve storage in portable drums or containers shall not exceed 60 gallons on any given story and shall be stored in spaces conforming to Mechanical Code (MC) section 1305.13.3, Items 1 through 5, and 7. Any empty drums or containers shall be removed immediately and disposed of in a legal manner.

4. Diesel fuel shall be transferred in sealed portable drums or containers satisfying Fire Code sections Fire Code (FC) 2703.10.2 and 2703.10.3.

5. The transfer of diesel fuel and the manual filling of the generator storage tanks shall be conducted by, or supervised by, a person holding a Fire Department (FDNY) Certificate of Fitness C-92 for storage and use of combustible liquids.

6. The transfer of diesel fuel from lower to upper stories or roof shall only be via the building freight elevator utilizing hand trucks. Transfer via any passenger elevator shall be prohibited.

7. The transfer of diesel fuel from the sealed portable container to the emergency generator fuel storage tank shall be performed using a hand crank pump satisfying the provisions of section FC 3405.2.5.

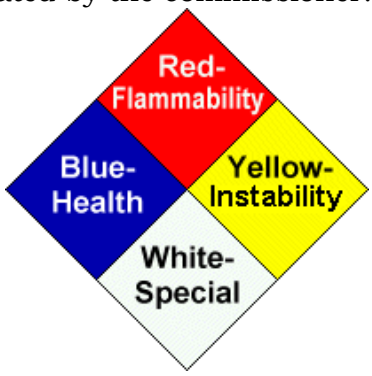
8. The DOB Boiler Division shall, upon satisfactory inspection, issue to the owner DOB form 16A “Certificate of Approval for Oil Burning Installation” indicating that the application involves the manual transfer and filling of the emergency generator diesel fuel storage tank(s) from portable drums or containers and that an FDNY Certificate of Fitness is required when such manual transfer is performed. A copy of the completed form shall be transmitted by the DOB Boiler Division to the Fire Department District office of the bureau of Fire Prevention.

If the diesel storage tanks in buildings lawfully constructed after December 6, 1968, fuel oil shall be supplied by a transfer pump or automatic pump or by other approved means. The transfer of diesel fuel and the automatic filling of the generator storage tanks shall be conducted by, or supervised by, a person holding a FDNY Certificate of Fitness P-98 for supervising Fuel-Oil Piping and Storage in Buildings.

4. LABELING AND SIGNS

4.1 NFPA Diamond Sign

Unless otherwise exempted by the commissioner, hazard identification (diamond) signs are required for specific materials as set forth in NFPA 704. These signs shall be conspicuously affixed on stationary containers and aboveground tanks and at entrances to locations where hazardous materials are stored, handled or used, including dispensing, in quantities requiring a permit, including locations where such materials are dispensed, and at such other locations as may be designated by the commissioner.



The NFPA National Fire Protection Association (www.nfpa.org), a private, non-profit organization that produces technical data related to fire protection and prevention, including the widely used NFPA diamond containing codes representing chemical hazards. 704 diamond (sometimes called the "fire diamond") is a standard placard used to quickly identify a chemical's level of hazard. The diamond sign is divided into 4 quadrants:

- Within the blue, red, and yellow quadrants a number from 0 to 4 indicates the degree of risk associated with the chemical. The higher the number, the higher the risk.
- For some chemicals, the white quadrant contains symbols indicating special hazards.

The meaning of each code number and symbol is shown on the following page.

Where more than one chemical is present in a building or specific area, professional judgment shall be exercised to indicate ratings using the following methods:

(1) Composite Method. Where many chemicals are present, a single sign shall summarize the maximum ratings contributed by the material(s) in each category and the special hazard category for the building and/or the area. That is, it shows the highest value in each hazard category for any chemical at that location. It may be that one chemical poses the highest health hazard, while another poses the highest flammability hazard.

(2) Individual Method. Where only a few chemicals are present or where only a few chemicals are of concern to emergency responders (taking into account factors including physical form, hazard rating, and quantity), individual signs shall be displayed. The chemical name shall be displayed below each sign.

(3) Composite–Individual Combined Method. A single sign shall be used to summarize the ratings via the Composite Method for buildings or other areas containing numerous chemicals. Signs based on the Individual Method shall be used for rooms or smaller areas within the building containing small numbers of chemicals.

Interpreting NFPA 704 Codes

Quadrant	Code	Meaning
Health Hazard	4	Materials that, under emergency conditions, can be lethal.
	3	Materials that, under emergency conditions, can cause serious or permanent injury.
	2	Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.
	1	Materials that, under emergency conditions, can cause significant irritation.
	0	Materials that, under emergency conditions, would offer no hazard beyond that of ordinary combustible materials
Flammability Hazard	4	Materials that rapidly or completely vaporize at atmospheric pressure and normal ambient temperature or that are readily dispersed in air and burn readily.
	3	Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions.
	2	Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. Materials in this degree would not under normal conditions form hazardous atmospheres with air, but under high ambient temperatures or under moderate heating could release vapor in sufficient quantities to produce hazardous atmospheres with air.
	1	Materials that must be preheated before ignition can occur. Materials in this degree require considerable preheating, under all ambient temperature conditions, before ignition and combustion can occur.
	0	Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand.
Instability (Reactivity) Hazard	4	Materials that in themselves are readily capable of detonation or explosive decomposition or explosive reaction at normal temperatures and pressures.
	3	Materials that in themselves are capable of detonation or explosive decomposition or explosive reaction but that require a strong initiating source or must be heated under confinement before initiation.
	2	Materials that readily undergo violent chemical change at elevated temperatures and pressures.
	1	Materials that in themselves are normally stable but that can become unstable at elevated temperatures and pressures.
	0	Materials that in themselves are normally stable, even under fire conditions.
Special Hazard	"**W**"	The materials that react violently or explosively with water (water reactivity rating of 2 or 3).

Quadrant	Code	Meaning
	"**OX**"	The materials that possess oxidizing properties. The severity of the hazard posed by an oxidizer can be divided in to 4 classes from Classes 1 through 4. The adding of the quantification of the oxidation helps to better define the hazard. For example, for the material categorized as a Class 2 oxidizer (e.g. calcium chlorite) can be marked "**OX 2**" to better define the hazard.

4.2 Warning Signs and Labels

Signage for identification and warning such as for the inherent hazard of flammable liquids or prohibiting smoking shall be provided. Signs and markings shall not be obscured or removed, shall be in English as a primary language or in symbols allowed by this code, shall be durable, and the size, color and lettering shall be acceptable to the commissioner. 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.

(1) Warning signs
Warning signs shall be constructed 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 in height and 0.5 inch in stroke.

(An example of the warning sign)

Signs shall be posted in locations as required by the commissioner. Piping containing flammable liquids shall be identified in accordance with ANSI A13.1.

(2)No-smoking signs
Signs shall be posted in storage areas prohibiting open flames and smoking. "No Smoking" signs shall be required even in institutions that totally prohibit smoking. The signs shall be provided in English as a primary language and conspicuously posted in the following locations:

a.) In rooms or areas where hazardous materials are stored or used.
b.) Within 25 feet of outdoor hazardous material storage, handling and use areas, including dispensing areas.
c.) Facilities or areas within facilities in which smoking has been entirely prohibited.

The Fire Department has published an approved "No Smoking" sign as set forth in Fire Department Rules. However, the Fire Department does not mandate that this design be

used. Other legible, durable signs, clearly communicating the "no smoking" requirement, may be used, but are subject to Fire Department enforcement action if found to be inadequate.

Examples of acceptable sign

(2) Labels

Individual containers, packages and cartons shall be identified, marked, labeled and placarded in accordance with federal regulations and applicable state laws.

Tanks more than 100 gallons in capacity, which are used for the storage of Class I, II or IIIA liquids, shall bear a label and placard identifying the material therein. Placards shall be in accordance with NFPA 704.

5. FIRE PROTECTION AND EMERGENCY RESPONSES

In areas where flammable or combustible liquids are manufactured, stored, handled and used, including dispensing, in quantities requiring a permit, the portable fire extinguishers shall be provided in accordance with Table 5-1.

Table 5- 1.Flammable or combustible liquids with depths of less than or equal to 0.25-inch

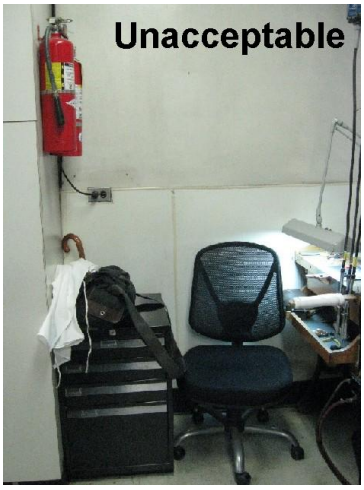
Type of Hazard	Basic Minimum Extinguisher Rating	Maximum Travel Distance[d] to Extinguishers (feet)
Light (Low)[a]	5-B 10-B	30 50
Ordinary (Moderate)[b]	10-B 20-B	30 50
Extra (High)[c]	40-B 80-B	30 50

a. Light(low) hazard occupancies consist of fire hazards having normally expected quantities of Class A combustible furnishings, and/or the total quantity of Class B flammable typically expected to be present is less than 1 gal in any room or area.
b. Ordinary(moderate) hazard occupancies consist of fire hazards having normally expected quantities of Class A combustible furnishings, and/or the total quantity of Class B flammable typically expected to be present is between 1 gal to 5 gal in any room or area.
c. Extra(high) hazard occupancies consist of fire hazards having normally expected quantities of Class A combustible furnishings, and/or the total quantity of Class B flammable typically expected to be present is more than 5 gal in any room or area.
d. The travel distance is intended to be the actual walking distance along a normal path of travel to the extinguisher.

(1) Liquid storage rooms:
A minimum of one portable fire extinguisher having a rating of not less than 20-B shall be located not less than 10 feet or more than 50 feet 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 from, the door opening into a liquid storage room.

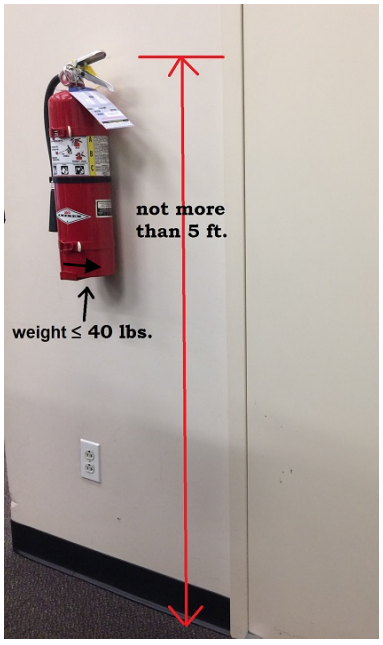
(2) Warehouse:
In liquid warehouses, either 1.5-inch lined or 1-inch hard rubber hand hose lines shall be provided in sufficient number to reach all liquid storage areas.

Fire extinguishers must be located in conspicuous locations where they will be readily accessible and immediately available for use. These locations must be along normal paths of travel. Fire extinguishers having a gross weight 40 pounds or less must be installed so that the top of the extinguisher is not more than 5 ft above the floor. Hand-held fire extinguishers having a gross weight exceeding 40 pounds shall be installed so that their tops are not more than 3.5 feet above the floor. The clearance between the floor and the bottom of installed hand-held extinguishers shall not be less than 4 inches. In other words, **no fire extinguisher is allowed to be on the floor.**



(1) For the fire extinguisher having 40 pounds or less, its top must not be more than 5 ft above the floor
(2) The fire extinguishers must be accessible and unobstructed.

(1) The bottom of the fire extinguisher must be at least 4 in above the floor.
(2) The fire extinguisher must be properly mounted.



In the event of a fire extinguisher has been discharged, a fully charged replacement is required before work can resume. Portable fire extinguishers are important in preventing a small fire from growing into a catastrophic fire, however, they are not intended to fight large or spreading fires. By the time the fire has spread, fire extinguishers, even if used properly, will not be adequate to extinguish the fire. Such fires should be extinguished by the building fire extinguishing systems or trained firefighters only.

In case of any fire, 911 must be called. 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 of Fitness holder should be familiar with the use of portable fire extinguishers. When it comes 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.

5.1 Different Types of Fire Extinguishers

The Certificate of Fitness holder must be familiar with the different types of fire extinguishers that are present. He/she must know how to operate the extinguishers in a safe and efficient manner. He/she must know the difference between the various types of extinguishers and when they should be used. A description of the five 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 the power has been isolated from 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.

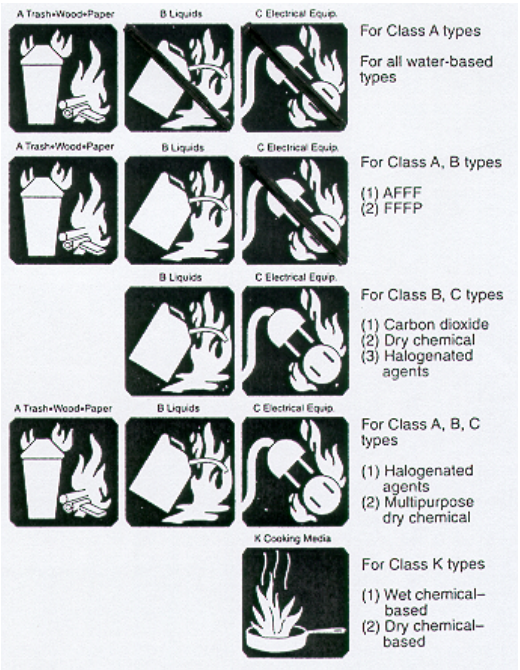
A multi-purpose dry chemical fire extinguisher may be used to extinguish more than 2 Classes fires. Examples of some fire extinguishers are shown below.

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 of Fitness holder must understand these symbols. All fire extinguishers should be kept in good working order at all times.

5.2 Portable Fire Extinguisher Tags

Installed portable fire extinguishers must have an FDNY standard PFE tag affixed. This tag will have important information about the extinguisher. By November 15, 2019, all portable fire extinguishers must have the new PFE tags. The FDNY will only recognize new PFE tags and will be issuing violations to business that have PFE installed without a proper tag.

The color of the fire extinguishers may be changed by the FDNY every few years. The FDNY recommends two ways to verify the tag's legitimacy:

1. Hologram:

A real hologram strip shown on the tag 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.

2. QR code

IF you scan the QR code, it should direct you to the updated FDNY approved fire extinguisher company list. You can use the company list to verify if the company printed on the list is currently approved by the FDNY.

If your PFE tags cannot be verified via these two methods, contact your supervisor. If you suspect your PFE is a counterfeit, contact FDNY immediately by e-mail: Tags.Decal@fdny.nyc.gov

PFE tag (This tag is released for 2021-2023)

5.3 Portable 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 is documented 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.

5.4 Emergency Procedures

5.4.1 Fire notification

Anyone becoming aware of any fire is required to immediately notify the emergency operator (911) or, depending upon the borough in which the property is located, insert one of the following the Fire Department Dispatcher numbers:

Manhattan properties	(212) 999-2222
Bronx properties	(718) 999-3333
Brooklyn properties	(718) 999-4444
Queens properties	(718) 999-5555
Staten Island properties	(718) 999-6666

The New York City Fire Department will respond. No supervisor or other person shall issue any directive or take any action to prevent or delay the reporting of a fire or other emergency to the department. You should also notify the building's designated fire safety person who is familiar with the building and can meet the responding emergency units upon their arrival, and direct them quickly to the fire area.

The Certificate of Fitness holder must know the locations of manual fire alarm system pull stations and portable fire extinguishers and how to operate them. In addition to calling 911, you should also activate the fire alarm system manual pull station in the event of a fire emergency. Activation of the manual pull station will sound the alarm in the building.

The Certificate of Fitness holder should know how to respond when an individual's clothing has caught fire. The most important instruction for the case of clothing fires: immediately drop to the floor and roll. If the person is panicking and running, other people in the area should immediately knock that person to the floor and roll that person around to smother the flames. If the safety shower is near, the use of this shower would also be an effective way to smother the flames. If after smothering the fire, if the clothing that caught fire can be removed, remove it. If the clothes are burnt onto your skin, do not remove the clothes but soak with water and keep cool. In all cases, immediately seek medical attention.

5.4.2 Spill notification

In case of a major spill, the Certificate of Fitness holder must notify the Fire Department by phone immediately. The Certificate of Fitness holder must know the telephone number of the Fire Department Dispatcher number in the borough where the building is located. These phone numbers must be posted near the phones most likely to be used in case of an emergency.

6. SPECIAL REQUIREMENTS FOR DRY CLEANING

6.1 Certificate of Fitness and Supervision

Dry cleaning facilities using Class II or III solvents in dry cleaning systems shall be under the **general supervision** of a certificate of fitness holder. Such certificate of fitness holder shall be an employee of the dry cleaning facility. The certificate of fitness holder shall monitor the equipment and facilities, ensure that the equipment and facilities are operated and maintained in accordance with this section, and instruct all employees who use or supervise the use of equipment in the proper operation and maintenance of such equipment.

Exception. Dry cleaning facilities may be operated under the general supervision of a person who is not an employee of the dry cleaning facility, provided that such person:

1. Holds a certificate of fitness.
2. Is an authorized representative of the manufacturer of the dry cleaning equipment, and provides the owner of the dry cleaning facility with appropriate proof of such authority.
3. Instructs all employees of the dry cleaning facility who use or supervise the use of the equipment in the proper operation and maintenance of the equipment.
4. Personally conducts a monthly inspection of the equipment and facility to ensure that they are being operated and maintained in accordance with this section.
5. Records each monthly inspection in a logbook maintained on the premises by the owner of the dry cleaning facility, by making the following entries: the date of the inspection, the name, address, and certificate of fitness number and expiration date of the person conducting the inspection and the certification that the equipment and facility are being operating and maintained in accordance with this section.

Photocopies of the certificates of fitness of all persons responsible for the supervision of a dry cleaning facility, and of the proof that such person is an authorized representative of the manufacturer, where applicable, shall be maintained on the premises and made available for inspection by any representative of the department.

6.2 Design and Installation Documents

It shall be unlawful to install, operate or maintain a Type I dry cleaning system. Class I solvents only allowed be stored, handled, and used for spotting and pretreating purposes in any dry cleaning facility.

Design and installation documents required to be submitted to the commissioner pursuant to the provisions of the Fire code, the Fire rules or the construction codes, including dry cleaning systems using Class II and III solvents, or as directed by the commissioner to demonstrate or document that a device, equipment, system, operation or facility regulated by the Fire code is designed and installed in accordance with the Fire Code, shall be submitted in accordance with this the Fire Code Section 105.4.

The above documents once approved by the Department of Building are required to submit to the Fire Department, Technology Management for review and approval.

6.3 Classifications

Solvent Classifications	Definition	Dry Cleaning Systems Classifications[a]	Definition
Class I	Flammable liquids having a flash point below 100°F	Type I[b]	Systems using Class I solvents
Class II	Combustible liquids having a flash point between 100°F & 140°F	Type II	Systems using Class II solvents
Class IIIA	Combustible liquids having a flash point between 140°F & 200°F	Type III-A	Systems using Class IIIA solvents
Class IIIB	Combustible liquids having a flash point at or above 200°F	Type III-B	Systems using Class IIIB solvents
Class IV	Liquids that are neither flammable nor combustible	Type IV	Systems using Class IV solvents in which dry cleaning is not conducted by the public
		Type V	Systems using Class IV solvents in which dry cleaning is conducted by the public

a. Dry cleaning facilities using more than one class of dry cleaning system shall be classified based on the numerically lowest type of system.

b. It shall be unlawful to install, operate or maintain a Type I dry cleaning system. Class I solvents only allowed be stored, handled, and used for spotting and pretreating purposes in any dry cleaning facility.

6.4 Requirements

6.4.1 Ignition control

It shall be unlawful to smoke in a dry cleaning facility. “NO SMOKING” signs shall be provided. In Type II dry cleaning facilities, heating shall be by indirect means using steam or hot water. Electrical wiring and equipment in dry cleaning rooms or other portions of the facility exposed to flammable vapors shall be installed in accordance with the Electrical Code. Tanks, treatment tanks, filters, pumps, piping, ducts, dry cleaning units, stills, tumblers, drying cabinets and other dry cleaning equipment, where not inherently electrically conductive, shall be bonded together and grounded. Isolated equipment shall be grounded.

6.4.2 Written instructions and identification

The manufacturer’s manuals for the installation, operation and maintenance of the equipment shall be maintained on the premises and made available for inspection by any representative of the department. Type II, III-A, III-B and IV dry cleaning systems shall be operated in accordance with the instructions provided by the manufacturer. The owner

shall ensure that all persons operating dry cleaning equipment comply with such instructions. Operating instructions for customer use of Type V dry cleaning systems shall be conspicuously posted in a location near the dry cleaning equipment. A telephone number shall be provided for emergency assistance.

The manufacturer shall permanently affix to dry cleaning equipment nameplates indicating the class of solvent for which each piece of equipment is designed. The name of the dry cleaning solvent approved for use in dry cleaning equipment shall be clearly and conspicuously marked or posted at the fill connection of the equipment.

6.4.3 Operation and maintenance requirements

It shall be unlawful to dry clean by immersion and agitation in open systems. Only solvents of a type listed for a particular piece of equipment shall be used in that equipment.

Proper operating practices and maintenance shall be observed in order to prevent the leakage of solvent or the accumulation of lint. Class I and II liquids shall not be used for cleaning floors. Filter residue and other waste containing solvent shall be stored in covered metal containers and disposed of lawfully. Lint and other waste shall be removed from traps daily, deposited in approved waste cans and disposed of lawfully. Lint traps shall remain in place while the dry cleaning equipment is in operation. In Type V dry cleaning systems, customer areas shall be kept free of rubbish and other combustible waste. Type II, III, IV and V dry cleaning systems shall be provided with an automatically activated exhaust ventilation system. The ventilation system shall operate automatically when the dry cleaning equipment is in operation and shall have manual controls at an approved location.

Type II dry cleaning systems shall be operated in accordance with the following additional requirements:

(2) Items to be dry cleaned shall be searched thoroughly, and foreign materials, including matches and metallic substances, shall be removed.

(3) In removing dry cleaned items from the washer, provision shall be made to minimize the dripping of solvent onto the floor. Where items are transferred from a washer to a drain tub, a nonferrous metal drip apron shall be placed so that the apron rests on the drain tub and the cylinder of the washer.

6.4.4 Inspections and testing

All dry cleaning equipment using Class II or III solvents shall be inspected and tested on at least an annual basis. The owner of the dry cleaning facility shall remove from service any equipment that is found to be defective, and shall promptly repair such equipment or remove it from the premises. Such equipment shall not be returned to service until it has been inspected and tested. All such inspection and testing shall be performed by a person holding a certificate of fitness.

The individual performing the inspection and testing of equipment shall prepare a written report identifying any defects in the condition and operation of the equipment and/or certifying that the equipment can be safely operated in accordance with this chapter. A certification that all equipment in service is in proper working order in accordance with this chapter shall be maintained on the premises for 3 years and made available for inspection by any representative of the department.

6.4.5 Filling and emptying

The filling and emptying of dry cleaning equipment with Class II or III solvents shall be performed by a certificate of fitness holder. Each filling and emptying of dry cleaning equipment with a Class II or III solvent shall be recorded in a logbook. Such records shall include the date of the filling or emptying, the type and amount of dry cleaning solvent, the equipment filled or emptied, and the name and certificate number of the certificate of fitness holder who performed the filling or emptying. The records shall be maintained on the premises for 3 years and made available for inspection by any representative of the department.

6.5 Spotting and Pretreating

It shall be unlawful to install, operate or maintain a Type I dry cleaning system. Class I solvents only allowed be stored, handled, and used for spotting and pretreating purposes in any dry cleaning facility. The maximum quantity of Class I solvents allowed at any dry cleaning facility shall be 1 gallon. Class I solvents shall be stored in approved metal containers or safety cans of not more than 2 quarts capacity.

Spotting and pretreating, including scouring and brushing, shall be conducted with Class II or III solvents. The maximum quantity of Class II or III solvents allowed at any work station shall be 1 gallon. In an occupancy other than a Group H-2 occupancy, the aggregate quantities of solvents shall not exceed the maximum allowable quantity per control area for use-open systems. Scouring, brushing or spotting tables on which items are soaked in solvent shall have a liquid-tight top with a curb on all sides not less than 1 inch high. The top of the table shall be pitched to ensure thorough draining to a 1.5-inch drain connected to an approved container. Metal scouring, brushing and spotting tables and scrubbing tubs shall be permanently and effectively bonded and grounded.

Items that may be damaged from being washed in the washing equipment may be manually cleaned in scrubbing tubs. Scrubbing tubs shall comply with the following requirements:

1. Only Class II or III liquids shall be used.
2. The total amount of solvent used in such tubs shall not exceed 3 gallons.
3. Scrubbing tubs shall be secured to the floor.
4. Scrubbing tubs shall be provided with permanent 1.5- inch (38 mm) drains. Such drains shall be provided with a trap and shall be connected to an approved container.

It shall be unlawful to store, handle or use any Class I, Class II or Class III solvent for spotting or pretreating operations in any Type V dry cleaning facility or in connection with the use of any Type V dry cleaning system.

6.6 Fire Extinguishers

A minimum of two 2-A:10-B:C portable fire extinguishers shall be provided near the doors inside dry cleaning rooms containing Type II, Type III-A and Type III-B dry cleaning systems.

7. COMMON FLAMMABLE AND COMBUSTIBLE LIQUIDS

The following paragraphs give a brief overview of the flammable and combustible liquids that are commonly used in the workplace. The name of each flammable and combustible liquid is followed by its hazard signal classification for flammability, instability (reactivity), and health. The Certificate of Fitness holder must know the properties of each of these liquids and their handling and storage requirements. He or she must also know the procedures that must be followed when dealing with fire or spill emergencies for these liquids.

Self-contained breathing apparatus

It is recommended that all personnel wear rubber safety gloves, chemical safety goggles and properly fitted self-contained breathing apparatus when handling the flammable liquids described below. If a person becomes exposed to the liquids or their irritating vapors, or if their breathing becomes compromised due to exposure, immediately remove them from the contaminated environment to an unaffected area with plenty of fresh air. Contact qualified medical personnel to provide medical attention.

7.1 Flammable Liquids

7.1.1 Class IA

(A) Ethyl ether
(Hazard Signal: 1 Health 4 Flammability 1 Instability)

Ethyl ether, is also known as Diethyl ether, simply ether, or ethoxyethane. It is a colorless, highly volatile flammable liquid with a characteristic odor. It is commonly used as a solvent.

Handling and Storage

- ***Handling Precautions:***
  Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, moisture.
- ***Storage:***
  Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of

ignition (spark or flame). Do not store above 30°C (86°F). Hygroscopic; keep container tightly closed. Air Sensitive. Sensitive to light.

Fire Hazards
Extremely flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials, of acids. Vapors may travel to source of ignition and flash back. Most vapors are heavier than air. Burns with smokey greenish flame.

Health Hazards
- ***Inhalation:***
  Irritant. General anesthesia by inhalation can occur. Continued exposure may lead to respiratory failure or death. Early symptoms include irritation of nose and throat, vomiting, and irregular respiration, followed by dizziness, drowsiness, and unconsciousness.
- ***Skin Contact:***
  Irritating to the skin and mucous membranes by drying effect. Can cause dermatitis on prolonged exposure. May be absorbed through skin.
- ***Eye Contact:***
  May cause irritation, redness and pain. Prolonged exposures to high concentrations of vapor can cause eye damage.
- ***Chronic Exposure:***
  Repeated exposures may be habit forming. Prolonged exposures may result in headache, drowsiness, excitation, and psychic disturbances. Teratogenic effects are possible.

(B) Gasoline
(Hazard Signal: 1 Health 3 Flammability 0 Instability)

Gasoline is a toxic translucent, petroleum-derived liquid that is primarily used as a fuel in internal combustion engines. It consists mostly of organic compounds obtained by the fractional distillation of petroleum, enhanced with a variety of additives. Some gasoline also contains ethanol as an alternative fuel. In North America, the term "gasoline" is often shortened in colloquial usage to "gas", whereas most current or former Commonwealth nations use the term "petrol"

Handling and Storage
- ***Handling Precautions:***
  USE ONLY AS A MOTOR FUEL. DO NOT SIPHON BY MOUTH. Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion. Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product).
- ***Storage:***
  Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Store in a well-ventilated area. Avoid storage near incompatible materials.

Fire Hazards
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Health Hazard
- ***Inhalation:***
  Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.
- ***Skin Contact:***
  Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.
- ***Eye Contact:***
  Moderate irritant. Contact with liquid or vapor may cause irritation.
- ***Chronic Exposure:***
  Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity.

7.1.2 Class IB

(A) Acetone
(Hazard Signal: 1 Health 3 Flammability 0 Instability)

Acetone is a colorless, flammable liquid with a sweet odor and the consistency of water. It is also referred to as imethyl ketone, propanone, and 2-propanone. Acetone is miscible with water and serves as an important solvent in its own right, typically as the solvent of choice for cleaning purposes in the laboratory. When mixed with water, an irritating flammable vapor is produced. This flammable liquid is shipped and stored inside glass bottles or cans, steel drums, and storage tanks at ambient temperatures.

Handling and Storage
- ***Handling Precautions:***
  Keep locked up. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, acids, alkalis.
- ***Storage:***

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Keep away from direct sunlight and heat and avoid all possible sources of ignition (spark or flame).

Fire Hazards
Highly flammable in presence of open flames and sparks, of heat. Highly flammable in presence of open flames and sparks, of heat.

Health Hazards
- ***Inhalation:***
  High concentrations may lead to central nervous system effects (drowsiness, dizziness, nausea, headache, paralysis and loss of consciousness and even death).High vapor concentrations are irritating to the eyes, nose, throat and lungs.
- ***Skin Contact:***
  Moderately irritating to the skin. Prolonged or repeated contact can result in defatting and drying of the skin which may result in skin irritation and dermatitis (rash).
- ***Eye Contact:***
  Contact with the eye may cause moderate to severe irritation.

(C) Propyl alcohol (n-propyl alcohol or isopropyl alcohol)
(Hazard Signal: 1 Health 3 Flammability 0 Instability)

Propyl alcohol may be n-propyl alcohol or isopropyl alcohol, depending on whether the hydroxyl group is bonded to the 1st or 2nd carbon on the propane chain. Ethanol and n-propyl alcohol are primary alcohols. n-propyl alcohol is used as a solvent in the pharmaceutical industry, and for resins and cellulose esters.

Isopropyl alcohol is a secondary alcohol which is a colorless, flammable chemical compound with a strong odor. The vast majority of isopropyl alcohol was used as a solvent for coatings or for industrial processes.

Handling and Storage
- ***Handling Precautions:***
  Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.
- ***Storage:***
  Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 100°F.

Fire Hazards
Highly flammable in presence of open flames and sparks, of heat, of oxidizing materials. Explosive in the form of vapor when exposed to heat or flame. Vapor may travel

considerable distance to source of ignition and flash back. When heated to decomposition it emits acrid smoke and irritating fumes. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME

Health Hazard

- ***Inhalation:***
  May cause irritation to respiratory tract. Exposure to high concentrations has a narcotic effect, producing symptoms of dizziness, drowsiness, headache, staggering, unconsciousness and possibly death.
- ***Skin and Eye Contact:***
  May cause irritation.

7.1.3 Class IC

(A) Turpentine
(Hazard Signal: 1 Health 3 Flammability 0 Instability)

Turpentine is a fluid with a strong odor obtained by the distillation of resin obtained from trees, mainly pine trees. The two primary uses of turpentine in industry are as a solvent and as a source of materials for organic synthesis. As a solvent, turpentine is used for thinning oil-based paints, for producing varnishes. Turpentine is also used as a source of raw materials in the synthesis of fragrant chemical compounds.

Handling and Storage

- ***Handling Precautions:***
  Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.
- ***Storage:***
  Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Fire Hazards
Flammable in presence of oxidizing materials.

Health Hazards

- ***Inhalation:***
  May cause dizziness, headache, watering of the eyes, irritation of the respiratory tract, nausea, depression of the central nervous system, and serious irritation to the kidneys. Severe overexposure may cause unconsciousness.
- ***Skin Contact:***
  This material is a skin irritant.
- ***Eye Contact:***
  This material is a severe eye irritant.
- ***Chronic Exposure:***

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. May cause jaundice, bone marrow damage, liver damage, anemia, nausea, skin irritation, headache, dizziness, some loss of memory, heart palpitations, and kidney damage, central nervous system damage, mental confusion, convulsions, coma, and death.

7.2 Combustible Liquids

7.2.1 Class II

(A) Kerosene
(Hazard Signal: 2 Health 2 Flammability 0 Instability)

Kerosene is a thin, clear combustible hydrocarbon liquid formed from hydrocarbons. In field settings, it is also referred to kerosine or fuel oil #1. Kerosene is widely used to power jet-engined aircraft (jet fuel) and some rockets, but is also commonly used as a heating fuel and for fire toys. Kerosene has an ignition quality similar to Numbers 1 and 2 Diesel Fuel. But Kerosene is too thin to work well as an engine fuel.

Handling and Storage

- ***Handling Precautions:***
  Keep locked up. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.
- ***Storage:***
  Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Fire Hazards

Flammable in presence of open flames and sparks, of heat.

Health Hazards

- ***Inhalation:***
  Inhalation causes irritation to respiratory tract. Symptoms may include coughing, shortness of breath, burning sensation in chest, headache, nausea, weakness, restlessness and incoordination, drowsiness and coma.
- ***Skin Contact:***
  Causes irritation to skin. Symptoms include redness, itching, and pain. May cause dermatitis.
- ***Eye Contact:***
  May cause severe irritation and pain.

(B) WD-40 Lubricant
(Hazard Signal: 2 Health 2 Flammability 0 Instability)

WD-40 is the trademark name of a United States-made water-displacing spray. WD-40 stands for "Water Displacement – 40th Attempt". It was originally designed to repel water and prevent corrosion, and later was found to have numerous household uses.

Handling and Storage

- ***Handling Precautions:***
  Avoid contact with eyes. Avoid prolonged contact with skin. Avoid breathing vapors or aerosols. Use only with adequate ventilation. Keep away from heat, sparks, pilot lights, hot surfaces and open flames. Unplug electrical tools, motors and appliances before spraying or bringing the can near any source of electricity. Electricity can burn a hole in the can and cause contents to burst into flames. To avoid serious burn injury, do not let the can touch battery terminals, electrical connections on motors or appliances or any other source of electricity. Wash thoroughly with soap and water after handling. Keep containers closed when not in use. Keep out of the reach of children. Do not puncture, crush or incinerate containers, even when empty.
- ***Storage:***
  Store in a cool, well-ventilated area, away from incompatible materials. Do not store above 120°F or in direct sunlight.

Fire Hazards

Contents under pressure. Keep away from ignition sources and open flames. Exposure of containers to extreme heat and flames can cause them to rupture often with violent force. Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back.

Health Hazards

- ***Inhalation:***
  High concentrations may cause nasal and respiratory irritation and central nervous system effects such as headache, dizziness and nausea. Intentional abuse may be harmful or fatal.
- ***Skin Contact:***
  Prolonged and/or repeated contact may produce mild irritation and defatting with possible dermatitis.
- ***Eye Contact:***
  Contact may be irritating to eyes. May cause redness and tearing.

(C) Diesel

(Hazard Signal: 0 Health 2 Flammability 0 Instability)

Diesel in general is any liquid fuel used in diesel engines. The most common is a specific fractional distillate of petroleum fuel oil. Diesel fuel is refined into several sub-catagories or grades. From highest to lowest viscosity are Number 1 Diesel Fuel (1-D), Number 2 Diesel Fuel (2-D) and Number 4 Fuel Diesel (4-D). Number 4 Fuel Diesel Fuel is used in low and medium speed engines that operate at a constant or near-constant speed, such as stationary powerplants or railroad locomotives. Numbers 1 and 2 Diesel Fuel are the primary fuel for mobile diesel engine applications. Volatility is one of the primary factors which distinguish #1 from #2 diesel fuel. No. 1 diesel typically has greater volatility than No. 2. Number 1 Diesel Fuel is commonly labeled at the pump as "Premium Diesel". While Number 2 Diesel Fuel has a higher lubricating quality than Number 1 Diesel, its thickness can cause rough starting in a cold engine and rough-running in cold weather.

Home heating oil is closest to Number 2 diesel fuel in ignition quality and lubricating ability. But home heating oil is not intended to be used in an internal combustion engine because it may not have the smoke suppressants, ignition accelerators and biocides.

Handling and Storage

- ***Handling Precautions:***
  Handle as a combustible liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion. Diesel fuel, and in particular low and ultra low sulfur diesel fuel, has the capability of accumulating a static electrical charge of sufficient energy to cause a fire/explosion in the presence of lower flashpoint products such as gasoline. The accumulation of such a static charge occurs as the diesel flows through pipelines, filters, nozzles and various work tasks such as tank/container filling, splash loading, tank cleaning; product sampling; tank gauging; cleaning, mixing, vacuum truck operations, switch loading, and product agitation. There is a greater potential for static charge accumulation in cold temperature, low humidity conditions
- ***Storage:***
  Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Store in a well-ventilated area.

Fire Hazards

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Health Hazards

- ***Inhalation:***
  Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.
  WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.
- ***Eye Contact:***
  Contact with liquid or vapor may cause mild irritation.
- ***Skin Contact:***
  May cause skin irritation with prolonged or repeated contact. Practically non-toxic if absorbed following acute (single) exposure. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.
- ***Chronic Exposure:***
  Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications.

7.2.2 Class IIIA

(A) Butyric Acid
(Hazard Signal: 3 Health 2 Flammability 0 Instability)

Butyric acid also known under the systematic name butanoic acid. Butyric acid is found in butter, parmesan cheese, and vomit, and as a product of anaerobic fermentation (including in the colon and as body odor). It is a clear liquid and has an unpleasant smell and acrid taste, with a sweetish aftertaste

Handling and Storage

- ***Handling Precautions:***
  Keep container dry. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes.
- ***Storage:***
  Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Fire Hazards

Vapors may flow along surfaces to distant ignition sources and flash back. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire.

Health Hazards

Corrosive. Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns.

- ***Inhalation:***
  May cause severe irritation of the upper respiratory tract with pain, burns, and inflammation. Causes chemical burns to the respiratory tract.
- ***Eye Contact:***
  Causes eye burns.
- ***Skin Contact:***
  Harmful if absorbed through the skin. Causes skin burns.

(B) Creosote Oil
(Hazard Signal: 2 Health 2 Flammability 0 Instability)

Creosote oil is a dark brown to black oily liquid with Penetrating smoky odor. It is the portion of chemical products obtained by the distillation of a tar that remains heavier than water, notably useful for its anti-septic and preservative properties. The two main types in industrial production are wood-tar creosote and coal-tar creosote — the coal-tar variety, having stronger and more toxic properties, has chiefly been used as a preservative for wood; while the wood-tar variety has been used for meat preservation, wood treatment, and for medicinal purposes.

Handling and Storage

- ***Handling Precautions:***
  Always wear recommended personal protective equipment. Wear clothing closed at the neck, long sleeves and non-porous type gloves, eg. neoprene, butyl rubber, nitrile, poly-vinyl alcohol (PVA), polyvinyl chloride (PVC).
- ***Storage:***
  Store in closed containers. Keep away from children and food. Avoid exposure to sources of extreme heat. Closed containers may explode when exposed to extreme heat.

Fire Hazards

Noxious fumes (carbon monoxide, acrid smoke) may be emitted under fire conditions. Water sprays may cause frothing or eruption in closed tanks.

Health Hazards

- ***Inhalation:***
  Overexposure to vapor may result in irritation to respiratory tract. Prolonged exposure can result in acute toxic effects such as dizziness, respiratory difficulty, convulsions and possible cardiovascular collapse.
- ***Eye Contact:***
  Overexposure to product vapors can result in irritation. Eye contact with product may cause moderate irritation, which in the absence of recommended first aid can result in effects from minor burns to severe corneal injury, including keratitis, conjunctivitis and corneal abrasion.
- ***Skin Contact:***
  Contact with skin can result in irritation, which if not washed off or when accentuated by sunlight, can result in minor burns.
- ***Chronic Exposure:***
  Prolonged and repeated skin exposure over many years in the absence of recommended hygiene practices may lead to changes in skin pigmentation, benign skin growths and may in some case, result in skin cancer. Additionally, inhalation may present a lung cancer hazard.

7.3 Cleaning Fluids Used In Dry Cleaning Operations

There are two common dry cleaning solvents that are used in the dry cleaning systems. The first one is ExxonMobil Chemical Dry-cleaning Fluid 2000(DF 2000) and the other solvent is GE Siloxane-based solvent(SB 32). Both solvents are Class IIIA solvents.

(A) DF 2000

(Hazard Signal: 1 Health 2 Flammability 0 Instability)

Handling and Storage

- ***Handling Precautions:***
  Do not handle near an open flame, heat or other sources of ignition. Material will accumulate static charges which may cause an electrical spark. Use proper bonding and/or grounding procedures.
- ***Storage:***
  Keep container closed. Store in a cool, well ventilated place away from incompatible materials. Do not store near an open flame, heat or other sources of ignition. Protect material from direct sunlight.

Fire hazard
Combustible liquid, can form combustible mixtures at temperatures at or above the flashpoint. Material can accumulate static charges which can cause an incendiary electrical discharge. Empty containers retain product residue and can be dangerous. DO NOT pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty drums should be completely drained, properly bunged and promptly return to a drum reconditioned, or properly disposed of.

Health Hazards
- ***Inhalation:***
  High vapor/aerosol concentrations are irritating to the eyes and the respiratory tract, and may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death. May cause severe irritation of the upper respiratory tract with pain, burns, and inflammation. Causes chemical burns to the respiratory tract.
- ***Eye Contact:***
  Slightly irritating but does not injure eye tissue.
- ***Skin Contact:***
  Low order of toxicity. Frequent or prolonged contact may irritate and cause dermatitis. Skin contact may aggravate an existing dermatitis condition.

(B) SB 32
(Hazard Signal: 1 Health 2 Flammability 0 Instability)

Handling and Storage
- ***Handling Precautions:***
  Avoid contact with skin and eyes. Avoid inhalation of vapors or mists. Keep away from children. Use ground strap and appropriate precautions for dispensing flammable liquids.
- ***Storage:***
  Store away from heat, sources of ignition, and incompatibles. Keep container tightly closed.

Health hazard
- ***Eye and Skin Contact:***
  May cause irritation.

PART II. NEW OR MODIFIED INSTALLATIONS

This part addresses the 2008 New York City Fire Code applicable for **new or modified installations/facilities approved by the Fire Department on or after July 1st, 2008.**

It also applies to any pre-existing installations that are requesting an increase of their previously **permitted storage quantities when the aggregate quantity will be in excess of the maximum allowable quantity (MAQ) listed below. If the quantity of flammable or combustible liquids is in excess of a previously permitted quantity in any pre-existing installations, a revised FDNY permit must be obtained.**

8. STORAGE IN NEW INSTALLATION FACILITIES

8.1 Container Storage and Indoor Storage (New or Modified Installations)

8.1.1 Maximum allowable quantity (MAQ)

Flammable and combustible liquids shall not exceed the maximum allowable quantity (MAQ) per control area indicated in Table 8-1 and Table 8-2. Quantities exceeding the MAQ shall be in liquid storage rooms or liquid storage warehouses in accordance with the storage regulations.

Table 8- 1. Maximum allowable quantity of flammable liquids storage per control area

Building protected throughout by a sprinkler system?	**Floor Level**		**# of Control Areas per Floor**	**Flammable Liquids**					
				NOT stored in Cabinets (gallons)			**Stored in Cabinets (gallons)**		
				IA	IB & IC	Combination (IA,IB,IC)[a]	IA	IB & IC	Combination (IA,IB,IC)[a]
NO	Above Grade	> 9	1	1.5	6	6	3	12	12
		7-9	2	1.5	6	6	3	12	12
		4-6	2	3.75	15	15	7.5	30	30
		3	2	15	60	60	30	120	120
		2	3	22.5	90	90	45	180	180
		1	4	30	120	120	60	240	240
	Below Grade		Not Allowed	Not Allowed			Not Allowed		
YES	Above Grade	> 9	1	3	12	12	6	24	24
		7-9	2	3	12	12	6	24	24
		4-6	2	7.5	30	30	15	60	60
		3	2	30	120	120	60	240	240
		2	3	45	180	180	90	360	360
		1	4	60	240	240	120	480	480
	Below Grade		Not Allowed	Not Allowed			Not Allowed		

a. Containing not more than the maximum allowable quantity per control area of each class of flammable liquid.

Table 8- 2.Maximum allowable quantity of combustible liquids storage for control area

Building protected throughout by a sprinkler system?	**Floor Level**		**# of Control Areas per Floor**	**Combustible Liquids**					
				NOT stored in Cabinets (gallons)			**Stored in Cabinets (gallons)**		
				II	IIIA	IIIB	II	IIIA	IIIB
NO	Above Grade	>9	1	6	16.5	660	12	33	1,320
		7-9	2	6	16.5	660	12	33	1,320
		4-6	2	15	41.25	1,650	30	82.5	3,300
		3	2	60	165	6,600	120	330	13,200
		2	3	90	247.5	9,900	180	495	19,800
		1	4	120	330	13,200	240	660	26,400
	Below Grade	1	3	Not Allowed/ 90[a]	Not Allowed/ 247.5[a]	Not Allowed/ 9,900[b]	Not Allowed/ 180[a]	Not Allowed/ 495[a]	Not Allowed/ 19,800[b]
		2	2	Not Allowed/ 60[a]	Not Allowed/ 165[a]	Not Allowed/ 6,600[b]	Not Allowed/ 120[a]	Not Allowed/ 330[a]	Not Allowed/ 13,200[b]
		> 2		Not Allowed			Not Allowed		
				II	IIIA	IIIB	II	IIIA	IIIB
YES	Above Grade	>9	1	12	33	No limit	24	66	No limit
		7-9	2	12	33	No limit	24	66	No limit
		4-6	2	30	82.5	No limit	60	165	No limit
		3	2	120	330	No limit	240	660	No limit
		2	3	180	495	No limit	360	990	No limit
		1	4	240	660	No limit	480	1320	No limit
	Below Grade	1	3	180	495	No limit	360	990	No limit
		2	2	120	330	No limit	240	660	No limit
		> 2		Not Allowed			Not Allowed		

a. *Class II and Class IIIA liquids shall be allowed to be stored in basements, cellars or other areas below grade provided that such basement, cellar or other below grade area is protected throughout by a sprinkler system and other fire protection required by the Fire Department and the Building Department. If Class II and Class IIIA liquids are allowed to be stored below grade, the maximum quantity must not exceed the quantity listed in this table.*

b. *Class IIIB 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. If Class IIIB liquids are allowed to be stored below grade, the maximum quantity must not exceed the quantity listed in this table.*

8.1.2 Liquid storage rooms and liquid warehouses

Quantities of liquids exceeding the maximum allowable quantities set in table 8-1 and table 8-2 for storage in control areas or for the quantities of liquids in any pre-existing installations exceeding their **previously permitted amounts** must be stored in a liquid storage room. The quantity and the height of storage in the pile or rack must not exceed the smallest of the maximum quantities and heights for the classes of liquids stored in accordance with table 8-3 or table 8-4.

Table 8- 3. Storage Arrangements for Palletized or Solid-pile Storage in Liquid Storage Rooms and Warehouses

Class[e]	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[d]	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[d]	Not allowed	Not allowed	Not allowed	Not allowed
IC	Ground floor	1	6.5[c]	5,000	15,000
	Upper floors	1	6.5[c]	3,000	12,000
	Basements[d]	Not allowed	Not allowed	Not allowed	Not allowed
II	Ground floor	3	10	10,000	25,000
	Upper floors	3	10	10,000	25,000
	Basements[d]	1	5	7,500	7,500
III	Ground floor	5	20	15,000	50,000
	Upper floors	5	20	15,000	50,000
	Basements[d]	3	10	10,000	25,000

a. *For liquid warehouses, 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.*
b. *Storage heights are allowed to be increased for Class IB, IC, II and III liquids in metal containers having a capacity of 5 gallons or less where an automatic AFFF-water protection system has been approved by the commissioner and the commissioner of buildings.*
c. *These height limitations are allowed to be increased to 10 feet for containers having a capacity of 5 gallons or less.*
d. *Basements include cellars and other areas below grade.*
e. *Where two or more classes of liquids are stored in a pile section, the quantity or the height of storage in the pile or rack must not exceed the smallest of the maximum quantities or heights for the classes of liquids stored.*

Table 8- 4. Storage Arrangements for Rack Storage in Liquid Storage Rooms and Warehouses

Class[a]	Type Rack	Storage Level	Maximum Storage Height (feet)	Maximum Quantity Per Room (gallons)
			Containers	Containers
IA	Double row or Single row	Ground floor	25	7,500
		Upper floors	15	4,500
		Basements	Not allowed	Not allowed
IB IC	Double row or Single row	Ground floor	25	15,000
		Upper floors	15	9,000
		Basements	Not allowed	Not allowed
II	Double row or Single row	Ground floor	25	24,000
		Upper floors	25	24,000
		Basements	15	9,000
III	Multirow Double room Single row	Ground floor	40	48,000
		Upper floors	20	48,000
		Basements	20	24,000

a. *Where two or more classes of liquids are stored in a rack section, the quantity or the height of storage in the pile or rack must not exceed the smallest of the maximum quantities or heights for the classes of liquids stored.*

Piles shall be separated from each other by at least 4-foot aisles. Aisles shall be provided so that all containers are 20 feet or less from an aisle. Where the storage of liquids is on racks, a minimum 4-foot-wide aisle shall be provided between adjacent rows of racks and adjacent storage of liquids. Main aisles shall be a minimum of 8 feet 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 in width, unless greater widths are required for separation of piles or racks, in which case the greater width shall be provided.

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.

8.2 Outdoor Storage (New Installations)

8.2.1 Quantity limits for outdoor container storage

The outdoor storage of containers shall be located with respect to the quantities and the distances to lot lines, in according with Table 8-5. The storage areas must be protected against tampering or trespassers by fencing or other approved control measures. Posts or other means shall be provided to protect outdoor storage tanks from vehicular damage. Brush, grass, vines, weeds and other vegetation capable of being ignited that is located within 15 feet of a flammable or combustible liquid storage location shall be regularly mowed or pruned and the clippings removed from the premises. Rubbish and other combustible waste shall not be allowed to accumulate within 15 feet of a flammable or combustible liquid storage location.

Table 8- 5. Storage Arrangements for Outdoor Storage of Containers

Class of Liquid	Container Storage-Maximum Per Pile		Minimum Distance Between Piles or Racks (feet)	Minimum Distance to Lot Line[c] (feet)	Minimum Distance to Public Street or Private Road[c] (feet)
	Quantity[a,b] (gallons)	Height (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

b. Where two or more classes of liquids area stored in a single pile, the quantity in the pile must not exceed the smallest of maximum quantities for the classes of material stored.

c. 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.

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.

8.3 Tank Storage (New Installations)

8.3.1 Tank capacity limitations

Except at a bulk plant or terminal or as otherwise specified by the Fire Department, the capacity of flammable and combustible liquid storage tanks shall not exceed the amounts set forth:

Table 8- 6. Maximum capacity of flammable and combustible liquid storage tanks

	Underground tanks[a]		Aboveground tanks[b]		
	Flammable liquids	Combustible liquids	Flammable liquids	Combustible liquids	
				Outdoors	Indoors
Single tank	4,000 gal	12,000 gal	**Prohibited**, except as specifically authorized in FC 3406.		
Aggregate capacity of all tanks at a premises	20,000 gal	40,000 gal		30,000 gal	20,000 gal

a. Underground tanks shall not store petroleum products containing mixtures of a nonpetroleum nature, such as ethanol or methanol blends, without evidence of compatibility.

b. Liquids with boilover characteristics shall not be stored in fixed roof tanks larger than 150 feet in diameter unless an approved gas enrichment or inerting system is provided on the tank.

9. HANDLING AND USE IN NEW INSTALLATION FACILITIES

9.1 Indoor Use (New Installations)

Indoor use of flammable and combustible liquids includes the dispensing and mixing of such liquids.

9.1.1 Processing vessels

Processing vessels shall be located with respect to distances to lot lines, in accordance with Table 9-1. Processing vessels for flammable liquids shall be limited to not more than 550 gallons. Processing vessels for Class II and IIIA combustible liquids shall be limited to not more than 1,100 gallons. Processing vessels for Class IIIB combustible liquids shall be limited to not more than 20,000 gallons.

Table 9- 1. Location of processing vessels

Tank Capacity (gallons)	Processing Vessels with Emergency Relief Venting	Location			
		Minimum Distance from Lot Line (feet)		Minimum Distance From a Building, Public Street or Private Road (feet)	
		Stable liquid	Unstable liquids[a]	Stable liquid	Unstable liquids
275 or less	≤ 2.5 psig	5	12.5	5	12.5
	> 2.5 psig	7.5	20	7.5	20
Over 275 or 750	≤ 2.5 psig	10	25	5	12.5
	> 2.5 psig	15	40	7.5	20
Over 750 to 12,000	≤ 2.5 psig	15	37.5	5	12.5
	> 2.5 psig	22.5	60	7.5	20
Over 12,000 to 20,000	≤ 2.5 psig	20	50	5	12.5
	> 2.5 psig	30	80	7.5	20

a. An unstable liquid can self-react when exposed to heat.

A. The following vessels must be provided with self-closing, tight-fitting, noncombustible lids that will control a fire within such vessel:
   (1) Any vessels used for mixing, dispensing or blending of Class I liquids and
   (2) Any vessels used for mixing, dispensing or blending of Class II or III liquids at a temperature higher than 20°F less than their flash points,
   unless such devices are determined by the commissioner to be impractical, a fire extinguishing system shall be provided.
B. Static electricity will spark between surfaces with different electrical potential. This spark is an ignition source for Class I liquids. As a result, where differences of potential could be created, all vessels containing Class I liquids or the vessels containing Class II or III liquids at temperature higher than 20°F 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.

9.1.2 Maximum allowable quantity for handling and use

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 Table 9-2 and Table 9-3. Quantities exceeding the maximum allowable quantity per control

area indicated in Table 9-2 and Table 9-3 shall be in compliance with the following requirements:

- **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 requirements and FC Section 3405.3.7.1 through 3405.3.5.
- **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 Sections 3405.3.7 through 3405.3.7.4 and 3405.3.7.6.

Table 9- 2. Maximum allowable quantity of flammable liquids for handling and use per control area

Building protected throughout by a sprinkler system?	**Floor Level**		**# of Control Areas per Floor**	**Flammable Liquids**					
				In Closed System (gallons)			**In Open System (gallons)**		
				IA	IB & IC	Combination (IA,IB,IC)[a]	IA	IB & IC	Combination (IA,IB,IC)[a]
NO	Above Grade	> 9	1	1.5	6	6	0.5	1.5	1.5
		7-9	2	1.5	6	6	0.5	1.5	1.5
		4-6	2	3.75	15	15	1.25	3.75	3.75
		3	2	15	60	60	5	15	15
		2	3	22.5	90	90	7.5	22.5	22.5
		1	4	30	120	120	10	30	30
	Below Grade		Not Allowed	Not Allowed			Not Allowed		
YES	Above Grade	> 9	1	3	12	12	1	3	3
		7-9	2	3	12	12	1	3	3
		4-6	2	7.5	30	30	2.5	7.5	7.5
		3	2	30	120	120	10	30	30
		2	3	45	180	180	15	45	45
		1	4	60	240	240	20	60	60
	Below Grade		Not Allowed	Not Allowed			Not Allowed		

a. Containing not more than the maximum allowable quantity per control area of each class flammable liquid.

Table 9- 3.Maximum allowable quantity of combustible liquids for handling and use per control area

Building protected throughout by a sprinkler system?	**Floor Level**		**# of Control Areas per Floor**	**Combustible Liquids**					
				In Close System (gallons)			**In Open System (gallons)**		
				II	IIIA	IIIB	II	IIIA	IIIB
NO	Above Grade	>9	1	6	16.5	660	1.5	4	165
		7-9	2	6	16.5	660	1.5	4	165
		4-6	2	15	41.25	1,650	3.75	10	412.5
		3	2	60	165	6,600	15	40	1,650
		2	3	90	247.5	9,900	22.5	60	2,475
		1	4	120	330	13,200	30	80	3,300
	Below Grade	1	3	Not Allowed/ 90[a]	Not Allowed/ 247.5[a]	Not Allowed /9,900[b]	Not Allowed/ 22.5[a]	Not Allowed/ 60[a]	Not Allowed /2,475[b]
		2	2	Not Allowed/ 60[a]	Not Allowed/ 165[a]	Not Allowed /6,600[b]	Not Allowed/ 15[a]	Not Allowed/ 40[a]	Not Allowed /1,650[b]
		> 2		Not Allowed			Not Allowed		
				II	IIIA	IIIB	II	IIIA	IIIB
YES	Above Grade	>9	1	12	33	No limit	3	8	No limit
		7-9	2	12	33	No limit	3	8	No limit
		4-6	2	30	82.5	No limit	7.5	20	No limit
		3	2	120	330	No limit	30	80	No limit
		2	3	180	495	No limit	45	120	No limit
		1	4	240	660	No limit	60	160	No limit
	Below Grade	1	3	180	495	No limit	45	120	No limit
		2	2	120	330	No limit	30	80	No limit
		> 2		Not Allowed			Not Allowed		

a. *Class II and Class IIIA liquids shall be allowed to be stored in basements, cellars or other areas below grade provided that such basement, cellar or other below grade area is protected throughout by a sprinkler system and other fire protection required by the Fire Department and the Building Department. If Class II and Class IIIA liquids are allowed to be stored below grade, the maximum quantity must not exceed the quantity listed in this table.*

b. *Class IIIB 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. If Class IIIB liquids are allowed to be stored below grade, the maximum quantity must not exceed the quantity listed in this table.*

9.2 Outdoor Use (New Installations)

The location of processing vessels must be located with respect to distances to lot lines in accordance with Table 9-1. Dispensing activities which exceed the quantities set forth in Table 9-4 shall not be conducted within 15 feet of buildings or combustible materials or within 25 feet of building openings, lot lines, public streets or private roads. Dispensing activities that exceed the quantities set forth in Table 9-4 shall not be conducted within 15 feet 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.

Table 9- 4.Maximum allowable quantity 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[b]
Combustible	
Class II	30
Class IIIA	80
Class IIIB	3,300

a. It indicates the MAQ for dispensing the liquids under the conditions mentioned in the above "9-2 outdoor use" section.

b. Containing not more than the maximum allowable quantity per control area of each individual class.

10. SPECIAL REGULATIONS FOR NEW INSTALLED GROUP M OCCUPANCIES

In addition to the regulations specified in the previous sections, this section addresses the particular regulations for the installations of group M occupancies which are approved by the NYC Fire Department (FDNY) on or after 07/01/2008. The regulations regarding below-grade storage in pre-existing Group M occupancies are addressed in the Appendix C.

10.1 Storage, Handling and Use in Group M Occupancies

Flammable and combustible liquids shall be stored, handled and used 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. 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 Table 10-1 and Table 10-2, except that no gasoline or flammable liquid motor fuel may be stored in portable containers for wholesale or retail sale. Quantities exceeding those allowed in control areas set forth in the Table 10-1 and Table 10-2 shall be in liquid storage rooms or liquid storage warehouses in accordance with the storage regulations.

10.2 Wholesale and Retail Sales

For Group M occupancy (i.e. mercantile occupancy) wholesale and retail sales, the containers for Class I liquids must be metal and shall not exceed a capacity of 5 gallons.

> Exception: In sprinklered buildings, an aggregate quantity of 120 gallons of water-miscible Class IB and Class IC liquids is allowed in nonmetallic containers, each having a capacity of 16 ounces or less.
>
> Exception: Metal containers not exceeding 55 gallons are permitted for storage up to 240 gallons of the maximum allowable quantity of Class IB and IC liquids in a control area. The building shall be protected throughout by a sprinkler system. 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.

Flammable liquids shall not be permitted in basements, cellars or other areas below grade. 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, indicating the liquid is flammable, and shall be kept away from heat and an open flame.

The storage areas must be protected in accordance with Table 3404.3.6.3 (4) to Table 3404.3.6.3(8) in the Fire Code (see Appendix D) and the construction codes as appropriate.

Combustible commodities shall not be stored above flammable and combustible liquids. All flammable and combustible liquids storage for sale must be accordance with the following:

(A) Storage on shelves must not exceed 6 feet in height and shelving must be metal.
(B) Storage on pallets or in piles if greater than 4 feet 6 inches in height, or where the ceiling exceeds 18 feet in height, must be protected by a sprinkler system in accordance with Table 3404.3.6.3(4) (See Appendix D), and the storage heights and arrangements shall be limited to those specified in the Table 8-3.
(C) Storage on racks, if greater than 4 feet 6 inches in height, or where the ceiling exceeds 18 feet in height shall be protected in accordance with Table 3404.3.6.3(5) to Table

3404.3.6.3 (8) (see Appendix D) and the construction codes and the storage heights and arrangements shall be limited to those specified in the Table 8-4.

Table 10- 1.Maximum allowable quantity of flammable liquids in wholesale and retail sales uses for control area[a]

Sprinkler system	Floor Level		# of Control Areas per Floor	Flammable Liquids			
				NOT stored in Cabinets (gallons)		**Stored in Cabinets (gallons)**	
Non-sprinklered	Above Grade			IA	IB & IC	IA	IB & IC
		> 9	1	1.5	80	3	160
		7-9	2	1.5	80	3	160
		4-6	2	3.75	200	7.5	400
		3	2	15	800	30	1600
		2	3	22.5	1200	45	2400
		1	4	30	1600	60	3200
	Below Grade		Not Allowed	Not Allowed		Not Allowed	
Sprinklered[b] per footnote densities				IA	IB & IC[c]	IA	IB & IC[c]
	Above Grade	> 9	1	3	375	6	750
		7-9	2	3	375	6	750
		4-6	2	7.5	937.5	15	1875
		3	2	30	3750	60	7500
		2	3	45	5625	90	11250
		1	4	60	7500	120	15000
	Below Grade		Not Allowed	Not Allowed		Not Allowed	
Sprinklered per table in Appendix D Tables and Table FC 3404.3.7.5.1				IA	IB & IC[c]	IA	IB & IC[c]
	Above Grade	> 9	1	3	750	6	1500
		7-9	2	3	750	6	1500
		4-6	2	7.5	1875	15	3750
		3	2	30	7500	60	15000
		2	3	45	11250	90	22500
		1	4	60	15000	120	30000
	Below Grade		Not Allowed	Not Allowed		Not Allowed	

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 permitted 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 permitted 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.

Table 10- 2. Maximum allowable quantity of combustible liquids in wholesale and retail sales uses for control area[a]

Sprinkler system	**Floor Level**		**# of Control Areas /Floor**	**Combustible Liquids**					
				NOT stored in Cabinets (gallons)			**Stored in Cabinets (gallons)**		
Non-sprinklered				II	IIIA	IIIB	II	IIIA	IIIB
	Above Grade	>9	1	80	80	660	160	160	1320
		7-9	2	80	80	660	160	160	1320
		4-6	2	200	200	1650	400	400	3300
		3	2	800	800	6600	1600	1600	13200
		2	3	1200	1200	9900	2400	2400	19800
		1	4	1600	1600	13200	3200	3200	26400
	Below Grade	1	3	Not Allowed /1200[d]	Not Allowed/ 1200[d]	Not Allowed/ 9,900[e]	Not Allowed/ 2400[d]	Not Allowed/ 2400[d]	Not Allowed/ 19,800[e]
		2	2	Not Allowed /800[d]	Not Allowed/ 800[d]	Not Allowed/ 6,600[e]	Not Allowed/ 1600[d]	Not Allowed/ 1600[d]	Not Allowed/ 13,200[e]
		> 2		Not Allowed			Not Allowed		
Sprinklered[b] per footnote densities				II[c]	IIIA[c]	IIIB	II[c]	IIIA[c]	IIIB
	Above Grade	>9	1	375	375	No limit	750	750	No limit
		7-9	2	375	375	No limit	750	750	No limit
		4-6	2	937.5	937.5	No limit	1875	1875	No limit
		3	2	3750	3750	No limit	7500	7500	No limit
		2	3	5625	5625	No limit	11250	11250	No limit
		1	4	7500	7500	No limit	15000	15000	No limit
	Below Grade	1	3	5625	5625	No limit	11250	11250	No limit
		2	2	3750	3750	No limit	7500	7500	No limit
		> 2		Not Allowed			Not Allowed		
Sprinklered per table in Appendix D Tables and Table FC 3404.3.7.5.1				II[c]	IIIA[c]	IIIB	II[c]	IIIA[c]	IIIB
	Above Grade	>9	1	750	750	No limit	1500	1500	No limit
		7-9	2	750	750	No limit	1500	1500	No limit
		4-6	2	1875	1875	No limit	3750	3750	No limit
		3	2	7500	7500	No limit	15000	15000	No limit
		2	3	11250	11250	No limit	22500	22500	No limit
		1	4	15000	15000	No limit	30000	30000	No limit
	Below Grade	1	3	11250	11250	No limit	22500	22500	No limit
		2	2	7500	7500	No limit	15000	15000	No limit
		> 2		Not Allowed			Not Allowed		

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 permitted 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 permitted 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 sepaFration is not required. The cumulative amounts, including amounts attained by having an additional control area, shall not exceed 30,000 gallons.

d. Class II and Class IIIA liquids shall be allowed to be stored in basements, cellars or other areas below grade provided that such basement, cellar or other below grade area is protected throughout by a sprinkler system and other fire protection required by the Fire Department and the Building Department. If Class II and Class IIIA liquids are allowed to be stored below grade, the maximum quantity must not exceed the quantity listed in this table.

e. Class IIIB 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. If Class IIIB liquids are allowed to be stored below grade, the maximum quantity must not exceed the quantity listed in this table.

Appendix A. Hazardous Materials Report Forms

NEW YORK STATE DEPARTMENT OF STATE
OFFICE OF FIRE PREVENTION AND CONTROL

HAZARDOUS MATERIALS REPORT FORM
(General Municipal Law, § 209-u)

The information entered herein is essential to your local fire chief for the protection of your employees, the fire-fighters and citizens in the immediate area, and to reduce damage to your property in the event of a fire or an emergency.

Every fire insurance policyholder, engaged in commerce in this state, is required by law to report the presence of hazardous materials at their business address.

Failure to file in accordance with the provisions of section 209-u of the General Municipal Law could result in a fine.

A separate report is required annually for each business address.

WHEN COMPLETED, THIS FORM MUST BE SENT TO YOUR LOCAL FIRE DEPARTMENT.

Hazardous Materials Location*

Firm Name _____ Street Add. Only _____

Bus. Add. _____ Bldg. Name or No. _____

City, State, Zip _____ City, State, Zip _____

Tel. No. _____ Policy Anniv. Date _____

Name
Emergency Contact _____ Bus. Tel. _____ Home Tel. _____

_____
(Signature and Title of Person Completing Form)

*It is suggested that a separate form be filled out for each building that contains hazardous materials.

EXEMPTIONS

Requests for exemptions from this law must be made in writing, attached to this form, and filed annually with your local fire department not later than the anniversary date of your policy.

All exemptions approved shall expire on the next policy anniversary date.

Exemptions denied shall require that the insured file a completed hazardous materials report form within 15 days of denial.

FOR FIRE DEPARTMENT USE ONLY

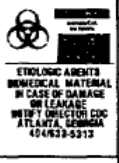
Exemptions: Approved _____ Denied _____ Additional Information Needed _____

_____ _____
(Date) (Signature of Fire Chief)

_____ _____
(Fire Department Name and Address) (Print Name of Fire Chief)

New York State Department of State, Office of Fire Prevention and Control
DOS-0347 (12/02)

V Hazardous Material Listing (attach additional sheets if necessary)
Note: Definitions of symbols are on the second page of the instruction sheet.

Identifying Symbol	Material Description & Proper Shipping Name	Total Amount	Identifying Symbol	Material Description & Proper Shipping Name	Total Amount
					
					
					
					
					
					
					

VI Special Considerations/Remarks:

Appendix B. Combustible Commodities
(FC 2303)

Commodities are the items in high-piled combustible storage, including products and product packaging. Commodities shall be classified as Class I, II, III, IV or high hazard in accordance with this section. Materials listed within each commodity classification are assumed to be unmodified for improved combustibility characteristics. Use of flame-retarding modifiers or the physical form of the material could change the classification. Combustible commodities may include Class II, III, IV or high hazard commodities. The examples of the Class II, III, IV or high hazard commodities are listed below:

Class II commodities. Class II commodities are Class I products in slatted wooden crates, solid wooden boxes, multiple-thickness paperboard cartons or equivalent combustible packaging material with or without pallets. Class II commodities are allowed to contain a limited amount of Group A plastics. Examples of Class II commodities include the following:

Alcoholic beverages not exceeding 20-percent alcohol, in combustible containers
Foods in combustible containers
Incandescent or fluorescent light bulbs in cartons
Thinly coated fine wire on reels or in cartons

Class III commodities. Class III commodities are commodities of wood, paper, natural fiber cloth, or Group C plastics or products thereof, with or without pallets. Products are allowed to contain limited amounts of Group A or B plastics, such as metal bicycles with plastic handles, pedals, seats and tires. Examples of Class III commodities include the following:

Aerosol, Level 1 (see Fire Code Chapter 28)
Combustible fiberboard
Cork, baled
Feed, bagged
Fertilizers, bagged
Food in plastic containers
Furniture: wood, natural fiber, upholstered, nonplastic, wood or metal with plastic-padded and covered arm rests
Glycol in combustible containers not exceeding 25 percent
Liquids, noncombustible, in plastic containers having a capacity of more than 5 gallons (19 L)
Lubricating or hydraulic fluid in metal cans
Lumber
Mattresses, excluding foam rubber and foam plastics
Paints, oil base, in metal cans
Paper, waste, baled
Paper and pulp, horizontal storage, or vertical storage that is banded or protected with approved wrap
Paper in cardboard boxes
Pillows, excluding foam rubber and foam plastics
Plastic-coated paper food containers
Plywood
Rags, baled

Rugs, without foam backing
Sugar, bagged
Wood, baled
Wood doors, frames and cabinets
Yarns of natural fiber and viscose

Class IV commodities. Class IV commodities are Class I, II or III products containing Group A plastics in ordinary corrugated cartons and Class I, II and III products, with Group A plastic packaging, with or without pallets. Group B plastics and free-flowing Group A plastics are also included in this class. The total amount of nonfree-flowing Group A plastics shall be limited. Examples of Class IV commodities include the following:
Aerosol, Level 2 (see Fire Code Chapter 28)
Alcoholic beverages, exceeding 20-percent but less than 80-percent alcohol, in cans or bottles in cartons.
Clothing, synthetic or nonviscose
Combustible metal products (solid)
Furniture, plastic upholstered
Furniture,wood or metal with plastic covering and padding
Glycol in combustible containers (greater than 25 percent and less than 50 percent)
Linoleum products
Paints, oil base in combustible containers
Pharmaceutical, alcoholic elixirs, tonics, etc.
Rugs, foam back
Shingles, asphalt
Thread or yarn, synthetic or nonviscose

High-hazard commodities. High-hazard commodities are high-hazard products presenting special fire hazards beyond those of Class I, II, III or IV. Group A plastics not otherwise classified are included in this class. Examples of high-hazard commodities include the following:
Aerosol, Level 3 (see Fire Code Chapter 28)
Alcoholic beverages, exceeding 80-percent alcohol, in bottles or cartons
Commodities of any class in plastic containers in carousel storage
Flammable solids (except solid combustible metals)
Glycol in combustible containers (50 percent or greater)
Lacquers, which dry by solvent evaporation, in metal cans or cartons
Lubricating or hydraulic fluid in plastic containers
Mattresses, foam rubber or foam plastics
Pallets and flats which are idle combustible
Paper, asphalt, rolled, horizontal storage
Paper, asphalt, rolled, vertical storage
Paper and pulp, rolled, in vertical storage which is unbanded or not protected with an approved wrap
Pillows, foam rubber and foam plastics
Pyroxylin
Rubber tires
Vegetable oil and butter in plastic containers

Appendix C. Pre-existing Installations

This part 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.

1. Quantities Limitation for Pre-existing Installations

Generally, for "pre-existing" installations that have been operating with a valid FDNY permit, the permitted storage quantity of flammable and combustible liquids would be established by that permit.

Any pre-existing installations that are requesting an increase of their previously **permitted storage quantities when the aggregate quantity will be in excess of the maximum allowable quantity (MAQ) listed in the 2nd part of this study material (e.g. Table 8-1 and Table 8-2) shall comply with the current Fire Code. If the quantity of flammable or combustible liquids is in excess of a previously permitted quantity in any pre-existing installations, a revised FDNY permit must be obtained.**

2. Pre-existing Tanks Capacity Limitations for Flammable Liquid Manufacture

Each tank used for the storage of volatile flammable oil shall have a capacity not exceeding 4,000 gallons when equipped with a double complete shell or when embedded or encased in twelve inches of concrete to the level of the top of the tanks. Aggregate capacity of all tanks at a premises shall not be in excess of 20,000 gallons.

3. 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/combustible mixtures, except that, where flammable/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 be accordance with the Building Code.

4. The Quantity Limitations for Distilled Liquors, Spirits or Alcohols

The combined total amount of distilled liquor, spirits or alcohols must not exceed 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. The total amount must not exceed 3,000 gallons, if such distilled liquor, spirits or alcohols is dispensed or used on the premises.

5. The Requirements for Petroleum, Shale Oils and the Liquid Products thereof

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 550 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 100°F, when tested in a Tagliabue open cup tester—1,100 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 December 6th, 1968:
      - for storage of over 45,000 gallons: sprinkler protection shall be provided;
      - for storage of between 22,500 and 45,000gallons: sprinkler protection, or smoke detection or thermostatic alarm system with connection to central office, shall be provided;
      - for storage of less than 22,500 gallons: portable fire fighting appliances, as the commissioner may direct, shall be provided.

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

(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 5 gallons or less and for use only.

6. The Quantity Limitations for the Storage of Fats and Oils

An approved system of automatic sprinklers shall be provided when fats and oils are stored in quantities exceeding the equivalent of 100 barrels. In addition, when more than 100 barrels of fats and oils are to be stored in any building occupied in part as a dwelling, that portion of the building occupied by the applicant must be separated from the rest of the building by fireproof walls and floors of at least a three hour rating.

7. Pre-existing Liquid Tank Storage Systems in Paint Stores

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. Tanks are to be approved 275 or 550 gallon capacity. Electrical equipment is to be explosion-proof.

Combustible liquids which flash over 100°F may be stored in Bowser or similar type above ground tanks which shall not exceed 110 gallons in capacity. The number of Bowser or similar type tanks shall not exceed 5.

8. Pre-existing Flammable and Combustible Liquid Storage

8.1 Storage and Sale of Acetone and/or Nail Polish Remover

Not more than one drum of acetone shall be allowed in a frame building. With regard to the storage and use of raw materials, such as acetone, vegetable and essential oils, the following requirements are applicable:

(1). For 55 gallons or less of acetone:
- (i) Metal storage cabinet;
- (ii) Cabinet shall be against an outside building wall and remote from possible ignition sources;
- (iii) Cabinet to be provided with top and bottom ventilation to outer air.

(2). For quantities exceeding 55 gallons and up to 275 gallons:
- (i) Storage room. Storage room shall be separated or cut off from remainder of premises by, at least, a 1 1/2 hour fire retardant partition. Floor and ceiling should be of non-combustible construction and designed with sufficient strength and customary safety factors and sustain maximum imposed loads.
- (ii) The storage room shall be provided with a suitable extinguishing system. This equipment may be of the foam or CO2 type.
- (iii) Ample ventilation to outer air shall be provided in storage room.
- (iv) All lights, switches and other electrical apparatus shall be of the explosion proof type.
- (v) Heat, if required, shall be by indirect means, hot water or steam coils to be located either at ceiling or at walls above maximum drum height. No open flame devices shall be allowed in room or near communicating opening.
- (vi) All electrical equipment, in or near the workroom or laboratory room, where acetone is used, shall be of the explosion proof type.
- (vii) All machinery shall be properly grounded.
- (viii) Fixed ventilation (natural or mechanical) shall be provided in room where acetone is used.

(3). For the quantity of acetone exceeds 275 gallons, a buried storage system shall be required.

8.2 Storage and Sale of Flammable and/or Volatile Flammable Oils in Retail Paint Stores

In buildings other than those with dwelling facilities where not more than 15 persons congregate, the quantity of such liquids, flammable mixtures and/or volatile flammable oils, shall be limited to 55 gallons above ground, or in an approved underground tank when the amount exceeds 55 gallons.

In buildings used for a place of assembly or licensed place of public assembly, or in buildings where more than 15 persons congregate above the paint store occupancy, the

quantity of such liquids shall be limited to 5 gallons above ground in a safety can, or in an approved underground tank when the amount exceeds 5 gallons.

8.3 Storage of Paints, Varnishes and Lacquers, and Similar Products in Multiple Dwellings

(1). No volatile flammable oils shall be stored.
(2). Paints, varnishes, enamels and all similar materials used for painting or coating, having a flashpoint, shall be stored in storage rooms of fireproof construction. No such storage shall be permitted in basement, cellar or sub-cellar areas of non-fireproof buildings, except in such areas which have heretofore been approved by the fire commissioner. Storage rooms in basement or cellar occupancies having a door leading to the outer air with a maximum distance of 25 feet from the paint room door to such door to the outer air and easily accessible by ramp or stairway to grade, may be permitted in class I fireproof buildings.
(3). The storage room shall be provided with either natural ventilation or an independent duct leading to the outer air. The ventilation shall not terminate in an enclosed court nor within 20 feet of any building opening. Motors of ventilating system shall be explosion proof. Automatic sprinklers shall be provided for the storage room. Sprinklers may be connected to the house supply.
(4). The door to the paint storage room shall be fireproof and self closing. A masonry or concrete sill at least 6 inches above the floor shall be provided at the door opening. Door shall be kept securely locked when room is not in actual use.
(5). No portable electrical appliances of any kind shall be used in the storage room.
(6). All globes shall be of the vapor proof type. The electric light switch shall be located outside of the room.
(7). The door to the room shall be marked "Paint Storage Room – No Smoking" in RED letters at least 4" high.
(8). The total quantity of paint material shall not exceed 200 gallons in non-fireproof multiple dwellings, except where storage in a separate fireproof exterior building.

In class I fireproof multiple dwellings, or complexes of contiguous multiple dwellings under the same ownership, 2 gallons per apartment, but not more than 2,000 gallons storage may be permitted provided that, when storage exceeds 200 gallons, the automatic sprinkler system required for the storage room is extra hazard spacing and piping, with a fire department siamese connection, that the room is on an outside wall of the building, and that explosion venting is provided. Explosion venting provided shall be a minimum of 10 square feet when less than 20 gallons of material having a flashpoint of under 100°F. Tag. o.c. is stored, and in accordance with NFPA Standard No. 68 (1954) when 20 gallons or more of low flash material under 100°F.Tag. o.c. flash) are stored. (These are in addition to all other requirements specified in these regulations).

(9). All thinning of such paints, etc. shall be prepared in said storage areas.
(10). All such paints, when not in actual use, shall be returned to said approved storage areas. All paint products shall be transported in closed containers.
(11). No spraying or dipping with such paints, etc. may be performed except as provided for in the rules of the Board of Standards and Appeals.

Appendix D. Fire protection system in Group M occupancy

Table 3404.3.6.3 (4)

SPRINKLER SYSTEM PROTECTION FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN 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
	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

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 Section 104.7.2.

Table 3404.3.6.3 (5)
SPRINKLER SYSTEM PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN 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				Min. Hose Stream Demand (gpm)	Min. Duration Sprinkler and Hose Stream (hours)
	Density (gpm/ft²)	Area (square feet) High-temp. sprinklers	Area (square feet) Ordinary temp. sprinklers	Max. spacing (ft²/head)	Racks up to 9 feet deep	Racks ore than 9 feet to 12 feet deep	30 psi (standard orifice) 14 psi (large orifice)	Number of sprinklers operating		
I (max. 25-foot height) Option 1	0.40	3,000	5,000	80	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. 8 sprinklers if only 1 level 2. 6 sprinklers each on 2 levels if only 2 levels 3. 6 sprinklers each on top 3 levels, if there or more levels 4. Hydraulically most remote	750	2
I (max. 25-foot height) Option 2	0.55	2,000[b]	Not Applicable	100	See 1 through 4 above	See 1 through 4 above	14 psi (0.53-in orifice)	See 1 through 4 above	500	2
I and II (max. 14-foot storage height) (max.3 tiers)	0.55[c]	2,000[b,d]	Not Applicable	100	Not Applicable None for max. 6-foot-deep racks	Not Applicable			500	2
II (max. 25-foot height)	0.30	3,000	5,000	100	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. One line sprinklers b/w levels at nearest 10-foot vertical intervals 3. Locate in longitudinal flue spaces, staggered vertical. 4. Shields required where multilevel	1. Ordinary temperature sprinklers 8 feet apart horizontally 2. Two lines b/w levels at nearest 10-foot vertical intervals 3. Locate in transverse flue spaces, staggered vertical and within 20 inches of aisle. 4. Shields required where multilevel	30 psi	Hydraulically most remote-6 sprinklers at each level, up to a max. of 3 levels	750	2
III (40-foot height)	0.25	3,000	5,000	120	Same as for Class II liquids	Same as for Class II liquids	30 psi	Same as for Class II liquids	500	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.

Table 3404.3.6.3 (6)
SPRINKLER SYSTEM PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN CONTAINERS GREATER THAN 5-GALLON CAPACITY[a]

Class Liquid	Ceiling Sprinkler Design and Demand			In-rack Sprinkler Arrangement and Demand				Min. Hose Stream Demand (gpm)	Min. Duration Sprinkler and Hose Stream (hours)
	Density (gpm/ft²)	Area (square feet)		Max. spacing (ft²/head)	On-side storage racks up to 9-foot-deep racks	On-end storage (on pallets) up to 9-foot-deep racks	Min. nozzle pressure	Number of sprinklers operating	
		High-temp. sprinklers	Ordinary temp. sprinklers						
IA (max. 25-foot height)	0.60	3,000	5,000	80	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 level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multilevel	30 psi	Hydraulically most remote- 6 sprinklers at each level	1,000	2
IB, IC and II (max. 25-foot height)	0.60	3,000	5,000	100	1. See 1 above 2. One line sprinklers every 3 tiers of storage 3. See 3 above 4. See 4 above	See 1 through 4 above	30 psi	Hydraulically most remote	750	2
III (max. 40-foot height)	0.25	3,000	5,000	120	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	500	1

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.

Table 3404.3.6.3 (7)
AUTOMATIC AFFF WATER PROTECTION REQUIREMENTS FOR RACK STORAGE OF LIQUIDS IN CONTAINERS GREATER THAN 5-GALLON CAPACITY[a,b]

Class Liquid	Ceiling Sprinkler Design and Demand			In-rack Sprinkler Arrangement and Demand[c]				Min. Duration AFFF Supply	Duration Water Supply
	Density (gpm/ft²)	Area (square feet)		On-side storage racks up to 9-foot-deep racks	Min. nozzle pressure	Number of sprinklers operating	Hose stream demand[d]		
		High-temp. sprinklers	Ordinary temp. sprinklers						
IA, IB, IC and II	0.30	1,500	2,500	1. Ordinary temperature sprinklers up to 10 feet apart horizontally 2. One line sprinklers above each level of storage 3. Locate in longitudinal flue space, staggered vertical 4. Shields required where multilevel	30 psi	3 sprinklers per level	500(gpm)	15	2 (hours)

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 231C.
c. Storage heights shall not exceed 25 feet.
d. Hose stream demand includes 1.5-inch inside hand hose, when required.

Table 3404.3.6.3 (8)
SPRINKLER SYSTEM PROTECTION REQUIREMENTS FOR CLASS I LIQUID STORAGE 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]

Storage Height	Ceiling Sprinkler Design and Demand				In-rack Sprinkler Arrangement and Demand				Min. Hose Stream Demand	Min. Duration Sprinklers and Hose Stream
	Density (gpm/ft²)	Area (square feet) High-temp.	Area (square feet) Ordinary temp.	Max. spacing (ft²/head)	Racks up to 9 feet deep	Racks 9 to 12 feet	Min. nozzle pressure	Number of sprinklers operating		
Max. 20-foot storage height	0.60	2,000[b]	Not Applicable	100	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. 6 sprinklers each on 2 levels 2. Hydraulically most remote 12 sprinklers	15(gpm)	2 (hours)

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.

Table 3404.3.7.5.1
AUTOMATIC AFFF-WATER PROTECTION REQUIREMENTS FOR SOLID-PILE AND PALLETIZED STORAGE OF LIQUIDS IN METAL CONTAINERS OF 5-GALLON CAPACITY OR LESSa,b

Package Type	Class Liquid	Ceiling Sprinkler Design and Demand					Storage Height (feet)	Hose Demand (gpm)	Min. Duration AFFF supply	Duration Water Supply (hours)
		Density (gpm/ft²)	Area (ft²)	Temp. rating	Max. spacing	Orifice size (inch)				
Cartoned	IB, IC, II and III	0.40	2,000	286°F	100 ft²/head	0.531	11	500	15	2
Uncartoned	IB, IC, II and III	0.30	2,000	286°F	100 ft²/head	0.5 or 0.531	12	500	15	2

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 1.5-inch inside hand hose, when required