Revised on 11/20/14

FIRE DEPARTMENT • CITY OF NEW YORK

STUDY MATERIAL FOR THE EXAMINATION FOR CERTIFICATE OF FITNESS FOR

Storage and Handling of Corrosives and Oxidizers

C-42

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Contents

NOTICE OF EXAMINATION 3
STUDY MATERIAL AND TEST INFORMATION 9
Introduction 11
Pre-existing and New Installations **11**
PART I: 14
1. DEFINITIONS **14**
2. GENERAL FIRE CODE REQUIREMENTS **20**
Permits 21
New York State General Municipal Law (NYSGML) **23**
3. GENERAL HOUSEKEEPING AND GOOD WORK PRACTICES **25**
General Storage 25
Cabinet Storage 26
4. GENERAL DOT INFORMATION **29**
5. NFPA HAZARD DIAMOND SIGN EXPLANATION **30**
6. LOCATION STORAGE RESTRICTIONS **32**
7. MATERIAL SAFETY DATA SHEETS (MSDS) **33**
8. EXPOSURE HAZARDS **33**
9. EMERGENCY PROCEDURES **34**
10. PENALTIES FOR NON-COMPLIANCE WITH FIRE CODE **35**
PART II: CORROSIVES 36
PERMITS AND CERTIFICATES OF FITNESS **36**
MATERIAL DESCRIPTION **36**
STORAGE & USE REQUIREMENTS **40**
Storage 40
Handling and Use 42
PART III: OXIDIZERS 44
PERMIT AND CERTIFICATE OF FITNESS **45**
STORAGE REQUIREMENTS **45**
HANDLING & USE **47**
FIRE EXTINGUISHING DEVICES AND SYSTEMS: 49
Tables **54**
Hazardous Materials Report Form **57**
Sample Material Safety Data Sheet (MSDS) **61**

Revised on 11/20/14

NOTICE OF EXAMINATION

Title: **Certificate of Fitness for Storage and Handling of Corrosives and Oxidizers (C-42)**

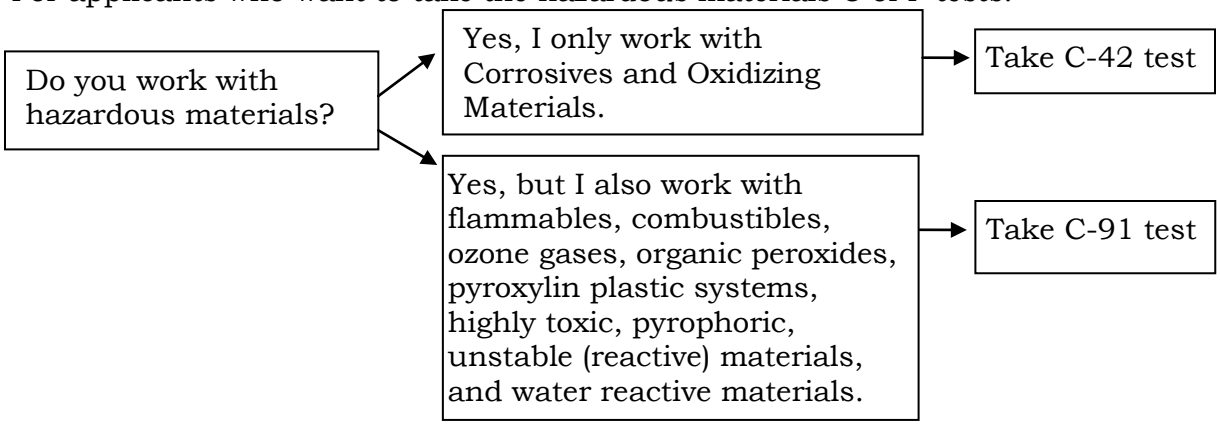
Date of Exam: Written exams are conducted Monday through Friday (except legal holidays) 8:00 AM to 2:30 PM.

REQUIREMENTS FOR WRITTEN EXAM

Applicants who need to take the exam must apply in person and bring the following documents:

1. Applicants must be at least 18 years of age.
2. Applicants must have a reasonable understanding of the English language.
3. Applicant must provide two forms of identifications; at least one identification must be government issued photo identification, such as a State-issued Driver's License or Non Driver's License or a passport.
4. Applicants must present a letter of recommendation from his/her employer. The letter must be on official letterhead, and must state the applicant's full name, experience and the address where the applicant will work. If the applicants are self-employed or the principal of the company, they must submit a notarized letter attesting to their qualifications. For more info: http://www.nyc.gov/html/fdny/html/c_of_f/cof_requirements.shtml
5. The letter of recommendation from his/her employer must also state (1) the address of premises where applicant will be employed; (2) The applicant receives the training in the performance of their duties in accordance with the fire safety and evacuation plan. (The sample letter is on the page 6)
6. Applicants must present a completed application for certificate of fitness (A-20 Form). http://www.nyc.gov/html/fdny/pdf/a20.pdf
7. Applicants not currently employed may take the exam without the recommendation letter. If the applicants pass the exam, FDNY will issue a temporary letter with picture for the job seeking purpose. The C of F card will not be issued unless the applicants are employed and provide the recommendation letter from his/her employer.
8. *Special Note:* C-42 can be issued to those who have already passed the C-91 exam. *$25 COF card fee applies.*

For applicants who want to take the hazardous materials C of F tests:



9. **APPLICATION FEE:**

Pay the **$25** application fee in person by one of the following methods:

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

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

- A letter requesting fee wavier 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

A convenience fee of 2.49% will be applied to all credit card payments.

10. **EXAM INFORMATION**

The **C-42** exam will consist of **25** multiple-choice questions, administered on a "touch screen" computer monitor. It is a time-limit exam. 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: A copy of the tables that reference permit and supervision requirements for corrosives and oxidizers will be provided. This study material, however, will NOT be provided during your exam.

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

11. If all the requirements are meet and pass the exam a certificate will be issued the same day. Applicant who fails the exam will receive a failure

report. To retake the exam applicants will need to submit a new application and payment.

RENEWAL REQUIREMENTS

This Certificate of Fitness must be renewed every ***THREE YEARS***. The renewal fee is **$15**. FDNY also reserves the right to require the applicants to take a re-examination upon submission of renewal applications.

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

To change a mailing address:

- Submit a letter requesting the change of mailing address and a copy of your C of F with $5.00 fee.

To change a work location,
Submit a letter from your current employer (on company letterhead) confirming that you are an employee and stating your new work location with a copy of your C of F and a $5.00 fee
To request a replacement certificate:
Submit a driver's license or passport, social security number, mailing address and a $5.00 fee.
The certificate can be renewed **On-line**, **by Mail** or **in Person**.

- **Renewal online**

If you are an individual, make sure you have your 12 digit Certificate of Fitness Access ID. This can be found on your Renewal Notice. If you do not have your Renewal Notice, your Access ID is your 8 digit Certificate of Fitness number and the last four digits of your social security number. If you are submitting renewals on behalf of a company's employees, the company must be approved by FDNY and have an 8 digit Company Code. To request approval, email pubrenew@fdny.nyc.gov.

Renewal fee can be paid by one of the following methods:

- Credit card (American Express, Discover, MasterCard, or Visa)
- Debit card (MasterCard or Visa)
- E-check

A fee exempted applicants cannot renew online only by mail or in person.

If all the requirements are met, the certificate of fitness will be mailed out within 10 days.

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For online renewal go to:
https://paydirect.link2gov.com/FDNYCOF/ItemSearch

- **Renewal by mail**

Mail your Renewal Notice (if you did not receive a Renewal Notice, a copy of your certificate), along with your fee payment

Personal or company check or money order (made payable to the NYC Fire Department)

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

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

NYC Fire Department (FDNY)
Cashier's Unit
9 MetroTech Center, 1st Floor
Brooklyn, NY 11201

If all the requirements are met, the certificate of fitness will be mailed out within four to six weeks.

- **Renewal in person**

Submit your Renewal Notice (or if you did not receive a Renewal Notice, a copy of your certificate), along with your fee payment by one of the following methods:

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

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

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

NYC Fire Department (FDNY)
Cashier's Unit
9 MetroTech Center, 1st Floor
Brooklyn, NY 11201

If all the requirements are met, the certificate of fitness will be issued the same day.

Revised on 11/20/14

A convenience fee of 2.49% will be applied to all credit card payments for original or renewal certificates.

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

Revised on 11/20/14

Sample of recommendation letter <u>on employer's letterhead</u> (C-42 C of F)

Date:_____
Fire Department
Bureau of Fire Prevention
9 MetroTech Center
Brooklyn, NY 11201-3857

Dear Sir/Madam:

I am pleased to recommend _____ to apply for a Certificate
(Applicant's name)
of Fitness for ***C-42: Storage and Handling of Corrosives and Oxidizers***. He/she has _____ of experience and **received the training in the performance of**
(years, months)
his/her duties located at _____.
(business address)

_____
(signature of employer)

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

SAMPLE
SAMPLE

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STUDY MATERIAL AND TEST INFORMATION

This study material will help you prepare for the written examination of the certificate of fitness (**C of F**) for the C-42 Storage and Handling of Corrosives and Oxidizers. The study materials include information taken from the New York City Fire Code (**FC**) and Fire Department rules. The study material does not contain all the information you need to know in order to perform the responsibilities of storage and handling of corrosives and oxidizers safely. It is your responsibility to become familiar with all applicable laws, rules and regulations of the federal, state and city agencies having jurisdiction on subject matter, even though such requirements are not included in this study material. You need to be familiar with **FC31** and **FC 40. It is critical that you read and understand this booklet to help increase you chance of passing this exam.**

About the Test

You must pass the given multiple choice test to qualify for the certificate of fitness. A score of 70% correct is required in order to pass the test. All questions have four optional answers. There is **only *one*** correct answer for each question. If you do not answer a question, or if you mark more than one answer to a single question, your answer to that question will be scored as incorrect. Read each question carefully before marking your answer. There is no penalty for guessing.

Sample Questions

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 in the testing room
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 in the testing room
C. the examiner in the testing room
D. the computer help desk

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

Introduction

This document outlines New York City Fire Department regulations for the safe handling and storage of hazardous corrosive and oxidizer chemicals. 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 used. The Fire Commissioner may require an additional Certificate of Fitness holder in some locations. The Certificate of Fitness holders are responsible for ensuring that all Fire Department regulations related to the safe handling and storage of hazardous chemicals or materials are obeyed on the premises.

The booklet provides a brief overview of the safety precautions, rules, guidelines, work practices, and emergency procedures for the storage, handling and use of corrosives and oxidizers. The Certificate of Fitness holder must know the properties of each of these hazardous materials and the proper storage, handling and use requirements. S/he must also know the procedures that must be followed when dealing with fire or spill emergencies for this hazard.

Pre-existing and New Installations

In July of 2008, 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 2008 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 2008 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.

Revised on 11/20/14

This study guide is broken down into three sections **Part I**: Definitions and General information about hazardous materials, **Part II:** Corrosives and **Part III**: Oxidizers.

C-42

- Corrosive materials systems and facilities: **[Fire Code Chapter 31]**
- Oxidizer systems and facilities: **[Fire Code Chapter 40]**

The hazardous materials below are NOT covered in this study guide and separate testing on these topics is required.

Covered by C-91

- Flammable solids systems and facilities: **[Fire Code Chapter 36]**
- Highly toxic and toxic materials systems and facilities: **[Fire Code Chapter 37]**
- Ozone gas generators **[Fire Code Chapter 37]**
- Organic peroxides storage and facilities: **[Fire Code Chapter 39]**
- Pyrophoric materials systems and facilities: **[Fire Code Chapter 41]**
- Pyroxylin plastics systems and facilities: **[Fire Code Chapter 42]**
- Unstable (Reactive) materials systems and facilities: **[Fire Code Chapter 43]**
- Water-reactive solids and liquids systems and facilities: **[Fire Code Chapter 44]**
- Flammable and combustible liquids: **[Fire Code Chapter 34]**

The C-91 covers all of the hazardous materials listed above. A C-42 can be issued to those who have already passed the C-91.

Covered by various exams

- Compressed Gases: **[Fire Code Chapter 30]**
- Explosives, Fireworks & Special Effects: **[Fire Code Chapter 33]**
- Liquid Petroleum Gas (LPG): **[Fire Code Chapter 38]**

C-14 →

- Non-production chemical laboratories: **[Fire Code Section 2706]**
- Combustible fibers: **[Fire Code Chapter 29]**

G-71 or G-79 →

- Cryogenic fluids systems and facilities: **[Fire Code Chapter 32]**

G-98 →

- Flammable gases: **[Fire Code Chapter 35]**

PART I:

1. DEFINITIONS

ACID: A solution that has a pH less than 7.0.

BASE: A solution that has a pH greater than 7.0. Basic materials or solutions are sometimes called caustic or alkaline

BOILING POINT: The temperature at which the vapor pressure of a liquid equals the atmospheric pressure of 14.7 pounds per square inch (psi) 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.

CEILING LIMIT: The maximum concentration of an airborne contaminant to which one may be exposed shall be as established by the regulations of the United States Department of Labor, as set forth in 29 CFR Part 1910.1000, or if not listed therein, the ceiling Recommended Exposure Limit (REL-C) concentrations published by the U.S. National Institute for Occupational Safety and Health (NIOSH), the Threshold Limit Value — Ceiling (TLV-C) concentrations published by the American Conference of Governmental Industrial Hygienists (ACGIH), the ceiling Workplace Environmental Exposure Level (WEEL-Ceiling) Guides published by the American Industrial Hygiene Association (AIHA), or other approved standard.

CHEMICAL: An element, chemical compound or mixture of elements or compounds or both.

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.

CONTAINER: For solid and liquid hazardous materials, a vessel of 60 gallons 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. 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.

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).

CONTAINMENT SYSTEM: A gas-tight recovery system comprised of devices or equipment which, when placed over or around the portion of the compressed gas container that is leaking, stops or controls the escape of gas from the container.

CONTAINMENT VESSEL: A gas-tight vessel which, when installed or placed over or around a leaking compressed gas container, confines the container and the gas leaking there from.

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.

CORROSIVE MATERIAL: A material that causes full thickness destruction of human skin at the site of contact within a specified period of time when tested by methods set forth in Department of Transportation (DOT) regulations 49 CFR Sections 173.136 and 173.137, or a liquid that has a severe corrosion rate on steel or aluminum based on the criteria set forth in DOT regulations 49 CFR Section 173.137(c) (2).

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.

DETONATION: An exothermic reaction with explosive effect that utilizes shock compression as the principal heating mechanism and generates a shock wave

in the material that establishes and maintains a reaction that progresses through the material at a rate greater than the velocity of sound.

DESIGN PRESSURE: The maximum gauge pressure that a pressure vessel, device, component or system is designed to withstand safely under the temperature and conditions of use.

DETACHED BUILDING: A separate single-story building, without a basement or crawl space, used for the storage, handling or use of hazardous materials and located an approved distance from other buildings or structures.

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.

EXCESS FLOW CONTROL: A fail-safe system or other approved device, equipment or system designed to shut off flow caused by a rupture in a pressurized piping system.

EXHAUSTED ENCLOSURE: A device, typically consisting of a hood equipped with a fan that serves to capture and exhaust fumes, mist, vapors and gases generated at a workstation or other local environment. An exhausted enclosure does not include a room provided with general ventilation.

EXOTHERMIC: a process or reaction that releases energy usually in the form of heat, but also in form of light e.g. a spark, flame, or explosion.

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).

FIRE: a chemical reaction during which oxygen combines with a fuel in the presence of oxygen, or an oxidizer. A source of ignition energy is required. The reaction takes place at a moderate rate with a release of light, heat and sound.

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.

FUEL: any material (solid, liquid or gas) that can undergo (rapid or moderate oxidation, or burning.) Burning is accomplished by materials which are combustible or flammable.

GAS CABINET: A fully enclosed, noncombustible enclosure used to provide an isolated environment for compressed gas containers in storage or use, including any doors and access ports for exchanging containers and accessing pressure-regulating controls.

GAS ROOM: A separately ventilated, fully enclosed room in which only compressed gases and associated equipment and supplies are stored or used.

GENERAL SUPERVISION: Supervision by the holder of any certificate of fitness who is responsible for performing the duties set forth in the Fire Code but need not be personally present on the premises at all times. The **storage** of oxidizers requiring a permit or the storage of corrosive materials in quantities exceeding 55 gallons of liquid or 1,000 pounds of solid shall be under the **general** supervision of a certificate of fitness holder.

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 New Fire Code, 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.

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH): The concentration of air-borne contaminants that poses a threat of death, immediate or delayed permanent adverse health effects, or effects that could prevent escape from such an environment, as established by the National Institute of Occupational Safety and Health (NIOSH) based on both toxicity and flammability. It generally is expressed in parts per million by volume (ppm v/v) or milligrams per cubic meter (mg/m3).

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.

LABORATORY CHEMICAL: A material with a health, flammability and/or instability hazard ranking of 2, 3 or 4 as defined in NFPA 704.

LABORATORY UNIT: An enclosed space of a minimum one-hour fire rated construction, designed or used as a non-production laboratory. Laboratory units may include one or more separate laboratory work areas, and accessory storage rooms or spaces within or contiguous with the laboratory unit, such as offices and lavatories.

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

MATERIAL SAFETY DATA SHEET (MSDS): A document prepared in accordance with the regulations of the United States Department of Labor, as set forth in 29 CFR Part 1910.1200 or a federally approved state OSHA plan which sets forth information concerning a hazardous material.

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA: The maximum amount of a hazardous material allowed to be stored, handled and/or used within a control area inside a building or structure or an outdoor control area. **The storage, handling and use MAQs are not additive**; that is, the maximum allowable quantity of any hazardous material stored, handled and/or used within a control area **shall not exceed** the maximum allowable quantity listed in the Fire Code for the **storage** of that particular hazardous material.

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

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

OXIDIZER: A material that readily yields oxygen or other oxidizing gas, such as bromine, chlorine and fluorine, or that readily reacts to promote or initiate combustion of combustible materials, classified as follows:

- **Class 1**. An oxidizer whose primary hazard is that it slightly increases the burning rate but which does not cause spontaneous ignition when it comes in contact with combustible materials.
- **Class 2**. An oxidizer that will cause a moderate increase in the burning rate or that causes spontaneous ignition of combustible materials with which it comes in contact.
- **Class 3**. An oxidizer that will cause a severe increase in the burning rate of combustible materials with which it comes in contact or that will undergo vigorous self-sustained decomposition caused by contamination or exposure to heat.
- **Class 4**. An oxidizer that can undergo an explosive reaction due to contamination or exposure to thermal or physical shock and can cause spontaneous ignition of combustibles.

OXIDIZING GAS: A gas that can support and accelerate combustion of other materials.

OXIDIZING MATERIALS: Any material that can serve as an oxidizer in a chemical reaction.

PERMISSIBLE EXPOSURE LIMIT (PEL): The maximum permitted 8-hour time-weighted average concentration of an air-borne contaminant as established by the regulations of the United States Department of Labor, as set forth in 29 CFR Part 1910.1000, the Recommended Exposure Limit (REL) concentrations published by the U.S. National Institute for Occupational Safety and Health (NIOSH), the Threshold Limit Value-Time Weighted Average (TLV-TWA) concentrations published by the American Conference of Governmental Industrial Hygienists (ACGIH), the Workplace Environmental Exposure Level (WEEL) Guides published by the American Industrial Hygiene Association (AIHA), or other approved standard.

PERSONAL SUPERVISION: Supervision by the holder of any certificate of fitness 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. For example, the **handling and use** of highly toxic and toxic materials, water-reactive solids and liquids in quantities requiring a permit or the handling and use of corrosive materials in quantities exceeding 55 gallons of liquid or 1,000 pounds of solid shall be under the **personal** supervision of a certificate of fitness holder.

pH: The negative logarithm of the hydrogen ion (H^+) concentration of a solution (in moles per liter or molarity).

PHYSICAL HAZARD: A chemical for which there is evidence that it is a combustible or flammable liquid; a flammable solid or gas; an explosive; an oxidizer; a water-reactive solid or liquid.

PILE: A grouping of materials (including a stack, group, or placement) for storage or staging. ("Containers in piles" "Piling containers: Containers . . . when piled one upon the other".)

REDUCED FLOW VALVE: A valve equipped with a restricted flow orifice and inserted into a compressed gas container that is designed to reduce the maximum flow from the valve under full-flow conditions. The maximum flow rate from the valve is determined with the valve allowed to flow to atmosphere with no other piping or fittings attached.

SAFETY CAN: An approved container with a capacity of not more than 5-gallons 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.

SOLID: A material that has a melting point and decomposes or sublimates at a temperature greater than 68°F.

STANDARD CUBIC FEET (SCF): Cubic feet of gas at normal temperature and pressure (NTP).

WATER-REACTIVE MATERIAL. A material that explodes, violently reacts, produces flammable, toxic or other hazardous gases, and/or generates enough heat to cause auto-ignition or ignition of combustible materials upon exposure to water or moisture. Water-reactive materials are classified as follows:

Class 1. Materials that react with water with some release of energy, but not violently.

Class 2. Materials that react violently with water or cause water to boil upon contact; produce flammable, toxic or other hazardous gases upon contact with water; or upon contact with water generate sufficient heat to cause auto-ignition or ignition of adjoining combustible materials.

Class 3. Materials that react explosively with water without requiring heat or confinement.

2. GENERAL FIRE CODE REQUIREMENTS

The certificate of fitness holder is responsible for ensuring that all required permits are secured and posted in visible locations. The holder is responsible for complying with the requirements of the Fire Code.

Permits are valid for 12 months only. Enforcement action may be taken against the certificate of fitness holder when the required permits are not secured and posted. The enforcement actions may include fines and/or the revocation of the Certificate of fitness.

An FDNY permit is required to manufacture, store, handle, use, sell or transport hazardous materials or combustible materials when required by the Fire Code, usually based on storage quantities.

Every permit or renewal shall require an inspection and shall expire after twelve months. Permits are not transferable and any change in occupancy, operation, tenancy or ownership shall require that a new permit be issued.

Current permits (or a legible copy) shall be posted in a conspicuous location on the premises and shall be readily available for inspection by any representative of the department.

In addition to the requirements of Fire Code, all applicants for a permit must meet the requirements of the Department of Buildings. Other agencies such as NYC DEP, NYS DEC, and USEPA may have additional requirements.

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.

Permits

1. **Site-specific permit.** Such permit authorizes the permit holder to manufacture, store, handle, use or sell hazardous materials or combustible materials, or conduct an operation or maintain a facility at a specific premises or location, for which a permit is required by FC105.6.

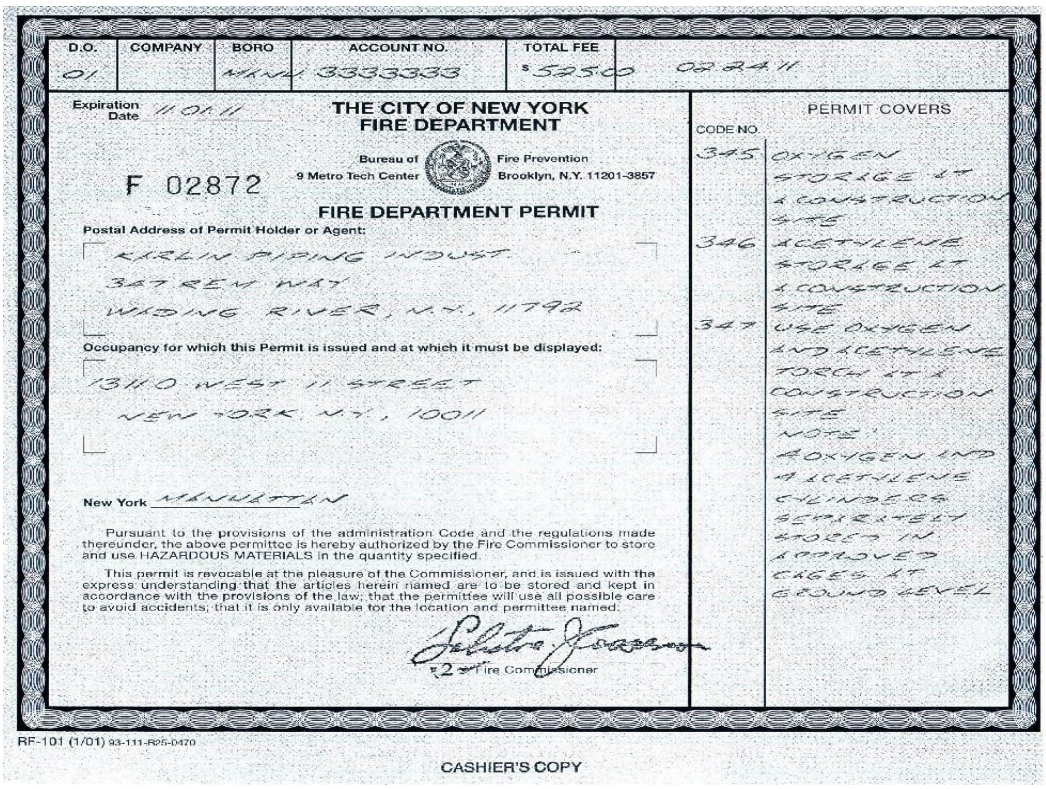
2. **Citywide permit.** Such permit authorizes the permit holder to store, handle, use or sell hazardous materials, or conduct an operation on a citywide basis, for which a permit is required by FC105.6. A citywide permit is valid to temporarily store, handle, use or sell hazardous materials or to conduct an operation at one or more locations subject to the following restrictions:

    - The duration of such activity at any individual location does not exceed 30 calendar days and all hazardous materials associated with such activity are removed from the location at the end of

the workday. Periods of activity in excess of 30 calendar days at any one location shall require a site-specific permit.

- The quantity of hazardous materials being temporarily stored and used does not exceed 5 gallons (19 L) of gasoline, or 250 gallons (946 L) of any other flammable liquid, and 300 gallons (1136 L) of any combustible liquid. Storage or use of hazardous materials in quantities exceeding these amounts requires a site-specific permit for each location at which such storage or use occurs.

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.



D.O.	COMPANY	BORO	ACCOUNT NO.	TOTAL FEE	
01		MANH	3333333	$ 525.00	02 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
WADING 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.

Fire Commissioner

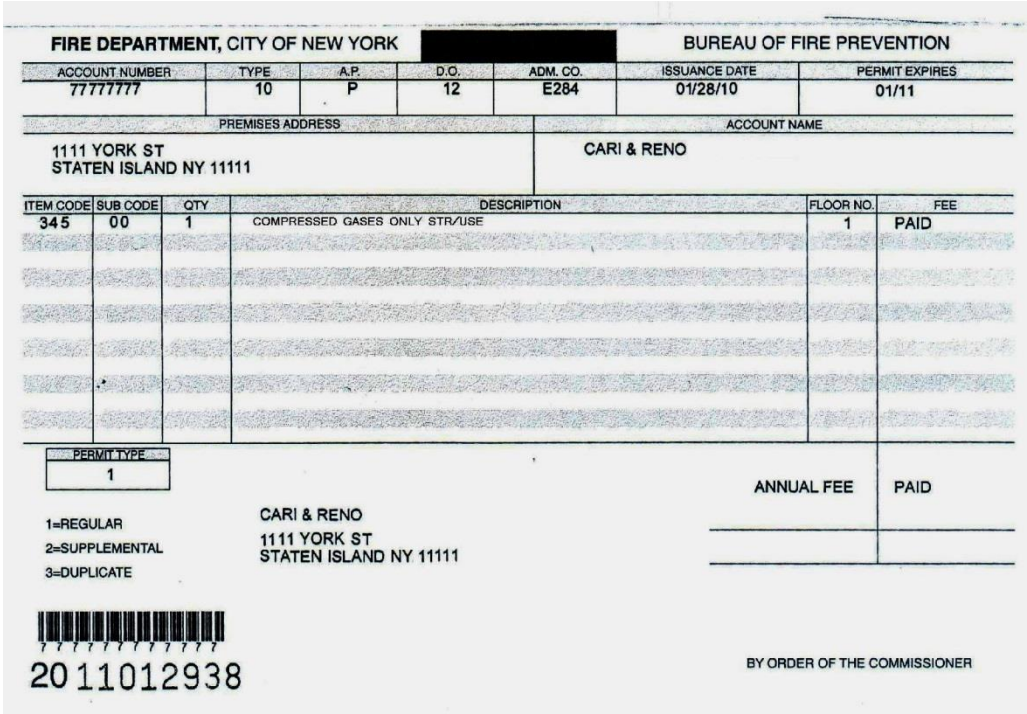
PERMIT COVERS

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

New York State General Municipal Law (NYSGML)

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 NYSGML for the facility or premises for which a permit is sought. (***See Appendix)***

Duties: In addition to any other responsibilities specified in this code or the rules, a certificate holder shall be responsible for:

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

times while conducting or supervising the material, operation or facility for which the certificate is required.

4. When becoming aware that a required fire protection system for hazardous material is out of service, assure that immediate notification is made to the FDNY and the C of F holder for fire protection system.

Hazardous Materials Management Plan: The Commissioner may require each application for a permit to include a Hazardous Materials Management Plan (HMMP). Such plan shall be drawn approximately to scale. The HMMP shall contain the following:

- Storage, handling and use areas.
- Maximum amount of each material stored, handled or used in each area.
- Type and size of containers to be used for storage.
- Location of valves and devices used to control and mitigate the accidental or unauthorized release of hazardous materials, and where such valves are of the self-indicating type, an illustration of their on and off position.
- Piping through which hazardous material liquids or gases are transferred, other than utility-owned natural gas lines and low-pressure natural gas lines subject to compliance with the requirements of the Plumbing Code.
- Storage plan showing the storage arrangement, including the location and dimensions of aisles.
- The location and type of emergency equipment.
- Such other information and documentation as the Commissioner may prescribe.

HMMP when required shall be submitted to:
Toxic Substance Unit
Haz-Mat Battalion FDNY
Division of Training, Building 8
Randall's Island, NY 10035

**In some cases FDNY will accept the New York Right to Know (NYRTK) Facility Inventory form which is filed with DEP in lieu of the HMMP*

3. GENERAL HOUSEKEEPING AND GOOD WORK PRACTICES

Poor housekeeping & work practices are one of the leading causes of hazardous material incidents, work place accidents and fires. Poor housekeeping can result in fire accidents, lost tools/supplies, damaged equipment and contribute to higher operating costs. Good housekeeping minimizes fire, accidents, reduces waste & disposal costs, increases efficiency and generally results in cheaper production costs. Areas kept in neat & organized condition provides a positive impression on inspectors. The following is some guidance on good practices.

General Housekeeping and Standards:

- Access doors, aisles and exit doors clear of obstructions. Keep storage of items out of hallways and stairwells. The Fire Code contains various requirements for aisle spacing depending upon stacking arrangements.
- Whenever feasible, outdoor storage areas should be covered to prevent contamination by the elements.
- Secure storage areas to minimize liability and hazards of intrusion or dumping.
- Be familiar with the use, limitations and location of emergency equipment such as emergency eyewashes, safety showers, fire alarms, exits and fire extinguishers.
- Be aware of Fire Code storage requirements for permit and Certificates of Fitness.
- Material Safety Data Sheet (MSDS, Safety Data Sheets (SDS)) information should be readily available.

General Storage

- Containers should be in good condition and closed when not in use.
- Defective containers shall be promptly removed from service or disposed of in approved manner.
- Chemicals should be stored per manufacturer's recommendations and in such a way to minimize the potential for tipping, tearing, puncture, or breakage.
- Flammable/combustible material must be stored away from open flame or other ignition sources.
- Do not store chemicals above eye level except for containers that are removed with mechanical equipment (e.g., fork-lift).
- Safety cans should be considered for storage of flammable solvents instead of glass containers.
- Do not store unprotected glass containers on the floor.

- Don't stack equipment against containers.
- Raise drums off floor to prevent corrosion from concrete "sweating" or storage in “wet” areas (i.e. pools).
- Segregate incompatible materials/wastes by hazard category to prevent reactions (e.g. acids and bases).
- Storage area should be checked periodically for container integrity, leaks, older stock, faded/missing labels etc.
- Know the characteristic of the material begin stored and possible interaction with other material stored.
- Piles of chemicals should be stacked in a secure manner, properly labeled in closed containers.

GENERAL STORAGE CHEMICAL COMPATABILITY

Table from: Office of Research Services: Division of Occupational Health and Safety

General Chemical Storage Compatibility						
+ means these groups may be stored together in most cases			* means store these groups AWAY from water and water sources			
Group 1 +	**Group 2+**	**Group 3 +***	**Group 4 ***	**Group 5 ***	**Group 6 ***	**Group 7 ***
Halogenated compounds	Ketones	Organic Acids	Aminies & Alkanolamines	Caustics	Oxidizers	Inorganic acids
Olefins	Saturated hydrocarbons	Acid Anhydrides	Ammonia	Hydroxides	Nitrates	Hydrochloric
Alcohols, gylcols & gylcol ethers	Aromatic hydrocarbons	Acetic Acid		Carbonates	Persulfates	Sulfuric
Phenol	Oils					Phosphoric
Chloroform	Aldehydes					Halogens
Dyes & Stains	Olefins					
Ethidium bromide	Esters					
	Formaldehyde					

Cabinet Storage

When cabinets are used to increase the maximum allowable quantity they shall be

- Treated, coated or constructed with materials that are nonreactive with the hazardous materials stored and of UL standard intended for storage of hazardous materials including:
  - Steel having a 18 gage thickness
  - Double walled with 1.5 in airspace in between walls
  - Joints shall be riveted, welded and tight fitting
  - Doors shall be well fitted and self-closing with a self-latching device
- Cabinets used for liquid storage shall have a bottom liquid tight to a minimum height of 2 inches.

Work Areas:

- Empty, but not clean, containers should be handled as having the same hazards as non-empty containers. In some cases the residual vapors are more dangerous than the liquids. (For example gasoline vapors are more flammable than liquid gasoline).
- Keep work areas clean and free of obstructions.
- Limit the amount of hazardous materials to the minimum needed for an operation and keep process containers covered when not being used.
- Clean surfaces (counter tops, bench tops, fume hoods and floors) of drips and residues.
- Clean spilled chemicals immediately and dispose of all wastes properly.
- Hazardous material in any quantity shall not be released into a sewer, water way, ground or atmosphere.
- Routinely inspect and address potential sources of leaks and spills including tanks, pipes, hoses and container storage areas. Spill control equipment & containment structures should be inspected periodically.
- Code required signage must be provided on all hazardous material containers and entrance to locations where hazardous material stored.
- Facilities conducting dust producing operations need to keep the accumulation of combustible dusts to a minimum by using collection equipment.

Outdoor Storage:

Outdoor control areas for hazardous materials shall be in compliance with the following requirements:

1. Outdoor control area shall be kept free from vegetation, rubbish and other combustible waste, and combustible materials not necessary to the storage. The area surrounding an outdoor control area shall be kept clear of such materials for a minimum of 15 feet.

2. Outdoor control areas shall be located at least 5 feet from a building opening and at least 15 feet from Assembly occupancies. Outdoor control areas shall be located at least 20 feet from a lot line, public street or private road.

Exception: A 2-hour fire-resistance-rated wall without openings extending not less than 30 inches above and to the sides of the storage area is

allowed in lieu of such distances required from a building opening, lot line, public street or private road.

3. Where a property exceeds 10,000 square feet, there may be two outdoor control areas separated by a minimum distance of 50 feet, when approved.

4. Where a property exceeds 35,000 square feet, there may be multiple outdoor control areas, separated a minimum distance of 50 feet, when approved.

Separation of incompatible materials:

Incompatible materials, shall be separated while in storage or use except for stored materials in containers 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.
- Isolating incompatible materials in storage by a noncombustible partition extending not less than 18 inches above and to the sides of the stored material.
- Storing liquid and solid materials in hazardous material storage cabinets. Materials that are incompatible shall not be stored in the same cabinet.
- Storing compressed gases in gas cabinets or exhausted enclosures in accordance with the Fire Code. Materials that are incompatible shall not be stored within the same cabinet or exhausted enclosure.

The following are general chemical segregation guidelines for some commonly encountered materials. The MSDS's should be consulted regarding specific incompatibilities. When diluting corrosives (especially concentrated strong corrosives) always add the corrosive material to water slowly while stirring; never the reverse. The exothermic reaction from the dilution can cause the water to flash to steam resulting in possible thermal and chemical burns due to splashing.

Corrosives: Should never be stored with combustible or flammable materials. Mutually reactive items (such as sulfuric acid & sodium hydroxide) should be separated.

Oxidizers: Oxidizers stored to avoid contact with incompatible materials, such as flammable/combustible liquids (must be kept as far away as possible). Solid oxidizers should not be stored directly beneath incompatible liquids. Gaseous oxidizing materials are highly reactive, and can react vigorously with finely divided metals, organic liquids, and other materials that are readily oxidizable. Spilled oxidizers should be placed in a clean, separate container and disposed

of in a proper manner. Oxidizer materials should not be placed in the trash. Spilled materials should never be returned to the original container.

4. GENERAL DOT INFORMATION

The USDOT regulates the transportation of hazardous materials and while these rules are not under the scope of the Fire Code certain portions of them can be a useful resource for material identification in particular the shipping descriptions and hazard packaging labels. The following table summarizes the DOT hazard labels, typical shipping names/DOT classes and cross references to related Fire Code sections.

DOT LABELS	REFERENCE EXAMPLES	DOT LABELS	REFERENCE EXAMPLES
	Fire Code Chapter 31 Corrosives		Fire Code Chapters 40 Oxidizers
	Corrosive liquids, n.o.s. 8 Hydrochloric acid 8 Sulfuric acid, spent 8		Calcium permanganate 5.1 Oxidizing solid, n.o.s. 5.1
	Code Chapters 41, 43, 44 Water Reactives		Fire Code Chapters 41, 43 44 Reactive
	Water-reactive solid, n.o.s. 4.3 Calcium carbide 4.3 Lithium 4.3		Magnesium alkyls 4.2 Self-heating liquid, inorganic, n.o.s. 4.2

Please note that this table is meant as an aid for material identification only as the Fire Code applicability requirement are not necessarily the same as DOT applicability requirements.

If a particular material meets the definition of more than one DOT hazard class or division, compliance with each hazard class shall be required. Where a material is both a physical hazard and a health hazard, compliance with the requirements for each hazard class shall be required. One example of this "multiple personality" is nitric acid (concentration greater than 35%), classified as both an oxidizer and a corrosive. A second example is concentrated acetic acid, which is classified as both a combustible and a corrosive.
Some hazard classes are assigned numerical designations based upon their hazard potential. For example, oxidizers are classified as Class 1, 2, 3 or 4 materials whereas water –reactive solids and liquids are classified as Class 1, 2 or 3 materials. The following chart explains the severity of each class:

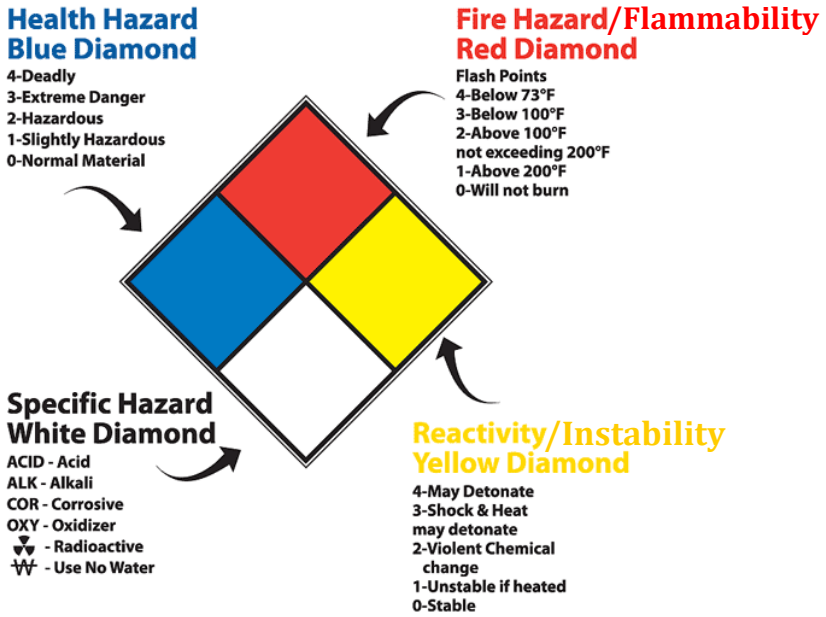
Arabic Numeral	
4	**HIGHEST HAZARD**
3	
2	
1	
0	**LOWEST HAZARD**

Where more than one class of oxidizer or water-reactive solid or liquid is stored in immediate proximity to one another, such area shall be provided with hazard identification signs for the most severe class present.

Where more than one class of oxidizers or water-reactive solid or liquid is stored in the same control area, the maximum quantity allowed of each hazardous material shall be limited as follows:

> The maximum quantity shall be reduced by multiplying the maximum allowable quantity for each such material by the proportional amount that such material bears to the total quantity of material stored in the control area. The total of the proportional amounts shall not exceed 100 percent.

5. NFPA HAZARD DIAMOND SIGN EXPLANATION

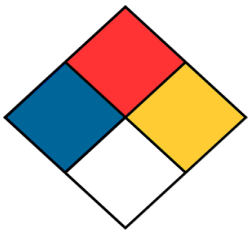


Revised on 11/20/14

Hazard Identification Signs: NFPA 704 Diamonds

The *transport* of hazardous materials is accompanied by the use of US DOT compliant placards and labels to assist identification of hazardous materials on the roadway, railway, waterway and in the air. In a similar manner the *storage, handling and use* of hazardous materials is accompanied in the Fire Code by a requirement for the use of consistent signage to alert people, including first responders, to the presence of hazardous materials in a facility. The intent of the signage is to provide an indication of both the *type* of hazardous material present and the relative *degree of harm* that the material may pose. This simplistic system uses symbols, colors and numbers to readily communicate these concerns in a visual manner, and recognizes the fact that a material may pose more than one type of hazard.

The basis of the system is a diamond-shaped sign that is divided into four color-coded quadrants. The left-most quadrant is colored blue and represents the *health* hazard posed by the material. The upper quadrant is red in color and indicates the relative *fire* hazard. The right-most quadrant is yellow and conveys the relative potential for *reactivity* of the material. The last quadrant, at the bottom, is white in color and serves to convey *"special"* information such as "OX" for oxidizer.



Blank NFPA Diamond Sign
(figure 1)

Sign with Hazards Indicated
(figure 2)

The diamond-shaped sign is required by the Fire Code to be conspicuously displayed at the entrance to locations where hazardous materials are stored, handled and used, and on stationary containers and aboveground tanks containing hazardous materials. Note that the sign requirement also applies to locations at which a hazardous material is dispensed. The triggering amount for the sign requirement is the **amount required for a permit**.

The numbering system that is used to convey the hazards of a material uses a scale of 0 through 4 for each of the three hazard types (health, fire and reactivity). A number is placed in each box, specific to the material at hand. In each quadrant, a "0" represents the least concern and "4" represents the highest degree of hazard posed by a material. For instance, a "0" in the upper quadrant indicates a material that will not burn, while a "4" in the same

quadrant indicates a gaseous material that will burn very readily (see Figure 2). Intermediate numbers represent increasing levels of hazard in all categories, such as the "3" that is present in the "health" quadrant of Figure 2. This is indicative of a material that can cause permanent or serious injury upon exposure.

6. LOCATION STORAGE RESTRICTIONS

*Maximum Allowable Quantity (MAQ) is not applicable to installations or facilities approved prior to July 1, 2008

Please note that the Maximum Allowable Quantity (MAQ) of any hazardous material stored or used within an indoor control area is dependent on the floor location relative to the ground floor (the ground floor being the least restrictive location). The MAQ of any hazardous material in control areas located above the ground floor or below grade are strictly reduced by a fixed percentage as specified by the Fire Code. Furthermore, the number of control areas allowed on any specific floor is also dependent on floor location relative to the ground floor (the ground floor being the least restrictive location).

The indoor storage of any hazardous material in excess of the MAQ in any one control area shall require that the control area be classified as High Hazard occupancy.

DESIGN AND NUMBER OF CONTROL AREAS

FLOOR LEVEL		PERCENTAGE OF THE MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA	NUMBER OF CONTROL AREAS PER FLOOR	FIRE-RESISTANCE RATING FOR FIRE BARRIERS IN OURS
Above grade	Higher than 9	5	1	2
	7-9	5	2	2
	6	12.5	2	2
	5	12.5	2	2
	4	12.5	2	2
	3	50	2	1
	2	75	3	1
	1	100	4	1
Below grade	1	75	3	1
	2	50	2	1
	Lower than 2	Not Allowed	Not Allowed	Not Allowed

7. MATERIAL SAFETY DATA SHEETS (MSDS)

The material safety data sheet (MSDS) 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 MSDS may list appropriate and inappropriate extinguishing agents. The Certificate of Fitness holder must refer to the MSDS when questions arise about how to handle, use, or store hazardous chemicals or materials. ***(See Appendix)***

8. EXPOSURE HAZARDS

Inhalation, ingestion, skin and eye contact: The health hazards associated with any hazardous materials will vary depending upon the individual chemical's hazards, the manufacturers MSDS/SDS should be consulted for each chemical in use.

Chronic Exposure: Chronic exposure hazards associated with any hazardous materials will vary greatly. Consult the individual chemical's MSDS/SDS for specific chronic hazards.

First Aid: First aid measures will vary greatly based on the individual chemicals hazard properties. Consult the specific chemical's manufacturers MSDS/SDS and when necessary, a medical professional for the appropriate first aid procedures.

Exposure Limits: Exposure limits will vary based on individual chemical hazards; consult the manufacturers MSDS/SDS for established exposure limits.

Exposure Controls/Engineering Controls: Local exhaust ventilation or breathing protection is generally required. Depending upon the level of flammability involved with specific chemicals, engineering control requirements may increase (e.g., use of inert atmospheres, glove boxes, special detection and/or extinguishing systems, etc.). Consult the MSDS for hazardous properties.

Administrative Controls: Administrative controls will vary based on individual chemical hazards. Personnel working with the materials must receive detailed training on the hazards, safe use, and emergency procedures.

Personal Protective Equipment: Avoid breathing dusts, vapors or fumes. Follow individual chemical's MSDS/SDS recommendations for the appropriate

PPE. In general, prevent skin/eye contact through the use of impervious gloves, clothing, boots, apron, and eye goggles or full face shield. If the airborne concentrations are elevated and engineering controls are not feasible wear a NIOSH-approved self-contained breathing apparatus with full face-piece operated in the pressure demand or other positive pressure mode

Disposal: In general, any hazardous materials are regulated as hazardous waste. Regulatory requirements will vary depending on the individual chemical.

Medical Monitoring (if applicable): Medical and exposure monitoring will vary depending on the individual chemical hazards. Consult the MSDS/SDS or industrial hygiene program manager for the appropriate monitoring for the chemical of concern.

9. EMERGENCY PROCEDURES

In the event of a significant release that poses a threat to employees and/or the environment, immediately evacuate the area and notify the emergency operator (911). The New York City Fire Department will respond. You are then required to notify your supervisor. Small spills can be cleaned up by properly trained employees with the appropriate spill response supplies.

The Certificate of Fitness holder must know the locations of and how to operate all fire extinguishing devices, control devices, and fire alarm stations installed at the facility. In case of a fire, explosion, major spill or emergency, the Certificate of Fitness (C of F) holder must notify the Fire Department by phone immediately. The Certificate of Fitness holder must know the telephone number of the Fire Department Borough Communication Office. The borough phone numbers are listed below. These phone numbers must be posted near the phones most likely to be used in case of an emergency.

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

After notification by phone, the local fire alarm must be sounded. In some cases, the activation of the fire alarm will transmit a signal to the Fire Department via an approved central station company. The C of F holder shall initiate an orderly evacuation when required by the hazard presented by any release and take reasonable steps to isolate the hazard until the Fire Department arrives. The Certificate of Fitness holder must answer any questions asked by them when they arrive. For example, he or she must indicate the location of the fire, describe the type of fire protection devices available, and describe the materials stored on the fire floor. The Bureau of Fire

Prevention must be notified as soon as possible after an explosion or fire has occurred. The Bureau of Fire Prevention may require a detailed report on the causes and the consequences of the explosion or fire. Generally, this report must be filed within ten days after the incident.

10. PENALTIES FOR NON-COMPLIANCE WITH FIRE CODE

All applicants and certificate holders are required to promptly notify the Fire Department of any change in the applicant's or certificate holder's residence address, any change in work location when such location is required for and/or indicated on such certificate or permit and such other information as the Department may require. COF holders and permit holders must ensure that all requirements of the Fire Code and RCNY are met. Failure to comply with these provisions may subject COF holder and/or permit holders to summonses, fines and other enforcement measures.

PART II: CORROSIVES

A corrosive material is a gas, liquid or solid that causes permanent injury (full thickness destruction) of intact human skin at the site of contact. Any liquid that can corrode 1/4 inch of bare steel (not stainless) or aluminum within a year is also classified as a corrosive material.

Most corrosives are either acids or bases. Common acids include hydrochloric acid, sulfuric acid, nitric acid, chromic acid, acetic acid and hydrofluoric acid. Common bases are ammonium hydroxide, potassium hydroxide (caustic potash) and sodium hydroxide (caustic soda).

PERMITS AND CERTIFICATES OF FITNESS

Quantities requiring a permit and supervision by C-42 Certificate of Fitness holder

Liquids	55 gallons
Solids	1000 pounds

The **handling and use** of corrosive materials in quantities exceeding 55 gallons of liquid or 1,000 pounds of solid shall be under the **personal supervision** of a certificate of fitness holder. The **storag**e of corrosive materials in quantities exceeding 55 gallons of liquid or 1,000 pounds of solid shall be under the **general supervision** of a certificate of fitness holder.

MATERIAL DESCRIPTION

Corrosives act either directly, by chemically destroying the part or indirectly by causing inflammation. Acids and bases are common corrosive materials. Information on pH can often be found in the **MSDS/SDS**. It is important to know the pH of substances because they may be corrosive or react with incompatible materials. For example acids and bases should not be stored or used near each other as their accidental combination could generate a huge amount of heat and energy, possibly resulting in an explosion.

It is also important to know the pH in case you get the material on your skin or in your eyes. Whenever a substance enters the eye, flush with water for 15 minutes and get prompt medical attention.

A general warning sign may appear like this:

The pH tells you whether a solution is acidic, basic or neutral. The corresponding ranges are:

- Acidic - the pH is between zero and 7.0
- Neutral - the pH is 7.0
- Basic (also called alkaline) - the pH is between 7.0 and 14.

For strong acids or bases, these values may actually be higher than 14 or lower than 0, but the 0-14 range is most commonly encountered. The pH scale is logarithmic. That means each change of one in pH value is 10 times more acidic. A substance with a pH of 2 is 1000 times more acidic than one with a pH of 5!

The pH values of some common substances are given in the table below:

Substance	**Typical pH**	**[H+], M**
Stomach acid (gastric juices)	1.4	0.0398
Lemon juice	2.4	0.00398
Vinegar	3.0	1×10^{-3}
Tomatoes	4.2	6.31×10^{-5}
Water exposed to air	5.5	3.16×10^{-6}
Pure water	7.0	1×10^{-7}
Blood or tears	7.4	3.98×10^{-8}
Baking soda	8.4	3.98×10^{-9}
Household ammonia	11.5	3.16×10^{-12}

Revised on 11/20/14

Acids

Strong acids completely dissociate into ions and form H+ in aqueous (water) solution. For example:

$$HCl \longrightarrow H^+ + Cl^-$$

Weak acids do not dissociate completely into ions. Examples of these include acetic acid (a 5% solution of acetic acid in water is called vinegar), formic acid, ammonium cation (NH4+), and water itself. The strength of acids can be measured using the pH scale. A lower pH indicates the greater the acidity of a solution. Mineral/inorganic acids can be strong or weak.

A general warning sign may appear like this:

All of the following strong acids will cause severe and immediate burns upon skin contact. The following acids are all examples of inorganic acids, sometimes called mineral acids.

Formula	**Name**
$HClO_4$	Perchloric acid
HI	Hydroiodic acid
HBr	Hydrobromic acid
HCl	Hydrochloric acid
H_2SO_4	Sulfuric acid
HNO_3	Nitric acid

Substances with names that end in "oic acid" or "ic acid" are organic acids called carboxylic acids. Two of the examples we just looked at, formic acid and acetic acid are carboxylic acids. Just because an acid is weak does not mean that it can't harm you. For example, HF, hydrofluoric acid, is a weak inorganic acid. When you spill it on your hand it doesn't burn but it migrates to the bones in your fingers and then begins to dissolve them from the inside out (a painful process; amputation may be required). In addition, systemic effects (referring to a disease, symptom, medication or injury) such as hypocalcaemia can cause death.

Some common properties of acids are:

- They have a sour taste ***(tasting acids…or for that matter, any chemical, is not recommended!).*** For example, the citric acid in lemons and acetic acid in vinegar are responsible for the sour taste of each.
- They can react with metals such as magnesium, zinc or iron to corrode them and produce explosive hydrogen gas. ***Do not*** store acids in metal containers!
- Solutions of acids can conduct electricity.

The concentration of acids can be expressed in many different ways:

- Molarity (defined earlier)
- Percent by mass
- Degrees Baumé (indirectly) or specific gravity

Examples: Chromic, Formic

Storage tanks

- All new or relocated acid storage tanks must have acid proof dikes capable of holding the full contents of the tank or tanks within the dike in the event of a leak or rupture of the tanks or associated piping.
- New or relocation acid storage tanks are not permitted in the basement, cellar or sub-cellar of any structure.
- New, relocated, or altered acid storage tanks must have excess flow valves for all bottom take-offs except where all bottom take-off piping terminates within the containing dike.
- All new and existing acid storage tanks must have cents not less than 1 ¼ inches for tanks up to 1,100 gallons and not less than 2 inches for tanks of 1,100 gallons or more.

Bases

Bases can be thought of as the chemical opposite of acids. A reaction between an acid and base is called neutralization Bases react with acids to produce water and salts (or their solutions).

Some general properties of bases include:

- Slimy or soapy feel on fingers, due to saponification of the lipids in human skin.

- Concentrated or strong bases are caustic on organic matter and react violently with acidic substances.
- Aqueous solutions or molten bases dissociate into ions and conduct electricity.
- Reactions with indicators: bases turn litmus paper blue and phenolphthalein pink.

A general warning sign may appear like this:

The following are examples of strong bases, meaning that they completely dissociate into ions and form OH- in aqueous (water) solution. All of these will cause severe burns upon skin contact. For example:

$$NaOH \longrightarrow Na^+ + OH^-$$

Formula	Name
NaOH	Sodium hydroxide
KOH	Potassium hydroxide
Ba(OH)2	Barium hydroxide
Ca(OH)2	Calcium hydroxide
NaOCl	Sodium hypochlorite

Weak bases do not dissociate completely to form hydroxide (OH^-) ions in water. Examples of these include ammonia (NH3), amines, fluoride ion (F-), and acetate ion (CH3COO-). Water can also act as a weak acid or base. Just because a base is weak does not mean that it can't harm you. For example, inhaling ammonia can be extremely irritating and cause severe burning of the lungs and potentially death.

STORAGE & USE REQUIREMENTS

*Maximum Allowable Quantity (MAQ) not applicable to installations or facilities approved prior to July 1, 2008

<u>Storage</u>

Special care needs to be taken when storing acids. Minor spills and acid fumes can quickly corrode standard metal storage cabinets or soapstone countertops,

for example. The best choice for storing acid containers is a chemically-resistant cabinet designed for that purpose, with polyethylene construction being the best choice. Polyethylene spill trays are also a very good idea, whether acids are stored on a bench top or in a cabinet.

Compressed gas containers and systems should not be exposed to corrosive chemicals or fumes that could damage containers, valves or valve-protective caps.

Indoor storage of corrosive materials in amounts exceeding the maximum allowable quantity per control area shall be in accordance with the following.

Floors in storage areas for corrosive liquids shall be of liquid-tight construction.

When corrosive materials are dispensed or used, mechanical exhaust ventilation shall be provided.

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[ae]

	STORAGE[b]	
Material	**Solid pounds[cd]**	**Liquid Gallons[cd]**
Corrosives	5,000	500

a. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with the requirements of FC2703.11, see FC Table 2703.11.1.
b. The aggregate quantity in storage, handling and use shall not exceed the quantity listed for storage.
c. Maximum allowable quantities may be increased 100 percent in buildings protected throughout by a sprinkler system. Where Note d applies, the quantities increased shall be as set forth in both notes.
d. Maximum allowable quantities may be increased 100 percent when stored in approved storage cabinets, gas cabinets, or exhausted enclosures. Where Note c applies, the quantities increased shall be as set forth in both notes.
e. The maximum allowable quantities shall be limited by FC2706 for non-production laboratories classified as Occupancy Group B.

Aboveground outdoor storage tanks exceeding an aggregate quantity of 1,000 gallons of corrosive liquids shall be provided with secondary containment.

Outdoor storage of corrosive materials shall not be within 20 feet of buildings not associated with the manufacturing or distribution of such materials, lot lines, public streets, private roads or means of egress. A 2-hour fire barrier wall without openings or penetrations, and extending not less than 30 inches above and to the sides of the storage area is allowed in lieu of such distance. The wall shall either be an independent structure or the exterior wall of the building adjacent to the storage area.

Outdoor storage of corrosive materials in amounts exceeding the maximum allowable quantity per control area shall be in accordance with the following:

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD IN AN OUTDOOR CONTROL AREA[abc]

	STORAGE	
Material	**Solid pounds**	**Liquid Gallons**
Corrosives	5,000	500

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with FC2703.1.2.
b. The aggregate quantities in storage and use shall not exceed the quantity listed for storage.
c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage on a single property under the same ownership or control

Preexisting facilities with corrosive material storage

The design and installation would not be allowed or approved under the current fire code may be continued in compliance with the Fire Code under which it was approved.

Handling and Use

Handling and use of corrosive materials shall be located in accordance with the distances and exposures noted for storage.

Piping and tubing shall be clearly identified to indicate the material conveyed. Readily accessible manual valves, or automatic remotely-activated fail-safe emergency shutoff valves, are required on supply piping and tubing at the point of use and at the source of supply. Emergency shutoff valves shall be clearly visible and readily accessible. A durable sign is to be conspicuously posted immediately adjacent to such valves that identify their purpose.

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD[ad]

	USE-CLOSED SYSTEMS[b]		USE-OPEN SYSTEMS[b]	
Material	**Solid Pounds**[c]	**Liquid Gallons**[c]	**Solid pounds**[c]	**Liquid Gallons**
Corrosives	5,000	500	1,000	100

a. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with the requirements of FC2703.11, see FC Table 2703.11.1.

b. The aggregate quantity in storage, handling and use shall not exceed the quantity listed for storage.
c. Maximum allowable quantities may be increased 100 percent in buildings protected throughout by a sprinkler system. Where Note f applies, the quantities increased shall be as set forth in both notes.
d. The maximum allowable quantities shall be limited by FC2706 for non-production laboratories classified as Occupancy Group B.

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A HEALTH HAZARD IN AN OUTDOOR CONTROL AREA[abc]

	USE-CLOSED SYSTEMS		**USE-OPEN SYSTEMS**	
Material	**Solid Pounds**	**Liquid Gallons**	**Solid pounds**	**Liquid Gallons**
Corrosives	5,000	500	1,000	100

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with FC2703.1.2.
b. The aggregate quantities in storage and use shall not exceed the quantity listed for storage.
c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage on a single property under the same ownership or control

**Note: Corrosives that are oxidizers (nitric acid, chlorine, fluorine) or are compressed gasses (ammonia, chlorine, fluorine) or water-reactive (concentrates sulfuric acid, sodium hydroxide) are both physical and health hazards.*

PART III: OXIDIZERS

Oxidizing materials are liquids or solids that readily give off oxygen or other oxidizing substances (such as bromine, chlorine, or fluorine). They also include materials that react chemically to oxidize combustible (burnable) materials; this means that oxygen combines chemically with the other material in a way that increases the chance of a fire or explosion. This reaction may be spontaneous at either room temperature or may occur under slight heating. Oxidizing liquids and solids can be severe fire and explosion hazards.

Oxidizers are classified as follows:

- **Class 1**. An oxidizer whose primary hazard is that it slightly increases the burning rate but which does not cause spontaneous ignition when it comes in contact with combustible materials (all inorganic nitrates, all inorganic nitrites, hydrogen peroxide (greater than 8 % up to 27.5%),nitric acid (40% or less)).
- **Class 2**. An oxidizer that will cause a moderate increase in the burning rate or that causes spontaneous ignition of combustible materials with which it comes in contact (hydrogen peroxide (greater than 27.5 up to 52%), calcium hypochlorite (50% or less by weight), nitric acid (more than 40% but less than 86%)).
- **Class 3**. An oxidizer that will cause a severe increase in the burning rate of combustible materials with which it comes in contact or that will undergo vigorous self-sustained decomposition caused by contamination or exposure to heat (calcium hypochlorite (over 50% by weight, nitric acid, fuming (more than 86% concentration), hydrogen peroxide (greater than 52% up to 91%)).
- **Class 4**. An oxidizer that can undergo an explosive reaction due to contamination or exposure to thermal or physical shock and can cause spontaneous ignition of combustibles (ammonium permanganate, hydrogen peroxide greater than 91%)

PERMIT AND CERTIFICATE OF FITNESS

Quantities requiring a permit AND Supervision by a C-42 certificate of fitness holder

Liquids		Solids	
Class 4	Any Amount	Class 4	Any Amount
Class 3	1 gallon	Class 3	10 pounds
Class 2	10 gallons	Class 2	100 pounds
Class 1	55 gallons	Class 1	500 pounds

The **handling and use** of oxidizers in quantities requiring a permit shall be under the **personal supervision** of a certificate of fitness holder. The **storage** of oxidizers in quantities requiring a permit shall be under the **general supervision** of a certificate of fitness holder.

STORAGE REQUIREMENTS

*Maximum Allowable Quantity (MAQ) not applicable to installations or facilities approved prior to July 1, 2008

It is important to understand that the conditions of acceptable storage for oxidizing materials are based upon their ability to cause combustible and flammable materials to ignite and burn, or explode. The fundamental and general rule is to keep fuels (including wood, paper, cardboard, flammable liquids and gases, metals, etc…) and sources of ignition away from the stored oxidizing materials.

Special attention must be paid to the class of oxidizer that one is dealing with, a designation that may be found on the label accompanying the material, it's MSDS/SDS (Material Safety Data Sheet, Safety Data Sheet), or through a phone call 1-800-CHEMTREC or to the manufacturer. For instance, greater care must be used in the storage of Class 4 oxidizers than with Class 1 oxidizers.

Indoor storage in amounts exceeding the Maximum Allowable Quantity per control area.

In addition to any other general Fire Code storage requirements, Class 4 oxidizer liquids and solids shall be separated from other hazardous materials by not less than a **1-hour** fire barrier or stored in hazardous materials storage cabinets.

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD [f,g]

Material	Class	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED[h]	STORAGE	
			Solid pounds	**Liquid Gallons** (pounds)
Oxidizer	4	H-1	1[d]	(1)[b, d]
	3[e]	H-2	10[a,b]	(10)[a, b]
	2	H-3	250[a,b]	(250)[a, b]
	1	H-3	4,000[b,c]	(4,000)[b, c]

a. Maximum allowable quantities, except for liquefied petroleum gas and flammable liquid motor fuel, may be increased 100 percent in buildings protected throughout by a sprinkler system. Where Note b applies, the quantities may be increased as set forth in both notes.
b. Maximum allowable quantities, except for liquefied petroleum gas and flammable liquid motor fuel, may be increased 100 percent when stored in approved storage cabinets, gas cabinets, exhausted enclosures or listed safety cans. Listed safety cans shall be in accordance with FC2703.9.10. Where Note a applies, the quantities may be increased as set forth in both notes.
c. Quantities shall not be limited in a building protected throughout by a sprinkler system.
d. Allowed only in buildings protected throughout by a sprinkler system.
e. A maximum quantity of 200 pounds of solid or 20 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance and operation of equipment when the storage containers and the manner of storage are approved.
f. For gallons of liquids, divide the amount in pounds by 10 in accordance with FC2703.1.2.
g. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with the requirements of FC2703.11, see FC Table 2703.11.1.
h. The maximum allowable quantities shall be limited by FC2706 for non-production laboratories classified as Occupancy Group B.

Outdoor storage in amounts exceeding the Maximum Allowable Quantities per control area.

Outdoor storage areas for liquid and solid oxidizers shall be located in accordance with FC Table 4004.1.2 (see Appendix).

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c]

Material	Class	STORAGE	
		Solid pounds	**Liquid Gallons** (pounds)
Oxidizer	4	1	(1)
	3	10	(10)
	2	250	(250)
	1	4,000	(4,000)

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with FC2703.1.2.
b. The aggregate quantities in storage and use shall not exceed the quantity listed for storage.
c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area when such storage is in accordance with FC2703.11.

HANDLING & USE

Solid oxidizers are less likely to pose problems than liquids and gases due to their physical characteristics. However, great care must be used in the handling and use of all oxidizing materials. In some respects the hazard during handling may be significantly increased due to the potential absence of a suitable container. The use of these materials near potential fuels must be avoided. Fuels include paper, wood, and flammable liquids. Also of concern is the use of oxidizing materials near some acids, as a dangerous reaction may occur when these materials are mixed. All materials in the vicinity of oxidizers should be investigated for compatibility, and segregated if necessary.

All potential sources of ignition must be removed from the vicinity of oxidizers in use. “No smoking” signs must be posted prominently and no open flames – such as those associated with boilers or water heaters – are permissible where oxidizers are used or stored.

Many oxidizing materials possess other hazards such as flammability, corrosivity and toxicity. Chlorine, for example, is an oxidizer that is also both corrosive and toxic. All hazards should be investigated prior to use and handling and steps taken to reduce the potential for problems, in accordance with the Fire Code.

In the event of an uncontrolled spill or release of a liquid, solid or gaseous oxidizing material, the area should be evacuated and notification to 911 made as soon as possible.

Oxidizers containing ammonium nitrate shall also comply with the requirements of NFPA 490.

Bulk oxygen systems shall also comply with the requirements of NFPA 50.

Bulk nitrous oxide systems shall also comply with the requirements of Compressed Gas Association Pamphlet G-8.1.

RESTRICTIONS

It shall be unlawful to store, handle or use:
1. **Class 4** oxidizers within Assembly, Educational, Institutional, Residential or Utility occupancies.
2. **Class 4** liquid and solid oxidizers within offices, retail sales areas and areas accessible to the public located within Business, Factory, Mercantile or Storage occupancies.

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD [e, f]

Material	Class	GROUP WHEN THE MAXIMUM ALLOWABLE QUANTITY IS EXCEEDED[g]	USE-CLOSED SYSTEMS		USE-OPEN SYSTEMS	
			Solid Pounds	Liquid Gallons	Solid pounds	Liquid Gallons
Oxidizers	4	H-1	0.25[c]	(0.25)[c]	0.25[c]	(0.25)[c]
	3[d]	H-2	2[a]	(2)[a]	2[a]	(2)[a]
	2	H-3	250[a]	(250)[a]	50[a]	(50)[a]
	1	H-3	4,000[b]	(4,000)[b]	1,000[b]	(1,000)[b]

a. Maximum allowable quantities, except for liquefied petroleum gas and flammable liquid motor fuel, may be increased 100 percent in buildings protected throughout by a sprinkler system. Where Note b applies, the quantities may be increased as set forth in both notes.
b. Maximum allowable quantities, except for liquefied petroleum gas and flammable liquid motor fuel, may be increased 100 percent when stored in approved storage cabinets, gas cabinets, exhausted enclosures or listed safety cans. Listed safety cans shall be in accordance with FC2703.9.10. Where Note a applies, the quantities may be increased as set forth in both notes.
c. f. Quantities shall not be limited in a building protected throughout by a sprinkler system.
d. Allowed only in buildings protected throughout by a sprinkler system.
e. A maximum quantity of 200 pounds of solid or 20 gallons of liquid Class 3 oxidizers is allowed when such materials are necessary for maintenance and operation of equipment when the storage containers and the manner of storage are approved.
f. For gallons of liquids, divide the amount in pounds by 10 in accordance with FC2703.1.2.
g. For storage and display quantities in Group M and storage quantities in Group S occupancies complying with the requirements of FC2703.11, see FC Table 2703.11.1.
h. The maximum allowable quantities shall be limited by FC2706 for non-production laboratories classified as Occupancy Group B.

MAXIMUM ALLOWABLE QUANTITY PER CONTROL AREA OF HAZARDOUS MATERIALS POSING A PHYSICAL HAZARD IN AN OUTDOOR CONTROL AREA[a, b, c]

Material	Class	USE-CLOSED SYSTEMS		USE-OPEN SYSTEMS	
		Solid Pounds	Liquid Gallons	Solid pounds	Liquid Gallons
Oxidizers	4	1/4	(1/4)	0.25	(0.25)
	3	2	(2)	2	(2)
	2	250	(250)	50	(50)
	1	4,000	(4,000)	1,000	(1,000)

a. For gallons of liquids, divide the amount in pounds by 10 in accordance with FC2703.1.2.

b. The aggregate quantities in storage and use shall not exceed the quantity listed for storage.

c. The aggregate quantity of nonflammable solid and nonflammable or noncombustible liquid hazardous materials allowed in outdoor storage per single property under the same ownership or control used for retail or wholesale sales is allowed to exceed the maximum allowable quantity per control area when such storage is in accordance with FC2703.11.

FIRE EXTINGUISHING DEVICES AND SYSTEMS:

The C-42 C of F holder must be familiar with the different types of fire extinguishers that are present on the premises. S/he must know how to operate the extinguishers in a safe and efficient manner. S/he must know the difference between the various types of extinguishers and when they should be used. A description of the four classes of fires and the appropriate extinguishers are described on the following page.

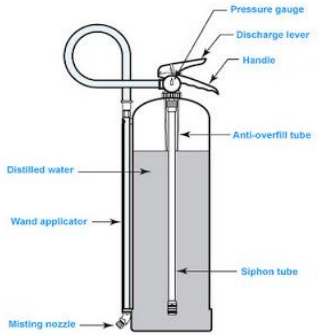
According to the ***National Fire Protection Association*** **and** ***New York City Fire Department's Rule***, fire extinguishers are categorized according to their compatibility with the fuel they are expected to extinguish, or the danger of energized electrical equipment. Fuels include four basic groups: wood, liquids, metals, and animal fats; and the hazard of electrical conductivity.

Corrosives

Corrosives are typically non-flammable use appropriate media for adjacent fire.

Oxidizers

In the event of a fire, personnel should be aware that many extinguishing agents – such as carbon dioxide - are likely to be ineffective against oxidizer-based fires. The principle upon which they operate is to deprive the fire of atmospheric oxygen. Oxidizers are unique in that they provide their own oxygen to the fire, independent of the atmosphere. Water as an extinguishing agent can often effectively be used, in very large quantities, to cool the burning material below its ignition temperature and thereby extinguish the fire. Prior to the use of water, however, it must first be determined that the material is not water-reactive.



- **Multipurpose dry chemical extinguishers** containing ammonium compounds shall ***not*** be used areas containing oxidizers that are pool chemicals (containing chlorine, as they can produce the explosive compound, NCL_3).
- **Halon and Halocarbon clean agent extinguishers** shall ***not*** be used in areas containing oxidizers as they can react with the oxidizer.

Revised on 11/20/14

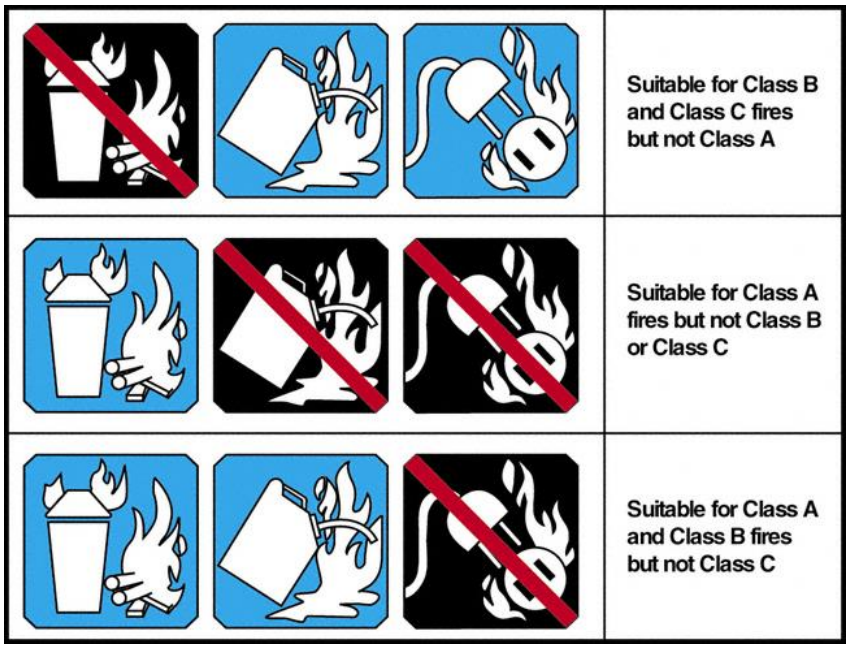
Classes of Fire Extinguishers

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.	
K	Cooking media (Vegetable or Animal Oils and Fats)	

A **<u>Multipurpose dry chemical</u>** fire extinguisher may be used to extinguish Class A, B, or C fires.

Typical Symbols Painted on Fire Extinguishers

The symbol with the shaded background and the slash indicate when the extinguisher must not be used. The C of F holder must understand these symbols.



Generally, operation instructions are clearly painted on the side of the fire extinguisher. They clearly describe how to use the extinguisher in case of an emergency. An example of these instructions is shown below.

<u>In case of any fire, 911 must be called.</u>

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 <u>P</u>ull, <u>A</u>im, <u>S</u>queeze, <u>S</u>weep. An example of these instructions is depicted in the picture.

Inspection of Fire Extinguisher-

The C of F holder must make sure that the fire extinguishers are kept in good working order at all times. Inspection is a "quick check" that a fire extinguisher is available and will operate. It is intended to give reasonable assurance that the fire extinguisher is fully charged and operable. This is done by verifying that it is in its designated place, that it has not been actuated or tampered with, and that there is no obvious or physical damage or condition to prevent its operation.

This basic inspection is a *visual examination* of the portable fire extinguisher. It shall be conducted **at least once a month**. It is a “quick check” that verifies that:

- Fire extinguishers are in their assigned place;
- Fire extinguishers are not blocked or hidden;
- it has not been actuated or tampered with;
- Fire extinguishers show no visual sign of damage or abuse that prevents its operation;
- Pressure gauge reading or indicator in the operable range or position;
- Ensure that the fire extinguishers tags are current;
- Pin and seals are in place;
- Nozzles are free of blockage.

The person conducting such inspections shall keep records of all portable fire extinguishers inspected, including the date the inspection was performed, the person performing the inspection, and those portable fire extinguishers found to require corrective action. Such recordkeeping shall be either kept on a tag or label securely attached to the portable fire extinguisher, on an inspection

checklist maintained on file or by an approved electronic method that provides a permanent record.

In addition, fire extinguisher maintenance should be done once per year. It is a "thorough check" of the extinguisher. It is intended to give maximum guarantee that an extinguisher will operate successfully and safely in the event of a fire. It includes a thorough examination, any necessary repair, recharging and/or replacement. This annual inspection must be performed by a W-96 COF holder employed by a FDNY approved portable fire extinguisher company.

Appendix

Tables

TABLE 4004.1.2
OXIDIZER (LIQUIDS AND SOLIDS) — DISTANCE FROM OUTDOOR STORAGE AREAS TO EXPOSURES

OXIDIZER CLASS	WEIGHT (pounds)	MINIMUM DISTANCE TO BUILDINGS, LOT LINES, PUBLIC STREETS, PRIVATE ROADS OR BUILDING EXITS (feet)
1	Note a	Not Required
2	Note a	35
3	Note a	50
4	Up to 10	50
	greater than 10 up to 100	75
	greater than 100 up to 500	100
	greater than 500 up to 1,000	125
	greater than 1,000 up to 3,000	200
	greater than 3,000 up to 5,000	300
	greater than 5,000 up to 10,000	400
	over 10,000	As required by the commissioner

a. Any quantity over the outdoor Maximum Allowable Quantity for outdoor control areas.

Storage configuration for liquid and solid oxidizers shall be in accordance with Tables 4004.1.7(1) through 4004.1.7(4).

TABLE 4004.1.7(1)
STORAGE REQUIREMENTS FOR CLASS 1 OXIDIZER (LIQUIDS AND SOLIDS) IN COMBUSTIBLE CONTAINERS[a]

STORAGE CONFIGURATION	LIMITS (feet)
Piles Maximum length Maximum width Maximum height Minimum distance to next pile Minimum distance to walls	 No Limit 50 20 3 2
Maximum quantity per pile	No Limit
Maximum quantity per building	No Limit

a. Storage in noncombustible containers or in bulk in detached storage buildings is not limited as to quantity or arrangement.

TABLE 4004.1.7(2)
STORAGE REQUIREMENTS FOR CLASS 2 OXIDIZER (LIQUIDS AND SOLIDS) [a,b]

STORAGE CONFIGURATION	LIMITS		
	Segregated storage	**Cutoff storage rooms**[c]	**Detached building**
Piles			
Maximum width	16 feet	25 feet	25 feet
Maximum height	10 feet	12 feet	12 feet
Minimum distance to next pile	Note d	Note d	Note d
Minimum distance to walls	2 feet	2 feet	2 feet
Maximum quantity per pile	20 tons	50 tons	200 tons
Maximum quantity per building	200 tons	500 tons	No Limit

a. Storage in noncombustible containers is not limited as to quantity or arrangement, except that piles shall be at least 2 feet from walls in buildings protected throughout by a sprinkler system and 4 feet from walls in buildings not protected throughout by a sprinkler system; the distance between piles shall not be less than the pile height.
b. Quantity limits shall be reduced by 50 percent in buildings or portions of buildings used for retail sales.
c. Cutoff storage rooms shall be separated from the remainder of the building by 2-hour fire barriers.
d. Aisle width shall not be less than the pile height.

TABLE 4004.1.7(3)
STORAGE REQUIREMENTS FOR CLASS 3 OXIDIZER (LIQUIDS AND SOLIDS) [a,b]

STORAGE CONFIGURATION	LIMITS		
	Segregated storage	**Cutoff storage rooms**[c]	**Detached building**
Piles			
Maximum width	12 feet	16 feet	20 feet
Maximum height	8 feet	10 feet	10 feet
Minimum distance to next pile	Note d	Note d	Note d
Minimum distance to walls	4 feet	4 feet	4 feet
Maximum quantity per pile	20 tons	30 tons	150 tons
Maximum quantity per building	100 tons	500 tons	No Limit

a. Storage in noncombustible containers is not limited as to quantity or arrangement, except that piles shall be at least 2 feet from walls in sprinklered buildings and 4 feet from walls in non-sprinklered buildings; the distance between piles shall not be less than the pile height.
b. Quantity limits shall be reduced by 50 percent in buildings or portions of buildings used for retail sales.
c. Cutoff storage rooms shall be separated from the remainder of the building by 2-hour fire barriers.
d. Aisle width shall not be less than the pile height.

TABLE 4004.1.7(4)
STORAGE REQUIREMENTS FOR CLASS 4 OXIDIZER (LIQUIDS AND SOLIDS)

STORAGE CONFIGURATION	LIMITS (feet)
Piles	
Maximum length	10
Maximum width	4
Maximum height	8
Minimum distance to next pile	8
Maximum quantity per building	No Limit

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Hazardous Materials Report Form

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)

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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
EXPLOSIVE / BLASTING AGENTS			NON-FLAMMABLE GAS		
POISON GAS			OXIDIZER		
POISON / IRRITANT			ORGANIC PEROXIDE		
FLAMMABLE LIQUID			RADIOACTIVE		
COMBUSTIBLE LIQUID			CORROSIVE		
FLAMMABLE SOLID			DANGEROUS WHEN WET		
FLAMMABLE GAS			ETIOLOGIC AGENTS BIOMEDICAL MATERIAL IN CASE OF DAMAGE OR LEAKAGE NOTIFY DIRECTOR CDC ATLANTA, GEORGIA 404/633-5313		

VI Special Considerations/Remarks:

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Instructions for Hazardous Material Listing

Identifying Symbol: This area identifies different classes of hazardous material. Most material will fall within one of these classes. If a particular material falls within two or more classes, it should be listed in each applicable class.

Two additional boxes are provided for material that does not fall within any class. These boxes may also be used if additional space is needed to further identify previously listed categories.

Amounts to be reported are shown in Table 1 below.

NOTE: SHIPPING AND PACKAGING LABELS MAY BE OF ASSISTANCE IN IDENTIFYING THE CLASS OF MATERIAL.

Hazardous Material Description and Proper Shipping Name

This area is reserved for the description and name of any hazardous material within a given class. If there is more than one material within a certain class, at a given location, then the most prevalent or most common should be used (indicate "most common").

Total Amount

List the total amount of reportable material within the given class. If the amounts vary from day to day, then the average amount should be listed.

Identifying Symbol	Hazardous Material Description and Proper Shipping Name	Total Amount
	Ethyl Chloride	60 gals.
	(most common)	

Special Considerations/Remarks

This area is reserved for the policyholder and the fire chief for making any notes or comments they feel are pertinent. Several examples are listed below:

1. Building has a sprinkler system.
2. Adjacent building is a school.
3. Guard dogs are on the premises from 6:00 p.m. to 6:00 a.m.
4. Hazardous material amounts may vary greatly from day to day.
5. Poor water supply.
6. Access to the building is poor.
7. Flammable liquid is stored in the same building as oxidizer.

Table 1

Amounts to be Reported

1. Explosives and Blasting Agents - any amount
2. Poison Gas - any amount
3. Poison and Irritant - any amount
4. Flammable Liquid - over 5 gallons inside a building and over 10 gallons outside a building
5. Flammable Solid - any amount
6. Flammable Gas - over 2,000 cubic feet at normal temperature
7. Nonflammable Gas - over 6,000 cubic feet at normal temperature
8. Oxidizer - over 50 pounds
9. Organic Peroxide - over 10 pounds
10. Combustible Liquid - over 25 gallons inside a building and over 60 gallons outside a building
11. Radioactive Material - any amount
12. Corrosive Material - over 55 gallons
13. Dangerous When Wet Material - any amount
14. Etiologic Material - any amount

(OVER)

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Hazardous Material Definitions

The following definitions have been abstracted from the Code of Federal Regulations, Title 49- Transportation, Parts 100 to 199. Refer to the referenced sections for complete details.

NOTE: Rulemaking proposals are outstanding or are contemplated concerning some of these definitions.

Hazardous Material - Means a substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety and property, when transported in commerce, and which has been so designated. (Sec. 171.8)

Multiple Hazards - A material meeting the definitions of more than one hazard class is classed according to the sequence given in Sec. 173.2.

HAZARD CLASS	DEFINITIONS
EXPLOSIVES	**An Explosive** - Any chemical compound, mixture or device, the primary or common purpose of which is to function by explosion, i.e., with substantially instantaneous release of gas and heat, unless such compound, mixture or device is otherwise specifically classified in Parts 170-189. (Sec. 173.50)
CLASS A EXPLOSIVE	Detonating or otherwise of maximum hazard. The nine types of Class A explosives are defined in Sec. 173.53.
CLASS B EXPLOSIVE	In general, function by rapid combustion rather than detonation and include some explosive devices such as special fireworks, flash powders, etc. **Flammable hazard.** (Sec. 173.88)
CLASS C EXPLOSIVE	Certain types of manufactured articles containing Class A or Class B explosives, or both, as components but in restricted quantities, and certain types of fireworks. **Minimum hazard.** (Sec. 173.100)
BLASTING AGENTS	A material designed for blasting which has been tested in accordance with Sec. 173.114a(b) and found to be so insensitive that there is very little probability of accidental initiation to explosion or of transition from deflagration to detonation (Sec. 173.114a(a))
COMBUSTIBLE LIQUID	Any liquid having a flash point above 100°F. and below 200°F. as determined by tests listed in Sec. 173.115(d). Exceptions to this are found in Sec. 173.115(b).
CORROSIVE MATERIAL	Any liquid or solid that causes visible destruction of human skin tissue or a liquid that has a severe corrosion rate on steel. See Sec. 173.240(a) and (b) for details.
FLAMMABLE LIQUID	Any liquid having a flash point below 100°F. as determined by tests listed in Sec. 173.115(d). Exceptions are listed in Sec. 173.115(a).
COMPRESSED GAS	**Compressed Gas** - Any material or mixture having in the container a pressure exceeding 40 psia at 70°F., or a pressure exceeding 104 psia at 130°F.; or any liquid flammable material having a vapor pressure exceeding 40 psia at 100°F. (Sec. 173.300(a))
FLAMMABLE GAS	Any compressed gas meeting the requirements for lower flammability limit, flammability limit range, flame projection, or flame propagation criteria as specified in Sec. 173.300(b).
NONFLAMMABLE GAS	Any compressed gas other than a flammable compressed gas.
FLAMMABLE SOLID	Any solid material, other than an explosive, which is liable to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation hazard. (Sec. 173.150)
ORGANIC PEROXIDE	An organic compound containing the bivalent -0-0 structure and which may be considered a derivative of hydrogen peroxide where one or more of the hydrogen atoms have been replaced by organic radicals must be classed as an organic peroxide unless... (See Sec. 173.151(a) for details)
OXIDIZER	A substance such as chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter. (See Sec. 173.151)
POISON A (Poison Gas)	**Extremely Dangerous Poisons** - Poisonous gases or liquids of such nature that a very small amount of the gas, or vapor of the liquid, mixed with air is **dangerous to life.** (Sec. 173.326)
POISON B (Poison)	**Less Dangerous Poisons** - Substances, liquids, or solids (including pastes and semi-solids), other than Class A or Irritating materials, which are known to be so toxic to man as to afford a hazard to health during transportation; or which, in the absence of adequate data on human toxicity, are presumed to be **toxic to man.** (Sec. 173.343)
IRRITATING MATERIAL	A liquid or solid substance which upon contact with fire or when exposed to air gives off dangerous or intensely irritating fumes, but **not including any poisonous material, Class A.** (Sec. 173.381)
ETIOLOGIC AGENT	An "etiologic agent" means a viable micro-organism, or its toxin which causes or may cause human disease. (Sec. 173.386) (Refer to the Department of Health, Education and Welfare Regulations, Title 42, CFR, Sec. 72.25(c) for details.)
RADIOACTIVE MATERIAL	Any material, or combination of materials, that spontaneously emits ionizing radiation, and having a specific activity greater than 0.002 microcuries per gram. (Sec. 173.389) **NOTE:** See Sec. 173.389(a) through (1) for details.
WATER REACTIVE MATERIAL (SOLID)	Means any solid substance (including sludges and pastes) which, by interaction with water, is likely to become spontaneously flammable or to give off flammable or toxic gases in dangerous quantities.

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Sample Material Safety Data Sheet (MSDS)

SECTION 1: PRODUCT IDENTIFICATION

PRODUCT NAME: **Arsenic Brew**

MANUFACTURER: **Batty's Batch of Chemicals**
ADDRESS: **111 Elm Ave**
Astoria, NY 11105

EMERGENCY PHONE: **1-800-555-5555**

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT:
Cacodylic Acid 90%

CAS NO.
75-60-5
Trade Secret Inert Ingredients 10%

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Toxic if inhaled or swallowed. Cancer hazard. May cause irritation to eyes, skin, and/or respiratory tract.

ROUTES OF ENTRY: Inhalation, Ingestion, Absorption.

POTENTIAL HEALTH EFFECTS
- **EYES: May cause irritation**
- **SKIN: May cause irritation**
- **INGESTION: May cause irritation to digestive tract. Toxic if ingested.**
- **INHALATION: May cause irritation. Toxic if inhaled.**

ACUTE HEALTH HAZARDS: May cause death or severe health reactions within 24 hours of ingestion or inhalation of particles.

CHRONIC HEALTH HAZARDS: May cause cancer.

CARCINOGENICITY
ACGIH: Not listed NTP: Not listed IARC: Group 1 carcinogen
OTHER: Carcinogen in California

SECTION 4: FIRST AID MEASURES

EYES: Flush with water. Immediate medical aid.
SKIN: Remove any clothing and flush skin with water. Immediate medical aid.
INGESTION: Do NOT induce vomiting. Call poison control and get medical aid.
INHALATION: Remove from exposure and get medical aid immediately. If breathing is impeded, give oxygen. Do NOT administer mouth-to-mouth resuscitation when substance inhaled or ingested.

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: Treat symptomatically and supportively.

SECTION 5: FIRE-FIGHTING MEASURES

FLASH POINT: Not applicable

AUTOIGNITION TEMPERATURE:
Not available

NFPA HAZARD CLASSIFICATION
HEALTH: 3 **FLAMMABILITY: 1**
REACTIVITY: 1
Note: ratings are estimated

HMIS HAZARD CLASSIFICATION
HEALTH: **FLAMMABILITY:**
REACTIVITY:
PROTECTION:

EXTINGUISHING MEDIA: Use water spray, dry chemical, carbon dioxide, or chemical foam

SPECIAL FIRE FIGHTING PROCEDURES: None

General: Use self-contained breathing apparatus, or approved respiratory gear in the case of a fire.

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES: Promote proper ventilation, Vacuum or sweep and put in appropriate disposal container. Use appropriate PPE.

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE: Store in a cool, dry place in closed container. Do not get in eyes, skin, or clothing. Use only in a chemical fume hood.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Eyewash facility and safety shower. Use only in chemical fume hood.

RESPIRATORY PROTECTION: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
EYE PROTECTION: Wear appropriate safety eye protection per OSHA 29 CFR 1910.133
SKIN PROTECTION: Wear appropriate safety gloves.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Crystalline powder, white
ODOR: Not available
PHYSICAL STATE: solid
pH: Not available
BOILING POINT: Not available
MELTING POINT: not available
FREEZING POINT: not available
SPECIFIC GRAVITY (H2O = 1): Not available
Molecular Formula: (Cacodylic acid) C2H7AsO2

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Hygroscopic
CONDITIONS TO AVOID (STABILITY): Incompatible materials, dust generation, excess heat, expo
INCOMPATIBILITY (MATERIAL TO AVOID): Strong oxidizing agents, strong bases
HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: Carbon monoxide, carbon dioxide, oxides of arsenic.
HAZARDOUS POLYMERIZATION: Will not occur

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION:
Oral, mouse: LD50=1200 mg/kg
Oral, rat: LD50=655 mg/kg

SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: Degrades in water and land through biodegradation. Dominant degradation leads to the formation of inorganic arsenate.

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Consult federal and state regulations for proper disposal guidance.

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION

PROPER SHIPPING NAME:	**Cacodylic Acid (solutions)**
HAZARD CLASS:	**6.1**
ID NUMBER:	**UN1572**
PACKING GROUP:	**II**