

**Fire Inspector Certification
Program
New Jersey Uniform Fire Code
Inspector training program
Module 12 Hazardous Materials-part 2**



1

Questions?

- *Do you have any questions or concerns about what was covered in Part I ?*

2

Hazardous Materials –Part II

- *Chapter 50 is the lead chapter to all hazardous materials.*
- *Chapter 50 requirements apply to all hazardous materials*
- *Subsequent Chapters through 67 may modify and enhance these requirements*
- *Fire Inspectors must always refer back to Chapter 50.*

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Hazardous Materials – Part II

- **This presentation will cover:**
 - Chapter 56 – Explosives and Fireworks
 - Chapter 57 – Flammable & Combustible Liquids
 - Chapter 58 – Flammable Gases & Flammable Cryogenic Gases
 - Chapter 59 – Flammable Solids
 - Chapter 60 – Highly Toxic & Toxic Materials
 - Chapter 61 – Liquefied Petroleum Gases

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Hazardous Materials – Part II

- **This presentation will cover:** *(Continued)*
 - Chapter 62 – Organic Peroxides
 - Chapter 63 – Oxidizers, Oxidizing Gases & Oxidizing Cryogenic Materials
 - Chapter 64 – Pyrophoric Materials
 - Chapter 65 – Pyroxylin Plastics
 - Chapter 66 – Unstable Reactive
 - Chapter 67 – Water Reactive

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Chapter 56 – Explosives and Fireworks



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Chapter 56

- 5601 General**
- 5602 Definitions**
- 5603 Record Keeping and Reporting**
- 5604 Explosive Materials Storage and handling**
- 5605 Manufacturing, Assembly and Testing**
- 5606 Small Arms Ammunition**
- 5607 Blasting**
- 5608 Fireworks Display**
- 5609 Temporary Storage of Consumer Fireworks**

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CHAPTER 56

- **5601 General**
- **Section covers** possession, manufacturing, storage, handling & use of explosives, explosive materials, fireworks, small arms ammunition.
- **Applicable Standards:**
 - Explosive materials – NFPA-495
 - Explosive material terminals – NFPA-498
 - Fireworks – NFPA 1124 et al
 - Rocketry – NFPA 1122, 1125 & 1127



CHAPTER 56 ⁵⁶

5601- General

- **Permits: NJAC 5:70-2.7**
 - The fire code official may limit the quantity of explosives used in a given location.
 - Not within 100 feet of residential
 - Not permitted for display of sale except as approved
- **Insurance:**
 - Blasting – NJAC 12:190-3.11 valid license from Department of Labor limits \$500,000.00 property & utility damage & 1,000,000.00 personnel injury

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CHAPTER 56

5601.2.4.2 Fireworks Displays

- *Insurance rider for municipality - \$500,000.00*
- *Municipal resolution for public display*
- *Fire safety permit NJAC 5:70-2.7*
 - *Application 15 days prior to display*
 - *Operator must have applicable licenses – DOL, ATF*
 - *Fireworks delivery require CDL/hazmat rider & placards*
 - *Firework area must have proper security and supervision*
 - *Operator shall be properly qualified (21 years old)*
 - *Fire Code Official may assign supervision over site for entire time*

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CHAPTER 56

5601.8.1 Quantities of Explosives

- *Explosive must be separated based upon quantity and distance (Q-D)*
 - *(5601.8.1.1) Mass detonation explosives 1.1 & 1.2 or 1.5*
 - *Table 5604.5.2 (1) or 5605.3*
 - *(5601.8.1.2) Non-mass detonation explosives 1.3*
 - *Table 5604.5.2 (2)*
 - *(5601.8.1.3) Combination mass & non mass 1.1,1.2,1.3*
 - *Tables 5604.5.2(1) 5604.5.2(2) & 5605.3 as appropriate*
- *Determined by the weight of explosives from tables identified in these sections*

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CHAPTER 56

5603- Record keeping & Reporting

- *The following records and reports must be maintained for explosive users:*
 - *Transactional records – 5 years*
 - *Loss or theft – report to ATF in 24 hours*
 - *Accidents- resulting in injury or damage*
 - *Misfires- aerial shells that fail to detonate*
 - *Hazard communications*
 - *Safety rules – 5603.7*

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CHAPTER 56

5604 Explosive Materials Storage and handling.

- *Explosives shall be stored in magazines*
- *Table 5604.3*
- *DOT class – protection – Magazine type*

TABLE 5604.3
STORAGE AMOUNTS AND MAGAZINE REQUIREMENTS FOR EXPLOSIVES, EXPLOSIVE MATERIALS AND BLASTING AGENTS

NEW OR REPLACEMENT	DOT CLASS	ATF/DOT CLASS	PROTECTION (minutes)				OUTDOOR (minutes)	MAGAZINE TYPE REQUIRED				
			Unprotected	Cabinet	Sprinklers	Sprinklers & cabinet		1	2	3	4	5
1.2 ^a	A	High	0	0	1	2	1	X	X	X	—	—
1.2	A	High	0	0	1	2	1	X	X	X	—	—
1.2	B	Low	0	0	1	1	1	X	X	X	X	—
1.3	B	Low	0	0	5	10	1	X	X	X	X	—
1.4 ^b	B	Low	0	0	50	100	1	X	X	X	X	—
1.5	C	Low	0	0	1	2	1	X	X	X	X	—
1.5	Blasting Agent ^c	—	0	0	1	2	1	X	X	X	X	X
1.6	Not Applicable	Not Applicable	0	0	1	2	1	X	X	X	X	X

^a Maximum net weight of 0.454 kg, 1 pound per gallon or 0.22 kg per liter, 1 ounce or 29.57 ml.
^b Maximum net weight of 0.909 kg per gallon or 0.454 kg per liter, 1 ounce or 29.57 ml.
^c Maximum net weight of 0.909 kg per gallon or 0.454 kg per liter, 1 ounce or 29.57 ml.

^d Black powder shall be stored in a Type 1, 2, 3 or 4 magazine as provided for in Section 5604.3.2.

^e This table shall not apply to commercial fireworks, 1.4G.

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CHAPTER 56

5604 - Storing Explosives

- **Type I magazine** – *permanent structure for high explosives* – (1.1,1.2,1.3,1.4,1.5,1.6 & blasting agents)
- **Type II magazine** – *portable storage of high explosives* (1.1,1.2,1.3,1.4,1.5,1.6 & blasting agents)
- **Type III magazine**–*temporary outdoor storage of day box* (1.1,1.2,1.3,1.4,1.5,1.6 & blasting agents)
- **Type IV magazines**– *storage of low explosives* – (1.3,1.4,1.5,1.6 & blasting agents)
- **Type V magazines**– *storage of blasting agents* – (blasting agents)

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Type 1 Magazine



(1.1,1.2,1.3,1.4,1.5,1.6 & blasting agents)

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Type 2 Magazine



(1.1,1.2,1.3,1.4,1.5,1.6 & blasting agents)

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Type 3 Magazine



(1.1,1.2,1.3,1.4,1.5,1.6 & blasting agents)
Day Box

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Type 3 Mobile Magazines



(1.1,1.2,1.3,1.4,1.5,1.6 & blasting agents)

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Type IV Magazine



(1.3, 1.4, 1.5, 1.6 & blasting Agents)

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Type V Magazine



Hold blasting agents

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CHAPTER 56

5605 – Manufacture, Assembly, Testing of Explosive Materials

- **Requires:**

- Emergency plan
- Hazardous materials management plan
- Maintenance plan
- Training for employees
- Emergency procedures
- Separation of on site buildings
- Waste disposal
- Static electricity controls
- Security
- Posting occupant limits



CHAPTER 56

5606 – Small Arms Ammunition

- **Residential Use:**

- Black powder not to exceed 20 pounds
- Smokeless powder not to exceed 20 pounds in original containers
- Smokeless powder 20-50 pounds must be in a wooden box or cabinet at least 1 inch thick.



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CHAPTER 56

5608-Fireworks for Public Displays

- **General Rules NFPA 1123:**

- No smoking
- 1.3,1.4G pyrotechnics only
- Safety distances – 70' feet per inch of shell
- Stable and proper mortar racks – (double nailed & braced)
- Canted mortars based upon wind conditions
- Test shot prior to display to determine fallout areas
- Safety equipment for operator–PPE, fire extinguishers
- Shells over 6"inch must be fired electronically
- Weather protection for products
- Fire watch
- Post display site inspection and report for amount of malfunctions or non firing shells

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CHAPTER 56

5608-Fireworks for Public Displays



Electrically fired



Stable Mortar Racks



Use directions



Post Display inspection²⁴

CHAPTER 56

5608.2.2 Proximate Pyrotechnics

- *Proximate pyrotechnics (1.4g) as defined in NFPA 1126 are permitted in theaters and public halls with the approval of the Fire Code Official*



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CHAPTER 56

5608.2.2 Proximate Pyrotechnics

- **The following conditions shall apply:**
 - 1. Building was designed under UCC for such activity
 - 2. Fireworks are discharged in accordance with manufactures requirements
 - 3. Shall provide a full demonstration for the Fire Code Official prior to final operation
 - 4. Shall not endanger the public
 - 5. Fire watch approved by the Fire Code Official shall be maintained with fire extinguishers on both sides of stage

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Explosive Demolition



Video: CDI Demo Sands AC

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Flammable & Combustible Liquids Chapter 57



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Chapter 57

- 5601 General
- 5602 Definitions
- 5603 Record Keeping and Reporting
- 5604 Explosive Materials Storage and Handling
- 5605 Manufacturing, Assembly and Testing
- 5606 Small Arms Ammunition
- 5607 Blasting
- 5608 Fireworks Display
- 5609 Temporary Storage of Consumer Fireworks

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CHAPTER 57

5701 General

Prevention, control and mitigation of dangerous conditions related to storage, use, dispensing, mixing and handling of flammable and combustible liquids shall be with Chapter 50 and this Chapter



CHAPTER 57

5 5701.22 Non-applicability

- *Garages, airports ,marinas - chapter 23*
- *Food, medicine, alcohol, less than 50% water miscible with individual containers under 1.3 gal.*
- *Alcoholic beverages in retail and wholesale*
- *Fuel oil tanks for oil burning equipment*
- *Refrigerant liquids and oil in refrigeration systems*
- *Commercial cooking oil storage tanks see section 610 & NFPA-30*

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CHAPTER 57

5701.5701.2 Non-applicability(continued)

- *Storage and display of aerosols Chapter 51*
- *Storage of liquids that have no fire point ASTM D92*
- *Liquids with a flash point greater than 95F in water miscible >80%*
- *Liquids with flash points that can be flammable under some conditions that contain halogenated hydrocarbons.*
- *Storage of distilled spirits and wines in wooden casks or barrels*

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Reference Documents

- *Applicable sections of Chapter 50 on Hazardous materials*
- *UCC Mechanical Subcode*
- *This Chapter*

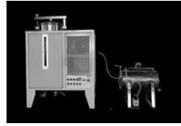


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CHAPTER 57

5703.1 Electrical

- *Electrical wiring shall be in accordance with Section 605 and the electrical sub-code of the UCC*



Solvent distillation unit

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CHAPTER 57

5703.2 Fire Protection

- *Fire protection for storage, use, dispensing, mixing, handling and on-site transportation shall be in accordance with this chapter and applicable sections of chapter 9*



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CHAPTER 57

5703.5 Labeling & Signage

- *Fire Code Official is authorized to require Labeling*
- *Signs shall be:*
 - Durable
 - White letters on red background
 - “DANGER-FLAMMABLE LIQUIDS”
 - 3 inch ht. ½ inch stroke
- *Flammable liquid piping –ASME A13.3*
- *Warning labels:*
 - Containers, packages, cartons
 - Approved labeling method



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CHAPTER 57



CHAPTER 57

5703.6 Piping Systems

- *Piping systems designed to*
 - *Table 5706.2*
 - *Chapter 27 of NFPA 30 unless modified by section 5703.6.2.1*

TABLE 5703.6.2
PIPING STANDARDS

PIPING USE	STANDARD
Power Piping	ASME B31.1
Process Piping	ASME B31.3
Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids	ASME B31.4
Building Services Piping	ASME B31.9

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CHAPTER 57

5703.6.4 Vehicle Protection

- *Guard posts or approved barriers shall be installed in accordance with section 312 to prevent vehicle damage as required by the Fire Official*



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CHAPTER 57

5704 Storage



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CHAPTER 57

5704.2 Tank Storage

- *Tank Storage shall be in accordance with:*
 - Chapter 50
 - Chapter 57
 - Uniform Construction Code
- *Applies to:*
 - Outdoor above ground tanks
 - Underground tanks
 - Above ground tanks inside buildings
 - Portable Tanks over 660gallon capacity

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CHAPTER 57

Tank Vehicles and Tank Cars 5704.2.2

- *Tank Cars and Tank Trucks shall not be used as storage tanks!*



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CHAPTER 57

5704.2.3.2 Label or Placard

- *No Smoking or Open Flames*
- *Tanks 100 gallons or more*
 - *Permanently installed*
 - *Class I,II,IIIA liquids*
 - *NFPA-704 Placard required*
 - *Exception:*
 - *300 gallon or less at single family home for*
 - » *Heating or cooking –R-3*
 - » *Underground tanks*



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CHAPTER 57

5704.2.4 Sources of Ignition

- *Sources of ignition are prohibited in storage areas*
Explosion controls must be provided
- *Incompatible materials must be separated*
- *Grass, weed and waste must not accumulate in an unsafe manner*

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CHAPTER 57

Removal & Disposal of Tanks

- *Removal shall include all flammable and combustible liquids from pipe and lines.*
- *Piping shall be disconnected*
- *Piping shall be removed from the ground*
- *Tank openings shall be capped and plugged*
- *Tanks shall be plugged and inerted prior to removal*
- *All exterior fill and vent pipes shall be removed*
- *Disposal shall be in accordance with NJDEP and UCC requirements*

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CHAPTER 57

5704.3 Container & Portable Tank Storage

- Containers less than 60 gallons and portable tanks less than 660 gallons
- **Design:**
 - For appropriate class of liquid
 - Section 6.2 of NFPA 30
- **Approved Containers:**
 - Portable containers 10 gallons or less
 - Flammable liquids – RED with name of liquid in contrasting colors
 - Kerosene – BLUE
 - Sign at point of sale explaining container colors for each liquid. The sign shall be 12 inches as the least dimension



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CHAPTER 57

Additional requirements

- Section 5704 Storage (balance)
- Section 5705 Dispensing, Use, Mixing and Handling
- Section 5706 Special Operations

These sections are extensive with numerous requirements based on specific applications. Students must use this chapter for reference when encountering these uses. Optional Part 3 has additional details

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Chapter 58 – Flammable Gases & Flammable Cryogenic Fluids

Hazard Categories –Appendix E

- Flammable Gases:
 - Acetylene
 - Ethane
 - Ammonia
- Cryogenic Flammables
 - Hydrogen
 - Carbon monoxide
 - Deuterium
 - Ethylene
 - Methane

CHAPTER 58

5803 General Requirements

- Requirements in control areas:
 - Prohibited in A, E,I,R and offices B occupancies
 - Cylinders shall be secure
 - Medical Gases shall be stored in gas rooms or cabinets
 - Shall have manual and automatic shut offs
 - Ignition sources shall be controlled
 - Bonded & grounded if flammable
 - Liquefied containers shall be upright
 - Storage in accordance with Chapter 50 Tables 5003.1.1(1) & 5003.1.1(3)

CHAPTER 58

5806 Flammable Cryogenics

- Storage prohibited for stationary containers outside as established by local law or statutes.
- Storage may be above or below ground tanks
- Tanks must have venting and overfill protection
- Vacuum jackets ASTM standard stainless steel or corrosive protective

CHAPTER 58

5807 Metal Hydride Storage Tanks

- Listed and approved
- Inspected and tested 5 year intervals
 - System markings
 - Valve markings
 - Pressure relief device markings
 - Pressure Vessel Markings



CHAPTER 58

5808 Hydrogen Fuel Gas Storage Rooms

- Constructed to UCC
- May not be below grade
- Negative pressure in room
- Operable windows not permitted
- Mechanical exhaust ventilation
- Gas detection system UL 2017
- Fail safe system on gas detection
- Explosion control
- Standby power supply



All items to be checked during an inspection

Chapter 59- Flammable Solids



Hazard Categories- Appendix E

- Camphor
- Cellulose nitrate
- Naphthalene
- Inorganic solids
- Phosphorus
- Potassium sulfide
- Sulfur
- Anhydrous, sodium sulfide
- Combustible metals
- Cesium
- Magnesium
- Zirconium

CHAPTER 59

5903- General Requirements

- Below the exempt amounts shall comply with Chapter 50 sections 5002,5003 & 5901
- Above the exempt amounts Chapter 50 section 5003.1
- Outdoor Storage Table 5003.1.1(1) 5001,5003,5004 & 5906



CHAPTER 59

5906 Magnesium

- Storage based on quantity
- Chapter 50 references
- Requirements for bulk piles, ingots, etc.
- Requirements and limits indoor and outdoor
- Use restrictions based on manufacturing type
- Collection requirements for dust and scrap

Chapter 60- Highly Toxic & Toxic Materials



Hazard Categories- Appendix E

- | | |
|---------------------|-----------------------|
| • Boron trichloride | • Barium chloride |
| • Hydrogen fluoride | • Cadmium chloride |
| • Phosgene | • Cadmium oxide |
| • Hydrogen sulfide | • Mercury II sulfate |
| • Acrylonitrile | • Oxalic acid |
| • Alkyl alcohol | • Potassium fluoride |
| • Diethyl ether | • Potassium hydroxide |
| • Chromium IV oxide | • Sodium fluoride |
| • Mercury chloride | |
| • Dimethyl ester | |

CHAPTER 60

6001-General

- Storage and use of highly toxic materials shall comply with this chapter and chapter 53 for compressed gases



CHAPTER 60

6003 – Highly Toxic and Toxic solids and liquids

Section covers wide variety of storage requirements based on control areas, indoor storage, outdoor storage and other requirements

6003 – Highly Toxic and Toxic compressed gases

Section covers wide variety of storage requirements based on control areas, indoor storage, outdoor storage and other requirements

CHAPTER 60

Other Considerations

- Emergency power
- Automatic fire detection system
- Gas detection system
- Gas supply shut offs
- Automatic valve closures



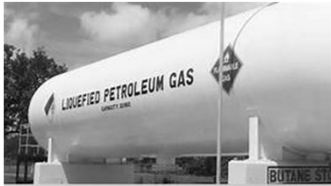
CHAPTER 60

6005- Ozone Generators

- Scope: 0.5 pound capacity or more for 24 hours
- Must be Located in approved cabinet or room
- Must be properly labeled NEMA 250
- Approved signs "HIGHLY TOXIC"
- Rooms ventilated mechanically in accordance with UCC and have gas detection
- Piping and valves are of approved materials
- Automatic shutdowns as shown in section
- Manual shutdowns at the generator and within 10 feet of exit or exit access door



CHAPTER 61 Liquefied Petroleum Gases



CHAPTER 61

- 6101 General*
- 6102 Definitions*
- 6103 Installation of Equipment*
- 6104 Location of LP-Gas containers*
- 6105 Prohibited use*
- 6106 Dispensing and Overfilling*
- 6107 Safety Precautions and devices*
- 6108 Fire Protection*
- 6109 Storage of portable LP-Gas containers awaiting use or resale*
- 6110 LP-Gas containers not in service*
- 6111 Parking and garaging of LP-GAS tank vehicles*

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CHAPTER 61

6103 Installation

- Installed to fuel gas sub code of UCC and NFPA 58
- Shall not be used in basements, pits or similar areas
- Temporary heating NFPA 58 sections 6.19.4, 6.19.5 & 6.19.8
- Factory – maximum aggregate 735 pounds manifold containers separated by 20 feet



CHAPTER 61

6103 Installation

- Use Group E & I
 - Research & Experimentation but not more than 50 pounds water capacity educational or not more than 12 pounds water capacity Institutional
 - Temporary demonstration 12 pounds water capacity
 - Torch assemblies – 2-1/2 pounds water capacity
 - Food preparation – approved appliance NFPA 58 sections 11.13 & 11.14

CHAPTER 61

6105 Prohibited Use

- May not be used to operate devices not approved for LPG
- Shall not be released to atmosphere except as permitted in NFPA 58 section 7.3



CHAPTER 61

6107 Safety Precautions

- Safety devices on LPG cylinders shall not be tampered with or made ineffective
- NO-SMOKING within 25 feet of LPG transfer locations while transfer or filling is in progress
- Combustible shall be kept 10 feet from LPG
- Containers storage areas of cylinders over 100 pounds shall be marked with warnings "Flammable Gas"
- LPG storage areas over 250 gallons shall have marker signs
 - Gas supplier y information and 24 hr emergency contact telephone
- Fire protection over 4,000 gallons NFPA 58 section 6.25
- Portable fire extinguishers section 906

CHAPTER 61

6109 LPG Awaiting Use or Resale

Sections 6109.1 through 6109.15

- Minimize exposure to excessive temperature, physical damage and tampering
- Shall not be stored in exits, or exit access or stairways
- Shall not be stored on roofs
- Shall not be stored in basements or pits
- Container valves shall be protected
- Storage not accessible to public
 - 2-1/2 pound cylinders not to exceed 200 pounds

CHAPTER 61

6109.15 LPG Cylinder Exchange for Resale

1. Secure lockable ventilated cabinet
2. Accessible only by authorized personnel
3. Sign: “DO NOT BRING LP –GAS CYLINDERS INTO BUILDING”
4. Emergency contact information within 10 feet of storage cabinet –size, color, location determined by Fire Official

CHAPTER 61

6109.15.1 Automatic Exchanges

1. Vending system for single cylinder transactions
2. Cylinders can only be inserted upright
3. Electric, mechanical or pneumatic door opening device
4. Electrical equipment shall be Class 1, Division 2
5. Manual override permitted by authorized personnel
6. Inspections shall be conducted as required by the Fire Official

CHAPTER 61

Approved LP-Gas Resale Exchanges



Manual



Automatic

6111- Parking LP-Gas vehicles

- Operator may be absent from vehicle when obtaining assistance due to accident, breakdown or other emergencies
- Vehicle shall not be left unattended within 500 feet of residential, educational or institutional buildings
- Absence longer than 1 hour:
 - Vehicle must be off public street
 - Inside bulk plant
 - Approved locations 50 feet from buildings
- Garages: As per NFPA 58



Chapter 62 – Organic Peroxides



CHAPTER 62

6201 General

6202 Definitions

6203 General Requirements

6204 Storage

6205 Use

There are five classes of organic peroxide.
Specific storage and use requirements are
listed in the chapter and summarized in Tables
6204.1.2 and 6201.1.7

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Hazard Categories –Appendix E

- Class 1
 - 1-butyl hydrogen peroxide –90%
 - Benzyl peroxide –98%
- Class 2
 - Acetyl peroxide-25%
 - 3,5,5 trimethylhexane
 - Peroxyacetic acid 4.3%
- Class 3
 - Acetyl cyclohexane
 - Sulfonyl peroxide –29%
 - Methyl ethyl ketone peroxide-9%
- Class 4
 - Benzyl peroxide –75%
 - Methyl ethyl ketone-9%
 - P-methanehydroperoxide

Chapter 63 Oxidizers, Oxidizing Gases & Oxidizing Cryogenic Materials



CHAPTER 63

6301 General

6302 Definitions

6303 General Requirements

6304 Storage

6305 Use

6306 Liquid Oxygen in Home Health Care

There are a variety of oxidizing materials covered in this chapter. Specific storage and use requirements are listed in the chapter and summarized in Tables in the chapter

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Hazard Categories Appendix E

- Oxidizers
 - Oxygen
 - Ozone
 - Nitric acid
 - Chlorates
 - Sulfuric acid
 - Bromine
 - Nitrogen
 - Nitrates
- Oxidizing cryogenics
 - Oxygen
 - Fluorine
 - nitric oxide
- Cryogenic oxidizers
 - Oxygen
 - Fluorine
 - nitric oxide

Chapter 64- Pyrophoric Materials



Multitank for Aluminum Alkyls, 1.8 m³

CHAPTER 64

6401 General

6402 Definitions

6403 General Requirements

6404 Storage

6405 Use

This chapter covers chemicals with an auto ignition temperature at or below 130 Degrees Fahrenheit. Specific storage and use requirements are listed in the chapter.

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Hazard Categories Appendix E

- | | |
|----------------------------|------------------------------|
| • Gases: | • Solids: |
| – Diborane | – Cesium |
| – Phosphine | – Lithium |
| – Silane | – White or yellow phosphorus |
| • Liquids: | – Potassium |
| – Diethylaluminum chloride | – Rubidium |
| – Dimethyl arsine | – Sodium |
| – Triethyl boron | – Plutonium |
| – Trimethyl aluminum | – Thorium |

Chapter 65 – Pyroxylin Plastics



Compounds of Cellulose Nitrate

CHAPTER 65

6501 General

6502 Definitions

6503 General Requirements

6504 Storage

6405 Use

1904 Pyroxylin developed

Pyroxylin lacquers and plastics served as a springboard for DuPont. They launched the company out of the powder business of the 19th century and into the forefront of the 20th century revolution in synthetic materials.

Pyroxylin is a generic name for nitro-cellulose compounds that form a film when dissolved in a mixture of ether and alcohol, from which plastics can be produced.

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Hazard Categories Appendix E

- Nitro cellulose
- Gun cotton
- Nitro cellulose film



Nitro cellulose

Also know as – Gun Cotton, Flash Paper ,Nitrocellulose film



Unstable (Reactive) Materials Chapter 66



CHAPTER 66

6601 General

6602 Definitions

6603 General Requirements

6604 Storage

6605 Use

These are materials that are not explosive but will decompose, polymerize, or otherwise react. storage and use requirements are listed in the chapter

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Hazard Categories Appendix E

- Class 4
 - Acetyl peroxide
 - Ethyl nitrate
 - Picric acid
 - Trinitro benzene
- Class 3
 - Hydrogen peroxide-52%
 - Nitro methane
 - Perchloric acid
 - Paranitroaniline
- Class 2
 - Acrolein
 - Acryl acid
 - Vinyl acetate
 - Styrene
- Class 1
 - Acetic acid
 - Sodium hydroxide
 - Titanium tetrachloride

Water-Reactive Solids & liquids
Chapter 67



CHAPTER 67

6701 General

6702 Definitions

6703 General Requirements

6704 Storage

6705 Use

These are materials that explode or react when exposed to water.. storage and use requirements are listed in the chapter

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Hazard Categories Appendix E

- Class 3:
 - Aluminum alkyls, ethyl nitrates, bromine trifluoride
- Class 2:
 - Calcium carbide, lithium hydride, potassium peroxide, sodium metal, potassium metal
- Class 1:
 - Acetic acid, hydrogen peroxide, sulfur monochloride, titanium tetrachloride

The End – Part II



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