The City of Providence

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

CHAPTER 38 – 40

No. 81 AN ORDINANCE GRANTING ADDITIONAL POWERS TO HIS HONOR THE MAYOR IN TIME OF EMERGENCY.

Approved July 19, 1968

Be it ordained by the City of Providence:

PREAMBLE

WHEREAS, the City Council recognizes the fact that natural catastrophes and/or other emergency situations may arise during times when it is impossible to convene an emergency session of the City Council immediately; and

WHEREAS, the City Council further recognizes that the Mayor must have certain extraordinary powers during said times of emergency,

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL AS FOLLOWS:

SECTION I. In addition to any powers that the Office of the Mayor may have pursuant to State Law, City Charter, or otherwise, the Mayor may have the following powers during the period of a declared public emergency. These powers shall include but not be limited to the following:

1. Establishment of a curfew during the hours of which no person shall be allowed in the public streets, ways or places throughout the City of Providence or in any designated section of the same.

2. The prohibition and/or regulation of congregation by six (6) or more persons upon the streets, highways, uninhabited buildings or appurtenances to buildings.

3. The prohibition and or regulation of sale or delivery of gasoline or other flammable materials and substances.

4. The prohibition and/or regulation of sale or delivery of firearms or ammunition.

5. The prohibition and/or regulation of sale or delivery of alcoholic beverages.

6. The establishment of restricted areas, access to which will be denied to all persons except those who must enter the same in the discharge of official duties or with the written permission from the Mayor or his duly designated representative.

No.

CHAPTER

AN ORDINANCE

THE COMMITTEE ON
ORDINANCES

Approves Passage of
The Within Ordinance

Vincent Ceraci
6-25-68 Chairman Clerk

7. The prohibition and/or regulation of the use or possession of any incendiary materials.

8. The rationing or restricting of sale or delivery of any food stuffs.

SECTION II. The Mayor shall have the power to declare a public emergency and to exercise said powers only by an executive order when necessary in the exercise of his sound and reasonable judgment. Said executive order shall recite the facts leading to the issuance of said order and shall, as near as may be, designate the area in which said emergency measures shall be imposed. The Mayor shall promulgate said executive order by any communication media available.

SECTION III. The City Council of the City of Providence shall meet in emergency session as soon as practicable following the declaration of a public emergency and shall at said meeting take action to ratify said declaration of a public emergency by appropriate legislation.

SECTION IV. Said public emergency shall continue until such time as the Mayor by executive order determines that the public emergency ceases to exist or when the City Council by resolution declares that the public emergency ceases to exist.

SECTION V. Any violation of any provisions of any executive order promulgated hereunder shall be punishable in accordance with the provisions of Chapter 1, Section 10 of the Ordinances of the City of Providence, 1946, as amended.

IN CITY COUNCIL
JUL 8 - 1968
FIRST READING
READ AND PASSED
Vincent Vespia
CLERK

APPROVED
JUL 10 1968
Joseph A. Doorley
MAYOR

IN CITY COUNCIL
JUL 18 1968
FINAL READING
READ AND PASSED
Russell J. Boyle
PRESIDENT
Vincent Vespia
CLERK

No.

CHAPTER

AN ORDINANCE

The City of Providence

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

CHAPTER 68 — 49

No. AN ORDINANCE IN AMENDMENT OF CHAPTER 12 OF THE REVISED ORDINANCES OF THE CITY OF PROVIDENCE, RHODE ISLAND, 1946 ENTITLED, "FIRE PREVENTION CODE."

Approved July 19, 1968

Be it ordained by the City of Providence:

SECTION 1. The accompanying "Fire Prevention Code" incorporated herein by reference be and the same is hereby adopted.

SECTION 2. All Ordinances or parts of Ordinances inconsistent herewith are hereby repealed.

IN CITY COUNCIL
JUL 8 - 1968
FIRST READING
READ AND PASSED
Vincent E. Cooper
CLERK

APPROVED
JUL 19 1968
Joseph A. Doorley
MAYOR

IN CITY COUNCIL
JUL 18 1968
FINAL READING
READ AND PASSED
Russell J. Boyle
PRESIDENT
Vincent E. Cooper
CLERK

No.

CHAPTER

AN ORDINANCE

IN CITY COUNCIL

MAY 5 - 1967

FIRST READING
REFERRED TO COMMITTEE ON
ORDINANCES
Vincent Vespia
CLERK

THE COMMITTEE ON
Ordinances
Recommends
Be Continued
Vincent Vespia
Clerk
11-22-67

THE COMMITTEE ON
ORDINANCES
Approves Passage of
The Within Ordinance
Vincent Vespia
JUN 25 1968
Chairman
Clerk

FILED
MAY 1 5 47 PM '67
DEPT. OF CITY CLERK
PROVIDENCE, R.I.

PROPOSED PROVIDENCE FIRE PREVENTION CODE

PENALTIES

Any building owner or lessee who shall violate any of the provisions of the Code hereby adopted or fail to comply therewith, or who shall violate or fail to comply with any order made thereunder, or who shall build in violation of any detailed statement of specifications or plans submitted and approved thereunder, shall be guilty of a misdemeanor, and upon conviction be punished by a fine of not more than FIVE HUNDRED ($500) DOLLARS, or shall be imprisoned for not exceeding thirty (30) days, or both so fined and imprisoned for each such offense; and each day such violation, omission, failure or refusal continues, shall be deemed a separate offense.

It shall be the duty of the Chief of the Fire Department or his authorized representative to enforce the provisions of this Code.

FIRE PREVENTION CODE

ARTICLE 1

GENERAL PROVISIONS

Section 1.1. Intent of Code.

It is the intent of this code to prescribe regulations consistent with nationally recognized good practice for the safeguarding to a reasonable degree of life and property from the hazards of fire and explosion arising from the storage, handling and use of hazardous substances, materials and devices, and from conditions hazardous to life or property in the use or occupancy of buildings or premises. Compliance with standards of the American Insurance Association or the National Fire Protection Association or other approved nationally recognized safety standards shall be deemed to be prima facie evidence of compliance with this intent.

Section 1.2. Application of Code.

a. The provisions of this code shall apply equally to new and existing conditions except that existing conditions not in strict compliance with the terms of this code shall be permitted to continue where the exceptions do not constitute a distinct hazard to life or property in the opinion of the Chief of the Bureau of Fire Prevention.

b. Nothing contained in this code shall be construed as applying to the transportation of any article or thing shipped under the jurisdiction of and in compliance with the regulations prescribed by the Interstate Commerce Commission, nor as applying to the military forces of the United States.

Section 1.3. Authority to Enter Premises.

a. The Chief of the Fire Department, Chief of the Bureau of Fire Prevention or any inspector thereof may, at all reasonable hours, enter any building or premises for the purpose of making any inspection, or investigation which, under the provisions of this code, he or they may deem necessary to be made.

b. The Chief of the Fire Department, Chief of the Bureau of Fire Prevention or any inspector thereof shall be permitted by the owner, lessee, manager, or operator of any building or premise

to enter and inspect their building or premise at the time and for the purpose stated in this section.

Section 1.4. Inspections of Buildings and Premises.

a. It shall be the duty of the Chief of the Fire Department to inspect, or cause to be inspected by the Bureau of Fire Prevention, or by the Fire Department officers or members, all buildings and premises except the interiors of dwellings, as often as may be necessary for the purpose of ascertaining and causing to be corrected any conditions liable to cause fire, endanger life from fire, or any violations of the provisions or intent of this code and of any other ordinance affecting the fire hazard.

b. The Chief of the Fire Department, Chief of the Bureau of Fire Prevention or an inspector upon the complaint of any person or whenever he or they shall deem it necessary, shall inspect any buildings and premises within their jurisdiction.

Section 1.5. Orders to Eliminate Dangerous or Hazardous Conditions.

Whenever any of the officers, members or inspectors of the Fire Department or Bureau of Fire Prevention as mentioned in section 1.4 shall find in any building or upon any premises dangerous or hazardous conditions or materials as follows, he or they shall order such dangerous conditions or materials to be removed or remedied in such manner as may be specified by the Chief of the Bureau of Fire Prevention.

a. Dangerous or unlawful amounts of combustible or explosive or otherwise hazardous materials;

b. Hazardous conditions arising from defective or improperly installed equipment for handling or using combustible or explosive or otherwise hazardous materials;

c. Dangerous accumulations of rubbish, waste paper, boxes, shavings or other highly flammable materials;

d. Accumulations of dust or waste material in air conditioning or ventilating systems or of grease in kitchen or other exhaust ducts;

e. Obstructions to or on fire escapes, stairs, passageways, doors or windows, liable to interfere with the operations of the Fire Department or egress of occupants in case of fire;

f. Any building or other structure which, for want of repairs, lack of adequate exit facilities, automatic or other fire alarm apparatus or fire extinguishing equipment, or by reason of age or dilapidated condition, or from any other cause, creates a hazardous condition.

Section 1.6. Service of Orders.

a. The service of orders for the correction of violations of this code shall be made upon the owner, occupant or other person responsible for the conditions, either by delivering a copy of same to such person or by delivering the same to and leaving it with any person in charge of the premises, or in case no such person is found upon the premises, by affixing a copy thereof in a conspicuous place on the door to the entrance of the said premises. Whenever it may be necessary to serve such an order upon the owner of premises such order may be served either by delivering to and leaving with the said person a copy of the said order, or, if such owner is absent from the jurisdiction of the officer making the order, by sending such copy by registered mail to the owner's last known post office address.

b. If buildings or other premises are owned by one person and occupied by another under lease or otherwise, the orders issued in connection with the enforcing of this code shall apply to the occupant thereof, except where the rules or orders require the making of additions to or changes in the premises themselves, such as would immediately become real estate and be the property of the owner of the premises; in such cases the rules or orders shall affect the owner and not the occupant unless it is otherwise agreed between the owner and the occupant.

Section 1.7. Investigation of Fires.

a. The Bureau of Fire Prevention shall investigate the cause, origin and circumstances of every fire occurring in the municipality which is of suspicious nature or which involves loss of life or injury to persons or by which property has been destroyed or substantially damaged. Such investigations shall be begun immediately upon the occurrence of such a fire and, if it appears that such fire is of suspicious origin, the Chief of the Fire Department shall be immediately notified of the facts; he shall take charge immediately of the physical evidence, shall notify the proper authorities designated by law to pursue the investigation of such matters,

and shall further cooperate with the authorities in the collection of evidence and in the prosecution of the case.

b. Every fire shall be reported in writing to the Bureau of Fire Prevention within two days after the occurrence of the same, by the officer in whose jurisdiction such a fire has occurred. Such report shall be in such form as shall be prescribed by the Chief of the Fire Department, and shall contain a statement of facts relating to the cause, origin and circumstances of such fire, injury to persons, and extent of the damage thereof, and the insurance upon such property, and such other information as may be required.

c. The ~~Corporation Counsel~~ CITY SOLICITOR and the Police Department, upon request of the Bureau of Fire Prevention, shall assist the inspectors in the investigation of any fire which, in their opinion, is of suspicious origin.

Section 1.8. Fire Records.

The Chief of the Fire Department shall keep, in the office of the Bureau of Fire Prevention, a record of all fires and of all the facts concerning the same, including statistics as to the extent of such fires and the damage caused thereby, and whether such losses were covered by insurance and if so, in what amount. Such record shall be made daily from the reports made by the fire department officers and inspectors. All such records shall be public.

Section 1.9. Permits.

a. A permit shall constitute permission to maintain, store or handle materials, or to conduct processes, which produce conditions hazardous to life or property, or to install equipment used in connection with such activities. Such permit does not take the place of any license required by law. It shall not be transferable, and any change in use or occupancy of premises shall require a new permit.

b. Before a permit may be issued, the Chief of the Bureau of Fire Prevention, or his assistants, shall inspect and approve the receptacles, vehicles, buildings or storage places to be used. In cases where laws or regulations enforceable by departments other than the Bureau of Fire Prevention are applicable, joint approval shall be obtained from all departments concerned.

c. All applications for a permit required by this code shall be made to the Bureau of Fire Prevention in such form and detail as

it shall prescribe. Applications for permits shall be accompanied by such plans as required by the Bureau of Fire Prevention.

d. Permits shall at all times be kept on the premises designated therein, and shall at all times be subject to inspection by any officer of the fire or police departments.

e. One permit only shall be required by establishments dealing in, or using, two or more flammable, combustible or explosive materials to be kept in the establishment at any one time, but each of the materials shall be listed in the permit.

Section 1.10. Revocation of Permit.

The Bureau of Fire Prevention may revoke a permit or approval issued if any violation of this code is found upon inspection or in case there has been any false statement or misrepresentation as to a material fact in the application or plans on which the permit or approval was based.

Section 1.11. Fire Drills in Educational and Institutional Occupancies.

a. Fire drills shall be held at least once a month in educational occupancies where such occupancies constitute the major occupancy of a building and at least once every two months in institutional occupancies where such occupancies constitute the major occupancy of a building. During severe weather, fire drills may be postponed. A record of all fire drills shall be kept and persons in charge of such occupancies shall file written reports at least quarterly with the Bureau of Fire Prevention giving the time and date of each drill held.

b. In educational occupancies fire drills shall include complete evacuation of all persons from the building. In institutional occupancies fire drills shall be conducted to familiarize operating personnel with their assigned positions of emergency duty; complete evacuation of occupants from the building at the time of the fire drill shall be required only where it is practicable and does not involve moving or disturbing persons under medical care.

Section 1.12. Definitions.

Unless otherwise expressly stated, the following terms shall, for the purpose of this code, have the meanings indicated in this section.

Acetylene, low pressure—see section 30.2a.

Acetylene, medium pressure—see section 30.2b.

Acetylenic compound—see section 30.2c.

Aircraft service station—see section 16.12a.

Approved means accepted by the Chief of the Fire Department or Chief of the Bureau of Fire Prevention, as a result of their investigation and experience or by reason of test, listing or approval by Underwriters' Laboratories, Inc., the National Bureau of Standards, the American Gas Association Laboratories or other nationally recognized testing agencies.

Assembly occupancy means the occupancy or use of a building or structure or any portion thereof by a gathering of persons for civic, political, travel, religious, social or recreational purposes.

Automatic fire alarm system means a system which automatically detects a fire condition and actuates a fire alarm signal device.

Automotive service station (garage)—see section 16.12b.

Barrel—see section 16.12c.

Basement means a story of a building or structure having one-half or more of its clear height below grade.

Blasting agent—see section 12.2a.

Boil-over—see section 16.12e.

Boiling point—see section 16.12d.

Bonded or grounded as protection against static electricity means either that a bond or ground has been deliberately applied, or that an electrically conductive path having a resistance adequate for the intended purpose, usually one million ohms or less, is inherently present by the nature of the installation.

Bulk oxygen system—see section 8.2a.

Bulk plant—see section 16.12f.

Business occupancy means the occupancy or use of a building or structure or any portion thereof for the transaction of business, or the rendering or receiving of professional services.

Cargo tank—see section 16.102a.

Carrier—see section 12.2b.

Catalytic combustion system—see section 26.2.

Cellulose nitrate plastic (pyroxylin)—see section 6.1.

Chemical plant—see section 16.12g.

Closed container—see section 16.12h.
Combustible fibre—see section 7.1.
Combustible liquid—see section 16.12n.
Commercial or industrial establishment—see section 16.12i.
Compressed gas—see section 8.2b.
Container—see section 16.12j.
Conversion range oil burner—see section 24.2a.
Corrosive liquid—see section 20.2a.
Crude petroleum—see section 16.12k.
Decorative material—see section 27.1a.
Dip tank—see section 15.31a.
Distillery—see section 16.12 l
Dry cleaning—see section 9.1a.
Dust—see section 10.1.

Dwelling means a building occupied exclusively for residence purposes and having not more than two dwelling units or as a boarding or rooming house serving not more than 15 persons with meals or sleeping accommodations or both.

Dwelling unit means one or more rooms arranged for the use of one or more individuals living together as a single housekeeping unit, with cooking, living, sanitary and sleeping facilities.

Educational occupancy means the occupancy or use of a building or structure or any portion thereof by persons assembled for the purpose of learning or of receiving educational instruction.

Explosive—see section 12.2c.
Explosive-actuated power device—see section 12.2d.
Explosive material—see section 12.2e.

Fire resistance rating means the time in hours that the material or construction will withstand the standard fire exposure as determined by a fire test made in conformity with the "Standard Methods of Fire Tests of Building Construction and Materials," ASTM E119, UL Inc. 263, or NFPA No. 251.

~~Fire wall—see section 18.2.~~
Flammable anesthetic—see section 8.2c.
Flammable liquid—see section 16.12n.
Flammable solid—see section 20.2b.
Flash point—see section 16.12m.
Fuel gas—see section 30.2d.

Fuel oil—see section 24.2b.

Fumigant—see section 18.2a.

Fumigation—see section 18.2b.

Gaseous hydrogen system—see section 8.2d.

Hazardous chemical—see section 20.1.

Heating and cooking appliance—see section 24.2c.

High hazard occupancy means the occupancy or use of a building or structure or any portion thereof that involves highly combustible, highly flammable, hazardous chemical or explosive material, or which has inherent characteristics that constitute a special fire hazard.

Highly toxic material—see section 20.2c.

Highway—see section 12.2f.

Hydraulic back pressure valve—see section 30.2e.

I.C.C. container means any container approved by the Interstate Commerce Commission for shipping any liquid, gaseous or solid material of a flammable, toxic or other hazardous nature.

Industrial establishment—see section 16.12i.

Industrial occupancy means the occupancy or use of a building or structure or any portion thereof for assembling, fabricating, finishing, manufacturing, packaging or processing operations; except when classed as a high hazard occupancy.

Inhabited building—see section 12.2g.

Institutional occupancy means the occupancy or use of a building or structure or any portion thereof by persons harbored or detained to receive medical, charitable or other care or treatment, or by persons involuntarily detained.

Liquefied petroleum gas—see section 21.2a.

Liquefied petroleum gas equipment—see section 21.2b.

Liquid—see section 16.12n.

LP-Gas means liquefied petroleum gas.

Machine—see section 30.2f.

Magazine—see section 12.2h.

Magnesium—see section 23.2.

Manifold—see section 30.2g.

Marine service station—see section 16.12o.

Mercantile occupancy means the occupancy or use of a building or structure or any portion thereof for the displaying, selling or buying of goods, wares or merchandise; except when classed as a high hazard occupancy.

Multifamily house means a building or portion thereof con-

taining three or more dwelling units; including tenement house, apartment house, flat.

Nonflammable medical gas—see section 8.2e.

Oil burner—see section 24.2d.

Oil burning equipment—see section 24.2e.

Oil fired unit—see section 24.2f.

Organic coating—see section 25.2.

Owner includes his duly authorized agent or attorney, a purchaser, devisee, fiduciary, and a person having a vested or contingent interest in the property in question.

Oxidizing material—see section 20.2d.

Oxygen manifold, high pressure—see section 30.2h.

Oxygen manifold, low pressure—see section 30.2i.

Person includes corporation and copartnership as well as individual.

Pipe—see section 30.2j.

Piped distribution system—see section 8.2f.

Piping—see section 30.2j.

Place of assembly—see section 27.1b.

Poisonous gas—see section 20.2e.

Portable outlet header—see section 30.2k.

Pressure vessel means a storage tank or vessel which has been designed to operate at pressures above 15 psig.

Process area—see section 16.12p.

Processing plant—see section 16.12q.

Propellant-actuated power device—see section 12.2i.

Public conveyance—see section 12.2j.

Pyrotechnic—see section 12.2k.

Radioactive material—see section 20.2f.

Railway—see section 12.2 l

Refinery—see section 16.12r.

Residential occupancy means the occupancy or use of a building or structure or any portion thereof by persons for whom sleeping accommodations are provided but who are not harbored or detained to receive medical, charitable or other care or treatment, or are not involuntarily detained.

Safety can—see section 16.12s.

Sealed source—see section 20.2g.

Small arms ammunition—see section 12.2m.

Small arms ammunition primer—see section 12.2n.
Smokeless propellant—see section 12.2o.
Solvent classification—see section 9.1b.
Spraying area—see section 15.21.
Special industrial explosive device—see section 12.2p.
Special industrial explosive material—see section 12.2q.
Station outlet—see section 30.2 1
Storage, isolated—see section 20.2h.
Storage, separated—see section 20.2i.

Storage occupancy means the occupancy or use of a building or structure or any portion thereof for the storage of goods, wares, merchandise, raw materials, agricultural or manufactured products, including parking garages, or the sheltering of live stock and other animals; except when classed as a high hazard occupancy.

System classification—see section 9.1c.

Tank, atmospheric means a storage tank which has been designed to operate at pressures from atmospheric through 0.5 psig.

Tank, low pressure means a storage tank which has been designed to operate at pressures above 0.5 psig but not more than 15 psig.

Tank vehicle—see section 16.102b.
Terminal—see section 12.2r.
Test blasting cap No. 8—see section 12.2s.
Thermal insecticidal fogging—see section 18.2d.
Thermal insecticidal fogging liquid—see section 18.2c.
Tubing—see section 30.2j.
Unstable (reactive) chemical—see section 20.2j.
Unstable (reactive) liquid—see section 16.12n.
Vapor area—see section 15.31b.
Vapor pressure—see section 16.12t.
Vehicle—see section 12.2t.
Ventilation—see section 16.12u.

Section 1.13. Liability for Damages.

This code shall not be construed to hold the municipality responsible for any damage to persons or property by reason of the inspection or re-inspection authorized herein or failure to inspect or reinspect or the permit issued as herein provided or by reason of the approval or disapproval of any equipment authorized herein.

ARTICLE 2

AUTOMOBILE TIRE REBUILDING PLANTS

Section 2.1. General.

Automobile tire rebuilding plants shall conform to all other applicable requirements of this code as well as to the following provisions.

Section 2.2. Permit Required.

A permit shall be required to conduct or maintain any tire recapping or rebuilding plant.

Section 2.3. Construction and Protection.

a. Tire rebuilding plants shall have all floor openings, such as for stairs and elevators, enclosed in an approved manner.

b. Tire rebuilding plants in buildings of wood frame construction or in buildings used in part for residence occupancy shall be separated from other portions of the building by noncombustible construction having a fire resistance rating of not less than two hours, and shall be equipped with an approved automatic sprinkler system.

Section 2.4. Dust Collecting System.

Buffing machines shall be located in a room separated from the remainder of the plant by construction having a fire resistance rating of not less than one hour, with each door opening protected by an approved self-closing fire door. Each machine shall be connected to an ample dust collecting system discharging to a suitable container which shall be cleaned at frequent intervals.

Section 2.5. Ventilation.

Each room where rubber cement is used or mixed, or flammable or combustible solvents are applied, shall be equipped with effective mechanical or natural ventilation.

ARTICLE 3

AUTOMOBILE WRECKING YARDS, JUNK YARDS AND WASTE MATERIAL HANDLING PLANTS

Section 3.1. General.

Automobile wrecking yards, junk yards and waste material handling plants shall conform to all other applicable requirements of this code as well as the following provisions.

Section 3.2. Permit Required.

A permit shall be obtained to conduct or maintain any automobile wrecking yard, junk yard or waste material handling plant.

Section 3.3. Location.

No automobile wrecking yard, junk yard or waste material handling plant shall be located as to seriously expose adjoining or adjacent properties.

Section 3.4. Construction and Protection.

a. Handling and storage of large quantities of waste paper, rags or other combustible materials shall not be in a building of wood frame or ordinary construction unless the building is sprinklered. Vertical openings shall be enclosed in an approved manner.

b. Picking rooms shall be separated from storage rooms by construction having a fire resistance rating of not less than one hour, with each door opening provided with an approved fire door. Picking rooms shall be provided with exhaust systems of sufficient capacity to adequately remove dust and lint.

ARTICLE 4

BOWLING ESTABLISHMENTS

Section 4.1. General.

Bowling establishments shall conform to all other applicable requirements of this code, as well as the following provisions.

Section 4.2. Permit Required.

A permit shall be required for bowling pin refinishing and bowling lane resurfacing operations involving the use and application of flammable or combustible liquids or materials.

Section 4.3. Lane Resurfacing Operations.

Resurfacing operations shall not be carried on while the establishment is open for business. The Bureau of Fire Prevention shall be notified when bowling lanes are to be resurfaced. Proper ventilation shall be provided. Heating, ventilating, or cooling systems employing recirculation of air shall not be operated during resurfacing operations or within one hour following the application of flammable finishes. All electric motors or other equipment in the area which might be a source of ignition shall be shut down, and all smoking and use of open flames prohibited during the application of flammable finishes and for one hour thereafter.

Section 4.4. Pin Refinishing.

a. Pin refinishing involving the application of flammable finishes shall be done only in a special room meeting the provisions of section 16.32a; such room shall not be located below grade nor shall it have communication with any pits, well, pockets or basements.

b. All power tools in such special rooms shall be effectively grounded. A substantial metal box or other receptacle approved by the Chief of the Bureau of Fire Prevention shall be provided for lathes and sanding or buffing machines for catching dust thrown off during operations. Contents shall be removed daily and disposed of safely.

c. Storage of flammable or combustible liquids in such special rooms shall not exceed a combined aggregate of 60 gallons in

original metal containers, or in approved safety containers not exceeding 5 gallons individual capacity. A metal waste can with self-closing cover shall be provided for all waste materials and rags; contents shall be removed daily. Smoking shall be prohibited at all times in refinishing rooms.

ARTICLE 5

CELLULOSE NITRATE MOTION PICTURE FILM

Section 5.1. Scope.

This article applies to the storage and handling of cellulose nitrate motion picture film, hereafter referred to as "nitrate film". Film having a cellulose acetate or other approved slow-burning base, marked safety film, is exempt from these provisions.

Section 5.2. Permit Required.

a. No person shall store, keep or have on hand more than 25 pounds (for 35 mm. film about 5,000 feet) of nitrate motion picture film without a permit.

b. No person shall sell, lease or otherwise dispose of any nitrate motion picture film to any person not having a permit to handle, use or display such film.

Section 5.3. Storage of Film.

a. Storage of nitrate film, not in process or being worked on, shall be in accordance with sections 5.3 b through 5.3 d.

b. Except as provided in section 5.3 c, amounts in excess of 25 pounds (5 standard rolls) but not in excess of 1,000 pounds (200 standard rolls) shall be kept in approved cabinets or in vaults.

c. Amounts in excess of 1,000 pounds shall be kept in vaults.

d. Unexposed nitrate film enclosed in the original, unbroken, shipping cases, conforming to I.C.C. regulations shall be kept in a sprinklered room. If the amount exceeds 750 pounds (150 standard rolls), it shall be stored in a room used for no other purpose.

Section 5.4. Film Cabinets.

a. Cabinets shall be of approved construction and shall have a capacity not in excess of 375 pounds. (75 standard rolls).

b. Every cabinet having a capacity of over 50 pounds of film shall be provided with a vent to the outside of the building. The vent shall have a minimum effective sectional area of 14 square inches per 100 pounds of film capacity. Vent flues shall be of construction equivalent to 0.0478 inch thickness sheet steel (no. 18 manufacturers' standard gauge), and where inside the building shall be covered with 1 inch of approved heat insulating material.

c. Cabinets holding over 75 pounds of film shall be provided with at least one automatic sprinkler; provided that a cabinet constructed so that each roll is in a separate compartment and will burn out without communicating fire to film in any other compartment, need not be provided with an automatic sprinkler.

d. Film in cabinets shall be in individual roll containers or in I.C.C. shipping containers. Materials other than film shall not be stored in the same cabinet with film. Where cabinets are provided with individual insulated compartments for each roll, the individual rolls stored therein need not be in cans or other containers.

Section 5.5. Film Vaults.

a. Film vaults shall be constructed, vented and sprinklered so as to be reasonably safe to persons and property. Evidence that film vaults have been constructed, vented and sprinklered in accordance with the applicable standard specified for this section 5.5a in article 31 of this Fire Prevention Code shall be evidence that such film vaults are reasonably safe to persons and property.

b. All film in vaults shall be in containers, either in single or double roll containers, cardboard boxes conforming to I.C.C. Specification 12-B or I.C.C. shipping containers.

Section 5.6. Handling of Nitrate Film.

a. All nitrate film shall be kept in closed containers except during the actual time it is being worked upon or examined.

b. Nitrate film shall not be placed or kept under benches, tables, or other surfaces which would shield it from the discharge of sprinklers.

c. Scrap nitrate film shall be kept separate from waste paper, safety film, and other rubbish, and shall be kept under water at all times. It shall be collected from work rooms at least once daily, and removed to a room used for no other purpose, where it shall be kept under water in steel drums or metal containers with tight covers. Scrap film shall be disposed of at frequent intervals. Discarded film in full or part rolls shall be kept in containers in vaults. Scrap film shall not be baled or burned.

Section 5.7. Enclosures for Motion Picture Projectors.

Motion picture projectors shall not be operated with cellulose nitrate motion picture film except when located in enclosures

constructed, equipped and maintained so as to be reasonably safe to persons and property. Evidence that motion picture projectors have been located in enclosures constructed, equipped and maintained in accordance with the applicable standard specified for this section 5.7 in article 31 of this Fire Prevention Code shall be evidence that such motion picture projectors are reasonably safe to persons and property.

Section 5.8. Handling of Nitrate Film in Motion Picture Theatres and Other Occupancies in Which the Principal Use of Film is in Motion Picture Projection.

a. Rewinding of nitrate films shall be performed either in a special rewind room at an approved location, or in the projection room. An approved can for scrap film having a self-closing hinged cover shall be provided.

b. Nitrate film in any projection room or rewinding room shall be kept as follows:

(1) Up to 40 pounds of film (8,000 feet of 35 mm. film) may be kept in I.C.C. shipping containers, or approved cabinet in each room.

(2) If the amount of film on hand exceeds 40 pounds, an approved cabinet shall be provided, in which the amount of film in excess of 40 pounds shall be kept.

Section 5.9. Motion Picture Film Exchanges to be Sprinklered.

Areas of buildings used for nitrate motion picture film exchanges shall be equipped with automatic sprinklers.

ARTICLE 6

CELLULOSE NITRATE PLASTICS (PYROXYLIN)

Section 6.1. Definition.

Cellulose nitrate plastic (pyroxylin) shall mean any plastic substance, material or compound, other than cellulose nitrate film covered by article 5 or guncotton or other explosive covered by article 12, having cellulose nitrate as a base, by whatever name known, when in the form of blocks, slab, sheets, tubes or fabricated shapes.

Section 6.2. Permit Required.

a. All retailers, jobbers and wholesalers storing or handling more than 25 pounds of cellulose nitrate plastics (pyroxylin) shall obtain a permit.

b. A permit shall be required for the manufacture of articles of cellulose nitrate plastics (pyroxylin), which shall include the use of cellulose nitrate plastics (pyroxylin) in the manufacture or assembling of other articles.

Section 6.3. Display of Plastics.

a. All display of cellulose nitrate plastic (pyroxylin) articles in stores shall be in show cases or show windows except as permitted in sections 6.3 b through 6.3 e.

b. Articles may be placed on tables but no table shall be over 3 feet wide and 10 feet long, and tables shall be spaced at least 3 feet apart. Where articles are displayed on counters, they shall be arranged in like manner.

c. Spaces underneath tables shall be kept free of storage of any kind and of accumulations of paper, refuse and other combustible material.

d. Sales or display tables shall be so located that in the event of a fire at that table, the table will not interfere with free exit from the room, in at least one direction.

e. No electric or gas light shall be located directly above any cellulose nitrate plastic (pyroxylin) material, unless provided with a suitable guard to prevent heated particles falling.

Section 6.4. Storage and Handling.

a. All raw cellulose nitrate plastic (pyroxylin) material in factory buildings shall be stored and handled in accordance with sections 6.4 b through 6.4 h.

b. Where raw material in excess of 25 pounds is received in any building or fire area, an approved vented cabinet or vented and sprinklered vault shall be provided for the storage of the material.

c. Not more than 1,000 pounds of raw material may be stored in cabinets in any one workroom, but not more than 500 pounds in any one cabinet, nor more than 250 pounds in one compartment.

d. All raw material in excess of that permitted above shall be kept in vented vaults not exceeding 1,500 cubic feet capacity and with one automatic sprinkler head to each 125 cubic feet of total vault space and with construction and venting in conformity with the requirements prescribed in section 5.5 and satisfactory to the Bureau of Fire Prevention.

e. No cellulose nitrate plastics (pyroxylin) shall be stored within 2 feet of any heat producing appliances, steam pipes, radiators or chimneys.

f. In factories manufacturing articles of cellulose nitrate plastics (pyroxylin) such sprinklered and vented cabinets, vaults or storage rooms, approved by the Bureau of Fire Prevention, shall be provided as may be necessary to prevent the accumulation in work rooms, of raw stock, stock in process or finished articles.

g. In the work rooms of cellulose nitrate plastic (pyroxylin) factories, operators shall not be stationed closer together than 3 feet, and the amount of material per operator shall not exceed one-half day's supply and shall be limited to the capacity of three tote-boxes including material awaiting removal or use.

h. All waste cellulose nitrate plastic (pyroxylin) materials such as shaving, chips, turnings, sawdust, edgings and trimmings shall be kept under water in metal receptacles until removed from the premises.

Section 6.5. Fire Control.

All new and existing building or any portion of buildings used for the manufacture or storage of articles of cellulose nitrate

plastic (pyroxylin) in quantities exceeding 100 pounds shall be equipped with an approved system of automatic sprinklers.

Section 6.6. Heating Equipment.

a. Heating equipment used in buildings manufacturing articles from cellulose nitrate plastics shall comply with sections 6.6 b and 6.6 c.

b. Heating equipment containing ignition sources shall not be permitted in any room used for the storage of cellulose nitrate plastic nor within 20 feet of any manufacturing operation.

c. Heating shall be by low pressure steam or hot water radiators.

ARTICLE 7

COMBUSTIBLE FIBRES

Section 7.1. Definition.

Combustible fibre shall mean and include readily ignitable and free burning fibres, such as cotton, sisal, henequen, ixtle, jute, hemp, tow, cocoa fibre, oakum, baled waste, baled waste paper, kapok, hay, straw, Spanish moss, excelsior, certain synthetic fibres, and other like materials.

Section 7.2. Permit Required.

A permit shall be required for the storage and handling of combustible fibres in quantities in excess of 100 cubic feet.

Section 7.3. Loose Storage.

a. Loose combustible fibres (not in suitable bales or packages), whether housed or in the open, shall not be stored within 100 feet of any building except as hereinafter specified.

b. Not to exceed 100 cubic feet of loose combustible fibres may be kept in any building provided storage is in a metal or metal-lined bin equipped with a self-closing cover.

c. Quantities exceeding 100 cubic feet of loose combustible fibres, but not exceeding 500 cubic feet, may be stored in rooms or compartments having floor, walls and ceiling having a fire-resistance rating of not less than one hour. Each opening into such rooms or compartments from other parts of the building shall be equipped with an approved fire door.

d. Quantities exceeding 500 cubic feet of loose combustible fibres may be stored in approved vaults, constructed as follows:

(1) Storage vaults shall be located outside of buildings or if located inside shall be provided with approved safety vents to the outside.

(2) Walls, floors, and ceilings shall be constructed of brick or other approved noncombustible material. Roofs of outside vaults shall be of noncombustible material but may be so constructed as to readily give way in case of an internal explosion.

(3) Openings, if any, between vault and main building shall be protected on each side of the wall by an approved fire

door. Wall openings in outside vaults exposing other property (not sufficiently detached to be considered cut off) shall be protected by approved fire doors.

(4) Vaults located within buildings and exceeding 1,000 cubic feet storage capacity shall be protected by approved automatic sprinklers, carbon dioxide, or other approved inert gas systems.

e. Not to exceed 2,500 cubic feet of loose fibres may be stored in a detached "loose house" suitably located, with openings properly protected against entrance of sparks. The "loose house" shall be used for no other purpose.

Section 7.4. Baled Storage.

a. No single block or pile shall contain more than 25,000 cubic feet of fibre exclusive of aisles or clearances. Blocks or piles of baled fibre shall be separated from adjacent storage by aisles not less than 5 feet wide; or by flash fire barriers consisting of continuous sheets of noncombustible material extending from floor to a height of at least one foot above the highest point of piles and projecting at least one foot beyond the sides of the piles.

b. Sisal and other fibres in bales bound with combustible tie ropes, also jute and other fibres liable to swell when wet, shall be stored to allow for expansion in any direction without endangering building walls, ceilings or columns. Not less than 3 feet clearance shall be left between walls and sides of piles, except that if storage compartment is not more than 30 feet in width, one foot clearance at side walls will be sufficient, provided a center aisle not less than 5 feet wide is maintained.

c. Not less than 3 feet clearance shall be maintained between sprinkler pipes and tops of piles.

Section 7.5. Storage of Agricultural Products on the Farm.

Unlimited quantities of hay, straw, and other agricultural products may be stored in or near farm buildings located outside closely-built areas. No permit shall be required for such storage.

ARTICLE 8

COMPRESSED GASES

Section 8.1. Scope.

This article shall apply to bulk oxygen systems and to the storage, handling, and use of compressed gases as defined herein. Liquefied petroleum gases and compressed gases used in conjunction with welding or cutting operations are exempt from these provisions.

Section 8.2. Definitions.

a. **Bulk oxygen system** shall mean an assembly of equipment, such as oxygen storage containers, pressure regulators safety devices, vaporizers, manifolds, and interconnecting piping, which has a storage capacity at normal temperature and pressure of:

(1) More than 13,000 cubic feet of oxygen connected in service or ready for service, or

(2) More than 25,000 cubic feet of oxygen, including unconnected reserves on hand at the site.

The bulk oxygen system terminates at the point where oxygen at service pressure first enters the supply line. The oxygen may be stored as a liquid or gas in either stationary or portable containers.

b. **Compressed gas** shall mean and include any mixture or material having in the container either an absolute pressure exceeding 40 pounds per square inch at 70°F., or an absolute pressure exceeding 104 pounds per square inch at 130°F., or both; or any liquid flammable material having a Reid vapor pressure, as defined in section 16.12t, exceeding 40 pounds per square inch at 100°F.

c. **Flammable anesthetic** shall mean a compressed gas which is flammable and administered as an anesthetic and shall include among others, cyclopropane, divinyl ether, ethyl chloride, ethyl ether and ethylene.

d. **Gaseous hydrogen system** shall mean a facility in which the hydrogen is delivered, stored and discharged in the gaseous form to consumer piping. The system includes stationary or movable containers, pressure regulators, safety relief devices, manifolds, interconnecting piping and controls. The system terminates at the point where hydrogen at service pressure first enters the consumer's distribution piping.

e. **Nonflammable medical gas** shall mean a compressed gas which is nonflammable and used for therapeutic purposes and shall include among others, oxygen and nitrous oxide.

f. **Piped distribution system** shall mean a central supply system with control equipment, and a system of piping extending to the points in the hospital where nonflammable medical gases are used, and suitable station outlet valves at each use point.

Section 8.3. Permit Required.

A permit shall be required for the storage, handling, or use at normal temperature and pressure of more than 2,000 cubic feet of flammable compressed gas or 6,000 cubic feet of nonflammable compressed gas.

Section 8.4. Storage Containers.

Each cylinder or pressure vessel shall be designed constructed, tested, maintained and marked with the name of the gas contained so as to be reasonably safe to persons and property. Evidence that each cylinder or pressure vessel has been designed, constructed, tested, maintained and marked with the name of the gas contained in accordance with the applicable standards specified for this section 8.4 in article 31 of this Fire Prevention Code shall be evidence that such cylinder or pressure vessel is reasonably safe to persons and property.

Section 8.5. Cylinder Systems for Flammable Anesthetics and Nonflammable Medical Gases.

a. Cylinders containing flammable anesthetics and nonflammable medical gases, in hospitals and similar facilities, shall be stored, handled and used so as to be reasonably safe to persons and property. Evidence that cylinders containing flammable anesthetics and nonflammable medical gases, in hospitals and similar facilities have been stored, handled and used in accordance with the applicable standard specified for this section 8.5a in article 31 of this Fire Prevention Code shall be evidence that such cylinders are reasonably safe to persons and property.

b. Piping systems shall not be used to distribute flammable medical gases in any hospital or similar facility.

Section 8.6. Piped Distribution Systems for Nonflammable Medical Gases.

Piped distribution systems handling nonflammable medical gases, in hospitals and similar facilities, shall be installed and used so as to be reasonably safe to persons and property. Evidence that said piped distribution systems have been installed and used in accordance with the applicable standard specified for this section 8.6 in article 31 of this Fire Prevention Code shall be evidence that such piped distribution systems are reasonably safe to persons and property.

Section 8.7. Bulk Oxygen Systems Installed at Industrial and Institutional Consumer Sites.

Bulk oxygen systems located at industrial and institutional consumer sites shall be installed so as to be reasonably safe to persons and property. Evidence that said bulk oxygen systems that have been located in industrial and institutional consumer sites have been installed in accordance with the applicable standard specified for this section 8.7 in article 31 of this Fire Prevention Code shall be evidence that such bulk oxygen system is reasonably safe to persons and property.

Section 8.8. Anhydrous Ammonia.

Anhydrous ammonia shall be stored and handled so as to be reasonably safe to persons and property. Evidence that anhydrous ammonia has been stored and handled in accordance with the applicable standard specified for this section 8.8 in article 31 of this Fire Prevention Code shall be evidence that such anhydrous ammonia is reasonably safe to persons and property.

Section 8.9. Gaseous Hydrogen Systems at Consumer Sites.

Gaseous hydrogen systems shall be installed so as to be reasonably safe to persons and property. Evidence that gaseous hydrogen systems have been installed in accordance with the applicable standard specified for this section 8.9 in article 31 of this Fire Prevention Code shall be evidence that such gaseous hydrogen systems are reasonably safe to persons and property.

ARTICLE 9

DRY CLEANING PLANTS

Section 9.1. Definitions.

a. **Dry cleaning** shall mean the process of removing dirt, grease, paints and other stains from wearing apparel, textiles, fabrics, rugs, or other material, by the use of nonaqueous liquids (solvents), and it shall include the process of dyeing clothes or other fabrics or textiles in a solution of dye colors and nonaqueous liquid solvents.

b. **Solvent classification** shall mean a method for classifying solvents as follows:

(1) Class I solvents shall mean flammable liquids having a flash point below 100° F.

(2) Class II solvents shall mean flammable liquids having a flash point at or above 100° F and below 140° F.

(3) Class III solvents shall mean combustible liquids having a flash point at or above 140° F.

c. **System classification** shall mean that dry cleaning plants or systems are classified as follows:

(1) Class I systems shall mean those utilizing Class I solvents.

(2) Class II systems shall mean those utilizing Class II solvents or systems utilizing Class III solvents which do not comply with Class III or Class IV systems.

(3) Class III systems shall mean those employing equipment listed by Underwriters' Laboratories, Inc., utilizing Class III solvents.

(4) Class IV systems shall mean those utilizing solvents which are nonflammable (will not support combustion) or nonflammable at ordinary temperatures and only moderately flammable at higher temperatures.

Section 9.2. Permit Required.

a. No person shall engage in the business of dry cleaning without a permit which shall prescribe the class of system to be used.

b. No change shall be made in the solvent used in the equipment, to a solvent in a more hazardous class unless permission for such change shall first have been obtained from the Bureau of Fire Prevention.

Section 9.3. Class I Systems.

a. New dry cleaning plants or systems utilizing Class I solvents shall be prohibited.

b. Existing dry cleaning plants or systems utilizing Class I solvents may be continued in use provided the quantity of Class I solvent that is stored and handled is not increased.

Section 9.4. Class II Systems.

a. Class II systems shall be located in buildings having walls of masonry or noncombustible construction and wall finish shall be plain or plastered without furring or concealed spaces. Floors of dry cleaning sections shall be of fire-resistive construction and without pits, wells or pockets; and where located over a basement, floor shall be vapor- and liquid-tight. Roof and floors above grade floor, if of combustible construction, shall have the ceilings over the dry cleaning areas protected by cement or gypsum plaster on metal lath or equivalent construction having a fire resistance rating of not less than one hour. Dry cleaning buildings shall not be closer than 10 feet to the line of adjoining property, except that if exposing walls are blank walls having a fire resistance rating of at least four hours the building may be located on the property line.

b. Dry cleaning operations shall be restricted to the lowest floor of a building but shall not be located on any floor below grade, nor in the same building with other occupancies. Operations incidental to the dry cleaning business such as laundering, pressing, and ironing may be in a communicating building or located on the same floor with the dry cleaning plant, provided the dry cleaning operations are separated therefrom by noncombustible partitions having a fire resistance rating of not less than two hours and the communicating openings are protected by approved fire doors.

c. Door openings on stairs or elevators leading from a dry cleaning area to a basement, or opening into a room having openings or stairs to basements, shall be provided with noncombustible sills or ramps raised at least 6 inches. Approved self-closing fire doors shall be provided at such openings. Enclosures shall be of con-

struction equivalent to the floor construction but having a fi resistance rating of not less than one hour.

d. Rooms in which articles are hung up to dry shall be co structed with noncombustible walls, partitions and ceilings havi a fire resistance rating of not less than 2 hours. Entrances drying rooms shall be provided with approved self-closing fi doors. If the drying room is in a separate building it shall confor in all respects to provisions for a dry cleaning building.

e. A mechanical system of ventilation shall be installed dry cleaning areas and drying rooms so as to be reasonably sa to persons and property. Evidence that a mechanical system ventilation has been installed in dry cleaning areas and dryi rooms in accordance with the applicable standard specified i this section 9.4 e in article 31 of this Fire Prevention Code shall l evidence that such mechanical system of ventilation is reasonab safe to persons and property.

f. The mechanical system of ventilation shall have sufficie capacity to insure complete and continuous change of air onc every 6 minutes and shall be provided with means for remo control. The system shall operate automatically when any dr cleaning equipment is in use.

Section 9.5. Class III Systems.

Class III systems, if located in the same building with othe occupancies, shall be separated from the remainder of the buildin vertically and horizontally by construction having a fire resistanc rating of not less than one hour with openings protected by ap proved fire doors, except that such separation shall not be require for operations incidental to or in connection with the dry cleanin business, such as laundering, scouring, scrubbing, drying, pressin or ironing, and the requirement for such separation may be waive at the discretion of the Chief of the Bureau of Fire Preventio based upon a consideration of such factors as type of buildin construction, nature of occupancy, storage and operating capacit of the system and extent of private fire protection provided.

Section 9.6. Class IV Systems.

a. Class IV systems shall be subject to the requirements fo permit in section 9.2, but shall be exempt from all other provision of this article.

b. Self-service dry cleaning plants utilizing only solvents approved for Class IV dry cleaning installations may be installed subject to the approval of the Chief of the Bureau of Fire Prevention.

c. Spotting operations using flammable or combustible liquids shall not be permitted where self-service dry cleaning equipment is installed.

Section 9.7. Heating Equipment.

a. Where Class II systems are used, heating shall be by steam or hot water only. Where Class III systems are used, heating shall be by any approved means which does not involve any open flame or ignition source in the dry cleaning area. Steam and hot water pipes and radiators for heating and drying purposes shall be at least one inch from all woodwork and shall be protected by substantial metal screens arranged so as to prevent combustible goods or materials from coming in contact with pipes and radiators.

b. For Class II or III systems boilers shall be located in a detached building or in a boiler room cut off from the dry cleaning room by partitions of noncombustible material having a fire resistance rating of not less than two hours and without openings. For Class II systems, openings into such boiler rooms shall be at least 10 feet from any exterior openings into the cleaning room.

Section 9.2. Storage and Handling of Cleaning Solvents.

a. Aboveground containers comprising purifiers, clarifiers, and filters, in Class II systems shall not exceed 350 gallons individual capacity and shall not exceed in capacity any industrial tank to which they may be connected. Solvent storage tanks for Class II and Class III systems may be inside of buildings if individual capacity of tanks does not exceed 275 gallons and the aggregate capacity of storage tanks does not exceed 550 gallons. Quantities of solvents for Class II and Class III systems in excess of the above shall be stored in accordance with article 16.

b. Pressure type filters shall be equipped with a reliable pressure gauge and shall not be operated at pressures exceeding those for which they are designed. The filters shall be provided with an air bleeding valve and line connected to discharge into the washer or into the storage tank vent line. Such air bleeding lines shall not discharge into the room.

c. The handling of solvents from storage tanks through the various machines and back to the settling and clear solvent tanks shall be through closed circuits of piping. Pumps of positive displacement type shall have a by-pass and relief valve.

d. Sight glasses, the breakage of which would permit the escape of liquids, shall be of a type not readily damaged by heat and shall be reliably protected against physical damage.

e. Liquid level gauge glasses in Class II systems shall be equipped with an automatic device which will immediately shut off the flow of solvent if the glass is broken. These liquid level gauge glasses shall be guarded against physical damage.

f. When underground treating and settling tanks are used, a separate suction and discharge connection shall be provided to the pump for removal of sludge. The suction pipe shall be carried to

the tank bottom, and the discharge connection to a suitable container.

g. All piping shall be tested to a pressure of at least fifty per cent in excess of normal operating pressure and proved tight and protected against physical damage.

h. Piping, valves, fittings and ground joint unions for solvents shall be designed for the working pressures and structural stresses to which they may be subjected. They shall be of steel or other material suitable for use with the solvent. Pipe systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion or contraction. Pipe systems shall contain a sufficient number of valves to operate the system properly and to protect the plant. Cast iron fittings for pressure piping shall be prohibited.

Section ~~9.10~~ 9.9. Washing Machines.

a. Washing machines shall be substantially constructed. The loading door opening shall be equipped with a close-fitting door so designed as to prevent solvent leaks due to splash. The machine shall be provided with interlocks to prevent cylinder rotation under power except for inching when doors are open.

b. Each washing machine shall be provided with an overflow pipe one size larger than the size of the solvent supply line to the machine. Such overflow pipe shall be connected to the shell of the washer so that the top of the overflow is below the bottom of the trunnion shaft; it shall be without shut-off valves and shall be arranged to discharge to a suitable tank. The supply pipe shall enter the washing machine above the charged liquid level.

c. Individual button and lint traps shall be provided for each washer.

d. In Class II systems, each washing machine shall be provided with approved extinguishing equipment, arranged to operate automatically in case of fire, consisting of a carbon dioxide system or a steam jet not less than ¾ inch with a continuously available steam supply at a pressure of not less than 15 pounds per square inch.

Section 9.10. Stills and Condensers.

a. Steam or hot water only shall be used as the source of heat. If steam is used, a pressure regulating valve shall be installed in the steam supply line to the still.

b. Stills and condensers shall be liquid- and gas-tight.

c. Stills shall be designed for operation on the vacuum principle.

d. If a relief valve is provided it shall be equipped with a vent line extending to the outside.

e. A check valve shall be installed in the steam line between the boiler and the still.

f. Each still shall be provided with a combination vacuum and pressure gauge.

g. Each still shall be equipped with a constant level valve to automatically maintain the solvent liquid level in the still at the proper height.

Section 9.11. Drying Tumblers and Cabinets.

a. Drying tumblers in Class II systems shall be of substantial construction, well secured to substantial foundations, and shall be provided with self-closing explosion hatches having an area equal to at least one square foot for each 30 cubic feet of cylinder volume. Hatches shall be arranged to open away from the operator.

b. Drying tumblers in Class II systems shall be provided with a steam jet, of not less than ⅜ inch size, for humidifying during the drying process.

c. Drying tumblers and drying cabinets shall be ventilated to the outside air by means of properly constructed pipes or ducts connected to an exhaust fan of sufficient capacity to remove all dust, vapors, or lint generated by the process. Such discharge pipes or ducts shall be carried to a height of not less than six feet above the roof, and shall be provided with cleanout facilities, if used for Class II systems.

d. Discharge pipes shall not terminate within ten feet measured horizontally from any door, window or frame walls of any adjoining or adjacent building.

e. The fan shall be properly housed and so interlocked as to insure operation while the drying tumbler is in use. The fan

spiders, blades or running rings shall be constructed of non-ferrous metal. In no case shall the fan motor be mounted within the ventilating duct.

f. Each drying tumbler in Class II systems shall be provided with approved extinguishing equipment, arranged to operate automatically in case of fire, consisting of a carbon dioxide or steam jet system as specified in section 9.9 d.

Section 9.12. Extractors.

a. The baskets shall have a rim of non-ferrous metal and shall be well balanced.

b. Extractors shall be provided with liquid-tight covers, or they shall be designed so that none of the liquid solvent is thrown out of the extractor while it is in operation. Cover shall be equipped with automatic mechanical or electrical interlocks which will prohibit operating the extractors while the cover is open and which will prohibit opening the cover until the basket comes to rest.

c. Extractors shall be provided with a drain pipe not less than 1½ inches in diameter connected direct to underground storage tanks or to a suitable aboveground container, or to the washer through an approved extractor pump with connections fitted with proper valves.

d. Brakes, if used, shall be so designed as to prevent the creation of sparks or excessive heat.

e. Extractors shall not be operated at a speed in excess of that prescribed by the manufacturer as shown on name plate which shall be provided on each machine.

f. Extractors equipped with a solvent spray nozzle for spray rinsing of garments after the primary extraction shall comply as follows:

(1) Installation of spray rinse equipment on existing extractors shall be subject to approval of the Chief of the Bureau of Fire Prevention.

(2) Extractor covers shall be made splash proof to prevent leakage of the solvent, and shall be equipped with a latch to hold the cover closed during operation.

(3) Supply pumps of positive displacement type shall be provided with a bypass and relief valve set so as to prevent excessive pressure.

(4) Valves in supply line between pumps and outlet shall be installed in such a manner that the cutoff is effected ahead of any flexible portion of the supply line.

(5) Extractor drain lines shall not be less than 2 inches for extractors up to and including 40 inches in diameter and 3 inches for extractors in excess of 40 inches in diameter.

(6) Extractors shall be provided with at least one drain line open at all times. If more than one extractor drain line is provided for the purpose of alternating use, quick opening valves or equivalent shall be installed in each line and interlocked so that when either valve is shut the other valve is open.

(7) If a separate extractor drain tank is provided, it shall have a capacity equal to the combined total gallonage of the charged solvent extraction, the rinse and the rinse extraction.

(8) Drainage from extractors to all tanks shall be by gravity flow.

Section 9.13. Combination Dry Cleaning Unit.

a. The provisions of this section shall apply to combination dry cleaning units wherein the washing and extracting cycles are completed within the same enclosure.

b. The machines shall be of substantial construction and shall be provided with splash proof doors, or covers, with interlocking means to prevent cylinder rotation, under power, except for inching at slow speed when doors or covers are open. Such interlocks shall provide that during the extracting cycle, opening of the door or cover will disconnect the drive motor and apply braking means to bring the cylinder to rest before access to cylinder is possible. Machines shall be provided with braking means to insure stoppage within reasonable time without the creation of sparks or excessive heat.

c. Each machine shall be provided with an overflow pipe one size larger than the size of the solvent supply line to the machine. Such overflow shall be connected so that the top of the overflow is below the bottom of the trunnion shaft and arranged to discharge into a suitable tank.

d. Individual button and lint traps, with suitable lids shall be provided for each machine.

e. The supply pipes to machines, whether from pumps, filters or storage tanks, shall be arranged to deflect solvent stream away from tub openings.

f. Cylinder shall be supported so as to provide sufficient clearance to prevent striking or rubbing adjacent parts during rotation.

g. Machine shall be furnished with name plate indicating maximum cylinder speed and warning that machine shall not be operated in excess of such speed.

h. Each machine in a Class II system shall be provided with approved extinguishing equipment, arranged to operate automatically in case of fire, consisting of a carbon dioxide or steam jet system as specified in section 9.[illegible] d.

Section 9.14 Bonding and Grounding for Class II and III Systems.

a. Storage tanks, treatment tanks, purifiers, pumps, piping, washers, extractors, drying tumblers, drying cabinets, combination units, and other such equipment, if not inherently electrically conductive, shall be bonded together. This system of equipment, if it is not grounded due to the electrical power services installed thereon, shall be grounded. Isolated units of equipment, such as drying cabinets, shall be grounded.

b. Pulleys and belting in dry cleaning rooms, shall be provided with properly grounded combs, collectors, or neutralizers.

c. When fabrics are transferred from one piece of equipment to another, the two pieces of equipment shall be electrically bonded together.

d. Metal tops of spotting tables shall be permanently and effectively grounded.

Section 9.15 Scouring, Brushing and Spotting.

a. The brushing (prespotting) table shall have a liquid-tight top with a curb on all sides not less than 1 inch high. The top of the table shall be pitched so as to insure thorough draining to a 1½ inch drain connected to a suitable container especially provided and marked for that purpose.

b. All scouring or brushing and spotting (prespotting) operations utilizing solvents with lower flash points than the solvents used in the plant dry cleaning machines shall be limited to one gallon and dispensed from approved safety cans. Additional storage shall be in approved safety cans of not over one gallon capacity.

c. Scouring or brushing operations utilizing in excess of one gallon of solvent with lower flash points than the solvent used in the plant dry cleaning machines shall be conducted only in a room or building conforming to all the requirements for a dry cleaning system utilizing the same type of solvent.

d. The total amount of Class I or II solvent used on scouring or brushing tables or in scrubbing tubs, in accordance with section 9.16c, shall not exceed 3 gallons. The scouring or brushing table or scrubbing tub shall be so located as to ensure thorough and effective disposal of vapors through the ventilating system. Scrubbing tubs shall be used only for articles, the character of which prevents their washing in the usual washing machines. Scrubbing tubs shall be secured to the floor and shall be provided with permanent 1½ inch trapped drains to a suitable container specially provided and marked for that purpose.

Section 9.17 Fire Control.

Adequate portable fire extinguishers of a type suitable for fighting fires involving flammable or combustible liquids, shall be provided in all dry cleaning plants; at least one extinguisher shall be provided at each entrance to every room or area where flammable or combustible liquids are stored or used.

Section 9.17. Smoking Prohibited.

Smoking in plants employing Class II or Class III systems, except in smoking rooms so designated, shall be strictly prohibited and "No Smoking" signs shall be posted.

ARTICLE 10

DUST EXPLOSIONS, PREVENTION OF

Section 10.1. Definition.

Dust as used in this article shall mean pulverized particles of any material which, if mixed with air in the proper proportions, become explosive and may be ignited by a flame or spark.

Section 10.2. Permit Required.

A permit shall be obtained for the operation of any grain elevator, flour, starch or feed mill, or plant pulverizing aluminum, coal, cocoa, plastics, magnesium, spices, sugar, or other material producing dust as defined in section 10.1.

Section 10.3 General Requirements.

a. All dust-producing or dust-agitating machinery such as grinding mills and separators, and all elevators, elevator legs, spouts, hoppers and other conveyors shall be provided with casings or enclosures maintained as nearly dust-tight as possible.

b. Approved magnetic or pneumatic separators shall be installed ahead of all shellers, crackers, crushers, grinding machines, pulverizers and similar machines in which the entrance of foreign materials may cause sparks to be generated.

c. Suitable dust collecting equipment shall be installed and accumulation of dust shall be kept at a minimum in the interior of buildings.

d. All machinery and metal parts of the crushing, drying, pulverizing and conveying systems shall be electrically grounded.

e. Smoking and the carrying of matches, the use of heating or other devices employing an open flame, or use of any spark producing equipment is prohibited in areas containing dust-producing or dust-agitating operations.

F. Plants producing dusts shall be reasonably safe to persons and property. Plants producing dusts which conform to the applicable provisions of this code shall be deemed to be reasonably safe to persons and property; on matters not covered in this code. Conformity of plants producing dusts to the applicable standards specified for this section 10.3 F in article 31 of this Fire Prevention Code shall be evidence that such plants are reasonably safe to persons and property.

ARTICLE 11

EXIT WAYS, MAINTENANCE OF

Section 11.1. Obstructions to Means of Egress.

a. No person shall at any time place an encumbrance of any kind before or upon any fire escape, balcony or ladder intended as a means of escape from fire.

b. In other than dwellings, no person shall place, store or keep, or permit to be placed, stored or kept on or under or at the bottom of any exit stairway, inside or outside, exit hallway, elevator or other means of egress, any materials the presence or the burning of which would obstruct or render hazardous, egress of persons from the building.

c. No aisle, passageway or stairway in any mercantile occupancy shall be obstructed with tables, show cases, or other obstruction during hours such occupancy is open to the public.

d. All doors in or leading to required exitways shall be kept unlocked at all times when the building or floor area served thereby is occupied.

Section 11.2. Marking of Exit Ways.

a. In rooms accommodating more than 75 persons, required exit doorways, other than those normally used for entrance, shall be plainly marked by approved exit signs, sufficiently illuminated when the floor area is occupied, to be readily distinguished.

b. Where the exit doorways are not visible from all locations in public corridors, directional signs, as required by the Bureau of Fire Prevention shall be placed on walls or otherwise displayed in conspicuous locations to direct occupants to exit doorways.

Section 11.3. Lighting of Exit Ways.

Required stairways, hallways and other means of egress, including exterior open spaces to or through which exit ways lead, shall be kept adequately lighted at all times that the building served thereby is occupied.

Section 11.4. Stairway Doors to be Kept Closed.

It shall be unlawful to block open any stairway enclosure door which leads to or from a floor of the building, and which by law is required to be self closing.

ARTICLE 12

EXPLOSIVES, AMMUNITION AND BLASTING AGENTS

Section 12.1. Scope.

a. This article shall apply to the manufacture, possession, storage, sale, transportation, and use of explosives, blasting agents, pyrotechnics, and ammunition except as provided in section 12.1 b.

b. Nothing in this article shall be construed as applying to:

(1) The Armed Forces of the United States or the State Militia.

(2) Explosives in forms prescribed by the official United States Pharmacopeia.

(3) The sale or use of fireworks.

(4) The possession, transportation and use of small arms ammunition or special industrial explosive devices.

(5) The possession, storage, transportation and use of not more than 20 pounds of smokeless propellant and 1,000 small arms primers for hand loading of small arms ammunition for personal use.

(6) The manufacture, possession, storage and use of not more than 15 pounds of explosives or blasting agents, exclusive of smokeless propellents in educational, governmental or industrial laboratories for instructional or research purposes when under direct supervision of experienced competent persons.

(7) The transportation and use of explosives or blasting agents by the United States Bureau of Mines, the Federal Bureau of Investigation, the United States Secret Service or Police and Fire Departments acting in their official capacity.

Section 12.2. Definitions.

a. **Blasting agent** shall mean any material or mixture, consisting of a fuel and oxidizer, intended for blasting, not otherwise classified as an explosive, in which none of the ingredients are classified as explosives, provided that the finished product, as mixed and packaged for use or shipment, cannot be detonated by means of a No. 8 test blasting cap when unconfined. Materials or

mixtures classified as nitro carbo nitrates by Interstate Commerce Commission Regulations shall be included in this definition.

b. **Carrier** shall mean persons who engage in the transportation of articles or materials by rail, highway, water or air.

c. **Explosive** shall mean any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion. The term "explosive" includes all materials classified as Class A, Class B or Classs C explosives by Interstate Commerce Commission Regulations, and includes, but is not limited to, dynamite, black powder, pellet powders, initiating explosives, blasting caps, electric blasting caps, safety fuse, fuse igniters, fuse lighters, squibs, cordeau detonant fuse, instantaneous fuse, igniter cord and igniters, small arms ammunition, small arms ammunition primers, smokeless propellant, cartridges for propellant-actuated power devices and cartridges for industrial guns, and pyrotechnics.

d. **Explosive-actuated power device** shall mean any tool or special mechanized device which is actuated by explosives, but not to include propellant-actuated power devices. Examples of explosive-actuated power devices are jet tappers and jet perforators.

e. **Explosive material** shall mean any quantity of Class A, Class B, Class C explosives and any other chemical compounds or mixtures thereof used as the propelling or exploding material in any cartridge or other explosive device.

f. **Highway** shall mean any public street, alley or road.

g. **Inhabited building** shall mean a building or structure regularly used in whole or in part as a place of human habitation. The term "inhabited building" shall also mean any church, school, store, railway passenger station, airport terminal for passengers, and any other building or structure where people are accustomed to congregate or assemble, but excluding any building or structure occupied in connection with the manufacture, transportation, storage and use of explosives and blasting agents.

h. **Magazine** shall mean any building or structure approved for the storage of explosives.

i. **Propellant-actuated power device** shall mean any tool or special mechanized device or gas generator system which is actuated by a smokeless propellant or which releases and directs work through a smokeless propellant charge.

j. **Public conveyance** shall mean any railway car, street car, cab, bus, airplane or other vehicle transporting passengers for hire.

k. **Pyrotechnic** shall mean any special fireworks (not included in article 13), which are manufactured and designed primarily for producing visible and audible pyrotechnic effects by a combustible explosion, and which are of such composition so as to be included under Class B explosives, as defined by the Interstate Commerce Commission Regulations.

l. **Railway** shall mean and include any steam, electric, or other railroad or railway which carries passengers for hire.

m. **Small arms ammunition** shall mean any shotgun, rifle, pistol or revolver cartridge and cartridges for propellant-actuated power devices and industrial guns.

n. **Small arms ammunition primer** shall mean a small percussion-sensitive explosive charge, encased in a cap, used to ignite propellant powder.

o. **Smokeless propellant** shall mean solid propellants, commonly called smokeless powders in the trade, used in small arms ammunition, cannon, rockets, or propellant-actuated power devices.

p. **Special industrial explosive device** shall mean any explosive-actuated power devices and propellant-actuated power devices.

q. **Special industrial explosive material** shall mean shaped materials and sheet forms and various other extrusions, pellets and packages of high explosives, containing dynamite, trinitrotoluol, pentaerythritoltetranitrate, cyclotrimethylenetrinitramine, or other similar compounds used for high-energy-rate forming, expanding and shaping in metal fabrication, and for dismemberment and quick reduction of scrap metal.

r. **Terminal** shall mean those facilities used by carriers for the receipt, transfer, temporary storage or delivery of articles or materials.

s. **Test blasting cap No. 8** shall mean one containing 2 grams of a mixture of 80% mercury fulminate and 20% potassium chlorate, or a cap of equivalent strength.

t. **Vehicle** shall mean a conveyance of any type operated upon the highways.

Section 12.3. Permits Required.

a. Permits shall be obtained:

(1) To manufacture, possess, store, sell or otherwise dispose of explosives, blasting agents, or small arms ammunition.

(2) To transport explosives or blasting agents.

(3) To use explosives or blasting agents.

(4) To operate a terminal for handling explosives or blasting agents.

(5) To deliver to or receive explosives or blasting agents from a carrier at a terminal between the hours of sunset and sunrise.

(6) To transport blasting caps or electric blasting caps on the same vehicle with explosives.

b. Permits required by section 12.3a (1) shall not be issued for:

(1) Liquid nitroglycerin.

(2) Dynamite (except gelatin dynamite) containing over 60% of liquid explosive ingredient.

(3) Dynamite having an unsatisfactory absorbent or one that permits leakage of a liquid explosive ingredient under any conditions liable to exist during storage.

(4) Nitrocellulose in a dry and uncompressed condition in quantity greater than ten pounds net weight in one package.

(5) Fulminate of mercury in a dry condition and fulminate of all other metals in any condition except as a component of manufactured articles not hereinafter forbidden.

(6) Explosive compositions that ignite spontaneously or undergo marked decomposition, rendering the products or their use more hazardous, when subjected to forty-eight consecutive hours or less to a temperature of 167° F.

(7) New explosives until approved by the Interstate Commerce Commission, except that permits may be issued to educational, governmental or industrial laboratories for instructional or research purposes.

(8) Explosives condemned by the Interstate Commerce Commission.

(9) Explosives not packed or marked in accordance with the requirements of the Interstate Commerce Commission.

(10) Explosives containing an ammonium salt and a chlorate.

Section 12.4. Bond Required for Blasting.

Before a permit to do blasting as required under section 12.3a (3) shall be issued, the applicant for such permit shall file a bond deemed adequate in each case by the Bureau of Fire Prevention, which bond shall become available for the payment of any damages arising from the permitted blasting.

Section 12.5. General Requirements.

a. The manufacture of any explosives, blasting agents, including small arms ammunition, and pyrotechnics, as herein defined, shall be prohibited unless such manufacture is authorized by the Chief of the Bureau of Fire Prevention. This shall not apply to hand loading of small arms ammunition prepared for personal use when not for resale.

b. The storage of explosives and blasting agents is prohibited within the limits established by law as the limits of the district in which such storage is to be prohibited, except for temporary storage for use in connection with approved blasting operations: provided, however, this prohibition shall not apply to wholesale and retail stocks of small arms ammunition, fuses, lighters, fuse igniters, and safety fuses (not including cordeau detonant fuses) in quantities involving less than 500 pounds of explosive material; nor shall it apply to explosive-actuated power devices, when employed in construction operations in highly populated areas, in quantities involving less than 50 pounds of explosive material.

c. The Chief of the Bureau of Fire Prevention may limit the quantity of explosives, blasting agents, or ammunition to be permitted at any location.

d. No person shall sell or display explosives or blasting agents on highways, sidewalks, public property or in places of public assembly.

Section 12.6. Storage of Explosives.

a. Explosives, including special industrial explosive materials and any newly developed and unclassified explosive, shall be stored

in magazines which comply with this article. This shall not be construed as applying to wholesale and retail stocks of small arms ammunition, explosive bolts, fuses, lighters, fuse igniters and safety fuses (not including cordeau detonant fuses) in quantities involving less than 500 pounds of explosive material; nor shall it apply to explosive-actuated power devices, when employed in construction operation in highly populated areas, in quantities involving less than 50 pounds of explosive material.

b. Magazines shall be in the custody of a competent person at all times who shall be at least 21 years of age, and who shall be held responsible for compliance with all safety precautions.

c. Smoking, matches, open flames, spark producing devices and firearms shall be prohibited inside or within 50 feet of magazines. Combustible materials shall not be stored within 50 feet of magazines.

d. The land surrounding magazines shall be kept clear of brush, dried grass, leaves, trash and debris for a distance of at least 25 feet.

e. Magazines shall be kept locked except when being inspected or when explosives are being placed therein or being removed therefrom.

f. Magazines shall be kept clean, dry and free of grit, paper, empty packages and rubbish.

g. Magazines shall not be provided with artificial heat or light, except that if artificial light is necessary, an approved electric safety flashlight or safety lantern shall be used.

h. Blasting caps, electric blasting caps, detonating primers and primed cartridges shall not be stored in the same magazine with other explosives.

i. Magazines shall be of two types, namely: Class I and Class II.

j. Class I magazines shall be used for the storage of explosives when quantities are in excess of fifty pounds of explosive material.

k. Class I or Class II magazines shall be used for the storage of explosives in quantities of 50 pounds or less of explosive material except that a Class II magazine may be used for temporary storage of a larger quantity of explosives at the site of blasting operations

where such amount constitutes not more than one day's supply for use in current operations.

l. Class I and Class II magazines shall be located away from inhabited buildings, passenger railways, public highways and other magazines in accordance with Table 12.6, except as provided in section 12.6 m.

m. The Chief of the Bureau of Fire Prevention may authorize the storage of up to 50 pounds of explosives and 5000 blasting caps in wholesale and retail hardware stores or other approved establishments. Explosives and blasting caps shall be stored in separate Class II magazines at approved locations on the first floor or basement provided an exit to the outside of the building is not more than 10 feet away. A distance of 10 feet shall be maintained between the magazines. Their location shall not be changed without approval of the Bureau of Fire Prevention.

n. At the site of blasting operations, a distance of at least 150 feet shall be maintained between Class II magazines and the blast area when the quantity of explosives temporarily kept therein is in excess of 25 pounds, and at least 50 feet when the quantity of explosives is 25 pounds or less.

o. Class I magazines shall be designed and constructed so as to be reasonably safe to persons and property. Evidence that Class I magazines have been designed and constructed in accordance with the applicable standard specified for this section 12.6 o in article 31 of this Fire Prevention Code shall be evidence that such Class I magazines are reasonably safe to persons and property.

p. Class I magazines shall have openings only for ventilation and entrance.

q. Class II magazines shall be constructed of 2-inch tongue and grooved hardwood covered on the outside with 0.0359 inch thickness sheet steel (no. 18 manufacturers' standard gauge) or equivalent aluminum, or of all metal construction with sides, bottom and cover of sheet metal lined with ⅜-inch plywood or the equivalent. Edges of metal covers shall overlap sides at least one inch. Class II magazines when located in wholesale and retail hardware stores or other approved establishments shall be mounted on casters or wheels to facilitate removal.

r. Magazines for the storage of explosives shall be weather-resistant and properly ventilated, and when used for storage of

Class A explosives other than black powder, blasting caps and electric blasting caps, shall also be bullet resistant.

s. Property upon which Class I magazines are located shall be posted with signs reading "Explosives—Keep Off." Such signs shall be located so as to minimize the possibility of a bullet traveling in the direction of the magazine if anyone shoots at the sign.

t. Class II magazines shall be painted red and shall bear lettering in white, on all sides and top at least three inches high, "Explosives—Keep Fire Away."

u. Packages of explosives shall not be unpacked or repacked in a magazine nor within 50 feet of a magazine.

v. Magazines shall not be used for the storage of any metal tools or of any commodity except explosives, but this restriction shall not apply to the storage of blasting agents, blasting supplies and oxidizers used in compounding blasting agents.

w. When an explosive has deteriorated to an extent that it is in an unstable or dangerous condition, or if nitroglycerin leaks from any explosive, then the person in possession of such explosive shall immediately report the fact to the Chief of the Bureau of Fire Prevention and upon his authorization shall proceed to destroy such explosives and clean floors stained with nitroglycerin in accordance with the instructions of the manufacturer. Only experienced persons shall do the work of destroying explosives.

x. Packages of explosives shall be laid flat with top side up. Black powder when stored in magazines with other explosives shall be stored separately. Black powder stored in kegs shall be stored on ends, bungs down, or on side, seams down. Corresponding grades and brands shall be stored together in such a manner that brands and grade marks show. All stocks shall be stored so as to be easily counted and checked. Packages of explosives shall be piled in a stable manner. When any kind of explosive is removed from a magazine for use, the oldest explosive of that particular kind shall always be taken first.

y. When magazines need inside repairs, all explosives shall be removed therefrom and the floors cleaned. In making outside repairs, if there is a possibility of causing sparks or fire, the explosives shall be removed from the magazine. Explosives removed from the magazine under repair shall either be placed in

another magazine or placed a safe distance from the magazine where they shall be properly guarded and protected until repairs have been completed, when they shall be returned to the magazine.

Section 12.7. Transportation of Explosives.

a. Explosives shall not be transported on public conveyances.

b. Vehicles used for transporting explosives shall be strong enough to carry the load without difficulty and shall be in good mechanical condition. If vehicles do not have a closed body, the body shall be covered with a flameproof and moistureproof tarpaulin or other effective protection against moisture and sparks. Such vehicles shall have tight floors and exposed spark-producing metal on the inside of the body shall be covered with wood or other non-sparking material to prevent contact with packages of explosives. Packages of explosives shall not be loaded above the sides of open-body vehicles.

c. Explosives may be loaded into and transported in a truck, truck with semi-trailer, truck with full trailer, truck tractor with semi-trailer, or truck tractor with semi-trailor and full trailer. Explosives shall not be transported on any pole trailer.

d. Every vehicle when used for transporting explosives shall be equipped with not less than two approved portable fire extinguishers of appropriate size and type for flammable or combustible liquid fires so as to provide reasonable safety to persons and property. Evidence that approved portable fire extinguishers of appropriate size and type for flammable or combustible liquid fires have been provided in accordance with the applicable standard specified for this section 12.7 d in article 31 of this Fire Prevention Code shall be evidence that such portable fire extinguishers provide reasonable safety to persons and property. At least one portable fire extinguisher shall be located near the driver's seat.

e. It shall be the duty of the person to whom a permit has been issued to transport explosives over the highways of the municipality, to inspect daily those vehicles employed by him to determine that:

(1) Fire extinguishers are filled and in operating condition.

(2) Electric wires are insulated and securely fastened.

(3) The motor, chassis and body are reasonably clean and free of excessive grease and oil.

(4) The fuel tank and fuel line are securely fastened and are not leaking.

(5) Brakes, lights, horn, windshield wipers and steering mechanism are functioning properly.

(6) Tires are properly inflated and free of defects.

(7) The vehicle is in proper condition for transporting explosives.

f. Spark producing metals or spark producing metal tools shall not be carried in the body of a vehicle transporting explosives.

g. Only those dangerous articles authorized to be loaded with explosives by Interstate Commerce Commission Regulations shall be carried in the body of a vehicle transporting explosives.

h. No person shall smoke, carry matches or any other flame-producing device, or carry any firearms or loaded cartridges while in or near a vehicle transporting explosives; or drive, load or unload any such vehicle in a careless or reckless manner.

i. Vehicles transporting explosives shall be in the custody of drivers who are physically fit, careful, capable, reliable, able to read and write the English language, not addicted to the use or under the influence of intoxicants or narcotics, and not less than 21 years of age. They shall be familiar with state and municipal traffic regulations, and the provisions of this article governing the transportation of explosives.

j. Every vehicle transporting explosives shall be marked or placarded on both sides, front and rear, with the word "Explosives" in letters not less than three inches high on a contrasting background.

k. Blasting caps, or electric blasting caps, shall not be transported over the highways of the municipality on the same vehicle with other explosives, except by permission of the Bureau of Fire Prevention.

l. Vehicles transporting explosives and traveling in the same direction shall not be driven within three hundred feet of each other.

m. Vehicles transporting explosives shall be routed to avoid congested traffic and densely populated areas.

n. Explosives shall not be transported through any completed vehicular tunnel or subway.

o. Vehicles transporting explosives shall not be left unattended at any time within the municipality.

p. Unauthorized persons shall not ride on vehicles transporting explosives.

q. The fire and police departments shall be promptly notified when a vehicle transporting explosives is involved in an accident, breaks down, or catches fire. Only in the event of such an emergency shall the transfer of explosives from one vehicle to another vehicle be allowed on highways within the municipality and only when qualified supervision is provided. Except in such an emergency, a vehicle transporting explosives shall not be parked before reaching its destination on highways within the municipality or adjacent to or in proximity to any bridge, tunnel, dwelling, building or place where people work, congregate or assemble.

r. Delivery shall only be made to authorized persons and into approved magazines or approved temporary storage or handling areas.

s. Vehicles containing explosives shall not be taken into a garage, or repair shop, for repairs or storage.

Section 12.8. Use and Handling of Explosives.

a. Blasting operations shall be conducted during daylight hours except when authorized at other times by the Chief of the Bureau of Fire Prevention.

b. The handling and firing of explosives shall be performed by the person possessing a permit to use explosives or by employees under his direct supervision who are at least 21 years old.

c. No person shall handle explosives while under the influence of intoxicants or narcotics.

d. No person shall smoke or carry matches while handling explosives or while in the vicinity thereof.

e. No open flame light shall be used in the vicinity of explosives.

f. Whenever blasting is being conducted in the vicinity of gas, electric, water, fire alarm, telephone, telegraph or steam utilities, the blaster shall notify the appropriate representatives of such utilities at least 24 hours in advance of blasting, specifying the

location and intended time of such blasting. Verbal notice shall be confirmed with written notice. In an emergency this time limit may be waived by the Chief of the Bureau of Fire Prevention.

g. Blasting operations shall be conducted so as to be reasonably safe to persons and property. Evidence that blasting operations have been conducted in accordance with the applicable standard specified for this section 12.8 g in article 31 of this Fire Prevention Code shall be evidence that such blasting operations are reasonably safe to persons and property.

h. Before a blast is fired, the person in charge shall make certain that all surplus explosives are in a safe place, all persons and vehicles are at a safe distance or under sufficient cover, and a loud warning signal has been sounded.

i. Due precautions shall be taken to prevent accidental discharge of electric blasting caps from current induced by radio or radar transmitters, lightning, adjacent power lines, dust storms, or other sources of extraneous electricity. These precautions shall include:

(1) The suspension of all blasting operations and removal of persons from the blasting area during the approach and progress of an electric storm.

(2) The posting of signs warning against the use of mobile radio transmitters on all roads within 350 feet of the blasting operations.

(3) Compliance with section 12.8 g when blasting within 1½ miles of broadcast or highpower short wave radio transmitters.

j. When blasting is done in congested areas or in close proximity to a building, structure, railway, highway or any other installation that may be damaged, the blast shall be covered before firing, with a mat constructed so that it is capable of preventing rock from being thrown into the air.

k. Tools used for opening packages of explosives shall be constructed of non-sparking materials.

l. Empty boxes and paper and fiber packing materials which have previously contained high explosives shall not be used again for any purpose, but shall be destroyed by burning at an approved

isolated location out of doors, and no person shall be nearer than 100 feet after the burning has started.

m. Explosives shall not be abandoned.

Section 12.9. Explosives and Blasting Agents at Terminals.

a. The Bureau of Fire Prevention may designate the location and specify the maximum quantity of explosives or blasting agents which may be loaded, unloaded, reloaded or temporarily retained at each terminal where such operations are permitted.

b. Shipments of explosives or blasting agents delivered to carriers shall comply with Interstate Commerce Commission Regulations.

c. Carriers shall immediately notify the Bureau of Fire Prevention when explosives or blasting agents are received at terminals.

d. Carriers shall immediately notify consignees of the arrival of explosives or blasting agents at terminals.

e. The consignee of a shipment of explosives or blasting agents shall remove them from the carrier's terminal within 48 hours, Sundays and holidays excluded, after being notified of their arrival.

Section 12.10. Blasting Agents, General Requirements.

a. Unless otherwise set forth in sections 12.12 and 12.13, blasting agents shall be transported, stored, and used in the same manner as explosives.

b. When oxidizers are stored inside a building used for mixing or storage of blasting agents or outside such a building and within the magazine separation distance from it, the weight of the oxidizer shall be added to the weight of the blasting agent when calculating the total quantity of material involved for application of Table 12.6.

Section 12.11. Mixing Blasting Agents.

a. Buildings or other facilities used for mixing blasting agents shall be located away from inhabited buildings, passenger railways and public highways, in accordance with Table 12.6.

b. Not more than one day's production of blasting agents or the limit determined by Table 12.6, whichever is less, shall be permitted in or near the building or other facility used for mixing

blasting agents. Larger quantities shall be stored in separate buildings or magazines.

c. Buildings or other facilities used for the mixing of blasting agents shall be designed and constructed so as to be reasonably safe to persons and property. Evidence that buildings or other facilities used for the mixing of blasting agents have been designed and constructed in accordance with the applicable standard specified for this section 12.11 c in article 31 of this Fire Prevention Code shall be evidence that such buildings or other facilities are reasonably safe to persons and property.

d. Compounding and mixing of recognized formulations of blasting agents shall be conducted so that no liquid fuel with a flash point lower than that of No. 2 Diesel fuel oil (125° F minimum or legal) is used and shall be performed to provide reasonable safety to persons and property. Evidence that compounding and mixing of recognized formulations of blasting agents have been conducted in accordance with the applicable standard specified for this section 12.11 d in article 31 of this Fire Prevention Code shall be evidence that such compounding and mixing are reasonably safe to persons and property.

e. Smoking or open flames shall not be permitted in or within 50 feet of any building or facility used for the mixing of blasting agents.

f. Empty oxidizer bags shall be disposed of daily by burning in a safe manner in the open at a safe distance from buildings or combustible materials.

Section 12.12. Storage of Blasting Agents and Supplies.

a. Blasting agents or oxidizers, when stored in conjunction with explosives, shall be stored in the manner set forth in section 12.6. The quantity of blasting agents or oxidizers shall be included when computing the total quantity of explosives for determining distance requirements.

b. Blasting agents, when stored entirely separate from explosives, may be stored as provided in:

(1) Section 12.6, or

(2) One story warehouses of fire resistive or noncombustible construction without basements, constructed so as

to eliminate open floor drains and piping into which molten materials could flow and be confined in case of fire, weather resistant, well ventilated, and equipped with a strong door kept securely locked except when open for business.

c. Buildings used for the storage of blasting agents separate from explosives shall be located away from inhabited buildings, passenger railways and public highways, in accordance with Table 12.6.

d. The interior of buildings used for the storage of blasting agents shall be kept clean and free from debris and empty containers. Spilled materials shall be cleaned up promptly and safely removed. Combustible materials, flammable liquids, corrosive acids, chlorates, nitrates other than ammonium nitrate shall not be stored in any building containing blasting agents unless separated therefrom by construction having a fire-resistance rating of not less than one hour. The provisions of this section shall not prohibit the storage of blasting agents together with non-explosive blasting supplies.

e. Semi-trailers or full trailers may be used for temporarily storing blasting agents, provided they are located away from inhabited buildings, passenger railways and public highways, in accordance with Table 12.6. Trailers shall be provided with substantial means for locking, and the trailer doors shall be kept locked except during the time of placement or removal of blasting agents.

f. Piles of oxidizers and buildings containing oxidizers shall be adequately separated from readily combustible fuels.

g. Caked oxidizers, either in bags or in bulk, shall not be loosened by blasting.

Section 12.13. Transportation of Blasting Agents.

a. When blasting agents are transported in the same vehicle with explosives, section 12.7 shall apply.

b. Vehicles transporting blasting agents shall be in safe operating condition at all times.

c. Every vehicle transporting blasting agents shall be marked or placarded on both sides, front and rear, with the word "Dangerous" and also the words "Blasting Agents," in letters not less than three inches high on a contrasting background.

d. No oils, matches, firearms, acids or other corrosive liquids shall be carried in the body of any vehicle transporting blasting agents.

e. No person shall be permitted to ride upon, drive, load or unload a vehicle containing blasting agents while smoking or under the influence of intoxicants, stimulating or depressing drugs, or narcotics.

Table 12.6. American Table of Distances for Storage of Explosives

EXPLOSIVES		DISTANCE IN FEET WHEN STORAGE IS BARRICADED			
Pounds Over	Pounds Not Over	From Inhabited Buildings	From Passenger Railways	From Public Highways	Separation of Magazines
2	5	70	30	30	6
5	10	90	35	35	8
10	20	110	45	45	10
20	30	125	50	50	11
30	40	140	55	55	12
40	50	150	60	60	14
50	75	170	70	70	15
75	100	190	75	75	16
100	125	200	80	80	18
125	150	215	85	85	19
150	200	235	95	95	21
200	250	255	105	105	23
250	300	270	110	110	24
300	400	295	120	120	27
400	500	320	130	130	29
500	600	340	135	135	31
600	700	355	145	145	32
700	800	375	150	150	33
800	900	390	155	155	35
900	1,000	400	160	160	36
1,000	1,200	425	170	165	39
1,200	1,400	450	180	170	41
1,400	1,600	470	190	175	43
1,600	1,800	490	195	180	44
1,800	2,000	505	205	185	45
2,000	2,500	545	220	190	49
2,500	3,000	580	235	195	52
3,000	4,000	635	255	210	58
4,000	5,000	685	275	225	61
5,000	6,000	730	295	235	65
6,000	7,000	770	310	245	68
7,000	8,000	800	320	250	72
8,000	9,000	835	335	255	75
9,000	10,000	865	345	260	78
10,000	12,000	875	370	270	82
12,000	14,000	885	390	275	87
14,000	16,000	900	405	280	90
16,000	18,000	940	420	285	94
18,000	20,000	975	435	290	98
20,000	25,000	1,055	470	315	105
25,000	30,000	1,130	500	340	112
30,000	35,000	1,205	525	360	119
35,000	40,000	1,275	550	380	124
40,000	45,000	1,340	570	400	129
45,000	50,000	1,400	590	420	135
50,000	55,000	1,460	610	440	140
55,000	60,000	1,515	630	455	145
60,000	65,000	1,565	645	470	150
65,000	70,000	1,610	660	485	155
70,000	75,000	1,655	675	500	160
75,000	80,000	1,695	690	510	165
80,000	85,000	1,730	705	520	170
85,000	90,000	1,760	720	530	175
90,000	95,000	1,790	730	540	180
95,000	100,000	1,815	745	545	185
100,000	110,000	1,835	770	550	195
110,000	120,000	1,855	790	555	205
120,000	130,000	1,875	810	560	215
130,000	140,000	1,890	835	565	225
140,000	150,000	1,900	850	570	235
150,000	160,000	1,935	870	580	245
160,000	170,000	1,965	890	590	255
170,000	180,000	1,990	905	600	265
180,000	190,000	2,010	920	605	275
190,000	200,000	2,030	935	610	285
200,000	210,000	2,055	955	620	295
210,000	230,000	2,100	980	635	315
230,000	250,000	2,155	1,010	650	335
250,000	275,000	2,215	1,040	670	360
275,000	300,000	2,275	1,075	690	385

NOTE 1: All types of blasting caps in strengths through No. 8 shall be rated at 1½ pounds of explosives per 1000 caps.

NOTE 2: "Barricaded" means that a building containing explosives is effectually screened from a magazine, building, railway, or highway, either by a natural barricade, or by an artificial barricade of such height that a straight line from the top of any sidewall of the building containing explosives to the eave line of any magazine, or building, or to a point twelve feet above the center of a railway or highway, will pass through such intervening natural or artificial barricade.

NOTE 3: "Artificial Barricade" means as artificial mound or revetted wall of earth of a minimum thickness of three feet.

NOTE 4: "Natural Barricade" means natural features of the ground, such as hills, or timber of sufficient density that the surrounding exposures which require protection cannot be seen from the magazine when the trees are bare of leaves.

NOTE 5: When a building containing explosives is not barricaded, the distances shown in the Table shall be doubled.

NOTE 6: When two or more storage magazines are located on the same property, each magazine shall comply with minimum distances specified from inhabited buildings, railways, and highways, and in addition they shall be separated from each other by not less than the distances shown for "Separation of Magazines," except that the quantity of explosives contained in cap magazines shall govern in regard to the spacing of said cap magazines from magazines containing other explosives. If any two or more magazines are separated from each other by less than the specified "Separation of Magazines" distances, then such two or more magazines, as a group, shall be considered as one magazine, and the total quantity of explosives stored in such group must be treated as if stored in a single magazine located on the site of any magazine of the group, and shall comply with the distances specified from other magazines, inhabited buildings, railways, and highways.

NOTE 7: This table applies only to the manufacture and permanent storage of commercial explosives. It is not applicable to transportation of explosives, or any handling of temporary storage necessary or incident thereto. It is not intended to apply to bombs, projectiles, or other heavily encased explosives.

ARTICLE 14

FIRE PROTECTION EQUIPMENT

Section 14.1. Scope.

This article shall apply to new and existing conditions except that sections 14.4, 14.5 and 14.6 shall not apply where equivalent or more stringent legal requirements are enforced by the building or other municipal departments.

Section 14.2. Survey of Premises and Specification of Equipment.

The Chief of the Bureau of Fire Prevention shall survey each commercial and industrial establishment, mercantile, educational and institutional occupancy, place of assembly, hotel, multi-family house, and trailer camp and shall specify suitable fire detecting devices or extinguishing appliances which shall be provided in or near boiler rooms, kitchens of restaurants, clubs and like establishments, storage rooms involving considerable combustible material, rooms in which hazardous manufacturing processes are involved, repair garages, and other places of a generally hazardous nature. Such devices or appliances may consist of automatic fire alarm systems, automatic sprinkler or water spray systems, standpipe and hose, fixed or portable fire extinguishers of a type suitable for the probable class of fire, or suitable asbestos blankets, manual or automatic covers, or carbon dioxide or other special fire extinguishing systems. In special hazardous processes or storage, appliances of more than one type or special systems may be required.

Section 14.3. Maintenance of Equipment.

Sprinkler systems, standpipe systems, fire alarm systems, and other fire protective or extinguishing systems or appliances which have been installed in compliance with any permit or order, or because of any law or ordinance, shall be maintained in operative condition at all times, and it shall be unlawful for any owner or occupant to reduce the effectiveness of the protection so required; except this shall not prohibit the owner or occupant from temporarily reducing or discontinuing the protection where necessary to make tests, repairs, alterations or additions. The Chief of the Bureau of Fire Prevention shall be notified before such tests, repairs, altera-

tions or additions are started unless the work is to be continuous until completion.

Section 14.4 Sprinkler Requirements

ARTICLE 15

FLAMMABLE FINISHES, APPLICATION OF

DIVISION I

GENERAL PROVISIONS

Section 15.11. Scope.

This article shall apply to locations or areas where the following activities are regularly done: (1) the application of flammable or combustible paint, varnish, lacquer, stain or other flammable or combustible liquid applied as a spray by whatever means, in continuous or intermittent processes; and (2) dip tank operations in which articles or materials are passed through contents of tanks, vats or containers of flammable or combustible liquids, including coating, finishing, treating and similar processes.

Section 15.12. Permit Required.

A permit shall be obtained for spraying or dipping operations utilizing on any working day more than one gallon of flammable or combustible liquids.

Section 15.13. Smoking Prohibited.

Smoking shall be prohibited in any spray finishing areas and in the vicinity of dip tanks. "No Smoking" signs with lettering of approved size shall be conspicuously posted in such areas and shall read "By Order of the Fire Chief".

Section 15.14. Welding Warning Signs.

Conspicuous signs shall be posted in the vicinity of all spraying areas, dipping operations and paint storage rooms, conveying the following warning:

> **NO WELDING**
> The use of welding or cutting equipment in, or near this area is dangerous because of fire and explosion. Welding and cutting shall be done only under the supervision of the foreman in charge.

DIVISION II
SPRAY FINISHING

Section 15.21. Definition.

a. **Spraying area** shall mean any area in which dangerous quantities of flammable vapors or combustible residues, dusts or deposits are present due to the operation of spraying processes. The Chief of the Bureau of Fire Prevention may define the limits of the spraying area in any specific case.

b. A spraying area shall include the interior of spray booths, the interior of ducts exhausting from spraying processes, any area in the direct path of spray, and any area containing dangerous quantities of air-suspended combustible residue, dust, deposits, spray or vapor as a result of spraying operations.

Section 15.22. Location of Spray Finishing Operations.

Spray finishing operations shall not be conducted in buildings used for assembly, educational, institutional or residential occupancies, except in a room designed for the purpose, protected with an approved system of automatic sprinklers and separated vertically and horizontally from other areas by construction having not less than 2 hours fire resistance rating.

Section 15.23. Spray Booths.

a. Spray booths shall be substantially constructed of noncombustible material.

b. The interior surfaces of spray booths shall be smooth and continuous without edges and otherwise designed to prevent pocketing of residues and facilitate cleaning and washing without injury.

c. The floor of the spray booth and operators' working area, if combustible, shall be covered with noncombustible material of such character as to facilitate the safe cleaning and removal of residues.

d. If installed, baffle plates shall be noncombustible material, readily removable or accessible on both sides for cleaning, and designed to promote an even flow of air through the booth and to prevent the deposit of overspray before it enters the exhaust duct. Such baffle plates shall not be located in exhaust ducts.

e. Each spray booth having a frontal area larger than nine square feet shall have a metal deflector or curtain not less than 2½-inches deep installed at the upper outer edge of the booth, over the opening.

f. Each spray booth shall be separated from other operations by not less than three feet, or by a greater distance, or by such partition or wall as the Chief of the Bureau of Fire Prevention may require to reduce the danger from juxtaposition of hazardous operations.

g. Spray booths shall be so installed that all portions are readily accessible for cleaning. A clear space of not less than three feet on all sides shall be kept free from storage or combustible construction.

Section 15.24. Dry Type Overspray Collectors — (Exhaust Air Filters).

a. Overspray dry filters or filter rolls, if installed in conventional dry type spray booths, shall conform to sections 15.24 c through 15.24 h.

b. The spraying operations shall be so designed, installed and maintained that the average air velocity over the open face of the booth or (booth cross-section during spraying operations)

shall be not less than 100 linear feet per minute. Visible gauges or audible alarm or pressure activated devices shall be installed to indicate or insure that the required air velocity is maintained.

c. All discarded filter pads and filter rolls shall be immediately removed to a safe, well detached location or placed in a water-filled metal container and disposed of at the close of the day's operation unless maintained completely in water.

d. The location of filters in a spray booth shall be so as to not reduce the effective booth enclosure of the articles being sprayed.

e. Space within spray booth on the downstream and upstream sides of filter shall be protected with approved automatic sprinklers.

f. Filters or filter rolls shall not be used when applying a spray material known to be highly susceptible to spontaneous heating and ignition.

g. Clean filters or filter rolls shall be noncombustible or of approved type.

h. Filters and filter rolls shall not alternately be used for different types of coating materials, where the combination of materials may be conducive to spontaneous ignition.

Section 15.26. Ventilation of Spray Booths and Spray Finishing Areas.

a. All spraying areas shall be provided with mechanical ventilation adequate to prevent the dangerous accumulation of vapors and to safely remove such vapors to a safe location.

b. Mechanical ventilation shall be kept in operation at all times while spraying operations are being conducted and for a sufficient time thereafter to allow vapors from drying coated articles and drying finishing material residue to be exhausted.

c. Each spray booth shall have an independent exhaust duct system discharging to building exterior, except multiple cabinet spray booths in which identical spray finishing material is used with a combined frontal area of not more than eighteen square feet may have a common exhaust. If more than one fan serves one booth, all fans shall be so interconnected that one fan cannot operate without operating all.

d. Electric motors driving exhaust fans shall not be placed inside booths or ducts. Fan rotating element shall be non-ferrous or non-sparking or the casing shall consist of or be lined with such material.

e. Belts shall not enter duct or booth unless belt and pulley within the duct or booth are tightly enclosed.

f. Exhaust ducts shall be constructed of steel and shall be substantially supported.

g. Exhaust ducts shall have a clearance from unprotected combustible construction or material of not less than 18 inches. If combustible construction is provided with the following protection applied to all surfaces within 18 inches, clearances may be reduced to the distances indicated:

(1) 0.0149 inch thickness uncoated sheet steel (no. 28 manufacturers' standard gauge) on ¼-inch asbestos mill board ..... 12 inches

(2) 0.0149 inch thickness uncoated sheet steel (no. 28 manufacturers' standard gauge) on ⅛-inch asbestos mill board spaced out one inch on non-combustible spacers ..... 9 inches

(3) 0.0299 inch thickness uncoated sheet steel (no. 22 manufacturers' standard gauge) on 1-inch mineral wool batts reinforced with wire mesh or the equivalent ..... 3 inches

(4) Where ducts are protected with an approved automatic sprinkler system, properly maintained; the clearance from unprotected combustible construction or material may be reduced to ..... 6 inches

h. Air exhausted from spraying operations shall not be recirculated.

Section 15.26 Storage and Handling of Flammable or Combustible Liquids.

a. The storage and handling of flammable or combustible liquids shall be in accordance with article 16 and shall also conform to the provisions of this section.

b. Where the quantity of liquid in 5-gallon and smaller containers, other than original sealed containers, exceeds a total of 10 gallons it shall be stored in a storage cabinet conforming to section 16.33 or in storage rooms or mixing rooms conforming to sections 16.32 or 16.72.

c. Original closed containers, approved portable tanks, approved safety cans or a properly arranged system of piping shall be used for bringing flammable or combustible liquids into spray finishing areas. Open containers shall not be used.

d. Containers supplying spray nozzles shall be of closed type or provided with metal covers kept closed. Containers not resting on floors shall be on noncombustible supports or suspended by wire cables. Containers supplying spray nozzles by gravity flow shall not exceed 10 gallons capacity.

e. All containers or piping to which is attached a hose or flexible connection shall be provided with a shut-off valve at the connection. Such valves shall be kept shut when not in use.

f. Heaters shall not be located in spray booths or other locations subject to the accumulation of deposits or combustible residue.

g. If flammable or combustible liquids are supplied to spray nozzles by positive displacement pumps, pump discharge line shall be provided with an approved relief valve discharging to pump suction or to a safe detached location, or a device provided to stop the prime mover if the discharge pressure exceeds the safe operating pressure of the system.

h. Whenever flammable or combustible liquids are transferred from one container to another, both containers shall be bonded and grounded. Piping systems for flammable or combustible liquids shall be permanently bonded and grounded.

Section 15.27. Fire Control.

Suitable portable fire extinguishers, small hose or other fire extinguishing equipment shall be installed near all spraying areas as may be specified by the Chief of the Bureau of Fire Prevention.

Section 15.28. Operations and Maintenance.

a. All spraying areas shall be kept as free from the accumulation of deposits of combustible residues as practical, with cleaning conducted daily if necessary.

b. Scrapers, spuds or other such tools used for cleaning purposes shall be of non-sparking material.

c. Residue scrapings and debris contaminated with residue shall be immediately removed from premises and properly disposed of.

d. The use of solvents for cleaning operations shall be restricted to Class II and III liquids except solvents with flash points not less than those normally used in spraying operations may be used for cleaning spray nozzles and auxiliary equipment, provided such cleaning is conducted inside spray booths and ventilating equipment is operating during cleaning.

e. Spray booths shall not be alternately used for different types of coating materials, where the combination of the materials may be conducive to spontaneous ignition, unless all deposits of the first used material are removed from the booth and exhaust ducts prior to spraying with the second.

f. Approved metal waste cans shall be provided wherever rags or waste are impregnated with finishing material and all such rags or waste deposited therein immediately after use. The contents of waste cans shall be properly disposed of at least once daily and at the end of each shift.

Section 15.29. Drying Apparatus.

a. Drying apparatus, in addition to conforming with this article, shall comply with the applicable provisions of article 26.

b. Spray booths, rooms or other enclosures used for spraying operations shall not alternately be used for the purpose of drying by any arrangement which will cause a material increase in the surface temperature of the spray booth, room or enclosure.

c. Except as specifically provided in [redacted], drying or baking units, utilizing a heating system having open flames or

which may produce sparks, shall not be installed in a spraying area as defined in section 15.21, but may be installed adjacent thereto when equipped with an interlocked ventilating system arranged to:

(1) Thoroughly ventilate the drying space before heating system can be started;

(2) Maintain a safe atmosphere at any source of ignition;

(3) Automatically shut down heating system in the event of failure of the ventilating system.

DIVISION III

DIP TANKS

Section 15.31. Definitions.

a. **Dip tank** shall mean a tank, vat or container of flammable or combustible liquid in which articles or materials are immersed for the purpose of coating, finishing, treating or similar processes.

b. **Vapor area** shall mean any area containing dangerous quantities of flammable vapors in the vicinity of dip tanks, their drain boards or associated drying, conveying or other equipment, during operation or shut-down periods. The Chief of the Bureau of Fire Prevention may determine the extent of the vapor area, taking into consideration the characteristics of the liquid, the degree of sustained ventilation, and the nature of the operations.

Section 15.32. Location of Dip Tank Operations.

Dip tank operations shall not be conducted in buildings used for assembly, educational, institutional or residential occupancies, except in a room designed for the purpose, protected with an approved system of automatic sprinklers and separated vertically and horizontally from other areas by noncombustible construction having not less than 2 hours fire resistance rating.

Section 15.33. Ventilation of Vapor Areas.

a. All vapor areas shall be provided with mechanical ventilation adequate to prevent the dangerous accumulation of vapors and to remove such vapors to a safe location.

b. Required ventilating systems shall be so arranged that the failure of any ventilating fan shall automatically stop any dipping conveyor system.

Section 15.34. Construction of Dip Tanks.

a. Dip tanks, including drain boards if provided, shall be constructed of substantial noncombustible material, and their supports shall be of heavy metal, reinforced concrete or masonry.

b. Dip tanks of over 150 gallons in capacity or 10 square feet in liquid surface area shall be equipped with a properly trapped overflow pipe leading to a safe location outside buildings.

c. The bottom of the overflow connection shall be not less than 6 inches below the top of the tank.

d. Dip tanks over 500 gallons in liquid capacity shall be equipped with bottom drains automatically and manually arranged to quickly drain tank in event of fire, unless the viscosity of the liquid at normal atmospheric temperature makes this impractical. Manual operation shall be from a safely accessible location. Where gravity flow is not practicable, automatic pumps shall be provided.

e. Such drains shall be trapped and discharge to a closed properly vented salvage tank or to a safe outside location.

f. Dip tanks utilizing a conveyor system shall be so arranged that in the event of fire, the conveyor system shall automatically cease motion and required bottom drains shall open.

Section 15.35. Storage and Handling of Flammable or Combustible Liquids.

The storage and handling of flammable or combustible, dip-tank liquids, shall be in accordance with article 16.

Section 15.37. Operations and Maintenance.

a. Areas in vicinity of dip tanks shall be kept as clear of combustible stock as practical and shall be kept entirely free of combustible debris.

b. When waste or rags are used in connection with dipping operations, approved metal waste cans shall be provided and all impregnated rags or waste deposited therein immediately after use. The contents of waste cans shall be disposed of at the end of each shift by methods approved by the Chief of the Bureau of Fire Prevention.

Section 15.38. Fire Control.

a. Areas in the vicinity of dip tanks shall be provided with manual fire extinguishers suitable for flammable or combustible liquid fires, as specified by the Chief of the Bureau of Fire Prevention.

b. Dip tanks of over 150 gallons capacity or 10 square feet

liquid surface area shall be protected with at least one of the following automatic extinguishing facilities:

(1) Approved automatic water spray extinguishing system;

(2) Approved automatic foam extinguishing system;

(3) Approved automatic carbon dioxide system;

(4) Approved automatic dry chemical extinguishing system;

(5) Dip tank covers conforming to section 15.39.

c. Dip tanks containing a liquid with a flashpoint below 110°F. (when used in such manner that the liquid temperature may equal or be greater than its flashpoint from artificial or natural causes) shall be protected as specified in section 15.38 b when having both a capacity of more than 10 gallons and a liquid surface area of more than 4 square feet.

Section 15.39. Dip Tank Covers.

a. Covers arranged to close automatically in the event of fire shall be actuated by approved automatic devices and shall also be arranged for manual operation.

b. Covers shall be of substantial noncombustible material or of tin-clad type with enclosing metal applied with locked joints.

c. Chains or wire rope shall be used for cover support or operating mechanism where the burning of a cord would interfere with the action of a device.

d. Covers shall be kept closed when tanks are not in use.

Section 15.310. Hardening and Tempering Tanks.

a. Hardening and tempering tanks shall conform to sections 15.34, 15.35, 15.37 and 15.38a as well as sections 15.310 b through 15.310 f, but shall be exempt from other provisions of division III of this article.

b. Tanks shall be located as far as practicable from furnaces and shall not be located on or near combustible floors.

c. Tanks shall be provided with a noncombustible hood and vent or other equally effective means, venting to outside of building to serve as a vent in case of fire. All such vent ducts shall be treated as flues and be kept well away from combustible roofs or materials.

d. Tanks shall be equipped with a high temperature limit switch arranged to sound an alarm when the temperature of the quenching medium reaches 50°F below the flash point.

e. Hardening and tempering tanks of over 500 gallons capacity or 25 square feet liquid surface area shall be protected as specified in section 15.38 b.

f. Air under pressure shall not be used to fill or to agitate oil in tanks.

Section 15.311. Flow Coat Operations.

a. Flow coat operations shall conform to the provisions for dip tanks, considering the area of the sump and any areas on which paint flows as the area of a dip tank.

b. Paint shall be supplied by direct low pressure pumping arranged to automatically shut down by means of approved heat actuated devices, in case of fire, or by a gravity tank not exceeding 10 gallons in capacity.

Section 15.312. Roll Coating.

a. The processes of roll coating, spreading and impregnating, in which fabrics, paper or other material is passed directly through a tank or trough containing flammable liquids, or over the surface of a roller that revolves partially submerged in a flammable liquid, shall conform to section 15.312 b and to the applicable provisions of sections 15.11 through 15.310.

b. Adequate arrangements shall be made to prevent sparks from static electricity by electrically bonding and grounding all metallic rotating and other parts of machinery and equipment and by the installation of static collectors or maintaining a conductive atmosphere by means such as high relative humidity.

DIVISION V

AUTOMOBILE UNDERCOATING

Section 15.51. Operations Included.

a. Automobile undercoating spray operations, conducted in areas having adequate natural or mechanical ventilation, may be exempt from the provisions of division II of this article, on approval by the Chief of the Bureau of Fire Prevention, when using undercoating materials which are not more hazardous than kerosene, or undercoating materials using only solvents having a flash-point in excess of 100°F.

b. Undercoating spray operations not conforming with section 15.51a shall be subject to all applicable provisions of this article.

ARTICLE 16

FLAMMABLE AND COMBUSTIBLE LIQUIDS

DIVISION I

GENERAL PROVISIONS

Section 16.11 Scope.

This article shall apply to liquids with a flash point below 200°F.; and to liquids with flash points above 200°F., which when heated assume the characteristics of liquids with flash points below 200°F.; except as provided in section 1.2 b.

Section 16.12. Definitions.

a. **Aircraft service station** shall mean that portion of an airport where flammable or combustible liquids used as aircraft fuel are stored or dispensed from fixed equipment and shall include all facilities essential thereto.

b. **Automotive service station (garage)** shall mean the use of a building or structure or any portion thereof for the purpose of dispensing motor fuels from fixed equipment into the fuel tanks of motor vehicles and for other services incidental thereto.

c. **Barrel** shall mean a volume of 42 U. S. gallons.

d. **Boiling point** shall mean the boiling point of a liquid at a pressure of 14.7 psia. Where an accurate boiling point is unavailable for the material in question, or for mixtures which do not have a constant boiling point, for purposes of this classification the initial point of a distillation as determined by applicable test procedures and apparatus specified for this section 16.12 d in article 31 of this Fire Prevention Code, may be accepted in lieu of the boiling point of the liquid.

e. **Boil-over** shall mean the expulsion of crude oil (or certain other liquids) from a burning tank in which the light fractions of the crude oil burn off producing a heat wave in the residue, which on reaching a water strata may result in the expulsion of a portion of the contents of the tank in the form of a froth.

f. **Bulk plant** shall mean that portion of a property where flammable or combustible liquids are received by tank vessel, pipe line,

tank car, or tank vehicle, and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipe line, tank car, tank vehicle, or container.

g. **Chemical plant** shall mean a large integrated plant or that portion of such a plant other than a refinery or distillery where flammable or combustible liquids or hazardous chemicals are produced by chemical reactions or used in chemical processing.

h. **Closed container** shall mean a container so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

i. **Commercial or industrial establishment** shall mean a place wherein the storage, handling, or use of flammable or combustible liquids is incidental to but not the principal business or process.

j. **Container** shall mean any can, bucket, barrel or drum.

k. **Crude petroleum** shall mean hydrocarbon mixtures that have a flash point below 150°F. and which have not been processed in a refinery.

l. **Distillery** shall mean a plant or that portion of a plant where flammable or combustible liquids produced by fermentation are concentrated, and where the concentrated products may also be mixed, stored or packaged.

m. **Flash point** of the liquid shall mean the minimum temperature at which it gives off vapor sufficient to form an ignitable mixture with the air near the surface of the liquid or within the vessel used as determined by applicable test procedures and apparatus specified for this section 16.12 m in article 31 of this Fire Prevention Code.

n. **Liquid** shall mean, when not otherwise identified, both flammable and combustible liquids.

Combustible liquid shall mean any liquid having a flash point at or above 140°F. and below 200°F., and shall be known as Class III liquids.

Flammable liquid shall mean any liquid having a flash point below 140°F. and having a vapor pressure not exceeding 40 pounds per square inch (absolute) at 100°F.

Flammable liquids shall be divided into two classes of liquids as follows:

Class I liquids shall include those having flash points below 100°F. and may be subdivided as follows:

Class IA shall include those having flash points below 73°F. and having a boiling point below 100°F.

Class IB shall include those having flash points below 73°F. and having a boiling point at or above 100°F.

Class IC shall include those having flash points at or above 73°F. and below 100°F.

Class II liquids shall include those having flash points at or above 100°F. and below 140°F.

When artificially heated to temperatures equal to or higher than their flashpoints, Class II and III liquids shall be subject to the applicable provisions for Class I or II liquids. The provisions of this article shall also be applied to high flash point liquids when heated to temperatures equal to or higher than their flash points even though these same liquids would be outside the scope of this article when they are not heated.

Unstable (reactive) liquid shall mean any liquid which will vigorously and energetically react, is potentially explosive, will polymerize, decompose instantaneously, undergo uncontrollable autoreaction or can be exploded by heat, shock, pressure or combinations thereof. Examples are organic peroxides and nitromethane.

o. **Marine service station** shall mean that portion of a property where flammable or combustible liquids used as motor fuels are stored and dispensed from fixed equipment on shore, piers, wharves, or floating docks into the fuel tanks of motor craft, and shall include all facilities used in connection therewith.

p. **Process area** shall mean that location where flammable or combustible liquids are processed, or stored as a part of current production, and may include working storage.

q. **Processing plant** shall mean that portion of a property in which flammable or combustible liquids are mixed, heated, separated or otherwise processed as principal business, but shall not include plants defined herein as refineries, chemical plants or distilleries.

r. **Refinery** shall mean a plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gasoline, or other hydrocarbon sources.

s. Safety can shall mean an approved container, not over 5 gallons capacity, having a spring-closing lid and spout cover.

t. Vapor pressure shall mean the pressure, measured in pounds per square inch (absolute) exerted by a volatile liquid, as determined by applicable test procedures and apparatus specified for this section 16.12 t in article 31 of this Fire Prevention Code.

u. Ventilation is for prevention of fire and explosion and shall be considered adequate when the vapor-air mixture does not exceed 25 percent of the lower flammable limit.

Section 16.13. Permits Required.

A permit shall be obtained for any of the following:

a. Storage, handling, or use of Class 1A and 1B liquids in excess of 1 gallon in a dwelling or other place of human habitation; or in excess of 6 gallons in any other building or other occupancy; or in excess of 10 gallons outside of any building; except that no permit shall be required for the following:

(1) For the storage or use of flammable or combustible liquids in the fuel tank of a motor vehicle, aircraft, motorboat, mobile power plant, or mobile heating plant.

(2) For the storage or use of paints, oils, varnishes, or similar flammable mixtures when such liquids are stored for maintenance, painting, or similar purposes for a period of not more than 30 days.

b. Storage, handling, or use of Class II or III liquids in excess of 25 gallons in a building or in excess of 60 gallons outside of a building, except for fuel oil used in connection with oil burning equipment.

c. For the manufacturing, processing, blending, or refining of flammable or combustible liquids.

d. For the storage of flammable or combustible liquids in stationary tanks.

Section 16.14. Laboratory Listed Tanks and Equipment.

Containers, tanks, equipment and apparatus meeting the standards of a nationally recognized testing agency shall be considered as meeting the requirements of this article.

Section 16.15. Container Size and Construction.

a. A container shall not exceed 60 gallons individual capacity and shall be made of metal except that:

(1) Plastic or glass containers having an individual capacity of not more than one pint may be used for flammable and combustible liquids.

(2) Plastic or glass containers having an individual capacity of not more than one gallon may be used for medicines, beverages, foodstuff and toiletries that are flammable or combustible liquids.

(3) Plastic or glass containers having an individual capacity of not more than one gallon may be used for flammable and combustible liquids whose chemical purity would be contaminated by metal containers.

Section 16.16. Warning Labels for Containers of Flammable Liquids with Flash Points Not in Excess of 150°F.

a. All flammable liquids, flammable liquid compounds or flammable liquid mixtures, offered for sale at retail in containers, except as indicated in section 16.16 b, shall be conspicuously marked or labeled in easily legible type, which is in contrast by typography, layout or color with any other printed matter on the label, as required by the flash point classifications indicated below. The warning herein required may be incorporated with similar warnings of other hazards inherent in the product or may be printed on a separate label. For the purpose of this section flash point shall be determined by Tagliabue's open cup tester.

b. The labels shall not be required:

(1) On beverages, articles of food or drugs,

(2) When the container is labeled in accordance with the Regulations of the Interstate Commerce Commission, or

(3) When the container is labeled in accordance with the Federal Hazardous Substances Labeling Act and Regulations.

c. For flammable liquids having a flash point of 20°F. or below a label similar to the following shall be used:

DANGER!
EXTREMELY FLAMMABLE
Keep Away from Heat, Sparks and Open Flame
Keep Closed When Not in Use

d. For flammable liquids having a flash point above 20°F. to 80°F. inclusive a label similar to the following shall be used:

> WARNING! FLAMMABLE
> Keep Away from Heat, Sparks and Open Flame
> Keep Closed When Not in Use

e. For flammable liquids having a flash point above 80°F. to 150°F. inclusive a label similar to the following shall be used:

> CAUTION! COMBUSTIBLE
> Keep Away from Heat and Open Flame
> Keep Closed When Not in Use

DIVISION II

TANK STORAGE

Section 16.21. Design and Construction of Tanks.

a. MATERIALS.

(1) Tanks shall be built of steel except as provided in sections 16.21a(2) through 16.21a(5).

(2) Tanks may be built of noncombustible materials other than steel if required by the properties of the flammable or combustible liquid stored.

(3) Tanks built of materials other than steel shall be designed to specifications embodying principles recognized as

good engineering design for the material used and shall be approved by the Chief of the Bureau of Fire Prevention.

(4) Unlined concrete tanks may be used for storing flammable or combustible liquids having a gravity of 40 degrees API or heavier. Concrete tanks with special lining may be used for other services providing the design is in accordance with sound engineering practice.

(5) Tanks may have combustible or noncombustible linings.

(6) Special engineering consideration shall be required if the specific gravity of the liquid to be stored exceeds that of water or if the tanks are designed to contain flammable or combustible liquids at a liquid temperature below zero degrees F.

b. FABRICATION.

(1) Tanks may be of any shape or type consistent with sound engineering design.

(2) Metal tanks shall be welded, riveted and caulked, brazed, or bolted, or constructed by use of a combination of these methods. Filler metal used in brazing shall be nonferrous metal or an alloy having a melting point above 1000°F. and below that of the metal joined.

c. ATMOSPHERIC TANKS.

(1) Atmospheric tanks shall be built so as to be reasonably safe to persons and property. Evidence that an atmospheric tank has been built in accordance with the applicable standards specified for this section 16.21 c(1) in article 31 of this Fire Prevention Code shall be evidence that such atmospheric tanks are reasonably safe to persons and property.

(2) Tanks designed for underground service not exceeding 2,500 gallons capacity may be used aboveground.

(3) Low pressure tanks and pressure vessels may be used as atmospheric tanks.

(4) Atmospheric tanks shall not be used for the storage of Class IA liquids.

d. LOW PRESSURE TANKS.

(1) The normal operating pressure of the tank shall not exceed the design pressure of the tank.

(2) Low pressure tanks shall be built so as to be reasonably safe to persons and property. Evidence that a low pressure tank has been built in accordance with the applicable standards specified for this section 16.21 d(2) in article 31 of this Fire Prevention Code shall be evidence that said low pressure tanks are reasonably safe to persons and property.

(3) Atmospheric tanks built according to Underwriters' Laboratories, Inc. standards in section 16.21 c(1) may be used for operating pressures not exceeding 1 psig and shall be limited to 2.5 psig under emergency venting conditions.

(4) Pressure vessels may be used as low pressure tanks.

e. PRESSURE VESSELS.

(1) The normal operating pressure of the vessel shall not exceed the design pressure of the vessel.

(2) Pressure vessels shall be built so as to be reasonably safe to persons and property. Evidence that a pressure vessel has been built in accordance with the applicable standard specified for this section 16.21 e(2) in article 31 of this Fire Prevention Code shall be evidence that such pressure vessels are reasonably safe to persons and property.

f. PROVISIONS FOR INTERNAL CORROSION.

When tanks are not designed in accordance with the sections 16.21 c through 16.21 e or if corrosion is anticipated beyond that provided for in the design formulas used, additional metal thickness or suitable protective coatings or linings shall be provided to compensate for the corrosion loss expected during the design life of the tank.

Section 16.22. Installation of Outside Aboveground Tanks.

a. RESTRICTED LOCATIONS. The storage of Class I liquids in aboveground tanks outside of buildings is prohibited within the limits established by law as the limits of the districts in which such storage is to be prohibited.

b. LOCATION WITH RESPECT TO PROPERTY LINES.

(1) Every aboveground tank for the storage of flammable or combustible liquids, except those liquids with boilover characteristics and unstable liquids, operating at pressures not in excess of 2.5 psig and equipped with emergency venting which will not permit pressures to exceed 2.5 psig shall be located in accordance with Table 16.22 b(1).

TABLE 16.22b(1)

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which May be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way
Floating Roof	Protection for Exposures*	½ times diameter of tank but need not exceed 90 feet	1/6 times diameter of tank but need not exceed 30 feet
	None	Diameter of tank but need not exceed 175 feet	1/6 times diameter of tank but need not exceed 30 feet
Vertical with Weak Roof to Shell Seam	Approved foam or inerting system on the tank	½ times diameter of tank but need not exceed 90 feet and shall not be less than 5 feet	1/6 times diameter of tank but need not exceed 30 feet and shall not be less than 5 feet
	Protection for Exposures*	Diameter of tank but need not exceed 175 feet	⅓ times diameter of tank but need not exceed 60 feet
	None	2 times diameter of tank but need not exceed 350 feet	⅓ times diameter of tank but need not exceed 60 feet
Horizontal and Vertical, with Emergency Relief Venting to Limit Pressures to 2.5 psig	Approved inerting system on the tank or approved foam system on vertical tanks	½ times Table 16.22b(5) but shall not be less than 5 feet	½ times Table 16.22b(5) but shall not be less than 5 feet
	Protection for Exposures*	Table 16.22b(5)	Table 16.22b(5)
	None	2 times Table 16.22b(5)	Table 16.22b(5)

* Protection for exposures shall mean fire protection for structures on property adjacent to tanks. When acceptable to the Chief of the Bureau of Fire Prevention, such structures located (1) within the jurisdiction of any public fire department or (2) within or adjacent to plants having private fire brigades shall be considered as having adequate protection for exposures.

(2) Every aboveground tank for the storage of flammable or combustible liquids, except those liquids with boil-over characteristics and unstable liquids, operating at pressures exceeding 2.5 psig or equipped with emergency venting which

will permit pressures to exceed 2.5 psig shall be located in accordance with Table 16.22 b(2).*

TABLE 16.22b(2)

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which May be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way
Any Type	Protection for Exposures	1½ times Table 16.22 b(5) but shall not be less than 25 feet	1½ times Table 16.22 b(5) but shall not be less than 25 feet
	None	3 times Table 16.22 b(5) but shall not be less than 50 feet	1½ times Table 16.22 b(5) but shall not be less than 25 feet

* Special consideration may be given to tanks equipped with automatic depressuring systems.

(3) Every aboveground tank for the storage of flammable or combustible liquids with boil-over characteristics shall be located in accordance with Table 16.22 b(3).

TABLE 16.22b(3)

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which May be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way
Floating Roof	Protection for Exposures	Diameter of tank but need not exceed 175 feet	⅓ times diameter of tank but need not exceed 60 feet
	None	2 times diameter of tank but need not exceed 350 feet	⅓ times diameter of tank but need not exceed 60 feet
Fixed Roof	Approved foam or inerting system	Diameter of tank but need not exceed 175 feet	⅓ times diameter of tank but need not exceed 60 feet
	Protection for Exposures	2 times diameter of tank but need not exceed 350 feet	⅔ times diameter of tank but need not exceed 120 feet
	None	4 times diameter of tank but need not exceed 350 feet	⅔ times diameter of tank but need not exceed 120 feet

(4) Every aboveground tank for the storage of unstable liquids shall be located in accordance with Table 16.22 b(4),

TABLE 16.22b(4)

Type of Tank	Protection	Minimum Distance in Feet from Property Line Which May be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way
Horizontal and Vertical Tanks with Emergency Relief Venting to Permit Pressure Not in Excess of 2.5 psig	Tank protected with any one of the following: Approved water spray, Approved inerting, Approved insulation and refrigeration, Approved barricade	Table 16.22b(5) but not less than 25 feet	Not less than 25 feet
	Protection for Exposures	2½ times Table 16.22 b(5) but not less than 50 feet	Not less than 50 feet
	None	5 times Table 16.22 b(5) but not less than 100 feet	Not less than 100 feet
Horizontal and Vertical Tanks with Emergency Relief Venting to Permit Pressure Over 2.5 psig	Tank protected with any one of the following: Approved water spray, Approved inerting, Approved insulation and refrigeration, Approved barricade	2 times Table 16.22 b(5) but not less than 50 feet	Not less than 50 feet
	Protection for Exposures	4 times Table 16.22 b(5) but not less than 100 feet	Not less than 100 feet
	None	8 times Table 16.22 b(5) but not less than 150 feet	Not less than 150 feet

except that unstable liquids that are unstable (reactive) chemicals such as organic peroxides and nitromethane shall in addition to complying with the applicable provisions of this article 16 shall comply with sections 20.7, and 20.8 or 20.9 as applicable.

(5) Reference table for minimum distance used in Tables 16.22 b(1) thru 16.22 b(4) inclusive shall be as follows:

TABLE 16.22b(5)

Capacity Tank Gallons	Minimum Distance in Feet from Property Line Which May be Built Upon, Including the Opposite Side of a Public Way	Minimum Distance in Feet from Nearest Side of Any Public Way
275 or less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45
2,000,001 to 3,000,000	165	55
3,000,001 or more	175	60

(6) Where two tank properties of diverse ownership have a common boundary, the Chief of the Bureau of Fire Prevention may, with the written consent of the owners of the two properties, substitute the distances provided in sections 16.22 c(1) through 16.22 c(6) for the minimum distances set forth in section 16.22 b.

(7) Where end failure of horizontal pressure tanks and vessels may expose property, the tank shall be placed with the longitudinal axis parallel to the nearest important exposure.

c. SPACING (SHELL-TO-SHELL) BETWEEN ABOVEGROUND TANKS.

(1) The distance between any two flammable or combustible liquid storage tanks shall not be less than three feet.

(2) Except as provided in sections 16.22 c(3) through 16.22 c(5) inclusive, the distance between adjacent tanks shall not be less than one-sixth the sum of their diameters except when the diameter of one tank is less than one-half the diameter of the adjacent tank, the distance between the two tanks shall not be less than one-half the diameter of the smaller tank.

(3) For crude petroleum in conjunction with production facilities located in noncongested areas and having capacities not exceeding 126,000 gallons (3,000 barrels), the distance between such tanks shall be not less than three feet.

(4) For crude petroleum in producing areas having capacities in excess of 126,000 gallons (3,000 barrels), the distance between such tanks shall be not less than the diameter of the smaller tank.

(5) For unstable liquids, the distance between such tanks shall be not less than one-half the sum of their diameters.

(6) When tanks are compacted in three or more rows or in an irregular pattern, greater spacing or other means shall be provided at the discretion of the Chief of the Bureau of Fire Prevention so that inside tanks are accessible for fire fighting purposes.

(7) The minimum separation between a liquefied petroleum gas container and a flammable or combustible liquid storage tank shall be 20 feet. Suitable means shall be taken to prevent the accumulation of flammable or combustible liquids under adjacent liquefied petroleum gas containers such as by diversion curbs or grading. When flammable or combustible liquid storage tanks are within a diked area, the liquefied petroleum gas containers shall be outside the diked area and at least 10 feet away from the center line of the wall of the diked area. The foregoing provisions shall not apply when liquefied petroleum gas containers of 125 gallons or less capacity are installed adjacent to fuel oil supply tanks of 550 gallons or less capacity.

d. NORMAL VENTING FOR ABOVEGROUND TANKS.

(1) Atmospheric storage tanks shall be adequately vented to prevent the development of vacuum or pressure sufficient to distort the roof of a cone roof tank or exceeding the design pressure in the case of other atmospheric tanks, as a result of filling or emptying, and atmospheric temperature changes.

(2) Normal vents shall be sized so as to be reasonably safe to persons and property and at least as large as the filling or withdrawal connection, whichever is larger but in no case less than 1¼ inch nominal inside diameter. Evidence that normal vents have been sized in accordance with the applicable standard specified for this section 16.22 d(2) in article 31

of this Fire Prevention Code shall be evidence that such normal vents are reasonably safe to persons and property.

(3) Low-pressure tanks and pressure vessels shall be adequately vented to prevent development of pressure or vacuum, as a result of filling or emptying and atmospheric temperature changes, from exceeding the design pressure of the tank or vessel. Protection shall also be provided to prevent overpressure from any pump discharging into the tank or vessel when the pump discharge pressure can exceed the design pressure of the tank or vessel.

(4) If any tank or pressure vessel has more than one fill or withdrawal connection and simultaneous filling or withdrawal can be made, the vent size shall be based on the maximum anticipated simultaneous flow.

(5) Unless the vent is designed to limit the internal pressure to 2.5 psi or less, the outlet of vents and vent drains shall be arranged to discharge in such a manner as to prevent localized overheating of any part of the tank in the event vapors from such vents are ignited.

(6) Tanks and pressure vessels storing Class IA liquids shall be equipped with venting devices which shall be normally closed except when venting to pressure or vacuum conditions except as provided in section 16.22 d(7). Tanks and pressure vessels storing Class IB and IC liquids shall be equipped with venting devices which shall be normally closed except when venting under pressure or vacuum conditions, or with approved flame arresters except as provided in section 16.22 d(8).

(7) Tanks of 3,000 bbls. capacity or less containing crude petroleum in crude-producing areas; and, outside aboveground atmosphere tanks under 1,000 gallons capacity containing other than Class IA flammable liquids may have open vents.

(8) Flame arresters or venting devices required in section 16.22 d(6) may be omitted for Class 1B and 1C liquids where conditions are such that their use may, in case of obstruction, result in tank damage.

e. EMERGENCY RELIEF VENTING FOR FIRE EXPOSURE FOR ABOVEGROUND TANKS.

(1) Every aboveground storage tank shall have some form of construction or device that will relieve excessive internal pressure caused by exposure fires.

(2) In a vertical tank the construction referred to in section 16.22 e(1) may take the form of a floating roof, lifter roof, a weak roof-to-shell seam, or other approved pressure relieving construction. The weak roof-to-shell seam shall be constructed to fail preferential to any other seam.

(3) Where emergency venting is not provided in accordance with section 16.22 e(2), the total capacity of both normal and emergency venting devices shall be not less than that derived from Table 16.22 e(3), except as provided in sections 16.22 e(4) or 16.22 e(5).

TABLE 16.22 e(3)

Wetted Area Versus Cubic Feet Free Air per Hour at 14.7 psia and 60°F.

Sq. Ft.	CFH	Sq. Ft.	CFH	Sq. Ft.	CFH
20	21,100	200	211,000	1,000	524,000
30	31,600	250	239,000	1,200	557,000
40	42,100	300	265,000	1,400	587,000
50	52,700	350	288,000	1,600	614,000
60	63,200	400	312,000	1,800	639,000
70	73,700	500	354,000	2,000	662,000
80	84,200	600	392,000	2,400	704,000
90	94,800	700	428,000	2,800	742,000
100	105,000	800	462,000	and over	
120	126,000	900	493,000		
140	147,000	1,000	524,000		
160	168,000				
180	190,000				
200	211,000				

The wetted area of the tank shall be calculated on the basis of: 55 per cent of the total exposed area of a sphere or spheroid, 75 per cent of the total exposed area of a horizontal tank, and first 30 feet aboveground of the exposed shell area of a vertical tank.

(4) The total emergency relief venting capacity for any specific liquid may be determined by the following formula:

$$\text{Cubic feet of free air per hour} = V \frac{1337}{L\sqrt{M}}$$

where

V = cubic feet of free air per hour from Table 16.22 e(3).

L = latent heat of vaporization of specific liquid in Btu per lb.

M = molecular weight of specific liquid.

(5) The required air flow rate of section 16.22 e(3) or e(4) may be multiplied by the appropriate factor listed in the following schedule when protection is provided as indicated. Only one factor may be used for any one tank.

.5 for drainage in accordance with section 16.22 g(2) for tanks over 200 square feet of wetted area.

.3 for approved water spray.

.3 for approved insulation.

.15 for approved water spray with approved insulation.

(6) The outlet of all vents and vent drains on tanks equipped with emergency venting to permit pressures exceeding 2.5 psig shall be arranged to discharge in such a way as to prevent localized overheating of any part of the tank, in the event vapors from such vents are ignited.

f. VENT PIPING FOR ABOVEGROUND TANKS.

(1) Vent piping shall be constructed in accordance with division IV.

(2) Where vent pipe outlets for tanks storing Class I liquids are adjacent to buildings or public ways, they shall be located so that the vapors are released at a safe point outside of buildings and not less than 12 feet above the adjacent ground level. In order to aid their dispersion, vapors shall be discharged upward or horizontally away from closely adjacent walls. Vent outlets shall be located so that flammable vapors will not be trapped by eaves or other obstructions and shall be at least five feet from building openings.

(3) When tank vent piping is manifolded, pipe sizes shall be such as to discharge, within the pressure limitations of the system, the vapors they may be required to handle when manifold tanks are subject to the same fire exposure.

g. DRAINAGE, DIKES AND WALLS FOR ABOVEGROUND TANKS.

(1) *Drainage and Diked Areas:* The area surrounding a tank or a group of tanks shall be provided with drainage as in section 16.22 g(2), or shall be diked as provided in section 16.22 g(3), to prevent accidental discharge of liquid from endangering adjoining property or reaching waterways, except that in particular installations these provisions may be waived or altered at the discretion of the authority having jurisdiction

when the tanks under consideration do not constitute a hazard to adjoining property.

(2) *Drainage:* Where protection of adjoining property or waterways is by means of a natural or man-made drainage system, such systems shall comply with the following:

(a) A slope of not less than one percent away from the tank toward the drainage system shall be provided.

(b) The drainage system shall terminate in vacant land or other area or in an impounding basin having a capacity not smaller than that of the largest tank served. This termination area and the route of the drainage system shall be so located that, if the flammable or combustible liquids in the drainage system are ignited, the fire will not seriously expose tanks or adjoining property.

(c) The drainage system, including automatic drainage pumps, shall not discharge to adjoining property, natural water courses, public sewers, or public drains unless the discharge of flammable or combustible liquids would not constitute a hazard, or the system is so designed that it will not permit flammable or combustible liquids to be released.

(3) *Diked Areas:* Where protection of adjoining property or waterways is accomplished by retaining the liquid around the tank by means of a diked area, such diked area shall comply with the following:

(a) Except as provided in section 16.22 g(3)(b), the volumetric capacity of the diked area shall not be less than the greatest amount of liquid that can be released from the largest tank within the diked area, assuming a full tank. The capacity of the diked area enclosing more than one tank shall be calculated by deducting the volume of the tanks other than the largest tank below the height of the dike.

(b) For a tank or group of tanks with fixed roofs containing crude petroleum with boil-over characteristics, the volumetric capacity of the diked area shall not be less than the tank or tanks served by the enclosure, assuming full tanks. The capacity of the diked area enclosing more

than one tank shall be calculated by deducting the volume of tanks below the height of the dike.

(c) Walls of the diked area shall be of earth, steel, concrete or solid masonry designed to be liquid tight and to withstand a full hydrostatic head. Earthen walls 3 feet or more in height shall have a flat section at the top not less than 2 feet wide. The slope of an earthen wall shall be consistent with the angle of repose of the material of which the wall is constructed.

(d) The walls of the diked area shall be restricted to an average height of 6 feet above interior grade.

(e) Where provision is made for draining water from diked areas, drainage shall be provided at a uniform slope of not less than one per cent away from tanks toward a sump, drainbox or other safe means of disposal located at the greatest practical distance from the tank. Such drains shall normally be controlled in a manner so as to prevent flammable or combustible liquids from entering natural water courses, public sewers or public drains, if their presence would constitute a hazard. Control of drainage shall be accessible under fire conditions.

(f) No loose combustible material, empty or full drum or barrel, shall be permitted within the diked area.

(g) Each diked area containing two or more tanks shall be sub-divided preferably by drainage channels or at least by intermediate curbs in order to prevent spills from endangering adjacent tanks within the diked areas as follows:

[1] When storing normally stable liquids in vertical cone roof tanks constructed with weak roof-to-shell seam or approved floating roof tanks or when storing crude petroleum in producing areas in any type tank, one sub-division for each tank in excess of 10,000 bbls. and one sub-division for each group of tanks (no tank exceeding 10,000 bbls. capacity) having an aggregate capacity not exceeding 15,000 bbls.

[2] When storing normally stable liquids in tanks not covered in section 16.22 g(3)(g)[1], one sub-

division for each tank in excess of 100,000 gallons (2,500 bbls.) and one sub-division for each group of tanks (no tank exceeding 100,000 gallons capacity) having an aggregated capacity not exceeding 150,000 gallons (3,570 bbls.)

[3] When storing unstable liquids in any type of tank, one sub-division for each tank except that tanks installed with drainage so as to be reasonably safe to persons and property shall require no additional sub-division. Evidence that such drainage has been installed in accordance with the applicable standard specified for this section 16.22 g(3)(g)[3] in article 31 of this Fire Prevention Code shall be evidence that such drainage provides reasonable safety to persons and property.

[4] The drainage channels or intermediate curbs shall be located between tanks so as to take full advantage of the available space with due regard for the individual tank capacities. Intermediate curbs, where used, shall not be less than 18 inches in height.

h. STAIRS, PLATFORMS AND WALKWAYS FOR ABOVEGROUND TANKS:

Stairs, platforms and walkways shall be of metal, concrete or wood.

i. TANK OPENINGS OTHER THAN VENTS FOR ABOVEGROUND TANKS.

(1) Connections for all tank openings shall be vapor and liquid tight.

(2) Each connection to an aboveground tank through which liquid can normally flow shall be provided with an internal or an external valve located as close as practical to the shell of the tank. Such valves, when external, and their connections to the tank shall be of steel except when the chemical characteristics of the liquid stored are incompatible with steel. When materials other than steel are necessary, they shall be suitable for the pressures, structural stresses and temperatures involved, including fire exposures.

(3) Each connection below the liquid level through which liquid does not normally flow shall be provided with a liquid-

tight closure. This may be a valve, plug or blind, or a combination of these.

(4) Openings for gaging shall be provided with a vapor-tight cap or cover.

(5) For Class IB and IC liquids other than crude oils, gasolines and asphalts, the fill pipe shall be so designed and installed as to minimize the possibility of generating static electricity. A fill pipe entering the top of a tank shall terminate within six inches of the bottom of the tank and shall be installed to avoid excessive vibration.

(6) Filling and emptying connections which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than five feet away from any building opening. Such connection shall be closed and liquid tight when not in use. The connection shall be properly identified.

Section 16.23. Installation of Underground Tanks.

a. LOCATION: Excavation for underground storage tanks shall be made with due care to avoid undermining of foundations of existing structures. Underground tanks or tanks under buildings shall be so located with respect to existing building foundations and supports that the loads carried by the latter cannot be transmitted to the tank. The distance from any part of a tank storing Class I liquids to the nearest wall of any basement or pit shall be not less than one foot, and to any property line that may be built upon, not less than three feet. The distance from any part of a tank storing Class II or III liquids to the nearest wall of any basement, pit or property line shall be not less than one foot.

b. DEPTH AND COVER: Underground tanks shall be set on firm foundation and surrounded with noncorrosive, inert materials such as clean sand, earth or gravel well tamped in place. Tanks shall be covered with a minimum of two feet of earth, or shall be covered with not less than one foot of earth, on top of which shall be placed a slab of reinforced concrete not less than four inches thick. When underground tanks are, or are likely to be, subjected to traffic, they shall be protected against damage from vehicles passing over them by at least three feet of earth cover, or 18 inches of well-tamped earth, plus six inches of reinforced concrete or eight inches of asphaltic concrete. When asphaltic or reinforced

concrete paving is used as part of the protection, it shall extend at least one foot horizontally beyond the outline of the tank in all directions.

c. LOCATION AND ARRANGEMENT OF VENTS FOR CLASS I LIQUIDS: Vent pipes from tanks storing Class I liquids shall be so located that the discharge point is outside of buildings, higher than the fill pipe opening, and not less than 12 feet above the adjacent ground level. Vent pipes shall discharge only upward in order to disperse vapors. Vent pipes two inches or less in nominal inside diameter shall not be obstructed by devices that will cause excessive back pressure. Vent pipe outlets shall be so located that flammable vapors will not enter building openings, or be trapped under eaves or other obstructions. If the vent pipe is less than ten feet in length or greater than two inches in nominal inside diameter, the outlet shall be provided with a vacuum and pressure relief device or there shall be an approved flame arrester located in the vent line at the outlet or within the approved distance from the outlet. In no case shall a flame arrester be located more than 15 feet from the outlet end of the vent line.

d. SIZE OF VENTS: Each tank shall be vented through piping adequate in size to prevent blow-back of vapor or liquid at the fill opening while tank is being filled. Vent pipes shall be not less than 1¼ inch nominal inside diameter.

e. LOCATION AND ARRANGEMENT OF VENTS FOR CLASS II OR III LIQUIDS: Vent pipes from tanks storing Class II or III flammable liquids shall terminate outside of building and higher than the fill pipe opening. Vent outlets shall be above normal snow level. They may be fitted with return bends, coarse screens or other devices to minimize ingress of foreign material.

f. VENT PIPING: Vent piping shall be constructed in accordance with division IV. Vent pipes shall be so laid as to drain toward the tank without sags or traps in which liquid can collect. They shall be located so that they will not be subjected to physical damage. The tank end of the vent pipe shall enter the tank through the top.

g. TANK OPENINGS OTHER THAN VENTS.

(1) Connections for all tank openings shall be vapor or liquid tight.

(2) Openings for manual gaging, if independent of the fill pipe, shall be provided with a liquid-tight cap or cover. If inside a building, each such opening shall be protected against liquid overflow and possible vapor release by means of a spring loaded check valve or other approved device.

(3) Fill and discharge lines shall enter tanks only through the top. Fill lines shall be sloped toward the tank.

(4) For Class IB and IC liquids other than crude oils, gasolines and asphalts, the fill pipe shall be designed and installed so as to minimize the possibility of generating static electricity by terminating within six inches of the bottom of the tank.

(5) Filling and emptying connections which are made and broken shall be located outside of buildings at a location free from any source of ignition and not less than five feet away from any building opening. Such connection shall be closed and liquid tight when not in use. The connection shall be properly identified.

Section 16.24. Installation of Tanks Inside of Buildings.

a. LOCATION: Tanks shall not be permitted inside of buildings except as provided in divisions VI, VII, VIII or IX.

b. VENTS: Vents for tanks inside of buildings shall be provided as in sections 16.22 d, 16.22 e, 16.22 f(2), and 16.23 c through 16.23 f except that emergency venting by the use of weak roof seams on tanks shall not be permitted. Vents shall discharge vapors outside the buildings.

c. VENT PIPING: Vent piping shall be constructed in accordance with division IV.

d. TANK OPENINGS OTHER THAN VENTS.

(1) Connections for all tank openings shall be vapor or liquid tight.

(2) Each connection to a tank inside of buildings through which liquid can normally flow shall be provided with an internal or an external valve located as close as practical to the shell of the tank. Such valves, when external, and their connections to the tank shall be of steel except when the chemical characteristics of the liquid stored are incompatible with steel. When materials other than steel are necessary, they shall be

suitable for the pressures, structural stresses and temperatures involved, including fire exposures.

(3) Flammable or combustible liquid tanks located inside of buildings except in one-story buildings designed and protected for flammable or combustible liquid storage, shall be provided with an automatic-closing heat-actuated valve on each withdrawal connection below the liquid level, except for connections used for emergency disposal, to prevent continued flow in the event of fire in the vicinity of the tank. This function may be incorporated in the valve required in section 16.24 d(2), and if a separate valve, shall be located adjacent to the valve required in section 16.24 d(2).

(4) Openings for manual gaging, if independent of the fill pipe shall be provided with a vapor-tight cap or cover. Each such opening shall be protected against liquid overflow and possible vapor release by means of a spring loaded check valve or other approved device.

(5) For Class IB and IC liquids other than crude oils, gasolines and asphalts, the fill pipe shall be designed and installed so as to minimize the possibility of generating static electricity by terminating within six inches of the bottom of the tank.

(6) The fill pipe inside of the tank shall be installed to avoid excessive vibration of the pipe.

(7) The inlet of the fill pipe shall be located outside of buildings at a location free from any source of ignition and not less than five feet away from any building opening. The inlet of the fill pipe shall be closed and liquid tight when not in use. The fill connection shall be properly identified.

(8) Tanks inside buildings shall be equipped with a device, or other means shall be provided, to prevent overflow into the building.

Section 16.25. Supports, Foundations and Anchorage for All Tank Locations.

a. Tank supports shall be installed on firm foundations. Tank supports shall be of concrete, masonry or protected steel. Single wood timber supports (not cribbing) laid horizontally may be used for outside aboveground tanks if not more than 12 inches high at their lowest point.

b. Steel supports or exposed piling shall be protected by materials having a fire resistive rating of not less than two hours, except that steel saddles need not be protected if less than 12 inches high at their lowest point. At the discretion of the authority having jurisdiction, approved water spray protection or its equivalent may be used in lieu of fire-resistive materials to protect supports.

c. The design of the supporting structure for tanks such as spheres shall require special engineering consideration.

d. Every tank shall be so supported as to prevent the excessive concentration of loads on the supporting portion of the shell.

e. Tanks shall rest on the ground or on foundations made of concrete, masonry, piling or steel. Tank foundations shall be designed to minimize the possibility of uneven settling of the tank and to minimize corrosion in any part of the tank resting on the foundation.

f. Where a tank is located in an area that may be subjected to flooding, the applicable precautions outlined in Appendix A, Protection of Tanks Containing Flammable or Combustible Liquids in Locations That May Be Flooded, shall be observed.

g. In areas subject to earthquakes, the tank supports and connections shall be designed to resist damage as a result of such shocks.

Section 16.26. Sources of Ignition.

In locations where flammable vapors may be present, precautions shall be taken to prevent ignition by eliminating or controlling sources of ignition. Sources of ignition may include open flames, lightning, smoking, cutting and welding, hot surfaces, frictional heat, sparks (static, electrical and mechanical), spontaneous ignition, chemical and physical-chemical reactions and radiant heat.

Section 16.27. Testing.

a. All tanks, whether shop-built or field-erected, shall be strength tested before they are placed in service in accordance with the applicable paragraphs of the Code or Standard referenced in sections 16.21 c(1), 16.21 d(2) and 16.21 e(2) under which they were built. The ASME Code stamp, API monogram, or the label of the Underwriters' Laboratories, Inc. on a tank shall be evidence of compliance with this strength test. Tanks not so marked shall

be strength tested before they are placed in service in accordance with good engineering principles.

b. When the vertical length of the fill and vent pipes is such that when filled with liquid the static head imposed upon the bottom of the tank exceeds ten pounds per square inch, the tank and related piping shall be tested hydrostatically to a pressure equal to the static head thus imposed. In special cases where the height of the vent above the top of the tank is excessive the hydrostatic test pressure shall be specified by the Bureau of Fire Prevention.

c. In addition to the strength test called for in sections 16.27a and 16.27 b, all tanks and connections shall be tested for tightness. Except for underground tanks, this tightness test shall be made at operating pressure with air, inert gas or water prior to placing the tank in service. In the case of field-erected tanks the strength test may be considered to be the test for tank tightness. Underground tanks and piping, before being covered, enclosed, or placed in use, shall be tested for tightness hydrostatically, or with air pressure at not less than three pounds per square inch and not more than five pounds per square inch.

d. All leaks or deformations shall be corrected in an acceptable manner before the tank is placed in service. Mechanical caulking is not permitted for correcting leaks in welded tanks except pin hole leaks in the roof.

e. Tanks to be operated at pressures below their design pressure may be tested by the applicable provisions of sections 16.27a or 16.27 b based upon the pressure developed under full emergency venting of the tank.

Section 16.28. Special Situations.

In particular installations the provisions of this division may be altered at the discretion of the Chief of the Bureau of Fire Prevention after consideration of the special features such as topographical conditions, barricades, walls, nature of occupancies and proximity to buildings or adjoining property and height and character of construction of such buildings; capacity and con-

struction of proposed tanks and character of liquids to be stored, degree of private fire protection to be provided and the adequacy of facilities of the fire department to cope with flammable or combustible liquid fires.

DIVISION III

CLOSED CONTAINER STORAGE

Section 16.31. Storage in Closed Containers Inside Buildings.

a. Sections 16.31 through 16.35 shall apply to the storage of flammable or combustible liquids in drums or other portable closed containers not exceeding 60 gallons individual capacity inside buildings.

b. Sections 16.31 through 16.35 shall not apply to the storage of closed containers in bulk plants, service stations, refineries, chemical plants and distilleries.

c. Sections 16.31 through 16.35 shall not apply to areas where containers are opened for dispensing, mixing or handling. Division VII, Commercial and Industrial Establishments and division VIII, Processing Plants shall apply to such areas, as applicable.

Section 16.32. Design and Construction in Inside Storage Rooms.

a. Inside Storage Rooms shall comply with the following general construction requirements: Walls, floors and ceilings shall be of noncombustible construction having a fire-resistance rating of not less than one hour. Openings to other rooms or buildings shall be provided with noncombustible liquid-tight sills or ramps at least 6 inches in height and with approved fire doors arranged to close doors automatically in case of fire. A permissible alternate to either sills and ramps is open trenches covered with steel grating which drain to a safe location. Where other portions of the building or other properties are exposed, windows shall be protected in an approved manner. Wood at least one inch nominal thickness may be used for shelving, racks, dunnage, scuffboards, floor overlays and similar installations. Proper ventilation shall be provided. Heating shall be restricted to low pressure steam or hot water or to electric units complying with section 16.32 b.

b. Electrical wiring and equipment located in Inside Storage Rooms shall be reasonably safe to persons and property. Where electrical wiring and equipment located in such rooms using Class I liquids is installed, evidence that such electrical wiring and equipment is approved for Class I, Division 1 hazardous locations and has been installed in accordance with the applicable standard specified for this section 16.32 b in article 31 of this Fire Prevention Code shall be evidence that such electrical wiring and equipment is reasonably safe to persons and property. Also where electrical wiring and equipment located in such rooms using Class II and III liquids evidence that electrical wiring and equipment is approved for general use and has been installed in accordance with the applicable standard specified for this section 16.32 b in article 31 of this Fire Prevention Code shall be evidence that such electrical wiring and equipment is reasonably safe to persons and property.

c. Rooms or portions of buildings, affording a type of building construction and other features equivalent to that required for Inside Storage Rooms [sections 16.32a through 16.32 e] may be utilized for storage of flammable or combustible liquids if not used for any other storage or operation which, in combination, create a greater fire hazard.

d. Storage rooms shall be located to minimize damage in the event of an explosion.

e. Where practical, Inside Storage Rooms shall be equipped with large vents to provide fire and explosion relief.

f. The quantity of flammable liquid in an Inside Storage Room shall not exceed the quantity specified in this section 16.32 f except as provided in section 16.32 g.

(1) If not protected by an approved automatic fire extinguishing system:

[a] 550 gallons total of Class I, II and III liquids, of which not more than

[b] 275 gallons may be of Class I liquids, of which not more than

[c] 60 gallons may be of Class IA liquid.

(2) If protected by an approved automatic fire extinguishing system:

[a] 1100 gallons total of Class I, II and III liquids, of which not more than

[b] 550 gallons may be of Class I liquids of which not more than

[c] 275 gallons may be of Class IA liquid.

g. The quantity of flammable or combustible liquid in an Inside Storage Room may be increased to that permitted by section 16.72 c for Inside Mixing and Handling Rooms provided the construction is as provided in sections 16.32a through 16.32 e, but with walls, floors and ceiling of noncombustible construction having a fire resistance rating of not less than two hours.

Section 16.33. Storage Cabinets.

a. Storage cabinets shall be constructed as follows or built to equivalent requirements. The bottom, top, door and sides of cabinet shall be at least 0.0478 inch thickness sheet steel (no. 18 manufacturers' standard gauge) and double walled with 1½-inch air space. Joints shall be riveted, welded or made tight by some equally effective means. The door shall be provided with a 3-point lock, kept closed when not in use, and the door sill shall be raised at least 2 inches above the bottom of the cabinet. When deemed necessary by the Chief of the Bureau of Fire Prevention, cabinets shall be vented. The cabinet shall be conspicuously labeled in red letters "FLAMMABLE—KEEP FIRE AWAY."

b. Storage cabinets may be used where it is desired to keep more than 10 gallons of flammable or combustible liquids inside buildings. No individual container shall exceed 5 gallons capacity and not over 50 gallons shall be stored in any one cabinet.

Section 16.34. Manner of Storage and Limitations.

a. Flammable or combustible liquids shall not be stored (including stock for sale), near exits, stairways or areas normally used for the safe egress of people.

b. The storage of flammable or combustible liquids in closed containers shall comply with the following occupancy schedule except that the Chief of the Bureau of Fire Prevention may impose a quantity limitation or require greater protection where, in his opinion, unusual hazard to life or property is involved, or he may authorize increase of these amounts where the type of construc-

tion, fire protection provided or other factors substantially reduce the hazard.

c. DWELLINGS AND APARTMENT HOUSES CONTAINING NOT MORE THAN THREE DWELLING UNITS AND ACCOMPANYING ATTACHED OR DETACHED GARAGES. Storage other than fuel oil for oil burner service, shall be prohibited, except that which is required for maintenance or equipment operation which shall not exceed 10 gallons. Such flammable or combustible liquid shall be stored in metal closed containers or safety cans.

d. ASSEMBLY AND BUSINESS OCCUPANCIES, APARTMENT HOUSES CONTAINING MORE THAN THREE DWELLING UNITS, AND HOTELS. Storage other than fuel oil for oil burner service, shall be prohibited, except that which is required for maintenance and operation of building and operation of equipment. Such storage shall be kept in closed metal containers stored in a storage cabinet or in safety cans or in an Inside Storage Room not having a door that opens into that portion of the building used by the public.

e. EDUCATIONAL AND INSTITUTIONAL OCCUPANCIES. Storage other than fuel oil for oil burner service, shall be limited to that required for maintenance, demonstration, treatment and laboratory work. Flammable or combustible liquids in the laboratories and at other points of use shall be in containers not larger than one quart or in safety cans or in storage cabinets.

f. MERCANTILE OCCUPANCIES. In rooms or areas accessible to the public, storage shall be in closed containers and limited to quantities needed for display and normal merchandising purposes. Where the aggregate quantity of additional stock exceeds 50 gallons it shall be stored in rooms or portions of buildings that comply with the construction provisions of section 16.32.

g. GENERAL PURPOSE AND PUBLIC WAREHOUSES. Storage shall be in accordance with Table 16.34 in fire-resistive buildings or in portions of fire-resistive buildings cut off by standard fire walls from combustible materials other than liquids except as may be required by other portions of this Code. Noncombustible material, creating no hazard to the flammable or combustible liquids, may be stored in the same area as the liquids.

h. FLAMMABLE OR COMBUSTIBLE LIQUID WAREHOUSES OR STORAGE BUILDINGS. Storage shall be in accordance with Table 16.34. Stor-

age buildings shall be of fire-resistive or noncombustible construction. If storage building is located 30 to 50 feet from a building or line of adjoining property that may be built upon, the exposing wall shall be a noncombustible blank wall having a fire resistance rating of at least two hours. If storage building is located 10 to 30 feet from a building or line of adjoining property that may be built upon, the exposing wall shall be a blank wall having a fire resistance rating of at least three hours. If storage building is less than 10 feet from the line of adjoining property than can be built upon, the exposing wall shall be a blank wall having a fire resistance rating of at least four hours. In particular installations the distances between the storage building and other buildings may be altered at the discretion of the Chief of the Bureau of Fire Prevention after consideration of the height, size and character of construction and occupancy of the exposed buildings. At the discretion of the Chief of the Bureau of Fire Prevention, approved Class A fire doors may be installed in an approved manner on the otherwise blank walls.

TABLE 16.34. Arrangement of Container Storage

CLASS OF LIQUID	STORAGE LEVEL	SPRINKLERED OR EQUIVALENT PROTECTION					UNPROTECTED				
		Maximums per Pile			AISLE WIDTH		Maximums per Pile			AISLE WIDTH	
		TOTAL Gallons	WIDTH Feet	HEIGHT Feet	Main Feet	Side Feet	TOTAL Gallons	WIDTH Feet	HEIGHT Feet	Main Feet	Side Feet
I	Ground and Upper Floors	2,640 (48)	8 (4)	6 (2)	8	5	660 (12)	4 (2)	3 (1)	8	7
	Basement	Not permitted					Not permitted				
II	Ground and Upper Floors	5,280 (96)	8 (4)	6 (2)	8	4	1,320 (24)	4 (2)	3 (1)	8	5
	Basement	Not permitted					Not permitted				
III	Ground and Upper Floors	11,000 (200)	12 (6)	3 ft. under sprinkler heads	8	4	2,640 (48)	8 (4)	12 (4)	8	4
	Basement	5,500 (100)	8 (4)	9 (3)	8	4	Not permitted				

NOTE: The figures in the column, Total Gallons, represents the number of gallons that may be stored per pile and the figures in parenthesis are the corresponding number of 55 gallon drums. The figures in the Width and Height Columns are the width and height of the pile in feet and the figures in parenthesis are the corresponding number of 55 gallon drums which when stored on end will produce this size pile.

Section 16.35. Fire Control.

a. Suitable fire-control devices, such as small hose or portable fire extinguishers, shall be available at locations where flammable or combustible liquids are stored.

b. When sprinklers are required, they shall be installed to provide reasonable safety to persons and property. Evidence that such sprinklers are installed in accordance with the applicable standard specified for this section 16.35 b in article 31 of this Fire Prevention Code shall be evidence that such sprinklers provide reasonable safety to persons and property.

c. Open flames, smoking and other sources of ignition shall not be permitted in flammable or combustible liquid storage rooms.

d. Materials which will react with water to produce flammable vapors shall not be stored in the same room with flammable or combustible liquids.

Section 16.36. Storage in Closed Containers Outside Buildings.

a. Sections 16.36 and 16.37 apply to the storage of flammable or combustible liquids in drums or other portable closed containers not exceeding 60 gallons individual capacity outside of buildings in areas used solely for such storage.

b. Sections 16.36 and 16.37 shall not apply to storage of flammable or combustible liquids in drums or portable closed containers in bulk plants, service stations, and refineries.

Section 16.37. Basic Safeguards.

a. Drums constructed in accordance with ICC Specifications or containers of equivalent construction may be stored out of doors.

b. Drums shall not be stored outside on building platforms or between buildings, or in locations adjacent thereto, in such a manner that they would contribute to the spread of fire.

c. Storage of over 100 drums of Class I liquids shall be limited to groups of 100 drums, located at least 60 feet from the nearest building or line of adjoining property that may be built upon and each group shall be separated by at least 40 feet. Storage of over 300 drums of Class II or III liquids shall be limited to groups of 300 drums located at least 50 feet from nearest building or line of adjoining property that may be built upon and each group shall be separated by at least 30 feet. These distances may

be reduced 50 percent if sprinklers and drainage away from exposures are provided. In particular installations the distances to buildings may be altered at the discretion of the Chief of the Bureau of Fire Prevention after consideration of the height, size and character of construction and occupancy of the exposed buildings.

d. The drum storage shall be located to prevent "run-off" or drainage toward other storage or buildings. The area shall be kept clear of grass, weeds and other foreign combustibles. Signs shall be posted prohibiting open flames and smoking.

DIVISION IV

PIPING, VALVES AND FITTINGS

Section 16.41. General.

a. The design (including selection of materials), fabrication, assembly, test and inspection of piping systems containing flammable or combustible liquids shall be suitable for the expected working pressures, and structural stresses and shall be reasonably safe to persons and property. Piping systems designed, fabricated, assembled, tested and inspected for the expected working pressures and structural stresses in conformance with the applicable provisions of this code shall be deemed to be reasonably safe to persons and property; on matters not covered in this code, conformity of piping system installations to the applicable standards specified for this section 16.41a in article 31 of this Fire Prevention Code shall be evidence that such piping systems are reasonably safe to persons and property.

b. This division shall not apply to any of the following:

(1) Tubing or casing on any oil or gas wells and any piping connected directly thereto.

(2) Floating craft or aircraft.

(3) Piping within the scope of any applicable boiler and pressure vessel Code.

c. Piping systems shall consist of pipe, flanges, bolting, gaskets, valves, fittings, the pressure containing parts of other components such as expansion joints and strainers, and devices which serve such purposes as mixing, separating, snubbing, distributing, metering, or controlling flow.

Section 16.42. Materials.

a. Piping materials shall be steel except as provided in sections 16.42 b through 16.42 d or other material suitable for use with the liquid being handled.

b. Piping may be built of noncombustible materials other than steel if required by the properties of the flammable or combustible liquid handled.

c. Piping built of materials other than steel shall be designed to specifications embodying principles recognized as good engineering design for the material used and shall be approved by the Chief of the Bureau of Fire Prevention.

d. When low melting point materials such as aluminum and brass or materials that soften on fire exposure such as plastic, or nonductile materials such as cast iron, are necessary, special consideration shall be given to their behavior on fire exposure. If such materials are used in aboveground piping systems or inside buildings, they shall be suitably protected against fire exposure or so located that any spill resulting from the failure of these materials could not unduly expose persons, important buildings or structures or can be readily controlled by remote valves.

Section 16.43. Pipe Joints.

Pipe joints dependent upon the friction characteristics of combustible materials for mechanical continuity of piping shall not be used inside buildings. They may be used outside of buildings above or below ground. If used aboveground, the piping shall either be secured to prevent disengagement at the fitting or the piping system shall be so designed that any spill resulting from such disengagement could not unduly expose persons, important buildings or structures, and could be readily controlled by remote valves.

Section 16.44. Supports.

Pipe systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion or contraction.

Section 16.45. Protection Against Corrosion.

All piping for flammable liquids, both aboveground and underground, where subject to external corrosion, shall be painted or otherwise protected.

Section 16.46. Valves.

Piping systems shall contain a sufficient number of valves to operate the system properly and to protect the plant. Piping systems in connection with pumps shall contain a sufficient number of valves to control properly the flow of liquid in normal operation and in the event of physical damage. Connections to pipe lines, by which equipment such as tank cars or tank vehicles discharge liquids by means of centrifugal pumps into aboveground storage tanks, shall be provided with check valves for automatic protection against back-flow.

Section 16.47. Testing.

All piping before being covered, enclosed or placed in use shall be tested hydrostatically or with air pressure at not less than 1½ times the maximum anticipated pressure of the system, but not less than five pound per square inch gage at the highest point of the system. This test shall be maintained for at least 30 minutes or for sufficient time to complete visual inspection of all joints and connections.

DIVISION V

BULK PLANTS

Section 16.51. Location of Plants.

No new bulk plants shall be constructed with the limits established by law as limits of the districts in which such plants are prohibited.

Section 16.52. Storage.

a. Class I liquids shall be stored in closed containers, or in storage tanks aboveground outside of buildings, or underground in accordance with division II.

b. Class II or III liquids shall be stored in containers, or in tanks within buildings or aboveground outside of buildings, or underground in accordance with division II.

c. Containers of flammable or combustible liquids when piled one upon the other shall be separated by dunnage sufficient to provide stability and to prevent excessive stress on container walls. The height of pile shall be consistent with stability and strength of containers.

Section 16.53. Buildings.

a. EXITS. Rooms storing flammable or combustible liquids or in which flammable or combustible liquids are handled by pumps shall have exit facilities arranged to prevent occupants being trapped in the event of fire.

b. HEATING. Rooms in which Class I liquids are stored or handled shall be heated only by means not constituting a source of ignition, such as steam or hot water. Rooms containing heating appliances involving sources of ignition shall be located and arranged to prevent entry of flammable vapors.

c. VENTILATION.

(1) Ventilation shall be provided for all rooms, buildings, or enclosures in which Class I liquids are pumped or dispensed. Design of ventilation shall take into account the relatively high specific gravity of the vapors. Ventilation may be provided by adequate openings in outside walls at floor level unobstructed except by louvers or coarse screens. Where natural ventilation is impracticable, mechanical ventilation shall be provided.

(2) Class I liquids shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

(3) Containers of Class I liquids shall not be drawn from or filled within buildings unless provision is made to prevent the accumulation of flammable vapors in hazardous concentrations. Where mechanical ventilation is required, it shall be kept in operation while flammable or combustible liquids are being handled.

Section 16.54. Loading and Unloading Facilities.

a. TANK VEHICLE LOADING RACKS.

(1) LOCATION. Tank vehicle loading racks dispensing Class I liquids shall be separated from tanks, warehouses, other plant buildings, and nearest line of property that may be built upon by a clear distance of not less than 25 feet, measured from the nearest position of any fill stem. Buildings for

pumps or for shelter of loading personnel may be part of the loading rack.

(2) STATIC PROTECTION. The following types of tank vehicle loading racks shall be equipped with protection against static sparks during tank vehicle filling:—racks dispensing Class I liquids into open domes of tank vehicles, and racks dispensing Class II or III liquids into open domes of tank vehicles which may contain flammable vapors from previous cargoes of Class I liquids. Protection shall consist of a metallic bond-wire permanently electrically connected to the fill-stem or some part of the fill-stem piping. The free end of such wire shall be provided with a clamp or similar device for convenient attachment to some metallic part of the cargo tank of the tank vehicle. The bond-wire connection shall be made prior to opening the dome covers. It shall be maintained in place during the entire filling operation and the dome covers shall be securely closed before the bond-wire is disconnected from the cargo tank.

(3) DRAG CHAINS. Drag chains or similar devices on tank vehicles shall not be deemed to meet the provisions of section 16.54a(2) for static protection.

b. TANK CAR RACKS. Class I liquids shall not be discharged from or loaded into tank cars unless protection against stray currents has been provided and is used. Protection shall be designed and installed so as to be reasonably safe to persons and property. Evidence that such static protection is in accordance with the applicable standard specified for this section 16.54 b in article 31 of this Fire Prevention Code shall be evidence that such static protection is reasonably safe to persons and property.

c. CONTAINER FILLING FACILITIES. Class I liquids shall not be run into containers unless the nozzle and container are electrically interconnected. Where the metallic floorplate on which the container stands while filling is electrically connected to the fill stem or where the fill stem is bonded to the container during filling operations by means of a bond-wire, the provisions of this section 16.54 c shall be deemed to have been complied with.

TABLE 16.55 b

Electrical Equipment Hazardous Areas—Bulk Plants.

Location	NEC Class I, Group D Division	Extent of Classified Area
TANK VEHICLE AND TANK CAR*— Bottom Loading or Unloading	2	Within 3 feet of point of connection, extending in all directions. Also 18 inches above grade within a horizontal radius of 10 feet from point of connection.
TANK VEHICLE AND TANK CAR*— Loading Through Open Dome	1	Within 3 feet of edge of dome, extending in all directions.
	2	Area between 3 feet and 5 feet from edge of dome, extending in all directions.
TANK VEHICLE AND TANK CAR*— Loading Through Closed Dome With Atmospheric Venting	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 5 feet from open end of vent, extending in all directions.
	2	Within 3 feet of edge of dome, extending in all directions.
TANK VEHICLE AND TANK CAR*— Loading Through Closed Dome With Vapor Recovery	2	Within 3 feet of point of connection from both fill and vapor line, extending in all directions.
DRUM AND CONTAINER FILLING— Outdoors, or Indoors With Adequate Ventilation	1	Within 3 feet of vent and fill opening, extending in all directions.
	2	Area between 3 feet and 5 feet from vent or fill opening, extending in all directions. Also up to 18 inches above floor or grade level within a horizontal radius of 10 feet from vent or fill opening.
TANK, ABOVEGROUND— Shell, Ends or Roof and Dike Area	2	Within 10 feet from shell, ends, or roof of tank. Area inside dikes to level of top of dike within 25 feet of tank.
TANK, ABOVEGROUND— Vent	1	Within 5 feet of open end of vent, extending in all directions.
	2	Area between 5 feet and 10 feet from open end of vent, extending in all directions.

* When classifying extent of area, consideration shall be given to fact that tank cars or tank vehicles may be spotted at varying points. Therefore, the extremities of the loading or unloading positions shall be used.

Table 16.55 b—Continued

Location	NEC Class I, Group D Division	Extent of Classified Area
TANK, ABOVEGROUND—Floating Roof	1	Area above the roof and within the shell.
TANK, UNDERGROUND	See Section 16.66	
PIT—Without Mechanical Ventilation	1	Entire area within pit if any part is within a Division 1 or 2 classified area.
PIT—With Mechanical Ventilation	2	Entire area within pit if any part is within a Division 1 or 2 classified area.
PIT—Containing Valves, Fittings or Piping, and Not Within a Division 1 or 2 Classified Area	2	Entire pit.
PUMPS, BLEEDERS, WITHDRAWAL FITTINGS, METERS, AND SIMILAR DEVICES—Indoors	2	Within 5 feet of any edge of such devices, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of such devices.
PUMPS, BLEEDERS, WITHDRAWAL FITTINGS, METERS, AND SIMILAR DEVICES—Outdoors	2	Within 3 feet of any edge of such devices, extending in all directions. Also up to 18 inches above grade level within 10 feet horizontally from any edge of such devices.
STORAGE AND REPAIR GARAGE FOR TANK VEHICLES	1	All pits or spaces below floor level.
	2	Area up to 18 inches above floor or grade level for entire storage or repair garage.
DRAINAGE DITCHES, SEPARATORS, IMPOUNDING BASINS	2	Area up to 18 inches above ditch, separator or basin. Also 18 inches above grade within 15 feet horizontally from any edge.
GARAGES FOR OTHER THAN TANK VEHICLES	Ordinary	If there is any opening to these rooms within the extent of an outdoor classified area, the entire room shall be classified the same as the area classification at the point of the opening. If there is any opening to these rooms within the extent of an indoor classified area, the room shall be classified the same as if the wall, curb or partition did not exist.
OUTDOOR DRUM STORAGE	Ordinary	
INDOOR WAREHOUSING WHERE THERE IS NO FLAMMABLE LIQUID TRANSFER	Ordinary	
OFFICE AND REST ROOMS	Ordinary	

Section 16.56. Sources of Ignition.

Class I liquids shall not be handled, drawn, or dispensed where flammable vapors may reach a source of ignition. Smoking shall be prohibited except in designated localities. "NO SMOKING" signs shall be conspicuously posted where hazard from flammable vapors is normally present.

Section 16.57. Drainage and Waste Disposal.

Provision shall be made to prevent flammable or combustible liquids which may be spilled at loading or unloading points from entering public sewers and drainage systems, or natural waterways. Connections to such sewers, drains, or waterways by which flammable or combustible liquids might enter shall be provided with separator boxes or other approved means whereby such entry is precluded. Crankcase drainings and flammable or combustible liquids shall not be dumped into sewers, but shall be stored in tanks or tight drums outside of any building until removed from the premises.

Section 16.58. Fire Control.

Suitable fire-control devices, such as small hose or portable fire extinguishers, shall be available to locations where fires are likely to occur. Additional fire-control equipment may be required where a tank of more than 50,000 gallons individual capacity contains Class I liquids and where an unusual exposure hazard exists from surrounding property. Such additional fire-control equipment shall be sufficient to extinguish a fire in the largest tank. The design and amount of such equipment shall provide reasonable safety to persons and property. Evidence that the design and amount of such equipment is in accordance with the applicable standard specified for this section 16.58 in article 31 of this Fire Prevention Code shall be evidence that such equipment provides reasonable safety to persons and property.

DIVISION VI

SERVICE STATIONS

Section 16.61. Location.

Apparatus dispensing Class I liquids into the fuel tanks of motor vehicles of the public shall not be located at a bulk plant

unless separated by a fence or similar barrier from the area in which bulk operations are conducted.

Section 16.62. Construction.

Class I liquids shall not be stored or handled within a building having a basement or pit into which flammable vapors may travel, unless such area is provided with ventilation designed to prevent the accumulation of flammable vapors therein.

Section 16.63. Storage and Handling.

a. GENERAL PROVISIONS.

(1) Class I liquids shall be stored in approved closed containers not exceeding 60 gallons capacity, in tanks located underground or in tanks in special enclosures as described in section 16.63 b.

(2) Class II and III liquids shall be stored in containers, in tanks, located underground or in tanks in special enclosures as described in section 16.63 b or as provided in section 16.65 b.

(3) Aboveground tanks, located in an adjoining bulk plant, may be connected by piping to service station underground tanks if, in addition to valves at aboveground tanks, a valve is also installed within control of service station personnel.

(4) The provisions of sections 16.63a(1) and 16.63a(2) shall not prohibit the temporary use of portable or semi-portable tanks in conjunction with the dispensing of flammable or combustible liquids into the fuel tanks of motor vehicles or other motorized equipment on premises not normally accessible to the public. Such installations shall only be made with the approval of the Chief of the Bureau of Fire Prevention.

b. SPECIAL ENCLOSURES.

(1) When installation of tanks in accordance with seciton 16.23 is impractical because of property or building limitation, tanks for flammable or combustible liquids may be installed in buildings if enclosed and upon specific approval of the Chief of the Bureau of Fire Prevention.

(2) The enclosure shall be substantially liquid and vapor tight without backfill. Sides, top, and bottom of the enclosure shall be of reinforced concrete at least 6 inches thick, with openings for inspection through the top only. Tank connec-

tions shall be so piped or closed that neither vapors nor liquid can escape into the enclosed space. Means shall be provided whereby portable equipment may be employed to discharge to the outside any vapors which might accumulate should leakage occur.

(3) At automotive service stations provided in connection with tenant or customer parking facilities at or below grade level beneath large buildings of commercial, mercantile or residential occupancy, tanks containing Class I liquids installed of necessity in accordance with section 16.63 b(2) shall not exceed 5,000 gallons individual or 10,000 gallons aggregate capacity.

c. INSIDE BUILDINGS.

(1) Except where stored in tanks as provided in section 16.63 b, no Class I liquids shall be stored or handled within any service station building except in approved closed containers. A container equipped with an approved pump or an approved self-closing faucet shall be considered a closed container for purposes of storage only.

(2) No Class I liquids shall be dispensed, or transferred from one container to another, inside of a service station building, except flammable anti-freeze liquids. Such anti-freeze may be dispensed in rooms of a service station building provided such rooms have approved heating devices and there is no open flame in such room lower than 8 feet above floor level. Service station areas other than lubritoriums or rooms in which flammable liquids are transferred or dispensed may be heated in any conventional manner.

(3) Class II or III liquids may be stored and dispensed inside service station buildings from tanks of not more than 120 gallons capacity each.

d. LABELING. No sale or purchase of any Class I, II or III liquids shall be made in containers unless such containers are clearly marked with the name of the product contained therein.

e. DISPENSING CONTAINERS. No delivery of any Class I liquids shall be made into portable containers unless the container has a tight closure with screwed or spring cover and is fitted with a spout or so designed that the contents can be poured without spilling.

Section 16.64. Dispensing Systems.

a. LOCATION. Dispensing devices at automotive service stations shall be so located that all parts of the vehicle being served will be on the premises of the service station.

(1) INSIDE LOCATION. Approved dispensing units may be located inside garages upon specific approval of the Chief of the Bureau of Fire Prevention. The dispensing area shall be separated from motor vehicle repair areas in a manner approved by the Chief of the Bureau of Fire Prevention. The dispensing unit and its piping shall be protected against physical damage from vehicles either by mounting on a concrete island or by equivalent means and shall be located in a position where it cannot be struck by a vehicle descending a ramp or other slope out of control. The dispensing area shall be provided with an approved mechanical or gravity ventilation system. A clearly identified switch, readily accessible in case of fire or physical damage to any dispensing unit, shall be provided to shut off the power to dispensing units. When dispensing units are located below grade, only approved mechanical ventilation shall be used and the entire dispensing area shall be protected by an approved automatic sprinkler system. The ventilating system shall be electrically interlocked with the gasoline dispensing units so that the dispensing units cannot be operated unless the ventilating fan motors are energized.

b. DISPENSING UNITS.

(1) Class I liquids shall be transferred from underground tanks by means of fixed pumps so designed and equipped as to allow control of the flow and to prevent leakage or accidental discharge. Class I liquids shall not be transferred from any storage tank by any equipment or procedure which subjects the shell of the storage tank to pressures above its allowable working pressure. Air or gas pressure shall not be used for this purpose.

(2) Supplemental means shall be provided outside of the dispensing device whereby the source of power may be readily disconnected in the event of fire or other accident.

(3) Dispensing devices for Class I liquids shall be of approved type.

(4) Class I liquids shall not be dispensed by pressure from drums, barrels, and similar containers. Approved pumps taking suction through the top of the container or approved self-closing faucets shall be used.

c. REMOTE PUMPING SYSTEMS.

(1) SCOPE. Remote pumping systems shall apply to systems for dispensing Class I liquid where such liquid is transferred from underground storage to individual or multiple dispensing units by pumps located elsewhere than at the dispensing units.

(2) PUMPS. Pumps shall be designed or equipped so that no part of the system will be subjected to pressures above its allowable working pressure. Pumps installed abovegrade, outside of buildings, shall be located not less than ten feet from lines of adjoining property which may be built upon, and not less than five feet from any building opening. When an outside pump location is impractical, pumps may be installed inside of buildings as provided for dispensers in section 16.64a(1), or in pits as provided in section 16.64 c(3). Pump shall be substantially anchored and protected against physical damage by vehicles.

(3) PITS. Pits for subsurface pumps or piping manifolds of submersible pumps shall withstand the external forces to which they may be subjected without damage to the pump, tank, or piping. The pit shall be no larger than necessary for inspection and maintenance and shall be provided with a tight fitting cover.

(4) CONTROLS.

(a) A control shall be provided that will permit the pump to operate only when a dispensing nozzle is removed from its bracket on the dispensing unit and the switch on this dispensing unit is manually actuated. This control shall also stop the pump when all nozzles have been returned to their brackets.

(b) There shall be a means, visible from the operating area, to indicate when the pump motor is running.

(c) A clearly identified switch, readily accessible in case of fire or physical damage at any dispensing unit, shall be provided to shut off the power to the pump motors.

(5) TESTING. After the completion of the installation including any paving, that section of the pressure piping system between the pump discharge and the connection for the dispensing facility, shall be tested for at least thirty minutes at a pressure fifty per cent above the maximum operating pressure. Such tests shall be repeated at five year intervals thereafter.

d. AUTOMATIC DISPENSING UNITS. The installation and use of unattended coin-operated dispensing devices for Class I liquids is prohibited.

e. DELIVERY NOZZLES.

(1) MANUAL NOZZLES. The dispensing of Class I liquid into the fuel tank of a vehicle or into a container shall be under the control of a competent attendant at all times. The use of any device which permits the dispensing of Class I liquids when the hand of the operator of the discharge nozzle is removed from the nozzle control lever is hereby forbidden except when using an automatic nozzle at an automotive service station as provided in section 16.64 e(2).

(2) AUTOMATIC NOZZLES WITH LATCH-OPEN DEVICES. In lieu of being held open by hand, an approved automatic nozzle may be used for dispensing Class I liquid into the fuel tank of a vehicle. Such a nozzle shall have the latch-open device as an integral part of the assembly and shall shut off the liquid reliably and positively when the gasoline tank is filled, when it falls from the filling neck of an automobile tank, when it is subject to rough usage such as dropping or lack of proper lubrication, or when an automobile is driven away while the nozzle is still in the tank. A competent attendant shall be in the immediate vicinity of the vehicle being filled by such an approved nozzle.

Section 16.65. Marine Service Stations.

a. Tanks and pumps, other than those integral with approved dispensing devices, supplying Class I liquids at marine service stations shall be located only on shore, or upon express permission of the Chief of the Bureau of Fire Prevention on a pier of solid-fill type. Approved dispensing devices with or without integral pumps may be located on shore, piers of solid-fill type, open piers, wharves or floating docks.

b. Tanks and pumps supplying Class II and III liquids at marine service stations may be located on shore, on a pier of solid-fill type or on open piers, wharves or floating docks. Class II or III liquid tanks which are located other than on shore or on piers of the solid-fill type shall be limited to 550 gallons aggregate capacity. Pumps not a part of the dispensing unit shall be located adjacent to the tanks.

c. Pipe lines attached to piers, wharves or floating docks shall be protected against physical damage. A readily accessible valve to shut off the supply from the shore shall be provided in each pipe line at or near the approach to the pier, wharf or floating dock.

d. Pipe lines to floating docks shall be so designed and installed as to make appropriate provision for changes in water level or tide. Transition from the fixed portion of the installation to the floating unit shall provide desirable product control, flexibility, and protection from physical damage.

TABLE 16.66 b

Electrical Equipment Hazardous Areas—Service Stations.

Location	NEC Class I, Group D Division	Extent of Classified Area
	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
UNDERGROUND TANK— Fill Opening	2	Up to 18 inches above grade level within a horizontal radius of 10 feet from a loose fill connection and within a horizontal radius of 5 feet from a tight fill connection.
UNDERGROUND TANK— Vent, Discharging Upward	1	Within 3 feet of open end of vent, extending in all directions.
	2	Area between 3 feet and 5 feet of open end of vent, extending in all directions.
DISPENSER— Pits	1	Any pit, box or space below grade level, any part of which is within the Division 1 or 2 classified area.
DISPENSER— Dispenser Enclosure	1	The area 4 feet vertically above grade within the enclosure of 18 inches in all directions.
DISPENSER— Outdoor	2	Up to 18 inches above grade level within 20 feet horizontally of any edge of enclosure.
DISPENSER— Indoor With Mechanical Ventilation	2	Up to 18 inches above grade or floor level within 20 feet horizontally of any edge of enclosure.
DISPENSER— Indoors With Gravity Ventilation	2	Up to 18 inches above grade or floor level within 25 feet horizontally of any edge of enclosure.
REMOTE PUMP— Outdoor	1	Any pit, box or space below grade level if any part is within a horizontal distance of 10 feet from any edge of pump.
	2	Within 3 feet of any edge of pump, extending in all directions. Also up to 18 inches above grade level within 10 feet horizontally from any edge of pump.

Table 16.66 b—Continued

Location	NEC Class I, Group D Division	Extent of Classified Area
	1	Entire area within any pit.
REMOTE PUMP—Indoor	2	Within 5 feet of any edge of pump, extending in all directions. Also up to 3 feet above floor or grade level within 25 feet horizontally from any edge of pump.
	1	Entire area within any pit.
LUBRICATION ROOM	2	Area up to 18 inches above floor or grade level within entire lubrication room.
LUBRICATION ROOM—Dispenser for Class I Liquids	2	Within 3 feet of any fill or dispensing point, extending in all directions.
SPECIAL ENCLOSURE INSIDE BUILDING PER SECTION 16.63b	1	Entire enclosure.
SALES, STORAGE AND REST ROOMS	Ordinary	If there is any opening to these rooms within the extent of an outdoor classified area, the entire room shall be classified the same as the area classification at the point of the opening. If there is any opening to these rooms within the extent of an indoor classified area, the room shall be classified the same as if the wall, curb or partition did not exist.

Section 16.67. Drainage and Waste Disposal.

Provision shall be made in the area where Class I liquids may be spilled to prevent liquids from flowing into interior of service-station buildings. Such provision may be by grading driveway, raising door sills, or other effective means. Crankcase drainings and flammable or combustible liquids shall not be dumped into sewers, but shall be stored in tanks or tight drums outside of any building until removed from the premises.

Section 16.68. Sources of Ignition.

In addition to the previous restrictions of this division, the following shall apply. There shall be no smoking or open flames

in the areas used for fueling, servicing internal combustion engines, receiving or dispensing of flammable or combustible liquids. Conspicuous and legible signs prohibiting smoking shall be posted within sight of the customer being served. The motors on all equipment being fueled shall be shut off during the fueling operation.

Section 16.69. Fire Control.

Suitable fire-control devices, such as small hose or portable fire extinguishers, shall be available to locations where fires are likely to occur.

DIVISION VII

COMMERCIAL AND INDUSTRIAL ESTABLISHMENTS

Section 16.71. Manner of Storage.

a. GENERAL. Flammable or combustible liquids shall be stored in tanks, closed containers or approved safety cans.

b. TANKS. Flammable or combustible liquids stored in tanks, drums or other closed containers shall conform to the applicable requirements of division II of this article.

c. CONTAINERS. Flammable or combustible liquids stored in drums and other closed containers shall conform to the applicable provisions of division III of this article.

Section 16.72. Handling and Use.

a. LOCATION. Flammable or combustible liquids in quantities requiring a permit shall be used in buildings, portions of buildings or rooms constructed and designed in accordance with the requirements of Inside Mixing and Handling Rooms.

b. DESIGN AND CONSTRUCTION OF INSIDE MIXING AND HANDLING ROOMS. Rooms shall have at least one exterior wall. Walls, floors and ceilings shall be of noncombustible material having a fire resistance rating of not less than 2 hours. Door openings shall be provided with noncombustible liquid-tight sills at least 6 inches high and provided with an approved self-closing fire door. Adequate drainage to a safe location shall be provided. Adequate natural or mechanical ventilation shall be provided.

c. STORAGE LIMITS FOR INSIDE MIXING AND HANDLING ROOMS.

(1) An Inside Mixing and Handling Room not protected by an approved automatic fire extinguishing system shall contain not more than,

[a] 1,100 gallons total of Class I, II and III liquids of which not more than,

[b] 550 gallons may be of Class I liquid of which not more than,

[c] 275 gallons may be of Class IA liquid.

(2) An Inside Mixing and Handling Room protected by an approved automatic fire extinguishing system shall not contain more than,

[a] 11,000 gallons total of Class I, II and III liquids of which not more than,

[b] 2,750 gallons may be of Class I liquid of which not more than,

[c] 550 gallons may be of Class IA liquid.

[d] These amounts may be increased to not more than one day's supply where daily consumption exceeds the above limits.

Section 16.73. Dispensing.

a. Class I liquids shall be dispensed only in an Inside Mixing and Handling Room.

b. Class I liquids shall not be drawn from or dispensed into vessels or containers within a building except by means of a device drawing from top of the tank or the container. Gravity discharge

within a building of Class I liquids from tanks, drums, or containers other than safety cans, is forbidden, except where the nature of the manufacturing process requires gravity flow. Upon approval of the Chief of the Bureau of Fire Prevention such gravity flow shall be permitted only from vessels storing flammable or combustible liquids sufficient for not more than one day's operation.

c. Class I liquids shall not be dispensed within a room or building which normally contains sources of ignition within the possible path of vapor travel. Dispensing devices shall be provided with iron or steel valves where compatible with the flammable or combustible liquid handled. Where practicable, there shall be, in addition to the outlet valve, a secondary control device or valve outside of the immediate area, by which the flow may be stopped in the event of fire or other accident at the outlet. Outlet valves, where practicable, shall be of the self-closing type.

[illegible] shall not be [illegible]

d. EXITS. Exit facilities shall be provided to prevent occupants being trapped in the event of fire.

Section 16.74. Ventilation.

a. Buildings or rooms or other enclosures in which Class I liquids are used or stored in open vats or dip tanks shall be provided with ventilation sufficient at all times to prevent accumulation of flammable vapors. Where natural ventilation is insufficient under all conditions to prevent the accumulation of flammable vapors, mechanical ventilation shall be provided and used. The accumulation of flammable vapors within the combustible or explosive range under normal operating conditions, as determined by an approved flammable-vapor indicator, shall be evidence of a violation of this section 16.74a.

b. Design of ventilating systems shall take into account the relatively high specific gravity of the vapors. Openings to the outside for natural ventilation shall be at floor level and shall be unobstructed except by louvers, or coarse screens.

Section 16.75. Sources of Ignition.

Open flames, heating devices and processes employing temperatures capable of igniting the vapors of the flammable liquids used shall be prohibited in buildings, rooms and other confined spaces in which Class I liquids are used in the open, or in which Class II and III liquids are used for the purpose of saturating, coating or otherwise treating goods or materials. Smoking shall be prohibited and suitable signs to that effect shall be displayed.

Section 16.76. Housekeeping.

a. Whenever flammable or combustible liquids are stored in containers, provision shall be made and maintained for the detection of leakage. Leaking containers shall be immediately removed or made tight.

b. Access shall be provided by unobstructed aisles whereby first-aid fire-control apparatus may be brought to bear on any part of such flammable or combustible liquid storage.

c. In buildings, rooms or other confined spaces in which flammable or combustible liquids are stored, combustible waste materials shall not be allowed to accumulate, except in closed metal containers.

d. Flammable liquids or combustible liquids shall not be dumped into sewers, but shall be stored in tanks or tight drums outside of any building until removed from the premises.

Section 16.77. Fire Control.

Where flammable or combustible liquids are used or dispensed, portable fire extinguishers shall be installed to provide reasonable safety to persons and property. Evidence that portable fire extinguishers are in accordance with the applicable standard specified

for this section 16.79 in article 31 of this Fire Prevention Code shall be evidence that such extinguishers provide reasonable safety to persons and property.

DIVISION VIII

PROCESSING PLANTS

Section 16.81. Manner of Storage.

a. GENERAL. Flammable or combustible liquids shall be stored in tanks, closed containers or approved safety cans.

b. TANKS. The storage of flammable or combustible liquids in tanks shall conform to the applicable requirements of division II of this article or section 16.63 b.

c. CONTAINERS.

(1) The storage of flammable or combustible liquids in drums or other closed containers shall conform to division III or section 16.81 c(2).

(2) The storage of flammable or combustible liquids within rooms or buildings not meeting division III shall be limited as follows:

[a] The storage of Class I liquids within wood-frame buildings is prohibited. The storage of Class II or III liquids within wood-frame buildings shall be limited to 60 gallons in any container.

[b] In other than wood-frame buildings, Class I liquids may be stored in closed containers or safety cans of not more than 5 gallons individual capacity and not exceeding a total of 25 gallons. Class II liquids may be stored in closed containers or safety cans of not more than 5 gallons individual capacity, and in barrels or drums of not more than 60 gallons individual capacity. The total quantity that may be stored in this manner shall be limited to 220 gallons. Class III liquids may be stored in closed containers of not more than 5 gallons individual capacity, or in barrels or drums not exceeding 60 gallons individual capacity. The total quantity stored in this manner shall be limited to 220 gallons.

Section 16.82. Blending and Mixing.

a. Mixing or blending rooms or buildings shall meet the design requirements of section 16.72 b. Mixing or blending rooms or buildings shall be provided with natural or mechanical ventilation that will prevent the accumulation of flammable vapors in hazardous concentrations. Design of ventilating systems shall take into account the relatively high specific gravity of the vapors. Openings in outside walls for natural ventilation shall be at floor level and shall be unobstructed except by louvers, or coarse screens.

b. Vessels used for mixing or blending of Class I liquids shall be provided with self-closing tight-fitting noncombustible lids that will control a fire within such vessel when applied thereto. Where such devices are impracticable, automatic or manually controlled chemical or other fire extinguishing devices approved by the Chief of the Bureau of Fire Prevention shall be provided.

c. Open flames and other sources of ignition shall not be used within the possible path of vapor travel where flammable or combustible liquids are mixed or blended in open containers.

d. Vessels shall be electrically connected by bond-wires, piping, or similar means, where differences of potential could otherwise be created by accumulation of static-electrical charges.

Section 16.83. Dispensing from Containers Within Buildings.

a. Class I liquids may be dispensed from approved safety cans, provided that there are no open flames or other sources of ignition within the possible path of vapor travel.

b. Class II or III liquids may be dispensed from containers not exceeding 60 gallons in individual capacity by means of a pump or similar device taking suction through the top of the container.

Section 16.84. Sources of Ignition.

Open flames, heating devices and processes employing temperatures capable of igniting the vapors of the flammable or combustible liquids used shall be prohibited in buildings, rooms and other confined spaces in which Class I liquids are used in the open, or in which Class II or III flammable liquids are heated above their flash point in open containers.

Section 16.85. Housekeeping.

a. Wherever flammable or combustible liquids are stored in containers, provision shall be made and maintained for the detection of leakage. Leaking containers shall be immediately removed and the contents transferred to a tight container.

b. Access shall be provided by unobstructed aisles whereby portable fire control apparatus may be brought to bear on any part of such flammable or combustible liquid storage.

c. In buildings, rooms or other confined spaces in which flammable or combustible liquids are stored, combustible waste materials shall not be allowed to accumulate, except in closed metal containers.

d. Flammable or combustible liquids shall not be dumped into sewers, unless they are designed for this purpose, but shall be stored in tanks or tight drums outside of any building until removed from the premises.

Section 16.86. Fire Control.

Where flammable or combustible liquids are stored, or are used in open vessels, or are dispensed within buildings or other enclosures, portable fire-control equipment shall provide reasonable safety to persons and property. Evidence that portable fire extinguishers are in accordance with the applicable standard specified for this section 16.86 in article 31 of this Fire Prevention Code shall be evidence that such extinguishers provide reasonable safety to persons and property.

DIVISION IX

REFINERIES, CHEMICAL PLANTS AND DISTILLERIES

Section 16.91. Location.

No permit shall be issued for the construction of a refinery, other plant storing or handling crude petroleum, chemical plant, or distillery until approval has been given for the proposed location with respect to topography, nearness to places of assembly, residential or mercantile occupancies, and adequacy of water supply for fire control.

Section 16.92. Storage.

a. Flammable or combustible liquids shall be stored in tanks or in containers. Tanks shall be installed in accordance with division II of this article.

b. Tanks for the storage of flammable or combustible liquids in tank farms and in locations other than process areas shall be located in accordance with sections 16.22 b and 16.22 c.

Section 16.93. Fired and Unfired Pressure Vessels.

Fired and unfired pressure vessels shall be constructed so as to be reasonably safe to persons and property. Evidence that fired and unfired pressure vessels have been constructed in accordance with the applicable standards specified for this section 16.93 in article 31 of this Fire Prevention Code shall be evidence that vessels are reasonably safe to persons and property.

Section 16.94. Location of Process Units.

Process units shall be located so that they are accessible from at least one side for the purpose of fire control. Where topographical conditions are such that flammable liquids may flow from a processing area so as to constitute a fire hazard to property of others, provisions shall be made to divert or impound the flow by curbs, drain, or other suitable means.

Section 16.95. Fire Control.

a. Portable fire extinguishment and control equipment shall provide reasonable safety to persons and property. Evidence that portable fire extinguishment is in accordance with the applicable standard specified for this section 16.95a in article 31 of this Fire

Prevention Code shall be evidence that such equipment provides reasonable safety to persons and property.

b. Water shall be available in volume and at adequate pressure to supply water hose streams, foam producing equipment, automatic sprinklers or water spray systems as the need is indicated by the special hazards of operation and storage.

c. Special extinguishing equipment such as that utilizing foam, inert gas, or dry chemical shall be provided as the need is indicated by the special hazards of operation and storage.

DIVISION X

TANK VEHICLES FOR FLAMMABLE AND COMBUSTIBLE LIQUIDS

Section 16.101. Scope.

This division shall apply to tank motor vehicles to be used for the transportation of asphalt or normally stable flammable and combustible liquids with a flashpoint below 200°F.

Section 16.102. Definitions.

a. **Cargo tank** shall mean any container having a liquid capacity in excess of 100 gallons, used for the carrying of flammable or combustible liquids or asphalt and mounted permanently or otherwise upon a tank vehicle. The term "cargo tank" does not apply to any container used solely for the purpose of supplying fuel for the propulsion of the tank vehicle upon which it is mounted.

b. **Tank vehicle** shall mean any vehicle other than railroad tank cars and boats, with a cargo tank mounted thereon or built as an integral part thereof used for the transportation of flammable or combustible liquids. Tank vehicles include self-propelled vehicles, and full trailers and semi-trailers without motive power and with wheels carrying either part or all of the load.

Section 16.103. Permit Required.

No person shall engage in the business of delivering flammable or combustible liquids from tank vehicles without a permit.

Section 16.104. Tank Vehicle Design.

a. Cargo tanks used for transporting flammable liquids with a vapor pressure of 18 psia or over at 100°F. shall be constructed so as to be reasonably safe to persons and property. Evidence that cargo tanks used for transporting flammable liquids with a vapor pressure of 18 psia or over at 100°F. are constructed in accordance with the applicable standards specified for this section 16.104a in article 31 of this Fire Prevention Code shall be evidence that such cargo tanks are reasonably safe to persons and property.

b. Cargo tanks used for transporting flammable or combustible liquids with a vapor pressure under 18 psia at 100°F. shall be constructed so as to be reasonably safe to persons and property. Evidence that cargo tanks used for transporting flammable or combustible liquids with a vapor pressure under 18 psia at 100°F. are constructed in accordance with the applicable standards specified for this section 16.104 b in article 31 of this Fire Prevention Code shall be evidence that such cargo tanks are reasonably safe to persons and property.

c. The material used in the construction of the cargo tanks shall be compatible with the chemical characteristics of the flammable or combustible liquid to be transported.

d. Any tank vehicle designed or used for transporting materials at liquid temperatures above ambient temperature shall have a red warning sign permanently attached to the vehicle containing at least the following:

"Maximum allowable cargo temperature is ----------°F."
This maximum allowable cargo temperature shall be specified by the manufacturer of the vehicle.

Section 16.105. Tires.

All tank motor vehicles shall be equipped with rubber tires on all wheels.

Section 16.106. Static Protection.

a. Cargo tanks and vehicle chassis shall be electrically bonded.

b. Provision shall be made in the tank structure of the vehicle for the bonding of the vehicle to the fill pipe during truck loading operations.

Section 16.107. Protection Against Collision or Overturn.

a. Draw-off valves or faucets projecting beyond the frame at the rear of a tank vehicle shall be adequately protected against collision by bumpers or similar means.

b. On tank vehicles constructed hereafter, all closures for filling openings shall be protected from damage in the event of overturning of the tank vehicle by being enclosed within the body of the tank, or a dome attached thereto, or by the use of suitable metal guards securely attached to the tank or the frame of the tank vehicle.

Section 16.109. Full Trailers and Semi-Trailers.

a. Trailers shall be firmly and securely attached to the vehicle drawing them, in a manner conforming with accepted engineering practice.

b. Each full trailer, and semi-trailer, shall be equipped with reliable brakes on all wheels, and adequate provision shall be made for their efficient operation from the driver's seat of the vehicle drawing the trailer, or semi-trailer.

c. Trailer connections shall be such as to prevent the towed vehicle from whipping or swerving from side to side dangerously or unreasonably and shall cause the trailer to follow substantially in the path of the towing vehicle.

Section 16.1010. Marking.

Every tank vehicle used for the transportation of any flammable liquid, regardless of the quantity being transported, or whether loaded or empty, shall be conspicuously and legibly marked on each side and the rear thereof, in letters at least 3 inches high on a background of sharply contrasting color, optionally as follows:

(1) With a sign or lettering on the motor vehicle with the word "Flammable."

(2) With the common name of the flammable liquid being transported.

Section 16.1011. Fire Control.

a. Each tank vehicle shall be provided with at least one portable fire extinguisher having at least a 12-B,C rating or when more than one is provided, each extinguisher shall have at least a 6-B rating.

b. Fire extinguishers shall be kept in good operating condition at all times, and they shall be located in an accessible place on each tank vehicle.

Section 16.1012. Operation of Tank Vehicles.

a. Drivers shall be thoroughly instructed in the proper method of operating tank vehicles.

b. Tank vehicles shall not be operated unless they are in proper repair, devoid of accumulation of grease, oil or other flammables, and free of leaks.

c. Dome covers shall be closed and latched while the tank vehicle is in transit.

d. No tank vehicle shall be operated with a cargo temperature above the maximum allowable cargo temperature specified on the warning sign required by section 16.104 d.

e. No material shall be loaded into or transported in a tank vehicle at a temperature above its ignition temperature, unless properly safeguarded in an approved manner.

f. Flammable liquids with a vapor pressure of 18 psia or over at 100°F. shall be loaded only into cargo tanks constructed in accordance with section 16.104a.

g. Flammable and combustible liquids shall be loaded only into cargo tanks whose material used in construction shall be chemically compatible with the chemical characteristics of the liquid. The flammable and combustible liquid being loaded shall also be compatible with the liquid hauled on the previous load unles the cargo tank has been cleaned.

h. No tank vehicle, or any compartment thereof, which has been utilized for Class I liquid, shall be loaded with Class II or III liquid until such tank or compartment and all piping, pumps, meters and hose connected thereto have been completely drained. A tank, compartment, piping, pump, meter or hose which does not

drain completely shall be flushed at the loading point with a quantity of Class II or Class III liquid equal to twice the capacity of piping, pump, meter and hose, to clear any residue of Class I liquid from the system.

Section 16.1013. Filling and Discharging Tank Vehicles.

a. The driver, operator or attendant of any tank vehicle shall not remain in the vehicle but shall not leave the vehicle while it is being [illegible]

b. Motor of tank trucks or tractors shall be shut down during making and breaking hose connections. If loading or unloading is done without the use of a power pump, the tank truck or tractor motor shall be shut down throughout such operations.

c. The cargo tank shall be bonded to the fill-stem or some part of the rack structure electrically interconnected with the fill stem piping, except tank vehicles handling asphalt, tank vehicles loading any flammable liquid through bottom connections, and tank vehicles used exclusively for transporting Class II or III liquids when loaded at locations where no Class I liquids are handled.

d. The bond-wire connection shall be made prior to opening the dome covers. It shall be maintained in place during the entire filling operation and the dome covers shall be securely closed before the bond-wire is disconnected from the cargo tank.

e. No external bond-wire connection nor bond-wire integral with a hose are needed for the unloading of flammable or combustible liquids into underground tanks.

f. No cargo tank or compartment thereof used for the transportation of any flammable or combustible liquid or asphalt shall be loaded liquid full. Sufficient space (outage) shall be left vacant in every case to prevent leakage from or distortion of such tank or compartment by expansion of the contents due to rise in temperature in transit and in no case less than one percent.

g. Simultaneous delivery to underground tanks from two or more hoses shall be made by means of tight connections between the hose and the fill pipe.

h. Cargo tanks shall be free of all water before they are loaded with hot asphalt.

Section 16.1014. Ignition Sources.

a. Smoking by tank vehicle drivers, helpers, repairmen, or other personnel is prohibited while they are driving, making deliveries, filling, or making any repairs to tank vehicles.

b. Open flames shall not be used near manholes or vents.

Section 16.1015. Parking and Garaging.

a. Except in an emergency no tank vehicle shall be left unattended on any street, highway, avenue or alley, provided that this shall not prevent a driver from the necessary absence from the truck in connection with the delivery of his load, except that during actual discharge of the liquid some responsible person shall be present at the vehicle, nor shall it prevent stops for meals during the day or night if the street is well lighted at point of parking.

b. Tank vehicles containing flammable or combustible liquids shall not be parked out of doors at any one point for longer than one hour, except off the streets, and at least 25 feet from any building used for assembly, institutional or residential occupancy.

c. Tank vehicles shall not be parked or garaged in any buildings other than those specifically approved for such use by the Chief of the Bureau of Fire Prevention.

ARTICLE 17

FRUIT RIPENING PROCESSES

Section 17.1. Scope.

This article shall apply to the process of ripening green bananas or citrus fruits in tightly closed rooms heated with direct fired heaters and shall include those processes where ethylene gas is introduced into the room to assist the ripening process.

Section 17.2. Permit Required.

A permit shall be required for any fruit ripening process.

Section 17.3. Use of Ethylene.

a. The location of buildings in which fruit ripening processes utilizing ethylene are conducted shall be approved by the Chief of the Bureau of Fire Prevention.

b. Ethylene shall be introduced by some means under positive control and measured so that the quantity introduced does not exceed 1 part ethylene to 1,000 parts of air.

c. Containers storing ethylene shall be constructed so as to be reasonably safe to persons and property. Evidence that containers storing ethylene are constructed in accordance with the applicable standards specified for this section 17.3 c in article 31 of this Fire Prevention Code shall be evidence that such containers are reasonably safe to persons and property.

d. Containers other than those connected for use shall be stored outside of the building or in a special building except that not more than two portable ICC containers not connected for use may be stored inside the building premises. Such inside rooms or portions of buildings used for storage of these containers shall be constructed in accordance with sections 30.17 d and 30.17 e.

e. Ethylene piping shall be of iron pipe. Flexible connectors and hose, when used, shall be of approved type. Tubing shall be of brass or copper with not less than 0.049 inch wall thickness.

Section 17.5. Heating.

a. Steam and hot water pipes and radiators shall have a clearance of at least one inch to combustible material.

b. Gas heaters and their vents shall be installed so as to be reasonably safe to persons and property. Evidence that gas heaters and their vents are installed in accordance with the applicable standards specified for this section 17.5 c in article 31 of this Fire Prevention Code shall be evidence that such gas heaters and vents are reasonably safe to persons and property. Gas heaters shall be equipped with an automatic pilot device to shut off the gas supply whenever the flame is extinguished.

c. Burners for gas or kerosene heaters shall be installed so that air for combustion is taken from outside the ripening room and the products of combustion are discharged to the outside.

d. Kerosene heaters shall be installed in accordance with the applicable provisions of article 24.

e. A protective guard shall be provided around any heater to prevent the possibility of its being knocked over by other equipment such as vehicles or lift trucks.

Section 17.6. Open Flames.

a. "No Smoking" signs shall be posted at every entrance and smoking shall be prohibited in the ripening rooms.

Section 17.7. Housekeeping.

Ripening rooms shall be frequently cleared of all combustible material.

ARTICLE 18

FUMIGATION AND THERMAL INSECTICIDAL FOGGING

Section 18.1. Scope.

This article applies to fumigation and thermal insecticidal fogging operations which shall conform to all other applicable requirements of this code, as well as the following provisions.

Section 18.2. Definitions.

a. **Fumigant** shall mean and include any substance which by itself or in combination with any other substance emits or liberates a gas (or vapor) in sufficient concentration to be lethal to pest organisms, insects, fungi, vermin, germs and rodents. This definition implies that the fumigant acts as a gas and shall be distinguished from insecticide or disinfectants which are dispersed as aerosols or particulate suspensions of liquids or solids in air. Examples are acrylonitrile, carbon bisulfide, ethylene dibromide, hydrogen cyamide, methyl bromide and sufuryl fluoride.

b. **Fumigation** shall mean the use of a fumigant, within an enclosed space for the destruction of plant or animal life, which may be hazardous or acutely toxic to man.

c. **Thermal insecticidal fogging liquid** shall mean any insecticidal liquid specifically designed for emission from a thermal fog generating unit in the form of an aerosol fog which is lethal to pest organisms and insects.

d. **Thermal insecticidal fogging** shall mean the application of any insecticidal liquid by discharging through a thermal fog-generating unit, by means of heat, pressure and turbulence, in the form of an aerosol fog or mist that is blown into an area to be treated.

Section 18.3. Permit Required.

a. A permit shall be required for any person performing any fumigation or thermal insecticidal fogging which is dangerous, noxious or poisonous to the life or health of human beings, or which constitutes a fire hazard. All persons actually engaged in the work shall require a fumigation or thermal insecticidal fogging "operators" permit.

b. Applicants for fumigation or thermal insecticidal fogging "operators" permits shall be required to appear in person before

the authority granting the permit for such questioning as will show the training, experience, qualifications, character and reputation of the applicant in regard to fumigation or thermal insecticidal fogging. Applicants shall demonstrate knowledge of the properties of the fumigants and thermal insecticidal fogging liquids used and shall be familiar with the proper first aid measures to be used in case of emergencies.

Section 18.5. Notification of Fumigation or Thermal Insecticidal Fogging.

a. The holder of a fumigation or thermal insecticidal fogging permit shall notify the Chief of the Bureau of Fire Prevention at least 24 hours prior to the beginning of a usual fumigation or fogging operation except at least 2 hours shall be required for fumigation in public health emergencies or on shipboard. Such notification shall give the location of the building, ship or enclosed space to be fumigated or fogged as well as its character and use, the fumigants or insecticides to be used, the person or persons in charge of the operation and the date and time when it will be started.

b. Notice of any fumigation or thermal insecticidal fogging shall be served with sufficient advance notice upon the occupants of any building or other enclosed space involved in the operation to enable them to evacuate the premises. Suitable warning signs

indicating the danger, type of chemical involved, and recommended precautions shall be posted on all doors and entrances to the premises and upon all gangplanks and ladders from the dock, pier or land to the ship. Such notice printed in red ink on white background letters in the headlines to be at least two inches in height shall state the date and time of the operation, the name and address of the person, the name of the operator in charge, together with a warning to the effect that the premises so occupied shall be vacated at least an hour before the operation is started and must not be re-entered until the danger signs have been removed by the proper authorities.

Section 18.6 Thermal Insecticidal Fogging Liquids.

No thermal insecticidal fogging liquid used for fogging a building or enclosure shall be a Class I liquid.

Section 18.7. Protective Equipment and Breathing Apparatus.

All persons engaged in the business of fumigation or thermal insecticidal fogging shall maintain and have available approved protective equipment and breathing apparatus as may be required.

Section 18.8. Watchman Required During Fumigation.

During the period fumigation is in process, except when fumigation is conducted in a gas-tight vault or tank, a capable, alert watchman or watchmen shall remain on duty at the entrance or entrances to the building, ship, or enclosed space fumigated until after the fumigation is completed and until the premises are properly ventilated and again safe for human occupancy. Sufficient watchmen shall be provided to prevent any person from entering the building, ship or enclosed space under fumigation without being observed.

Section 18.9. Thermal Insecticidal Fogging.

When conducting thermal insecticidal fogging indoors, not more than one gallon of insecticide shall be used for each 50,000 cubic feet of space. The fog shall not be blasted directly against any combustible object or material.

ARTICLE 19

GARAGES

Section 19.1. General.

Garages shall conform to all applicable requirements of this code, as well as to the provisions of this article.

Section 19.2. Permit Required.

A permit shall be required for any person using any building, shed or enclosure as a place of business for the purpose of servicing or repairing any motor vehicle therein.

Section 19.3. Cleaning with Flammable Liquids.

No Class I liquid shall be used in any garage for washing parts or removing grease or dirt, unless in a special closed machine approved for the purpose or in a separate well ventilated room enclosed by walls having a fire-resistance rating of not less than two hours with openings therein protected by approved fire doors or fire windows, and with no opening from such room to any upper or lower story.

Section 19.4. Handling of Gasoline and Oils.

a. The fuel tanks of motor vehicles shall be filled directly through hose from approved pumps attached to approved portable tanks or drawing from underground storage tanks. Storage and handling of flammable or combustible liquids shall conform to article 16. The transfer of gasoline in any garage shall not be made in any open container.

b. Garage floors shall drain to oil separators or traps discharging to sewer. Contents of oil separators or traps of floor drainage systems shall be collected at sufficiently frequent intervals and removed from the premises to prevent oil from being carried into the sewers. Self-closing metal cans shall be used for all oily waste or waste oils.

ARTICLE 20

HAZARDOUS CHEMICALS

Section 20.1. Scope.

This article shall apply to materials not otherwise covered in this code which are highly flammable, or which may react to cause fires or explosions, or which by their presence create or augment a fire or explosion hazard, or which because of their toxicity, flammability, or liability to explosion render fire fighting abnormally dangerous or difficult; also to materials and formulations which are chemically unstable and which may spontaneously form explosive compounds, or undergo spontaneous or exothermic reactions of explosive violence or with sufficient evolution of heat to be a fire hazard. Hazardous chemicals shall include such materials as corrosive liquids, flammable solids, highly toxic materials, oxidizing materials, poisonous gases, radioactive materials, and unstable chemicals, as defined in section 20.2.

Section 20.2. Definitions.

a. **Corrosive liquid** shall mean and include those acids, alkaline caustic liquids, and other corrosive liquids which when in contact with living tissue, will cause severe damage of such tissue by chemical action; or in case of leakage will materially damage or destroy other containers of other hazardous commodities by chemical action and cause the release of their contents; or are liable to cause fire when in contact with organic matter or with certain chemicals.

b. **Flammable solid** shall mean and include a solid substance, other than one classified as an explosive, which is liable to cause fires through friction, through absorption of moisture, through spontaneous chemical changes, or as a result of retained heat from manufacturing or processing. Examples are: white phosphorous, nitrocellulose, metallic sodium and potassium, and zirconium powder.

c. **Highly toxic material** shall mean a material so toxic to man as to afford an unusual hazard to life and health during fire fighting operations. Examples are: parathion, TEPP (tetraethyl phosphate), HETP (hexaethyl tetraphosphate), and similar insecticides and pesticides.

d. **Oxidizing material** shall mean and include substances that yield oxygen readily to support combustion. Examples are: chlorates, permanganates, peroxides, and nitrates.

e. **Poisonous gas** shall mean and include any noxious gas of such nature that a small amount of the gas in air is dangerous to life: Examples are: chlorine, cyanogen, fluorine, hydrogen cyanide, nitric oxide, nitrogen tetraoxide and phosgene.

f. **Radioactive material** shall mean and include any material or combination of material that spontaneously emits ionizing radiation.

g. **Sealed source** shall mean a quantity of radiation so enclosed as to prevent the escape of any radioactive material but at the same time permitting radiation to come out for use.

h. **Storage, isolated** shall mean storage away from incompatible materials in a different storage room or in a separate and detached building located at a safe distance from hazardous occupancies and important exposures.

i. **Storage, separated** shall mean storage in the same fire area but physically separated by as much space as practicable, using sills or curbs as safeguards, or by intervening storage of nonhazardous, compatible commodities.

j. **Unstable (reactive) chemical** shall mean any substance, other than one classified as an explosive or blasting agent, which will vigorously and energetically react, is potentially explosive, will polymerize, decompose instantaneously, undergo uncontrollable auto-reaction or can be exploded by heat, shock, pressure or combinations thereof. Examples are: organic peroxides, nitromethane, and ammonium nitrate.

Section 20.3. Permit Required.

a. A permit shall be required for the storage or handling of more than 55 gallons of corrosive liquids; or more than 500 pounds of oxidizing materials; or more than 10 pounds of organic peroxides; or more than 500 pounds of nitromethane; or 1,000 pounds or more of ammonium nitrate, ammonium nitrate fertilizers and fertilizer mixtures defined in section 20.10a or any amount of highly toxic material or poisonous gas.

b. A permit shall be required for the storage or handling at any installation of more than one microcurie of radium not contained in a sealed source; or more than one millicurie of radium or

other radioactive material in a sealed source or sources, or any amount of radioactive material for which a specific license from the United States Atomic Energy Commission is required so as to be reasonably safe to persons and property. Evidence that a specific license for the radioactive material has been obtained from the United States Atomic Energy Commission in accordance with the applicable standard specified for this section 20.3 b in article 31 of this Fire Prevention Code shall be evidence that such license represents reasonable procedure for safety to persons and property.

c. Before authorizing the issuance of any permit, the Chief of the Bureau of Fire Prevention may require the applicant to submit in writing one or more of the following:

(1) A report from an approved testing laboratory setting forth the physical and chemical properties of the chemical in question, whenever such properties are not readily available in published references or from other recognized sources.

(2) Evidence that the manner of manufacture, processing, storage, use or transportation of the hazardous chemicals in question is in accordance with nationally recognized safe practices and that no undue hazard to life or property is involved.

(3) Qualification, experience and knowledge of the person who is to supervise the operations involving the particular material.

Reports concerning materials or processes may be marked for the confidential information of the Chief of the Bureau of Fire Prevention, who shall use the data contained therein to evaluate the fire and explosion hazard.

Section 20.4. General Requirements.

a. The manufacture, storage, handling and use of hazardous chemicals shall be safeguarded with such protective facilities as public safety requires.

b. The Chief of the Bureau of Fire Prevention may require the separation, or isolation of any chemical that in combination with other substances may bring about a fire or explosion or may liberate a flammable or poisonous gas. The Chief of the Bureau of Fire Prevention may require separation from other storage facilities, dwellings, places of assembly, educational occupancies, railroads and public highways, when the quantity stored constitutes a material hazard. Limitations on storable quantities shall be con-

sidered with regard to proximity of these exposures and congested commercial and industrial districts.

c. Defective containers which permit leakage or spillage shall be disposed of or repaired, in accordance with recognized safe practices; no spilled materials shall be allowed to accumulate on floors or shelves.

d. Where kept for retail sale in containers or packages usual to the retail trade, storage shall be neat and orderly and shelves shall be of substantial construction.

Section 20.5. Oxidizing Materials.

Packaged oxidizing materials shall be stored in dry locations and separated from stored organic and other combustible materials. Bulk oxidizing materials shall not be stored on or against wooden surfaces.

Section 20.6. Radioactive Materials.

a. Durable, clearly visible signs warning of radiation dangers shall be placed at all entrances to areas or rooms where radioactive materials are used or stored. In addition, each container in which radioactive materials are used, stored, or transported shall bear a durable, clearly visible, appropriate warning sign. Such signs shall be posted to provide reasonable safety to persons and property. Evidence that such signs are in accordance with the applicable standard specified for this section 20.6a in article 31 of this Fire Prevention Code shall be evidence that such signs provide reasonable safety to persons and property.

b. Signs are not required for storage of manufactured articles other than liquids, such as instruments or clock dials or electronic tubes or apparatus of which radioactive materials are a component part, and luminous compounds, when securely packed in strong containers, provided the gamma radiation at any surface of the package is less than 10 milliroentgen in 24 hours.

c. When not in use, radioactive materials shall be kept in adequately shielded fire-resistant containers of such design that the gamma radiation will not exceed 200 milliroentgens per hour or equivalent at any point of readily accessible surface.

Section 20.7. Unstable (Reactive) Chemicals.

a. Storage location for unstable chemicals, such as organic peroxides, nitromethane and ammonium nitrate shall be subject to approval by the Chief of the Bureau of Fire Prevention with respect to nearness to dwellings, places of assembly, educational occupancies, institutional occupancies, railroads and public highways. Limitations on storable quantities shall be considered with regard to proximity of these exposures and congested commercial or industrial districts.

b. Unstable chemicals shall be stored away from all incompatible chemicals and contaminating and sensitizing materials. Such chemicals shall be kept away from all heat-producing appliances and electrical devices and shall be protected from external heat, fire and explosion. Unstable reactive chemicals shall not be stored in the same building with or in close proximity to explosives and blasting agents except that ammonium nitrate may be stored with explosives and blasting agents in accordance with article 12. Good housekeeping shall be maintained. Uncontaminated contents of broken or cracked bags, packages or other containers shall be transferred to new and clean containers before storing. Other spilled materials and discarded containers shall be promptly gathered up and destroyed in an approved manner. All electric bulbs shall be equipped with guards to prevent breakage. Open lights or flames and smoking shall be prohibited in or near storage areas. Internal combustion motor vehicles or lift trucks shall not be parked or stored in the room or compartment where such chemicals are located.

c. Unstable chemicals that are unstable (reactive) liquids, such as organic peroxides and nitromethane shall in addition to complying with the applicable provisions of this article 20 shall comply with the applicable provisions of division II of article 16.

Section 20.8. Organic Peroxides.

a. Organic peroxide storage shall comply with section 20.7 and this section 20.8.

b. Organic peroxides of 50 pounds or more shall be stored in a detached, well isolated ventilated and unheated storage building constructed of materials having a fire resistance rating of not

less than two hours with a noncombustible floor and a light weight insulated roof. If not adequately protected by a fast-acting deluge type automatic sprinkler system, the storage building shall be located the following minimum distances from flammable liquid storage, combustible materials in the open and from any other building or highway:

Weight of Organic Peroxide Pounds	Distance Feet
50 to 100	75
100 to 500	100
500 to 1000	125
1000 to 3000	200
3000 to 5000	300

c. Stock supplies stored inside production buildings shall be limited to 50 pounds at any one time.

d. The organic peroxides shall be stored in the original shipping containers (I.C.C. containers). Care shall be taken to avoid rough handling or contamination of these chemicals. Readily legible warning signs and placards shall be prominently placed in the storage and processing areas.

Section 20.9. Nitromethane.

a. Nitromethane storage shall comply with section 20.7 and this section 20.9.

b. Nitromethane storage shall be in a suitable isolated outdoor area with no hazardous processing in the vicinity of the storage area.

c. Nitromethane shall be stored in the drums in which it is received or in an underground tank with suitable corrosion protection and a minimum of 2 feet of earth over the tank or in barricaded tanks above-ground. If the drum storage is not adequately protected by a fast-acting deluge type automatic sprinkler system, the storage of 2,000 pounds or more shall be located the following minimum distances from inhabited buildings:

Weight			Approximate Number	
Pounds over		Pounds not over	of Drums	Distance Feet
Beginning	at	2,000	4	100
2,000	to	10,000	20	200
10,000	to	20,000	40	300
20,000	to	40,000	80	400
40,000	to	80,000	160	500

d. Care shall be taken to avoid rough handling or contamination of this chemical. Readily legible warning signs and placards shall be prominently placed in the storage and processing areas.

Section 20.10. Ammonium Nitrate.

a. Ammonium nitrate in the form of crystals, flakes, grains or prills shall include technical grade, fertilizer grade as determined by applicable test procedures and apparatus specified for this section 20.10a in article 31 of this Fire Prevention Code, nitrous oxide grade, dynamite grade, and other mixtures containing 60% or more ammonium nitrate; but shall not include blasting agents.

b. Ammonium nitrate storage shall comply with section 20.7 and this section 20.10.

c. Ammonium nitrate storage areas shall be separated by a space of 30 feet, with sills or curbs, or by approved type walls of not less than one hour fire-resistance rating, from stocks of organic chemicals, corrosive liquids, flammable compressed gases, flammable and combustible materials, such as coal, sawdust, charcoal, or flour where storage of such materials is permitted with ammonium nitrate. Walls referred to in this section 20.10 c need extend only to the underside of the roof. All flooring in storage and handling areas shall be of noncombustible material and shall be without drains, traps, pits or pockets into which any molten ammonium nitrate could flow and be confined in event of fire.

d. Sulphur and finely divided metals, explosives and blasting agents shall not be stored in the same building with ammonium nitrate except when stored so as to be reasonably safe to persons and property. Evidence that sulphur and finely divided metals, explosives and blasting agents when stored with ammonium nitrate are in accordance with the applicable standard specified for this section 20.10 d in article 31 of the Fire Prevention Code shall be

evidence that such storage is reasonably safe to persons and property.

e. Ammonium nitrate shall not be accepted for storage where the temperature of the product exceeds 130°F.

f. In areas where lightning storms are prevalent, approved lightning protection shall be provided.

g. BAGGED STORAGE:

(1) Bagged ammonium nitrate exceeding 60 tons total weight shall be stored in a well-ventilated building of fire-resistive or noncombustible construction or in buildings of other types of construction equipped with an approved automatic sprinkler system.

(2) Quantities of 2500 tons or more shall be stored in well-ventilated buildings of fire-resistive or noncombustible construction equipped with an approved automatic sprinkler system.

(3) Sprinkler protection shall be required for the storage of less than 2500 tons of ammonium nitrate where the location of the storage building or industrial occupancy or the presence of other stored materials may present a special hazard.

(4) Each storage pile of bags or other authorized packages and containers of such materials shall not exceed 20 feet in width and 50 feet in length. The length is not limited if the building is of fire-resistive or noncombustible construction or sprinkler protected. For pile heights exceeding 15 feet, a hydraulically engineered sprinkler system shall be required. Such pile units shall be separated by a clear space of not less than 36 inches in width from the base to the top of the piles, serving as cross-aisles. At least one service or main aisle in the storage area shall be not less than 4 feet in width. A clearance of not less than 30 inches shall be maintained from building walls and partitions and of not less than 36 inches from ceilings or roof structural members with a minimum of 18 inches from sprinklers.

(5) Automatic sprinkler systems, when required by section 20.10 g shall provide reasonable safety to persons and property. Evidence that automatic sprinkler systems have been designed and installed in accordance with applicable standard specified for this section 20.10 g(5) in article 31 of

this Fire Prevention Code shall be evidence that such automatic sprinkler systems provide reasonable safety to persons and property.

h. BULK STORAGE:

(1) Bulk storage of various grades of ammonium nitrate, which are described in section 20.10a, shall be permitted only after due consideration has been given to location in regard to heavily populated and built up centers, including marine terminals and other waterfront facilities, and after specific approval by the Chief of the Bureau of Fire Prevention.

(2) Ammonium nitrate shall be stored in an isolated location; when outdoors in covered open piles; or in bins in warehouses, away from incompatible materials, or in silo-type or other detached outdoor enclosed structures. Such storage facilities shall be well-ventilated.

(3) Height or depth of pile shall be limited by the pressure setting tendency of the product. The range of humidity and temperature changes, and the pellet quality of the product in the storage space shall be considered in determining the pressure setting tendency. Temperature cycles through 90°F. and high atmospheric humidity shall be considered undesirable for storage in depth. Pile height shall be at least 36 inches below ceilings or roof structural members with a minimum of 18 inches from sprinklers and shall be so sized and arranged that all material is moved out periodically.

(4) Galvanized iron, copper, lead and zinc shall not be used in bin structure unless suitably protected. Wooden bins or aluminum bins protected against impregnation by ammonium nitrate may be permitted. Bins and storage areas shall be clear and free of materials which may contaminate ammonium nitrate. Suitable provisions shall be made to prevent conveyor-system lubricants from dripping onto storage areas.

(5) If a facility in a permitted location provides a low hazard exposure through isolation, it may be considered acceptable without sprinkler protection when all other fire protection safeguards are met.

(6) Dynamite, other explosives and blasting agents shall not be used to break up or loosen caked ammonium nitrate.

ammonium nitrate dust.

j. Exposed ignition sources, such as [illegible], flames, and smoking shall be prohibited at all storage and bulk handling facilities.

J. All internal combustion motor vehicles, lift trucks, tractors, and other specialized bulk-handling and cargo-conveying equipment shall not be permitted to remain overnight in a building where ammonium nitrate is stored, unless parked in an area approved exclusively for such parking purposes. All such vehicles shall be refueled in a safe outside location.

K. All points of entry to commercial warehouses storing ammonium nitrate shall be identified with a prominently displayed, durable sign worded "Ammonium Nitrate," with letters at least 2 inches high in colors contrasting with the background, with a caution notice about open lights, flames, and smoking near such storage areas.

L. Ammonium nitrate shall be stored so as to be reasonably safe to persons and property. Evidence that ammonium nitrate has been stored in accordance with the applicable standard specified for this section 20.10 L in article 31 of this Fire Prevention Code shall be evidence that such ammonium nitrate storage is reasonably safe to persons and property.

M. Housekeeping and maintenance in all warehousing or storage facilities and marine terminals shall be regularly conducted to provide reasonable safety to persons and property. Evidence that housekeeping and maintenance in marine terminals has been conducted in accordance with the applicable standard specified for this section 20.10 M in article 31 of this Fire Prevention Code shall be evidence that such housekeeping and maintenance provide reasonable safety to persons and property.

Section 20.11. Highly Toxic Materials.

a. Highly toxic materials shall be separated from other chemicals and combustible and flammable substances by storage in a room or compartment separated from other areas by walls and floor and ceiling assemblies having a fire resistance rating of not less than one hour. The storage room shall be provided with adequate drainage facilities and natural or mechanical ventilation to the outside atmosphere.

b. Legible warning signs and placards stating the nature and location of the highly toxic materials shall be posted at all entrances to areas where such materials are stored or used.

Section 20.12. Poisonous Gases.

a. Storage of poisonous gases shall be in rooms of at least one-hour fire-resistant construction and having natural or mechanical ventilation adequate to remove leaking gas. Such ventilation shall not discharge to a point where the gases may endanger any person.

b. Legible warning signs stating the nature of hazard shall be placed at all entrances to locations where poisonous gases are stored or used.

Section 20.13. Corrosive Liquids.

Satisfactory provisions shall be made for containing and neutralizing or safely flushing away leakage of corrosive liquids which may occur during storage or handling.

ARTICLE 21

LIQUEFIED PETROLEUM GASES

Section 21.1. Scope.

This article shall apply to all storage and handling of liquefied petroleum gas and the installation of all equipment pertinent to systems for such uses.

Section 21.2. Definitions.

a. **Liquefied petroleum gas** shall mean any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them: propane, propylene, butane (normal butane or iso-butane) and butylenes.

b. **Liquefied petroleum gas equipment** shall mean all containers, apparatus, piping (not including utility distribution piping systems), and equipment pertinent to the storage and handling of liquefied petroleum gas. Gas consuming appliances shall not be considered as being liquefied petroleum gas equipment.

Section 21.3. Permits and Reports of Installations.

a. A permit shall be obtained for each installation of liquefied petroleum gas employing a container or an aggregate of interconnected containers of over 2,000 gallons water capacity, and for each permanent installation, irrespective of size of containers, made at buildings in which people congregate for civic, political, educational, religious, social or recreational purposes. Such buildings shall include schools, churches, hospitals, institutions, hotels, and restaurants, each having a capacity of 20 or more persons.

b. Where the nature of adjoining occupancy, proximity of adjacent buildings or unusual conditions indicate the need, the Chief of the Bureau of Fire Prevention may require the submittal of plans to the Bureau of Fire Prevention prior to making the installation and if compliance with the requirements of this code is shown by said plans, a permit shall be issued.

c. Installers shall maintain a record of all installations for which a permit is not required by section 21.3a (but not including installation of gas burning appliances and replacing of portable cylinders) and have it available for inspection by the Bureau of Fire Prevention.

Section 21.4. Inspection of Installations.

It shall be the duty of the Bureau of Fire Prevention to inspect a reasonable number of liquefied petroleum gas installations to determine if the provisions of this article are being complied with.

Section 21.5. Installation of Equipment.

All installations of liquefied petroleum gas equipment including such equipment installed at utility gas plants, shall be reasonably safe to persons and property. Liquefied petroleum gas installations which conform to the applicable provisions of this code shall be deemed to be reasonably safe to persons and property; on matters not covered in this code or in other laws or regulations legally in effect, conformity of liquefied petroleum gas installations to the applicable standards specified for this section 21.5 in article 31 of this Fire Prevention Code shall be evidence that such liquefied petroleum gas installations are reasonably safe to persons and property.

Section 21.6. Location of Containers.

a. Within the limits established by law restricting the bulk storage of liquefied petroleum gas for the protection of heavily populated or congested commercial areas, the aggregate capacity of any one installation shall not exceed 2,000 gallons water capacity; except that in particular installations this capacity limit may be altered at the discretion of the Chief of the Bureau of Fire Prevention after consideration of special features such as topographical conditions, nature of occupancy and proximity to buildings, capacity of proposed tanks, degree of private fire protection to be provided, and facilities of the local fire department.

b. Multiple container installations with a total storage water capacity of more than 180,000 gallons (approximately 150,000 gallons LP-Gas cacapity) shall be subdivided into groups containing not more than 180,000 gallons in each group. Such groups shall be separated by a distance of not less than 50 feet, unless the tanks are (1) buried or mounded in an approved manner, or (2) protected with approved insulation on such areas that may be subject to impingement of ignited gas from pipelines or other leakage or (3) protected by fire walls of approved construction, or (4) protected by an approved system for application of water, or (5) protected by other approved means. Where one of these forms of

protection is provided, the separation shall not be less than 25 feet between such container groups.

Section 21.7. Pressures Inside Buildings.

a. Gas for fuel purposes in either the liquid or vapor phase shall not be piped into any building at pressures in excess of 20 psig except as follows:

(1) Buildings used exclusively to house equipment for vaporization, pressure reduction, gas mixing, gas manufacturing or distribution.

(2) Buildings, or portions of buildings separated from other portions by walls, partitions, and floor and ceiling assemblies of noncombustible material having a fire resistance rating of not less than 2 hours, used exclusively to house internal combustion engines or industrial processes.

(3) Buildings, or portions of buildings separated from other portions by walls, partitions, and floor and ceiling assemblies of noncombustible material having a fire resistance rating of not less than 2 hours, used exclusively for research and experimental laboratories.

(4) Buildings, structures, or equipment under construction or repair.

b. Portable containers shall not be taken into buildings except as provided in section 21.8.

Section 21.8. Containers Inside Buildings.

a. Containers and first stage regulating equipment shall be located outside of buildings other than buildings especially provided for this purpose, except containers and regulating equipment may be used indoors under the following conditions:

(1) If temporarily used for demonstration purposes and the container has a maximum water capacity of 12 pounds.

(2) If used with a completely self-contained gas hand torch or similar equipment, and the container has a maximum water capacity of 2½ pounds.

(3) In industrial applications where oxygen is not required.

(4) In use as a motor fuel.

(5) In storage awaiting use or resale.

Section 21.9. Marking Cargo Vehicles.

Every tank vehicle used for the transportation of liquefied petroleum gas shall be marked on each side and rear, thereof, on a sharply contrasting background, with FLAMMABLE COMPRESSED GAS or FLAMMABLE GAS in block letters at least three inches high, and in block letters at least two inches high, LIQUEFIED PETROLEUM GAS, or BUTANE or PROPANE as appropriate.

Section 21.10. Parking and Garaging.

The parking and garaging of tank vehicles used for the transportation of liquefied petroleum gases shall be in accordance with section 16.1015.

Section 21.11. Marine and Pipeline Terminals, Natural-Gasoline Plants, Refineries, and Tank Farms.

Liquefied petroleum gas installations at marine and pipeline terminals, natural-gasoline plants, refineries and tank farms shall be designed and installed so as to be reasonably safe to persons and property. Evidence that liquefied petroleum gas installations at marine and pipeline terminals, natural gasoline plants, refineries, and tank farms, have been designed and installed in accordance with the applicable standard specified for this section 21.11 in article 31 of this Fire Prevention Code shall be evidence that such liquefied petroleum gas installations are reasonably safe to persons and property.

ARTICLE 22

LUMBER YARDS AND WOODWORKING PLANTS

Section 22.1. Permit Required.

A person shall not store in excess of 100,000 board feet of lumber without a permit.

Section 22.2. Open Yard Storage.

a. Lumber shall be piled with due regard to stability of piles and in no case higher than 20 feet.

b. Driveways between and around lumber piles shall be at least 15 feet wide and maintained free from accumulation of rubbish, equipment or other articles or materials. Driveways shall be so spaced that a maximum grid system unit of 50 feet by 150 feet is produced.

c. Permanent lumber storage, operating under a permit, shall be surrounded with a suitable fence at least 6 feet high, unless storage is within a building.

Section 22.3. Operational Fire Hazard in Lumber Yards.

a. The burning of shavings, sawdust and refuse materials shall be permitted only under boilers, in furnaces, or in incinerators or refuse burners safely constructed and located. Stacks shall be provided with approved spark arresters having openings not greater than ¾-inch, or other effective means provided which will eliminate the danger from sparks, such as an expansion chamber, baffle walls or other effective arrangement. At boiler or other points where sawdust or shavings are used as fuel, a storage bin of noncombustible construction with raised sill, shall be provided.

b. Smoking shall be prohibited except in specified safe locations in buildings. Large "No Smoking" signs shall be painted on exterior building walls and on signs, erected at driveways' edges. "No Smoking" signs shall be posted throughout all buildings except in specific locations designated as safe for smoking purposes.

c. Weeds shall be kept down throughout entire yard and shall be sprayed as often as needed with a satisfactory weed killer or cut or grubbed out. Dead weeds shall be removed.

d. Debris such as sawdust, chips and shorts shall be removed regularly from piling areas and not less frequently than once a year. Proper housekeeping shall be maintained at all times.

Section 22.4. Fire Control in Open Yards and Buildings.

Portable fire extinguishing equipment suitable for the fire hazard involved shall be provided at convenient conspicuous accessible locations in open yards. When used, approved Class A portable fire extinguishers, properly protected against freezing where necessary, shall be provided so that the travel distance to the nearest unit does not exceed 75 feet. In buildings, fire extinguishing equipment shall be provided as specified by the Chief of the Bureau of Fire Prevention.

Section 22.5. Woodworking Plants.

a. Sawmills, planning mills and other woodworking plants shall be equipped with refuse removal systems which will collect and remove sawdust and shavings as produced; or suitable metal or metal-lined bins, provided with normally closed covers or automatically closing covers, shall be installed at or near such machines, and shavings and sawdust shall be swept up and deposited in such bins at sufficiently frequent intervals as to keep the premises clean. Blower and exhaust systems shall be installed so as to be reasonably safe to persons and property. Evidence that blower and exhaust systems have been installed in accordance with the applicable standard specified for this section 22.5a in article 31 of this Fire Prevention Code shall be evidence that such blower and exhaust systems are reasonably safe to persons and property.

b. Fire fighting equipment, either portable fire appliances or small hose supplied from a suitable water system, shall be provided near any machine producing shavings or sawdust.

c. Woodworking plants shall be reasonably safe to persons and property. Woodworking plants which conform to the applicable provisions of this code shall be deemed to be reasonably safe to persons and property; on matters not covered in this code, conformity of woodworking plants to the applicable standard specified for this section 22.5 c in article 31 of this Fire Prevention Code shall be evidence that such plants are reasonably safe to persons and property.

ARTICLE 23

MAGNESIUM

Section 23.1. Scope.

This article applies to the storage, handling and processing of magnesium.

Section 23.2. Definition.

Magnesium shall mean the pure metal and alloys of which the major part is magnesium.

Section 23.3. Permit Required.

A permit shall be obtained for the melting, casting, heat treating, machining, or grinding, of more than 10 pounds of magnesium per working day.

Section 23.4. Storage of Pigs, Ingots and Billets.

a. Storage of magnesium pigs, ingots and billets out of doors shall be in piles not exceeding 1,000,000 pounds each, separated by aisles not less in width than ½ the height of pile, and separated from combustible material or buildings on the same or adjoining property by a distance of not less than the height of the nearest pile.

b. Storage of pigs, ingots and billets in buildings shall be on floors of noncombustible construction, in piles not larger than 500,000 pounds each, separated by aisles not less in width than ½ the height of the pile.

Section 23.5. Melting Pots.

Floors under and around melting pots shall be of noncombustible construction.

Section 23.6. Storage of Magnesium Articles in Foundries and Processing Plants.

The size of storage piles of magnesium articles in foundries and processing plants shall not exceed 1,250 cubic feet and shall be separated by aisles not less in width than one-half the height of pile.

Section 23.7. Heat Treating Ovens.

Approved means shall be provided for control of magnesium fires in heat treating ovens.

Section 23.8. Magnesium Processing Operations.

a. At each grinding, buffing or wire brushing operation on magnesium, not including rough finishing of castings, dust shall be collected by means of suitable hoods or enclosures connected to a liquid precipitation type of separator, such that the dust will be converted to sludge without contact in a dry state with any high speed moving parts.

b. Connecting ducts or suction tubes shall be completely grounded and as short as possible, with no unnecessary bends. Ducts shall be carefully fabricated and assembled, with a smooth interior and with internal lap joints pointing in the direction of air flow, and without unused capped side outlets, pockets or other dead-end spaces which might allow an accumulation of dust.

c. Each machine shall be equipped with its individual dust separating unit, except that with multi-unit machines not more than two dust-producing units may be served by one separator. Not more than four portable dust-producing units in a single enclosure or stand may be served by one separator unit.

Section 23.9. Fire Control.

A supply of approved extinguishing powder in a substantial container with a hand scoop or shovel for applying powder on magnesium fires or an approved extinguisher unit designed for use with such powder shall be kept within easy reach of every operator performing a machining, grinding or other processing operation on magnesium.

Section 23.10. Storage of Magnesium Articles in Warehouses and Stores.

a. Magnesium storage in quantity greater than 50 cubic feet shall be separated from storage of other materials that are either combustible or in combustible containers, by aisles equal in width to not less than the height of the piles of magnesium.

b. Magnesium storage in quantity greater than 1,000 cubic feet shall be separated into piles each not larger than 1,000 cubic feet with aisles between equal in width to not less than the height of the piles.

c. Where storage in quantity greater than 1,000 cubic feet is in a building of combustible construction, or the magnesium is packed in combustible crates or cartons, or there is other combustible storage within 30 feet of the magnesium, the storage area shall be protected by automatic sprinklers.

Section 23.11. Handling of Magnesium Fines (Fine Magnesium Scrap).

a. Chips, turnings and other fine magnesium scrap shall be collected from the pans or spaces under machines and from other places where they collect at least once each working day, and placed in a covered, vented steel container and removed to a safe location.

b. Magnesium fines shall be kept separate from other combustible materials.

c. Storage in quantity greater than 50 cubic feet of fine magnesium scrap (six 55-gallon steel drums) shall be separated from other occupancies by five-resistive construction without window openings or by an open space of at least 50 feet.

d. Storage in quantity greater than 1,000 cubic feet shall be separated from all buildings other than those used for magnesium scrap recovery operations by a distance of not less than 100 feet.

ARTICLE 24

OIL BURNING EQUIPMENT

Section 24.1. Scope.

This article applies to oil burning equipment except combustion engines, oil lamps, and portable devices such as blow torches, melting pots, and weed burners.

Section 24.2. Definitions.

a. **Conversion range oil burner** shall mean an oil burner designed to burn kerosene, range oil or similar fuel. This burner is intended primarily for installation only in a stove or range, a portion or all of which originally was designed for the utilization of solid fuel and which is flue-connected.

b. **Fuel oil** shall mean kerosene or any hydrocarbon oil specified for this section 24.2 b in article 31 of this Fire Prevention Code and having a flash point not less than 100°F.

c. **Heating and cooking appliance** shall mean an oil-fired appliance not intended for central heating. These appliances include kerosene stoves, oil stoves, and conversion range oil burners.

d. **Oil Burner** shall mean a device for burning oil in heating appliances such as boilers, furnaces, water heaters, ranges and the like. A burner of this type may be furnished with or without a primary safety control; and it may be a pressure atomizing gun type, a horizontal or vertical rotary type, or a mechanical or natural draft vaporizing type.

e. **Oil burning equipment** shall mean an oil burner of any type together with its tank, piping, wiring, controls and related devices and shall include all oil burners, oil-fired units, and heating and cooking appliances but exclude those exempted by section 24.1.

f. **Oil-fired unit** shall mean a heating appliance equipped with one or more oil burners and all the necessary safety controls, electrical equipment and related equipment manufactured for assembly as a complete unit. This definition does not include kerosene stoves or oil stoves.

Section 24.3. Permit Required.

A single permit shall be required for the initial installation of

an oil burner and a fuel oil tank used in connection therewith that is in excess of 25 gallons in a building or in excess of 60 gallons outside of a building. A separate permit shall be required for the replacement of either the oil burner or a fuel oil tank connected to an oil burner.

Section 24.4. Use of Approved Equipment.

Oil burning equipment shall be of approved type.

Section 24.5. General Installation Requirements.

a. The installation shall be made in accordance with the instructions of the manufacturer.

b. The installation shall be such as to provide reasonable accessibility for cleaning heating surfaces, removing burners, replacing motors, controls, air filters, draft regulators and other working parts and for adjusting, cleaning and lubricating parts requiring such attention.

c. After installation of the oil burning equipment, operation tests shall be conducted to make certain that the burner is operating in a safe and acceptable manner and that all safety devices function properly.

Section 24.6 Fuel Oil.

The grade of fuel oil used in a burner shall be that for which the burner is approved and as stipulated by the manufacturer. Crankcase oil or any oil containing gasoline shall not be used.

Section 24.7. Design, Construction and Installation of Fuel Oil Tanks.

a. The design and construction of fuel oil tanks shall comply with section 16.21, except as provided in sections 24.8 b through 24.8 e.

b. An outside aboveground tank not larger than 60 gallons capacity may be an ICC-5 Shipping Container (drum) and so marked or may be an approved safety can.

c. Section 16.21 d shall not apply to the construction of fuel oil tanks.

d. Atmospheric aboveground tanks built according to Underwriters Laboratories, Inc. standards in section 16.21 c(1) shall be limited to 2.5 psig under emergency venting conditions.

e. If pressure tanks built according to section 16.21 e are larger than 550 gallons or are to be buried underground, all openings in such tanks shall be located above the highest normal liquid level.

f. The installation of fuel oil tanks shall comply, where applicable, with sections 16.22 through 16.28 except as provided in sections 24.9 g through 24.9 m.

g. An unenclosed inside fuel oil supply tank shall have a capacity of not more than 550 gallons. Not more than one 550 gallon tank or two tanks of aggregate capacity of 550 gallons or less shall be connected to one oil burning appliance and the aggregate capacity of such tanks installed in the lowest story, cellar or basement of a building shall not exceed 1100 gallons unless separation is provided for each 550 gallons of tank capacity. Such separation shall consist of an unpierced masonry wall or partition extending from the lowest floor to the ceiling above the tank or tanks and shall have a fire resistance rating of not less than 2 hours.

h. A supply tank larger than 550 gallons capacity shall be enclosed when installed inside of a building as follows:

(1) The nominal gross capacity of enclosed tanks inside a building shall not exceed:

[a] 10,000 gallons in buildings of other than fire resistive construction.

[b] 15,000 gallons in buildings of fire-resistive construction,

[c] 50,000 gallons with an individual tank capacity not exceeding 25,000 gallons in any building; provided that the tank or tanks, enclosed as specified in section 24.9 h(4), and in addition are located in a room cut off vertically and horizontally from other portions of the main building by noncombustible construction having a fire-resistance rating of two hours.

(2) The tank shall be supported at least four inches above the floor by masonry saddles at least 12 inches thick, spaced not more than eight feet on centers and extending the full width of the tank.

(3) All connections to an enclosed supply tank having a capacity of more than 550 gallons shall be made through the top of the tank, and the transfer of oil shall be by pump only and through continuous piping to and from the consuming appliances.

(4) The walls of tank enclosures shall be constructed of solid masonry units or poured concrete construction having a fire-resistance rating of not less than three hours and bonded to the floor. The floor shall be of concrete or other fire-resistive construction. The top shall be of reinforced concrete at least five inches thick or equivalent fire-resistive construction, except that where the floor or roof construction above the enclosure is concrete or other fire-resistive construction, the walls may be extended to and bonded to the underside of the construction above in lieu of a separate top. At least 15 inches clearance shall be left around the tank for the purpose of inspection and repair.

(5) Each tank enclosure shall be provided with an approved self-closing fire door and a noncombustible liquid tight sill or ramp at least six inches high. If the sill or ramp is more than six inches high, the walls to a height corresponding to the level of oil that will be retained shall be built to withstand the lateral pressure due to the liquid head.

i. Stoves which are designed for barometric feed shall not be connected to separate oil supply tanks.

j. Non flue connected stoves shall be equipped with integral tanks of capacity not more than 2 gallons.

k. Gravity oil supply tanks installed in conversion range oil burners shall not exceed one 6 gallon metal tank or two 3 gallon glass bottles.

l. Supply or storage tanks located above the lowest story, cellar or basement shall not exceed 60 gallons capacity and the total capacity of tanks so located shall not exceed 60 gallons.

m. Oil supply tanks other than those furnished as an integral part of the stove or range shall not be located within 5 feet, hori-

zontally, of any fire or flame; except that tanks not over 6 gallons capacity may be within this distance but not within 2 feet of the stove or range in which the burner is installed, provided the temperature rise of the oil supply at this distance is not excessive when the burner is operated at full capacity.

Section 24.9. Piping Materials and Design.

a. All piping shall be wrought iron, steel, or brass pipe, or brass or copper tubing. Aluminum tubing shall not be used between the fuel oil tank and the burner unit. Wall thicknesses of pipe shall be such that they are reasonably safe to persons and property. Evidence that wall thicknesses of pipe are in accordance with the applicable standard specified for this section 24.9a in article 31 of this Fire Prevention Code shall be evidence that such wall thicknesses are reasonably safe to persons and property. Approved flexible metal hose may be used to reduce the effect of jarring and vibration or where rigid connections are impracticable and shall be installed in full compliance with its approval.

b. Piping used in the installation of oil burners and appliances other than conversion range oil burners shall be not smaller than ⅜ inch iron pipe size or ⅜ inch OD tubing. Copper or brass tubing shall have 0.035 inch nominal and 0.032 inch minimum wall thickness.

c. Piping between conversion range oil burners and tanks shall be standard steel, wrought iron or brass pipe not smaller than ¼ inch in size of brass or copper tubing not less than 5/16 inch OD with a wall thickness not less than 0.049 inch.

d. Pipe shall be connected with standard fittings and tubing with fittings of approved type. Connectors shall not be used inside of buildings or aboveground outside of buildings. If used belowground outside of buildings, connectors shall be of approved type and installed in accordance with their approval. All threaded joints and connections shall be made tight with suitable lubricant or pipe compound. Unions requiring gaskets or packing, right and left couplings, and sweat fittings employing solder having a melting point of less than 1000°F. shall not be used in oil lines. Cast iron fittings shall not be used.

e. Piping shall be substantially supported and protected against physical damage and where necessary protected against

corrosion. All buried piping except copper piping shall be protected against corrosion.

f. Proper allowance shall be made for expansion, contraction, jarring and vibration. Pipe lines, other than tubing, connected to underground tanks, except straight fill lines and test wells, shall be provided with double swing joints arranged to permit the tanks to settle without impairing the tightness of the pipe connections.

Section 24.10. Fill and Return Piping.

a. A fill pipe on a tank larger than 60 gallons shall terminate outside of a building at least two feet from any building opening. Every fill terminal shall be equipped with a tight metal cover.

b. A return line from a burner or pump to a supply tank shall enter the top of the tank.

c. An auxiliary tank installed in the supply piping between a burner and its main fuel supply tank shall be filled by pumping from storage tanks.

Section 24.11. Supply Connections.

a. All piping, except the burner supply line from a tank having a capacity not over 550 gallons and the cross connection between two such tanks having an aggregate capacity of 550 gallons or less, shall be connected into the top of the supply tank.

b. The burner supply connection to tank or tanks having a capacity of more than 550 gallons shall be connected to the top of the tank except in commercial and industrial installations the burner supply connection may be below the liquid level but each such connection shall be provided with an internal or external shutoff valve located as close as practicable to the shell of the tank. External valves and their connections to the tank shall be of steel.

c. A transfer pump may be used to deliver oil from a supply tank to a burner or to an auxiliary tank. Except in commercial, industrial or centralized oil distribution installations, such a pump shall be connected to tankage having a capacity of not more than 550 gallons or to two tanks having an aggregate capacity of not over 550 gallons.

d. The pressure at the oil supply inlet to an appliance shall not be greater than 3 psi.

e. Where supply tanks are set below the level of the burner, the oil piping shall be so laid as to pitch toward the supply tank without traps.

f. Pressurized tank feed shall not be used.

g. All tanks in which a constant oil level is not maintained by an automatic pump shall be equipped with an approved method of determining the oil level.

Section 24.12. Vent Piping.

Vent pipes shall terminate outside of buildings not less than two feet measured vertically or horizontally from any window or other building opening. Vent terminals shall terminate in a weather-proof vent cap which shall have a minimum free open area equal to the cross-sectional area of the vent pipe. If the static head of the vent pipe filled with oil exceeds 10 psi, the tank shall be designed for the maximum static head which will be imposed.

Section 24.13. Oil Pumps.

a. An oil pump not a part of an approved burner shall be a positive displacement type which automatically shuts off the oil supply when stopped.

b. An automatic pump not an integral part of a burner shall be an approved type installed in full compliance with its approval.

Section 24.14. Valves.

a. Readily accessible manual shut-off valves shall be installed at each point where required to properly control the flow of fuel in normal operation and where required to avoid oil spillage during servicing. The valve shall be installed to close against the supply.

b. Where a shutoff is installed in the discharge line of an oil pump not an integral part of a burner, a pressure relief valve shall be connected into the discharge line between the pump and the shut-off valve and arranged to return surplus oil to the supply tank or to bypass it around the pump, unless the pump includes an internal bypass.

c. Where oil is supplied to a burner requiring uniform flow by gravity feed and a constant level valve is not incorporated in the burner assembly or the oil is not supplied by an automatic pump, a constant level valve shall be installed in the supply line at the gravity tank or as close thereto as practicable, to insure

uniform delivery of oil to the burner. The vent opening of such constant level valve shall be connected by piping or tubing to the outside of the building, unless the constant level valve is provided with an anti-flooding device. Vent piping or tubing of constant level valves shall not be connected to tanks or tank vents.

Section 24.15. Installation of Oil Burners and Oil-Fired Units.

a. Oil burners other than oil stoves with integral tanks, shall be provided with some means for manually stopping the flow of oil to the burner. Such device or devices shall be placed in a convenient location at a safe distance from the burner.

b. Oil burners for which a competent attendant will not be constantly on duty in the room where the burner is located while the burner is in operation shall be equipped with a primary safety control of a type specifically approved for the burner with which it is used. When primary safety controls are installed in connection with other oil burners such automatic devices shall be of a type specifically approved for use with the burner to which they are attached.

c. Each appliance fired by oil burners and each oil-fired unit shall be provided with automatic limit controls which will prevent unsafe pressure or low water in a steam boiler or overheating within a hot-water boiler, furnace or heater.

d. A water heater shall be provided with water pressure, temperature and vacuum relief devices. Means shall be provided to prevent siphoning in any boiler or tank to which any circulating water heater is attached.

E. In systems where either steam or air is used for atomizing the oil or where air for combustion is supplied by a source which may be interrupted without shutting off the oil supply, the oil and atomizing or air supply shall be interlocked in a manner to immediately shut off the oil supply upon failure of the atomizing or air supply.

F. When automatically-operated burners are used in installations equipped with forced or induced draft fans or both, means shall be provided to immediately shut off the oil supply upon fan failure.

G. Oil burners not equipped to provide safe automatic restarting after shut down shall require manual restarting after any control functions to extinguish the burner flame.

H. Oil-fired appliances shall be installed in rooms that are large compared with the size of the appliance except that an appliance specifically approved for installation in a confined space such as an alcove or closet may be so installed when the installation is in compliance with the approval. In alcove and closet installations, the clearances from the appliance to the walls and ceiling shall be not less than as specified in the approval, regardless of the type of construction.

I. Oil burning appliances shall be installed so as to be reasonably safe to persons and property. Evidence that oil burning appliances have been installed in accordance with the applicable standard specified for this section 24.15 in article 31 of this Fire Prevention Code shall be evidence that such oil burning appliances are reasonably safe to persons and property.

Section 24.16. Installation of Heating and Cooking Appliances.

a. Kerosene and oil stoves shall be equipped with a primary safety control furnished as an integral part of the appliance by the manufacturer to stop the flow of oil in the event of flame failure. Barometric oil feed shall not be considered a primary safety control.

b. A conversion range oil burner shall be equipped with a thermal (heat actuated) valve in the oil supply line, located in the burner compartment of the stove.

c. Small heating and cooking appliances shall be installed so as to be reasonably safe to persons and property. Evidence

that small heating and cooking appliances have been installed in accordance with the applicable standard specified for this section 24.16 c in article 31 of this Fire Prevention Code shall be evidence that such small heating and cooking appliances are reasonably safe to persons and property.

ARTICLE 25

ORGANIC COATINGS, MANUFACTURE OF

Section 25.1. Scope.

a. This article shall apply to (1) processes manufacturing protective and decorative finishes or coatings (paints) for industrial, automotive, marine, transportation, institutional, household or other purposes and (2) the handling of flammable and combustible liquids, certain combustible solids and potential dust explosion conditions.

b. This article shall not apply to (1) processes manufacturing nonflammable or water thinned coatings or (2) operations applying coating materials.

Section 25.2. Definition.

Organic coating shall mean a liquid mixture of binders such as alkyd, nitrocellulose, acrylic, or oil, and flammable and combustible solvents such as hydrocarbon, ester, ketone, or alcohol, which when spread in a thin film convert to a durable protective and decorative finish.

Section 25.3. Permit Required.

A permit shall be required for any organic coating manufacturing operation making more than one gallon of an organic coating on any working day.

Section 25.4. Location.

a. Each organic coating manufacturing operation within 50 feet of the line of adjoining property that may be built upon or public thoroughfare shall have the exposing wall constructed as indicated in the schedule below.

Distances in Feet from Line of Adjoining Property That May Be Built Upon or Public Thoroughfare	Construction of Exposing Wall Expressed in Terms of Fire Resistance Rating
Less than 10	at least 4 hours
10 to 30	at least 3 hours
Over 30 but less than 50	at least 2 hours

When approved automatic sprinkler systems are installed, a 50 per cent reduction in the distances to property lines and the fire resistance ratings of the exposing walls may be made.

b. An organic coating manufacturing operation shall not be located in the same building with other occupancies. Operations incidental to or in connection with organic coating manufacturing shall not be classed as "other occupancies" for the purpose of this provision.

c. An organic coating manufacturing operation shall be accessible from at least one side for the purpose of fire control.

d. Where topographical conditions are such that flammable and combustible liquids may flow from the organic coating manufacturing operation so as to constitute a fire hazard to properties of others, drainage facilities shall be provided in accordance with sections 25.6 h and 25.6 i.

Section 25.5. Storage of Raw Materials and Finished Products.

a. The storage, handling and use of flammable and combustible liquids shall be in accordance with division II and III of article 16.

b. Tank storage for flammable and combustible liquids inside of buildings shall be permitted only in storage areas at or above-grade which are detached from the processing area or cut off from the processing area by noncombustible construction having at least a two hour fire resistance rating and openings shall be equipped with approved fire doors. This is not intended to prevent processing equipment from containing flammable and combustible liquids or storage in such quantities as are essential to the continuity of operations.

c. Tank car and tank vehicle loading and unloading stations for Class I liquids shall be separated from the processing area, other plant buildings, nearest line of adjoining property that may be built upon or public thoroughfare by a clear distance of not less than 25 feet.

d. Loading and unloading structures and platforms for flammable and combustible liquids shall be designed and installed in accordance with section 16.54.

e. Tank cars for flammable liquids shall be unloaded so as to be reasonably safe to persons and property. Evidence that such tank cars have been unloaded in accordance with the applicable standard specified for this section 25.5 e in article 31 of this Fire Prevention Code shall be evidence that such tank car unloading is reasonably safe to persons and property.

f. Tank vehicles for flammable and combustible liquids shall be loaded and unloaded in accordance with division X of article 16.

g. Finished products that are flammable or combustible liquids shall be stored outside of buildings, in a separate building, or in a separate room cut off from the processing area by a noncombustible wall or partition having at least a two-hour fire resistance rating and openings shall be equipped with approved fire doors. The storage of finished products shall be in tanks or in closed containers in accordance with divisions II and III of article 16.

h. The nitrocellulose storage shall be in a separate building or in a room cut off by noncombustible construction having a fire resistance rating of at least two hours and openings shall be equipped with approved fire doors. The nitrocellulose storage shall be used for no other purpose.

i. Nitrocellulose shall be stored only in closed containers. Barrels shall be stored on end and, if tiered, not more than two high. Barrels or other containers of nitrocellulose shall not be opened in the main storage building but at the point of use or other location set aside for the purpose.

j. Spilled nitrocellulose shall be promptly wetted with water and disposed of by use or by burning in the open at a suitable detached location.

k. The storage of organic peroxides shall be in accordance with sections 20.7 and 20.8.

l. The size of the package containing the organic peroxide shall be selected so that, as nearly as practical, full packages are

utilized at one time. Any peroxide spilled shall be promptly cleaned up and disposed of as recommended by the supplier.

Section 25.6. Process Buildings.

a. Buildings shall be of fire resistive or noncombustible construction without load bearing walls and without basements or pits. The first floor shall be at or above grade.

b. Raw material and finished stock storage buildings shall be limited to one story in height and either detached or cut off from manufacturing buildings by noncombustible construction having a fire-resistance rating of at least two hours and openings shall be equipped with approved fire doors.

c. Stairway enclosures and structures housing elevators shall be enclosed by noncombustible walls having a fire-resistance rating of at least two hours, and be equipped with approved fire doors.

d. Each manufacturing room shall have at least two exits, well separated, one of which shall be directly to the outside. Access to all exits shall be kept clear and doors shall open in the direction of travel. Door fastenings shall be of the safety release type. Supervisory management offices, change and locker rooms located in manufacturing buildings shall be provided with adequate exits.

e. Structures in which Class I liquids or finely divided flammable solids are processed shall be provided with explosion venting.

f. Enclosed buildings in which Class I liquids are processed or handled shall be ventilated at a rate of not less than ½ cubic foot per minute per square foot of solid floor area. This shall be accomplished by exhaust fans preferably taking suction at floor levels, and discharging to a safe location outside the building. Provision shall be made for introduction of noncontaminated intake air in such a manner that all portions of solid floor areas will be subject to continuous uniformly distributed movement of air.

g. Heating in hazardous areas, if required, shall be provided by indirect means. Ignition sources such as open flames, or electrical heating elements, except as provided in section 25.11 shall not be used within the building.

h. Drainage facilities shall be provided to direct flammable and combustible liquid leakage and fire protection water to a safe location away from the building, any other important value, or adjoining property.

i. Emergency drainage systems containing flammable and combustible liquids connected to public sewers or discharging into public waterways shall be equipped with traps or separator tanks.

Section 25.7. Process Mills, Mixers, and Kettles.

a. Mills operating with close clearances and used for the processing of flammable and heat sensitive materials, such as nitrocellulose, shall be located in a detached building or in a noncombustible structure without other occupancy. The amount of nitrocellulose or other flammable material brought into the area shall be no more than that required for a batch.

b. Mixers shall be of the enclosed type or, if of the open type shall be provided with properly fitted covers. Where gravity flow is used, a shutoff valve shall be installed as close as practical to the mixer and a control valve shall be provided near the end of the fill pipe.

c. Open kettles sha be located in an outside area, provided with a protective roof or in a separate building or noncombustible construction or separated from other areas by means of a noncombustible wall or partition having a fire-resistance rating of two hours.

d. The vaporizer section of heat transfer systems heating closed kettles containing solvents shall be remotely located. Contact heated kettles containing solvents shall be equipped with safety devices that in case of fire can turn the process heat off, turn the cooling medium on, and inject inert gas into the kettle.

e. The kettle and thin-down tank shall be instrumented, controlled and interlocked so that any failure of the controls will result in a safe condition. The kettle shall be provided with a pressure rupture disc in case the normal vent becomes inoperative. The vent piping from the rupture disc shall be of minimum length and shall discharge to a safe location. The thindown tank shall be adequately vented. Thinning operations shall be provided with an adequate vapor removal system.

Section 25.8. Process Piping.

a. All piping, valves and fittings shall be designed for the working pressures and structural stresses to which they may be subjected. They shall be of steel or other material approved for the service intended.

b. Valves shall be of an indicating type. Terminal valves on remote pumping systems shall be of the "dead-man" type which will shut off both the pump and the flow of solvent.

c. Piping systems shall be substantially supported and protected against physical damage. Piping shall be pitched to avoid unintentional trapping of liquids or suitable drains shall be provided.

d. Approved flexible connectors may be used where vibration exists or where frequent movement is necessary. Approved hose shall be used at dispensing stations.

e. Before being placed in service, all piping shall be free of leaks when tested to not less than 1½ times the working pressure or a minimum of not less than 5 psig at the highest point in the system. Tests shall continue for a minimum of 30 minutes.

Section 25.9. Transfer of Flammable and Combustible Liquids In Process Areas.

a. The transfer of large quantities of flammable and combustible liquids shall be through piping by means of pumps. The use of compressed air as a transfer medium shall be prohibited.

b. Pumps shall be selected for the flammable and combustible liquid used, the working pressures and the structural stresses to which they may be subjected.

c. Where solvents are pumped from storage to points of use, approved switches shall be provided in the processing areas and at the pumps to shut down the pumps in case of fire.

d. Empty and filled containers shall be stored outside the filling area.

Section 25.10. Raw Materials in Process Areas.

a. The amount of nitrocellulose brought into the operating area shall not exceed that required for a shift. Any nitrocellulose which may be spilled on the floor or elsewhere shall be promptly

swept up, put into a pail of water, and removed at the end of the day or shift and disposed of by use or by burning in the open at a suitable detached location.

b. Organic peroxides brought into the operating area shall be in the original shipping container and shall not exceed the quantity required for a shift. When in the operating area the peroxide shall not be placed in locations exposed to ignition sources, heat or mechanical shocks.

Section 25.12. Protection Against Static Electricity and Lightning.

a. All equipment such as tanks, machinery and piping, where an ignitible mixture may be present shall be bonded and connected to a ground. The bond or ground or both shall be physically applied or shall be inherently present by the nature of the installation.

b. Tank vehicles loaded or unloaded through open connections shall be grounded and bonded to the receiving system.

c. When a flammable mixture is transferred from one portable container to another, a bond shall be provided between the two containers.

d. Steel framing of buildings shall be grounded with resistance of not more than five ohms.

Section 25.13. Fire Control and Detection.

a. Important manufacturing and storage buildings shall be protected by a sprinkler system or a water spray system. Sprinkler systems or water spray systems shall be installed to provide reasonable safety to persons and property. Evidence that such sprinkler systems or water spray systems are installed in accordance with the applicable standards specified for this section 25.13a in article 31 of this Fire Prevention Code shall be evidence that such sprinkler systems or water spray systems provide reasonable safety to persons and property.

b. An adequate supply of portable fire extinguishers suitable for flammable liquid fires shall be provided.

c. Standpipe and hose shall be provided in important operating buildings.

d. Where good public fire protection facilities are not readily available, private fire protection facilities shall be provided.

f. All plant fire protection facilities shall be adequately maintained, periodically inspected and tested.

Section 25.14. Maintenance.

a. The cleaning of tanks or vessels which have contained flammable or combustible liquids shall only be done under the supervision of persons who understand the fire and explosion potential.

b. When necessary to make repairs involving "hot work" the work shall be authorized by the responsible individual in charge before the work is started.

c. When necessary to enter a tank, pit, manhole or other confined spaces, such entry shall be authorized by the responsible individual in charge.

d. Power operated industrial trucks shall be of a type approved for the location.

e. Open flames and direct-fired heating devices shall be prohibited in areas where flammable vapor-air mixtures may exist.

f. Smoking shall be prohibited except in designated safe areas.

g. Empty containers previously used for flammable or combustible liquids shall be removed to a well detached, outside location and if not cleaned on the premises, removed from the plant as soon as practical.

h. Full containers stored outside shall be kept a safe distance from buildings or other exposures.

i. Adequate aisles shall be maintained for unobstructed movement of personnel and so that fire protection equipment can be brought to bear in all parts of processing and storage areas of buildings.

ARTICLE 26

OVENS AND FURNACES

Section 26.1. Scope.

This article shall apply to the location, design, construction and operation of industrial processing ovens and furnaces operating at approximately atmospheric pressures and temperatures not exceeding 700°F. which are heated with oil or gas fuel or which during operation contain flammable vapors from the products being processed. It is the intent of this article to provide for the operation of these ovens and furnaces within certain limitations of control depending on oven or furnace design, flammable formulations and ventilation needs, the disregard of which may cause them to function in an unsafe manner, thereby becoming liable to destruction by fire or explosion.

Section 26.2. Definition.

Catalytic combustion system shall mean an oven heater of any construction that employs catalysts to accelerate oxidization or combustion of fuel-air or fume-air mixtures for eventual release of heat to an oven process.

Section 26.3. Permits and Plans Required.

a. No oven or furnace to which this code applies shall be operated without a permit from the Chief of the Bureau of Fire Prevention.

b. Application for a permit shall be accompanied by plans showing all essential details as to location, design, construction, controls and calculations for safe operation. The process and materials involved shall be fully described. Catalytic combustion systems utilized for the oxidization or combustion of the exhaust gases or vapors shall be described.

Section 26.4. Location and Construction.

a. Ovens, furnaces and related equipment shall be located with due regard to the possibility of fire resulting from overheating or from the escape of fuel gas or fuel oil and the possibility of damage to the building and injury to persons resulting from explosion.

b. Ovens and furnaces shall be located at or above grade, or if in basements at least fifty per cent of the wall area of the room in which the oven or furnace is located shall be above grade.

c. Ovens and furnaces shall be so located as to readily accessible for inspection and maintenance and with adequate clearances to permit the proper functioning of explosion vents. Roofs and floors of ovens and furnaces shall be sufficiently insulated and ventilated to keep temperatures at combustible ceilings and floors below 160°F.

d. Ovens and furnaces shall be constructed of noncombustible materials throughout except where the maximum oven operating temperature is not over 160°F. The amount of insulation used in oven panel construction shall be enough to prevent the outside surface temperature from exceeding 160°F., or adequate guards shall be provided to protect personnel

e. Ovens and furnaces which may contain flammable air-gas mixtures shall be equipped with relief vents for freely relieving internal explosion pressures, and all explosion-venting panels or doors shall be arranged so that when open, the full vent opening will be an effective relief area.

f. All duct work shall be constructed of noncombustible material. Ducts shall be made tight throughout and shall have no openings other than those required for the proper operation and maintenance of the system. Ducts passing through combustible walls, floors, or roofs shall have adequate insulation and clearances to prevent surface temperatures from exceeding 160°F. Exhaust ducts shall not discharge near doors, windows or other air intakes in a manner that will permit re-entry of vapors into the building.

Section 26.5. Ventilation.

a. Ovens and furnaces in which flammable or toxic vapors are liberated or through which products of combustion are circulated shall be ventilated by the introduction of a supply of fresh air and proper exhaust to outdoors. Discharge pipes shall not terminate within 10 feet measured horizontally from any door, window or wood frame walls of any building. Such ventilation shall be arranged to provide vigorous and well distributed air circulation within the oven or furnace to insure that the flammable vapor

concentration will be safely below the lower explosion limit at all times. Unless the oven or furnace is operated in accordance with specific approval specifying particular solvents and rate of ventilation, the rate of ventilation shall not be less than 10,000 cubic feet of fresh air per gallon of solvent evaporated in continuous process ovens or furnaces and not less than 380 cubic feet per minute per gallon of flammable solvent evaporated in batch process ovens or furnaces.

b. Exhaust duct openings shall be located in the area of greatest concentration of vapors.

c. All exhaust shall be by mechanical means using power driven fans.

Section 26.6. Design and Installation.

Ovens and furnaces including catalytic combustion systems shall be designed and installed so as to be reasonably safe to persons and property. Evidence that ovens and furnaces including catalytic combustion systems have been designed and installed in accordance with the applicable standard specified for this section 26.6 in article 31 of this Fire Prevention Code shall be evidence that such ovens and furnaces including catalytic combustion systems are reasonably safe to persons and property.

Section 26.7. Safety Controls.

a. Safety controls shall be sufficient in number, and substantially constructed and arranged to maintain the required conditions of safety and prevent the development of fire and explosion hazards.

b. Ventilation cotnrols, suitably interlocked, shall be provided which will insure the required preventilation and ventilation of the system.

c. Fuel safety controls, suitably interlocked and arranged to minimize the possibility of dangerous accumulations of explosive air-fuel mixtures in the heating system, shall be provided.

d. Excess temperature controls shall be provided to maintain a safe operating temperature within the oven or furnace.

e. Conveyor interlocks shall be provided in conveyor ovens or furnaces having a flammable vapor hazard, so that the conveyor cannot move unless ventilating fans are operating and discharging the required amount of air.

Section 26.8. Fire Control.

a. Ovens, furnaces and exhaust ducts containing or processing sufficient combustible materials to sustain a fire shall be equipped with automatic sprinklers as required by the Chief of the Bureau of Fire Prevention.

b. Approved portable fire extinguishers shall be installed near the oven, furnace, and related equipment to provide reasonable safety to persons and property. Evidence that approved portable fire extinguishers have been provided in accordance with the applicable standard specified for this section 26.8 b in article 31 of this Fire Prevention Code shall be evidence that such portable fire extinguishers provide reasonable safety to persons and property.

ARTICLE 27

PLACES OF ASSEMBLY

Section 27.1. Definitions.

a. **Decorative material** shall include all such materials as curtains, draperies, streamers, surface coverings applied over the building interior finish for decorative, acoustical or other effect, and also cloth, cotton batting, straw, vines, leaves, trees and moss used for decorative effect, but it shall not include floor coverings, ordinary window shades, nor materials one fortieth * of an inch or less in thickness applied directly to and adhering tightly to a noncombustible base.

b. **Place of assembly** shall mean a room or space used for assembly or educational occupancy for 100 or more occupants or which has a floor area of 1,500 square feet or more used for such purposes. Such room or space shall include any similar occupied connecting room or space in the same story, or in a story or stories above or below, where entrance is common to the rooms or spaces.

Section 27.2. Permit Required.

No place of assembly as defined in section 27.1 b shall be maintained, operated or used as such without a permit, except that no permit shall be required for any place of assembly used solely as a place of religious worship.

Section 27.3. Decorative Material.

a. No decorative material shall be used which as applied will ignite and allow flame to spread over the surface or allows burning particles to drop when exposed to a match flame test applied to a piece removed from the material and tested in a safe place. The piece shall be held in a vertical position and the bottom edge exposed to a flame from a common match held in a horizontal position, one-half inch underneath the piece, and at a constant location for a minimum of 15 seconds.

b. Treatments used to accomplish this flameproofing shall be renewed as often as may be necessary to maintain the flameproof effect.

* May be measured by folding a piece to 5 thicknesses and measuring to see if the thickness of 5 layers exceeds ⅛ inch.

Section 27.4. Proxylin Coated Fabric.

Pyroxylin coated fabric used as a decorative material in accordance with section 27.3, or as a surface covering on fixed furnishings, shall be limited as follows: Such fabrics containing 1.4 ounces or more of cellulose nitrate per square yard shall not be used in excess of a total amount equivalent to one square foot of fabric surface to 15 cubic feet of room volume. Each square foot of such fabric which contains 1.7 ounces or more of cellulose nitrate per square yard shall be counted as two square feet in making this computation.

Section 27.5. Motion Picture Screens.

In places of assembly no motion picture screen or screen masking shall be used which will ignite and allow flame to spread over the surface when exposed to the match flame test described in section 27.3a.

Section 27.6. Exit Doors.

During the period of occupancy, no exit door shall be locked, bolted, or otherwise fastened or obstructed by any means, so that the door cannot be opened from the inside by the use of the ordinary door latch or knob or by pressure on the door or on a panic release device.

Section 27.7. Aisles.

In each room where chairs, or tables and chairs, are used, the arrangement shall be such as will provide for ready access by aisles to each exit doorway. Aisles leading directly to exit doorways shall have not less than 36 inches clear width which shall not be obstructed by chairs, tables or other objects.

Section 27.8. Use of Exit Ways.

No part of a stairway, whether interior or exterior, nor of a hallway, corridor, vestibule, balcony or bridge leading to an exit way shall be used for any purpose which will interfere with its value as an exit way.

Section 27.9. Plan of Exit Ways and Aisles.

A plan showing the capacity and location of exit ways and of aisles leading thereto shall be submitted for approval to the

Bureau of Fire Prevention and an approved copy shall be kept on display in the premises.

Section 27.10. Marking and Lighting of Exit Ways.

All exit ways in places of assembly shall be marked and lighted in accordance with sections 11.2 and 11.3.

Section 27.11. Number of Occupants Permitted.

Each place of assembly shall be posted with a legible sign in contrasting colors conspicuously located stating the maximum number of occupants permitted. The number shall be determined by the capacity of exit ways provided.

Section 27.12. Fire Control.

All fire protection equipment required under article 14 shall be kept in working condition. Extinguishers and hose and similar appliances shall be visible and convenient at all times. It shall be the duty of the owner and the tenant of each building, or part of a building, occupied as a place of assembly to properly train sufficient regular employees in the use of fire appliances so that such appliances can be quickly put in operation.

Section 27.13. Ash Trays.

Where smoking is permitted, there shall be provided on each table and at other convenient places suitable noncombustible ash trays or match receivers.

ARTICLE 28

PRECAUTIONS AGAINST FIRE, GENERAL

...ardous.

Section 28.1. Matches.

a. PERMIT REQUIRED. No person shall manufacture matches without a permit. No person shall store matches exceeding in aggregate 25 cases of matches without a permit.

b. WHOLESALE STORAGE. At wholesale establishments and wherever matches exceeding 25 cases are stored, shipping containers containing matches shall be arranged in piles not exceeding 18 feet in height nor 25,000 cubic feet in volume. Such pile units shall be separated from each other and from other combustible material by

a clear space of not less than 4 feet. In storage rooms where shipping containers containing matches are open, the broken containers and contents shall be neatly piled with other match stock in a portion devoted to match storage exclusively.

Section 28.3. Smoking Prohibited Under Certain Conditions.

a. Smoking shall mean and include the carrying of lighted pipe, cigar, cigarette or tobacco in any form.

b. Where conditions are such as to make smoking a hazard in any areas of piers, wharves, warehouses, stores, industrial plants, institutions, places of assembly, and in open spaces where combustible materials are stored or handled, the Chief of the Bureau of Fire Prevention is empowered and authorized to order the owner or occupant in writing to post "No Smoking" signs in each building, structure, room or place in which smoking shall be prohibited. The Chief of the Bureau of Fire Prevention shall designate specific safe locations, if necessary, in any building, structure or place in which smoking may be permitted.

c. "No Smoking" signs of approved sized lettering and location required in accordance with section 28.3 b shall read "By Order of the Fire Chief."

d. It shall be unlawful for any person to remove any legally required "No Smoking" sign or to smoke in any place, where such signs are posted.

Section 28.4. Use of Torches for Removing Paint.

Any person using a torch or other flame-producing device for removing paint from any building or structure shall provide one approved fire extinguisher or water hose connected to the water supply on the premises where such burning is done. In all cases, the person doing the burning shall remain on the premises 1 hour after the torch or flame-producing device has been used.

Section 28.5. Hot Ashes and Other Dangerous Materials.

No person shall deposit hot ashes or cinders, or smouldering coals, or greasy or oily substances liable to spontaneous ignition, into any combustible receptacle, or place the same within ten feet of any combustible materials, except in metal or other noncombustible receptacles. Such receptacles, unless resting on a noncombustible floor or on the ground outside the building, shall be placed on noncombustible stands, and in every case shall be kept at least two

feet away from any combustible wall or partition or exterior window opening.

Section 28.5. Accumulations of Waste Materials.

Roofs, courts, yards, vacant lots and open spaces shall be kept free and clear of deposits or accumulations of waste paper, hay, grass, straw, weeds, litter or combustible waste or rubbish of any kind. All weeds, grass, vines or other growth, when same endangers property, or is liable to be fired, shall be cut down and removed by the owner or occupant of the property.

Section 28.6. Handling Readily Combustible Materials.

No person making, using, storing or having in charge, or under his control any shavings, excelsior, rubbish, sacks, bags, litter, hay, straw or combustible waste materials shall fail or neglect at the close of each day to cause all such material which is not compactly baled and stacked in an orderly manner to be removed from the building or stored in suitable vaults or in metal or metal lined, covered, receptacles or bins. The Chief of the Bureau of Fire Prevention shall require suitable baling presses to be installed in stores, apartment buildings, factories and similar places where accumulations of paper and waste materials are not removed at least every second day.

Section 28.7. Storage of Readily Combustible Materials.

a. PERMIT REQUIRED. No person shall store in any building or upon any premises in excess of 2,500 cubic feet gross volume of combustible empty packing cases, boxes, barrels or similar containers, or rubber tires, or baled cotton, rubber or cork, or other similarly combustible material without a permit.

b. STORAGE REQUIREMENTS. Storage in buildings shall be orderly, shall not be within two feet of the ceiling, and not so located as to endanger exit from the building. Storage in the open shall not be more than twenty feet in height, shall be so located, with respect to adjacent buildings, as not to constitute a hazard, and shall be compact and orderly.

Section 28.8. Flammable Decorative Materials in Buildings of Mercantile and Institutional Occupancy.

Highly flammable materials such as cotton batting, straw, dry vines, leaves, trees, artificial flowers or shrubbery and foam plastic

materials shall not be used for decorative purposes in show windows or other parts of mercantile and institutional occupancies unless first rendered flameproofed in accordance with section 27.3. Electric light bulbs in mercantile and institutional occupancies shall not be decorated with paper or other combustible materials unless such materials shall first have been rendered flameproofed.

Section 28.10. Open Flames or Lights Restricted.

a. No person shall take an open flame or light into any building, barn, vessel, boat or any other place where highly flammable, combustible, or explosive material is kept, unless such light or flame shall be well secured in a glass globe, wire mesh cage or similar approved device.

b. No heating apparatus or equipment capable of igniting flammable materials of the types stored or handled shall be used in the storage area of any warehouse storing rags, excelsior, hair or other highly flammable or combustible material; nor in the work area of any shop or factory used for the manufacture, repair or renovating of mattresses or bedding; nor in the work areas of any establishment used for the upholstering of furniture.

Section 28.11. Kindling of Fire on Land of Others Restricted.

No person shall kindle a fire upon the land of another without permission of the owner thereof or his agent.

Section 28.12. Maintenance of Chimneys and Heating Appliances.

a. All chimneys, smokestacks or similar devices for conveying smoke or hot gases to the outer air and the stoves, furnaces, restaurant type cooking equipment, incinerators, fire boxes or boilers to which they are connected shall be constructed and maintained in such a manner as not to create a hazardous condition.

b. Commercial and industrial type incinerators used for burning of rubbish or other readily combustible solid waste material and flue-fed incinerators shall be provided with approved spark arrestors or other effective means for arresting sparks and fly particles.

Section 28.13. Trapdoors to be Closed.

All trapdoors, except those which are automatic in their operation, in any factory building or building used for storage shall be closed at the completion of the business of each day.

Section 28.14. Shaftways to be Marked.

Every outside window in a building used for manufacturing purposes or for storage which opens directly on any hoistway or other vertical means of communication between two or more floors in such building, shall be plainly marked with the word "SHAFTWAY" in red letters at least six inches high on a white background; such warning sign to be so placed as to be easily discernible from the outside of the building. Every door or window opening on such shaftway from the interior of the building, unless the construction of the partition surrounding the shaftway is of such distinctive nature as to make its purpose evident at a glance, shall be similarly marked with the warning word, "SHAFTWAY" so placed as to be easily visible to any one approaching the shaftway from the interior of the building.

ARTICLE 30

WELDING OR CUTTING, ACETYLENE GENERATORS, AND CALCIUM CARBIDE

Section 30.1. Scope.

a. This article shall apply to:

(1) Installation and operation of oxygen-fuel gas, gaseous fuels generated from flammable liquids under pressure, or electric-arc welding or cutting or any combination thereof, or

(2) Storage of calcium carbide and gases used in welding, cutting or heat treating.

Section 30.2. Definitions.

a. **Acetlyene, low pressure** shall mean acetylene at a pressure not exceeding 1 psig.

b. **Acetylene, medium pressure** shall mean acetylene at pressures exceeding 1 psig. but not exceeding 15 psig.

c. **Acetylenic compound** shall mean a material which, like acetylene, have a triple bond between two carbon atoms.

d. **Fuel gas** shall mean acetylene, hydrogen, LP-Gas, and other liquefied and nonliquefied flammable gases.

e. **Hydraulic back-pressure valve** as a term is used interchangeably with "hydraulic seal" and "hydraulic valve."

f. **Machine** shall mean a device in which one or more torches using fuel gas and oxygen are incorporated.

g. **Manifold** shall mean an assembly of pipe and fittings for connecting two or more cylinders for the purpose of supplying gas to a piping system or directly to a consuming device.

h. **Oxygen manifold, high-pressure** shall mean a manifold connecting oxygen containers having an ICC service pressure exceeding 200 psig.

i. **Oxygen manifold, low-pressure** shall mean a manifold connecting oxygen containers having an ICC service pressure not exceeding 200 psig.

j. Piping shall mean pipe or tubing or both for any purpose and made of any material that is acceptable under this article.

Pipe shall mean a rigid conduit.

Tubing shall mean a semi-rigid conduit.

k. Portable outlet header shall mean an assembly of piping and fittings used for service-outlet purposes which is connected to the permanent service piping by means of hose or other non-rigid conductors.

l. Station outlet shall mean the point at which gas is withdrawn from the service piping system.

Section 30.3. Permit Required for Welding or Cutting.

a. A permit shall be required of each company, corporation, copartnership or owner-operator performing welding or cutting operations except as provided in section 30.3 b. This permit shall not be required for each welding or cutting job location. The company, corporation, copartnership or owner-operator shall notify the Bureau of Fire Prevention in advance where such work is taking place, except where such work is done in response to an emergency call that does not allow time for the Bureau of Fire Prevention to be notified in advance of the work.

b. A permit shall not be required of any company, corporation, copartnership or owner-operator:

(1) Where the welding or cutting is performed in areas approved for the purpose, or

(2) Having an approved permit system established for control of the fire hazards involved.

c. Application for a permit required by this article shall be made by the company, corporation, copartnership or owner-operator performing the welding or cutting operation or by his duly authorized agent.

d. A permit for welding or cutting operations shall not be issued unless the individuals in charge of performing such operations are capable of doing such work in a safe manner. Demonstration of a working knowledge of the provisions of this article shall constitute acceptable evidence of compliance with this requirement.

e. Companies, corporations, copartnerships and owner-operators required to have a permit shall maintain a record of all loca-

tions where welding or cutting operations are performed and have it available for inspection by the Bureau of Fire Prevention.

Section 30.4. Equipment.

Approved equipment shall be used in welding and cutting.

Section 30.5. Installation and Operation of Welding and Cutting Equipment.

a. Welding and cutting equipment shall be installed and operated so as to be reasonably safe to persons and property. Evidence that welding and cutting equipment has been installed and is operated in accordance with the applicable standards specified for this section 30.5a in article 31 of this Fire Prevention Code shall be evidence that such welding and cutting equipment and operations thereof are reasonably safe to persons and property.

b. The use of liquid acetylene or liquid acetylenic compounds is prohibited unless properly stabilized.

Section 30.6. Fire Control.

a. Before welding or cutting operations are begun in areas not designed or approved for the purpose, specific authorization shall be obtained from the owner of the premises or his duly authorized agent.

b. When welding or cutting operations are performed above, or within 35 feet of combustible construction or material exposed to the operation, or within 35 feet of floor, ceiling or wall openings so exposed:

(1) Such combustible construction or material shall be protected by noncombustible shields or covers from possible sparks, hot metal or oxide.

(2) Such floor, ceiling or wall openings shall be protected by noncombustible shields or covers.

(3) A fire watcher shall be provided to watch for fires, make use of portable fire extinguishers or fire hose, and perform similar fire prevention and protection duties. The fire watcher shall remain on the job at least thirty minutes after the welding or cutting operations have been completed to insure that no fire exists. A signed inspection report attesting to that fact shall be filed and available for inspection by the Bureau of Fire Prevention.

c. One or more portable fire extinguishers of approved type and size shall be kept at the location where welding or cutting is to be done.

d. Welding or cutting shall not be done in or near rooms or locations where flammable gases, liquids or vapors, lint, dust, or loose combustible stocks are present when sparks or hot metal from the welding or cutting operations may cause ignition or explosion of such materials.

e. Except as provided in section 30.6 f, welding or cutting shall not be performed on containers and equipment which contain or have contained flammable liquids, gases or solids until these containers and equipment have been thoroughly cleaned or inerted or purged.

f. "Hot tapping" may be permitted on tanks and pipe lines provided such operations are performed by companies, corporations, copartnerships or owner-operators not required to have a permit under section 30.3 b(2).

g. Sprinkler protection shall not be shut off while welding or cutting work is being performed. When welding or cutting is done close to automatic sprinkler heads, sheet asbestos or damp cloth guards may be used to shield the individual heads but shall be removed when the work is completed.

Section 30.7. Permit Required for Cylinder and Container Storage.

A permit shall be required for the storage of cylinders or containers used in conjunction with welding or cutting operations when more than 2,000 cubic feet of flammable compressed gas other than liquefied petroleum gas, 300 pounds of liquefied petroleum gas, or 6,000 cubic feet of nonflammable compressed gas is stored.

Section 30.8. Storage of Cylinders and Containers.

a. Fuel gas cylinders stored inside of buildings, except those in actual use or attached ready for use, shall be limited to a total capacity of 2,000 cubic feet of gas or 300 pounds of liquefied petroleum gas. Storage exceeding 2,000 cubic feet total gas capacity of cylinders of 300 pounds of liquefied petroleum gas shall be in a separate room in accordance with sections 30.17 d and 30.17 e, or cylinders shall be stored outside or in a separate building.

b. Separate rooms or buildings for fuel gas storage shall be well ventilated. Heating systems, electrical equipment and control of sources of ignition shall comply with sections 30.17 h through 30.17 j.

c. Cylinders of dissolved acetylene shall be stored with the valve end up to minimize possibility of solvent being discharged as liquid.

d. Oxygen cylinders shall not be stored in inside acetylene generator rooms.

e. Oxygen cylinders stored in outside generator houses shall be separated from the generator or carbide storage rooms by a noncombustible partition having a fire-resistance rating of at least one hour. This partition shall be without openings and shall be gastight.

f. Oxygen cylinders in storage shall be separated from fuel gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least ½ hour.

g. Cylinders permitted inside of buildings shall be stored at least 20 feet from highly combustible materials and where they will not be exposed to excessive rise in temperature, physical damage, or tampering by unauthorized persons.

h. Empty cylinders shall have their valves closed while in storage and during shipment.

i. Where caps are provided for valve protection, such caps shall be in place except when the cylinders are in service or connected ready for service.

j. Welding or cutting work shall not be supported by compressed gas cylinders.

k. Gas shall not be transferred from one cylinder to another or mixed with another gas in a cylinder.

l. Pressure adjusting screws on regulators shall be fully released before the regulator is attached to a cylinder and the cylinder valve opened.

m. Valves on cylinders of compressed gas shall be opened slowly.

n. Before a regulator is removed from a cylinder valve, the cylinder valve shall be closed and the gas released from the regulator.

o. High-pressure oxygen cylinders shall be used only with pressure-regulating devices approved and marked for use with oxygen.

p. As oxygen under high pressure may react violently with oil or grease, every possible precaution shall be taken to prevent oxygen from coming in contact with oil or grease. Oxygen cylinders, valves, regulators, hose, and other apparatus shall be kept free from oil or grease and shall not be handled with oily hands, oily gloves, or with greasy equipment.

q. Fuel gas shall not be used from cylinders through torches or other devices equipped with shutoff valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

Section 30.9. Manifolding of Cylinders.

a. Except as provided in section 30.9 b, fuel gas cylinders connected to one manifold inside a building shall be limited to a total capacity not exceeding 300 pounds of liquefied petroleum gas or 3000 cubic feet of other fuel gas. More than one such manifold with connected cylinders may be located in the same room provided the manifolds are at least 50 feet apart.

b. Fuel gas cylinders connected to one manifold having an aggregate capacity exceeding 300 pounds of liquefied petroleum gas or 3000 cubic feet of other fuel gas shall be located outdoors, or in a separate building or room constructed in accordance with sections 30.17 d and 30.17 e.

c. Separate manifold buildings or rooms may also be used for the storage of drums of calcium carbide and cylinders containing fuel gases. Such buildings or rooms shall have no open flames for heating or lighting and shall be well ventilated.

d. High-pressure fuel gas manifolds shall be provided with approved pressure regulating devices.

e. Oxygen manifolds shall not be located in an acetylene generator room. Oxygen manifolds shall be separated from fuel gas cylinders or combustible materials (especially oil or grease),

a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least ½ hour.

f. Except as provided in section 30.9 g, oxygen cylinders connected to one manifold shall be limited to a total gas capacity of 6000 cubic feet. More than one such manifold with connected cylinders may be located in the same room provided the manifolds are at least 50 feet apart.

g. An oxygen manifold, to which cylinders having an aggregate capacity of more than 6000 cubic feet of oxygen are connected, shall be located outdoors or in a separate noncombustible building. Such a manifold, if located inside a building having other occupancy, shall be located in a separate room of noncombustible construction having a fire resistance of at least ½ hour or in an area with no combustible material within 20 feet of the manifold.

h. High-pressure oxygen manifolds shall be provided with approved pressure-regulating devices.

i. Low-pressure oxygen manifolds shall be suitable for use with oxygen at a pressure of 250 psig, have a minimum bursting pressure of 1000 psig and be protected by a safety relief device which will relieve at a maximum pressure of 500 psig. The following sign shall be conspicuously posted at each low pressure oxygen manifold:

LOW-PRESSURE MANIFOLD
DO NOT CONNECT HIGH-PRESSURE CYLINDERS
MAXIMUM PRESSURE—250 PSIG

j. Portable outlet headers shall not be used indoors except for temporary service where the conditions preclude a direct supply from outlets located on the service piping system.

k. Each outlet on the service piping from which oxygen or fuel gas is withdrawn to supply a portable outlet header shall be equipped with a readily accessible shutoff valve.

l. Master shutoff valve for both oxygen and fuel gas shall be provided at the entry end of the portable outlet header.

m. Portable outlet headers for fuel gas service shall be provided with an approved hydraulic back-pressure valve installed at the inlet and preceding the service outlets, unless an approved pressure-reducing regulator, an approved back-flow check valve,

or an approved hydraulic back-pressure valve is installed at each outlet. Outlets provided on headers for oxygen service may be fitted for use with pressure-reducing regulators or for direct hose connection.

n. The pressure in the gas cylinders connected to and discharged simultaneously through a common manifold shall be approximately equal.

Section 30.10. Service Piping Systems for Fuel Gases and Oxygen.

a. Piping and fittings shall be reasonably safe to persons and property, and comply with sections 30.10 b through 30.10d. Evidence that piping and fittings are in accordance with the applicable standard specified for this section 30.10a in article 31 of this Fire Prevention Code shall be evidence that said piping and fittings are reasonably safe to persons and property.

b. Pipe shall be at least schedule 40 and fittings shall be at least standard weight in sizes not over six inches in nominal size.

c. Copper tubing shall be Type K or L so as to be reasonably safe to persons and property. Evidence that copper tubing is in accordance with the applicable standard specified for this section 30.10 c in article 31 of this Fire Prevention Code shall be evidence that said copper tubing is reasonably safe to persons and property.

d. Piping shall be steel, wrought iron, brass or copper pipe, or seamless copper, brass or stainless steel tubing except as provided in sections 30.10 e and 30.10 f.

e. Oxygen piping and fittings at pressures in excess of 700 psig. shall be stainless steel or nonferrous metal.

f. Pipe for acetylene or acetylenic compounds shall be steel or wrought iron, except that unalloyed copper may be used in listed equipment.

g. Acetylene shall not be piped (except in approved cylinder manifolds) or utilized at a pressure in excess of 15 psig.

h. Joints in steel or wrought iron piping shall be welded, threaded or flanged. Fittings, such as ells, tees, couplings and unions, may be rolled, forged or cast steel, malleable iron or nodular iron. Gray or white cast-iron fittings are prohibited.

i. Joints in brass or copper pipe shall be welded, brazed, threaded or flanged. If of the socket type, they shall be brazed with silver-brazing alloy or similar high melting point filler metal.

j. Joints in seamless copper, brass, or stainless steel tubing shall be approved gas tubing fittings or the joints shall be brazed. If of the socket type, they shall be brazed with silver-brazing alloy or similar high melting point filler metal.

k. Threaded connections in oxygen pipe shall be tinned or made up with litharge and glycerine, litharge and water, or other joint compound approved for oxygen service applied to the male threads only.

l. Piping shall be run as directly as practicable, protected against corrosion and physical damage, and allowance made for expansion, contraction, jarring and vibration.

m. Readily accessible gas valves shall be provided to shut off the gas supply to buildings, in the discharge from generators, gas holders, manifolds or other sources of supply.

n. Underground pipe and tubing and outdoor ferrous pipe and tubing shall be covered or painted with a suitable corrosion resisting material.

o. All piping shall be tested and proved tight at one and one-half times its maximum working pressure. Any medium used for testing oxygen lines shall be oil-free and nonflammable.

Section 30.11. Protective Equipment.

a. Service piping systems shall be protected by pressure relief devices set to function at not more than the design pressure of the systems and discharging to a safe location.

b. Approved protective equipment shall be installed in the fuel gas piping to prevent: (1) backflow of oxygen into the fuel gas supply system; (2) passage of a flash back into the fuel gas supply system; and (3) excessive back pressure of oxygen in the fuel gas supply system.

c. The protective equipment shall be located in the main supply line, or at the head of each branch line, or at each location where gas is withdrawn.

d. Backflow protection shall be provided by an approved device that will prevent oxygen from flowing into the fuel gas system.

e. Flash-back protection shall be provided by an approved device that will prevent flame from passing into the fuel gas system.

f. Back-pressure protection shall be provided by an approved pressure-relief device set at a pressure not greater than the pressure rating of the backflow or the flash-back protection device, whichever is lower. The pressure-relief device shall be located on the downstream side of the backflow and flash-back protection devices.

g. Fuel gas for use with equipment not requiring oxygen shall be withdrawn upstream of the piping protective devices.

Section 30.12. Station Outlet Protective Equipment.

a. A check valve, pressure regulator, hydraulic seal, or combination of these devices shall be provided at each station outlet, including those on portable headers, to prevent backflow.

b. A shutoff valve shall be installed at each station outlet and shall be located on the upstream side of other station outlet equipment.

Section 30.13. Hose and Hose Connections.

Hose for oxygen and fuel gas service including hose used to connect portable outlet headers to service piping shall be reasonably safe to persons and property. Evidence that hose for oxygen and fuel gas service including hose used to connect portable outlet headers is in accordance with the applicable standard specified for this section 30.13 in article 31 of this Fire Prevention Code shall be evidence that said hose is reasonably safe to persons and property.

Section 30.14. Pressure Reducing Regulator.

Regulators or automatic reducing valves shall be used only for the gas for which they are intended.

Section 30.15. Permit Required for Acetylene Generators.

No person shall operate an acetylene generator having a carbide capacity exceeding 5 pounds without a permit.

Section 30.16. Acetylene Generators.

a. Acetylene shall not be generated at a pressure in excess of 15 psig.

b. Portable generators shall not be operated within 10 feet of combustible material other than floors.

c. Portable generators shall be taken outdoors for cleaning, charging or purging.

Section 30.17. Outside Generator Houses and Inside Generator Rooms for Stationary Acetylene Generators.

a. Outside generator houses shall be of noncombustible construction. Openings in any outside generator house shall not be located within 5 feet of any opening in another building.

b. Exit doors shall be located so as to be readily accessible in case of emergency.

c. Buildings in which acetylene generators are located shall not exceed one story in height except that they may be installed on the top floor or roof of a multi- or single-story building.

d. Generators installed inside buildings shall be enclosed in a separate room of ample size. The walls, partitions, floors, and ceilings of inside generator rooms shall be of noncombustible construction having a fire-resistance rating of at least one hour. The walls or partitions shall be continuous from floor to ceiling and shall be securely anchored. At least one wall of the room shall be an exterior wall.

e. Openings from an inside generator room to other parts of the building shall be protected by an approved swinging type, self-closing fire door. Windows in partitions shall be wired glass in approved metal frames with fixed sash. Fire doors and windows shall be installed so as to be reasonably safe to persons and property. Evidence that fire doors and windows have been installed in accordance with the applicable standard specified for this section 30.17 e in article 31 of this Fire Prevention Code shall be evidence that such fire doors and windows are reasonably safe to persons and property.

f. Explosion venting for outside generator houses and inside generator rooms shall be provided in exterior walls or roofs. The venting area shall be equal to not less than one square foot per 50 cubic feet of room volume and may consist of any one or any combination of the following: walls of light, noncombustible material preferably single-thickness, single-strength glass; lightly fastened hatch covers; lightly fastened swinging doors in exterior walls opening outward; lightly fastened walls or roof designed to relieve at a maximum pressure of 25 pounds per square foot.

g. Inside generator rooms or outside generator houses shall be well ventilated with vents located at floor and ceiling levels.

h. Heating shall be by steam, hot water, or other indirect means. Heating by flames or fires shall be prohibited in outside generator houses or inside generator rooms, or in any enclosure communicating with them.

i. Source of ignition shall be prohibited in outside generator houses or inside generator rooms.

j. Operating instructions shall be posted in a conspicuous place near the generator or kept in a suitable place available for ready reference. When recharging generators the order of operations specified in the instructions supplied by the manufacturer shall be followed.

Section 30.18. Permit Required for Storage of Calcium Carbide.

No person without a permit shall store or keep calcium carbide in excess of two hundred pounds.

Section 30.19. Containers for Calcium Carbide.

Calcium carbide shall be contained in metal packages of sufficient strength to prevent rupture. The packages shall be provided with a screw top or equivalent and shall be constructed water- and air-tight. Solder shall not be used in such a manner that the package would fail if exposed to fire. Packages shall be conspicuously marked "Calcium Carbide—Dangerous If Not Kept Dry" or with equivalent warning.

Section 30.20. Storage of Calcium Carbide in Buildings.

a. Storage of calcium carbide inside buildings shall be in a dry, waterproof and well-ventilated location.

b. Calcium carbide not exceeding 600 pounds may be stored inside buildings or in the same room with fuel gas cylinders.

c. Calcium carbide exceeding 600 pounds but not exceeding 5000 pounds shall be stored in accordance with section 30.20 d, or an inside generator room or outside generator house, or, in a separate room in a one-story building which may contain other occupancies, but without cellar or basement beneath the carbide storage section. Such rooms shall be constructed in accordance with sections 30.17 d and 30.17 e. These rooms shall be used for no other purpose.

d. Calcium carbide in excess of 5000 pounds shall be stored in one story buildings without cellar or basement and used for no other purpose, or in outside generator houses. The location of such storage buildings shall be away from congested mercantile and manufacturing districts. If the storage building is of non-combustible construction, it may adjoin other one-story buildings if separated therefrom by unpierced fire walls; if it is detached less than 10 feet from such building or buildings, there shall be no opening in any of the mutually exposing sides of such buildings within 10 feet. If the storage building is of combustible construction, it shall be at least 20 feet from any other one- or two-story building, and at least 30 feet from any other building exceeding two stories.

Section 30.21. Storage of Calcium Carbide Outside Buildings.

Calcium carbide in unopened metal containers may be stored outdoors. Storage areas shall be at least 10 feet from lines of adjoining property that may be built upon.

Section 30.22. Electric Arc-Welding and Cutting.

a. The frame or case of the welding machine except internal combustion engine driven machines shall be grounded. Ground connections shall be mechanically strong and electrically adequate for the required current.

b. Welding current return circuits from the work to the machine shall have proper electrical contact at all joints and periodic inspection shall be made to ascertain that proper electrical contact is maintained.

c. When electric arc-welding or cutting is to be discontinued for any substantial period of time, such as during lunch hour or overnight, all electrodes shall be removed from the holders, the holders shall be carefully located so that accidental contact cannot occur, and the machines shall be disconnected from the power source.

ARTICLE 31

LIST OF STANDARDS AND PUBLICATIONS

Compliance with the standards or publications listed under the section numbers in this article shall be evidence of compliance with the section of the code referring to this article.

The abbreviations preceding these standards and publications shall have the following meaning and are the organizations issuing the standards and publications listed.

American Insurance Association
85 John Street, New York, N. Y. 10038
222 West Adams Street, Chicago, Ill. 60606
465 California Street, San Francisco, Calif. 94104

API—American Petroleum Institute
1271 Avenue of the Americas, New York, N. Y. 10020

ASA—American Standards Association
10 East 40th Street, New York, N. Y. 10016

ASME—American Society of Mechanical Engineers
345 East 47th Street, New York, N. Y. 10017

ASTM—American Society for Testing Materials
1916 Race Street, Philadelphia, Pa. 19103

CGA—Compressed Gas Association, Inc.
500 Fifth Avenue, New York, N. Y. 10036

MCA—Manufacturing Chemists' Association
1825 Connecticut Avenue, N.W., Washington 9, D. C.

NFPA—National Fire Protection Association
60 Batterymarch Street, Boston, Mass. 02110

NPFI—National Plant Food Institute
1700 K Street, N.W., Washington, D. C. 2006

SD—Superintendent of Documents
U. S. Government Printing Office, Washington 25, D. C.

U. L., Inc.—Underwriters' Laboratories, Inc.
207 East Ohio Street, Chicago, Ill. 60611
2550 Dundee Road, Box 247, Northbrook, Ill. 60062
Walt Whitman Road, Melville, Long Island, N. Y. 11749
1655 Scott Blvd., Santa Clara, Calif. 95050

USBM—United States Bureau of Mines
4800 Forbes Ave., Pittsburgh, Pa. 15213

Sections 5.5a and 5.7

NFPA No. 40, Standard for Cellulose Nitrate Motion Picture Film, 1962 edition.

Section 8.4

Title 49, Code of Federal Regulations, Parts 71 through 78, Interstate Commerce Commission Regulations, 1964 edition. Copies available from the Superintendent of Documents.

ASME, Code for Unfired Pressure Vessels, 1962 edition.

ASA Z48.1, Method of Marking Portable Compressed Gas Containers to Identify the Material Contained, 1954 edition.

Section 8.5a

NFPA No. 56, Standard for Flammable Anesthetics, 1962 edition.

Section 8.6

NFPA No. 565, Standard for Nonflammable Medical Gas Systems, 1962 edition.

Section 8.7

NFPA No. 566, Standard for Bulk Oxygen Systems at Consumer Sites, 1962 edition.

Section 8.8

ASA K 61.1, Standard for the Storage and Handling of Anhydrous Ammonia, 1960 edition.

Section 8.9

NFPA No. 567, Standard for Gaseous Hydrogen Systems at Consumer Sites, 1963 edition.

Section 9.4 e

NFPA No. 91, Standard for Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying, 1961 edition.

~~Section 9.8a, 9.8 b and 10.3~~ f

~~NFPA No. 70, National Electrical Code, 1962 edition~~.

Section 10.3 g

NFPA No. 60, Standard for Pulverized-Fuel Systems, 1961 edition.

NFPA No. 61A, Standard for Starch Factories, 1962 edition.

NFPA No. 61B, Standard for Terminal Grain Elevators, 1959 edition.

NFPA No. 61C, Standard for Flour and Feed Mills, 1962 edition.

NFPA No. 62, Standard for Pulverizing Sugar and Cocoa, 1959 edition.

NFPA No. 63, Principles for Prevention of Dust Explosions in Industrial Plants, 1964 edition.

NFPA No. 64, Standard for Country Grain Elevators, 1959 edition.

NFPA No. 65, Code for Processing and Finishing of Aluminum, 1963 edition.

NFPA No. 651, Code for the Manufacture of Aluminum Bronze Powder, 1963 edition.

NFPA No. 652, Code for Plants Producing or Handling Magnesium Powder, 1959 edition.

NFPA No. 653, Standard for Coal Preparation Plants, 1959 edition.

NFPA No. 654, Code for the Plastics Industry, 1963 edition.

NFPA No. 655, Standard for the Prevention of Sulfur Fires and Explosions, 1959 edition.

NFPA No. 656, Code for Spice Grinding Plants, 1959 edition.

NFPA No. 657, Code for Confectionery Manufacturing Plants, 1959 edition.

Section 12.6 o

NFPA No. 495, Code for the Manufacture, Transportation, Storage and Use of Explosives and Blasting Agents, 1962 edition.

Section 12.7 d

NFPA No. 512, Good Practice for Truck Fire Protection, 1955 edition.

Sections 12.8 g, 12.11 c, 12.11 d

NFPA No. 495, Code for the Manufacture, Transportation, Storage and Use of Explosives and Blasting Agents, 1962 edition.

USBM-IC 8179, Safety Recommendations for Sensitized Ammonium Nitrate Blasting Agents, 1963 edition.

Section 13.3 d

NFPA No. 494, Model State Fireworks Law, 1964 edition.

Section 14.5

NFPA No. 14, Standard for the Installation of Standpipe and Hose Systems, 1963 edition.

~~Sections 15.15, 15.25 d, 15.25 e, 15.810 d(5), 15.36 b and 15.95 e NFPA No. 70, National Electrical Code, 1962 edition.~~

Section 16.12 d

ASTM D-86, Standard Method of Test for Distillation of Petroleum Products, 1962 edition.

Section 16.12 m

Except for fuel oils and certain viscous materials, the flash point of a liquid having a flash point at or below 175°F. shall be determined in accordance with the applicable provisions of ASTM D-56, Standard Method of Test for Flash Point by the Tag Closed Tester, 1961 edition.

Except for fuel oils, the flash point of liquids having a flash point above 175°F. shall be determined in accordance with the applicable provisions of ASTM D-92, Standard Method of Test for Flash Point by the Cleveland Open Cup Tester, 1957 edition.

The flash point of fuel oils and certain viscous materials having a flash point at or below 175°F. shall be determined in accord-

ance with the applicable provisions of ASTM D-93, Standard Method of Test for Flash Point by the Pensky-Martens Closed Tester, 1962 edition.

Section 16.12 t

ASTM D323, Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method), 1958 edition.

Section 16.14

U.L., Inc. Gas and Oil Equipment List listing containers, tanks, equipment and apparatus, 1964 edition.

Section 16.21 c(1)

API Standard No. 12A, Specification for Oil Storage Tanks with Riveted Shells, 1951 edition.

API Standard No. 12B, Specification for Bolted Production Tanks, 1958 edition. Tanks built in accordance with this standard shall be used only as production tanks for crude oil storage in oil producing areas.

API Standard No. 12D, Specification for Large Welded Production Tanks, 1957 edition. Tanks built in accordance with this standard shall be used only as production tanks for crude oil storage in oil producing areas.

API Standard No. 12F, Specification for Small Welded Production Tanks, 1961 edition. Tanks built in accordance with this standard shall be used only as production tanks for crude oil storage in oil producing areas.

API Standard No. 650, Welded Steel Tanks for Oil Storage, 1964 edition.

U.L., Inc. Subject No. 58, Standard for Underground Tanks, 1961 edition.

U.L., Inc. Subject No. 80, Standard for Inside Tanks for Oil Burner Fuel, 1963 edition.

U.L., Inc. Subject No. 142, Standard for Aboveground Tanks for Flammable Liquids, 1963 edition.

Section 16.21 d(2)

API Standard No. 620, Recommended Rules for the Design and Construction of Large, Welded Low Pressure Storage Tanks, 1963 edition.

ASME Code for Unfired Pressure Vessels, 1962 edition.

Section 16.21 e(2)

ASME Code for Unfired Pressure Vessels, 1962 edition.

Section 16.22 d(2)

API RP2000, Guide for Tank Venting, 1965 edition.

Section 16.22 g(3)(g)[3]

NFPA No. 15, Standard for Water Spray Systems for Fire Protection, 1962 edition.

Section 16.32 b

[redacted].

Section 16.35 b

NFPA No. 13, Standard for Installation of Sprinkler Systems, 1964 edition.

Section 16.41a

ASA B31.3, Petroleum Refinery Piping, 1962 edition with 1963 addenda.

ASA B31.4, Oil Transportation Piping, 1959 edition with 1963 addenda.

Section 16.54 b

NFPA No. 77, Static Electricity, 1961 edition.

~~Section 16.66 b~~

[redacted].

Section 16.58

NFPA No. 11, Standard for Foam Extinguishing Systems, 1963 edition.

Sections 16.66 b, 16.72 b and 16.75

[redacted].

Section 16.75

NFPA No. 10, Standard for Portable Fire Extinguishers, 1963 edition.

~~Section 16.84~~ b

~~NFPA No. 70, National Electrical Code, 1962~~ edition.

Section 16.86

NFPA No. 10, Standard for Portable Fire Extinguishers, 1963 edition.

Section 16.93

ASME Code for Power Boilers, 1962 edition.

ASME Code for Unfired Pressure Vessels, 1962 edition.

Section 16.95a

NFPA No. 10, Standard for Portable Fire Extinguishers, 1963 edition.

Section 16.104a

Title 49, Code of Federal Regulations. Part 78 of Interstate Commerce Commission Regulations, 1964 edition. ICC Specifications MC304, MC330 or MC331. Copies available from the Superintendent of Documents.

NFPA No. 58, Standard for Liquefied Petroleum Gases, Division III, 1963 edition.

Section 16.104 b

Title 49, Code of Federal Regulations. Part 78 of Interstate Commerce Commission Regulations, 1964 edition. ICC Specifications MC300, MC302, MC303, MC304, MC305, MC330, and MC331. Copies available from the Superintendent of Documents.

NFPA No. 58, Standard for Liquefied Petroleum Gases, Division III, 1963 edition.

NFPA No. 385, Standard for Tank Vehicles for Flammable and Combustible Liquids, 1964 edition.

Section 17.3 c

Title 49, Code of Federal Regulations. Part 78 of Interstate Commerce Commission Regulations, 1964 edition. Copies available from Superintendent of Documents.

ASME Code for Unfired Pressure Vessels, 1962 edition.

~~Section 17.1a~~
~~NFPA No. 70, National Electrical Code, 1962 edition.~~

Section 17.5 c
NFPA No. 54, Standard for Gas Appliances and Gas Piping, 1964 edition.
American Insurance Association Code for the Installation of Heat Producing Appliances, 1955 edition.

~~Section 18.1 b~~
~~NFPA No. 70, National Electrical Code, 1962 edition.~~

Section 20.3 b
Title 10, Code of Federal Regulations. Part 30, Licensing of By-Product Material–Radioisotope Distribution, 1964 edition. Part 70, Special Nuclear Materials, 1964 edition. Copies available from Superintendent of Documents.

Section 20.6a
ASA N2.1, Radiation Symbol, 1960 edition.

Section 20.10a
NPFI, Definition and Test Procedures for Ammonium Nitrate Fertilizer, 1961 edition.

Section 20.10 d
NFPA No. 495, Code for the Manufacture, Transportation, Storage and Use of Explosives and Blasting Agents, 1962 edition.

Section 20.10 g(5)
NFPA No. 13, Standard for Installation of Sprinkler Systems, 1964 edition.

Section 20.10 i
~~NFPA No. 70, National Electrical Code, 1962 edition.~~

Section 20.10 ~~h~~
NFPA No. 490T, Code for the Storage of Ammonium Nitrate, 1964 edition.

Section 20.10 ~~n~~
NFPA No. 307, Operation of Marine Terminals, 1961 edition.

Section 21.5

NFPA No. 58, Standard for Liquefied Petroleum Gases, 1963 edition.

NFPA No. 59, Liquefied Petroleum Gases at Utility Gas Plants, 1963 edition.

Section 21.11

API Standard 2510, Design and Construction of Liquefied Petroleum Gas Installations at Marine and Pipeline Terminals, Natural Gasoline Plants, Refineries, and Tank Farms, 1957 edition.

Section 22.5a

NFPA No. 91, Standard for Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying, 1961 edition.

Section 22.5 c

NFPA No. 664, Code of Woodworking Plants, 1962 edition.

~~Section 23.8 e~~

~~NFPA No. 70, National Electrical Code, 1962 edition.~~

Section 24.2 b

ASTM D-396, Specifications for Fuel Oils, 1963T edition.

~~Section 24.6~~

~~NFPA No. 70, National Electrical Code, 1962 edition.~~

Section 24.9a

ASA B31.1, Section 3 of the American Standard Code for Pressure Piping, 1955 edition.

Sections 24.15 and 24.16 c

NFPA No. 31, Standard for Oil Burning Equipment, 1964 edition.

American Insurance Association Code for the Installation of Heat Producing Appliances, 1955 edition.

Section 25.5 e

MCA Sheet TC-4, Unloading Flammable Liquids from Tank Cars, 1952 edition.

~~Sections 25.5k and 25.11e~~

~~NFPA No. 70, National Electrical Code, 1962 edition.~~

Section 25.13a

NFPA No. 13, Standard for Sprinkler Systems, 1964 edition.

NFPA No. 15, Standard for Water Spray Systems, 1962 edition.

Section 26.6

NFPA No. 86A, Standard for Ovens and Furnaces, 1963 edition.

Section 26.8 b

NFPA No. 10, Standard for Portable Fire Extinguishers, 1963 edition.

Section 29.3

NFPA No. 102, ASA Z20.3, Places of Outdoor Assembly, Grandstand and Tents, 1957 edition.

Section 30.5a

NFPA No. 51, Oxygen-Fuel Gas Systems for Welding and Cutting, 1964 edition.

ASA Z49.1, Safety in Welding and Cutting, 1958 edition.

Section 30.10a

ASA B31.1, Section 2 of the American Standard Code for Pressure Piping, 1955 edition with 1963 addenda.

Section 30.10 c

ASTM-B88, Standard Specification for Seamless Copper Water Tube, 1962 edition.

Section 30.13

CGA-RMA Specification for Rubber Welding Hose, 1958 edition.

Section 30.17 e

NFPA No. 80, Standard for Fire Doors and Windows, 1962 edition.

~~Section 30.17 i~~

~~NFPA No. 70, National Electrical Code, 1962 edition~~.

APPENDIX A

PROTECTION OF TANKS CONTAINING FLAMMABLE OR COMBUSTIBLE LIQUIDS IN LOCATIONS THAT MAY BE FLOODED.

1. Scope.

The provisions herein are for the protection of tanks containing flammable or combustible liquids that may become buoyant due to a rise in the level of the water table or due to their location in an area that may be subjected to flooding.

2. Aboveground Tanks.

a. VERTICAL TANKS:

(1) No aboveground vertical storage tank containing a flammable or combustible liquid shall be located so that the allowable liquid level within the tank is below the established maximum flood stage, unless the tank is provided with a guiding structure such as described in section 6.

(2) Independent water supply facilities shall be provided at locations where there is no ample and dependable public water supply available for loading empty tanks with water.

(3) In addition to the preceding requirements, each tank so located that more than 70 per cent, but less than 100 per cent, of its allowable liquid storage capacity will be submerged at the established maximum flood stage, shall be safeguarded by one of the following methods:

(a) Tank shall be raised, or its height shall be increased, until its top extends above the maximum flood stage a distance equivalent to 30 per cent or more of its allowable liquid storage capacity, provided, however, that the submerged part of the tank shall not exceed 2½ times the diameter; or

(b) As an alternate to the foregoing, adequate noncombustible structural guides, designed to permit the tank to float vertically without loss of product, shall be provided.

b. HORIZONTAL TANKS:

(1) Independent water supply facilities shall be provided at locations where there is no ample and dependable public water supply available for loading partially empty tanks with water.

(2) Each horizontal tank so located that more than 70 per cent of its storage capacity will be submerged at the established flood stage, shall be anchored, attached to a foundation of concrete or of steel and concrete of sufficient weight to provide adequate load for the tank when filled with flammable or combustible liquid and submerged by flood waters to the established flood stage, or adequately secured by other means.

c. OTHER TYPES OF TANKS: Spherical and spheroidal tanks shall be protected by applicable methods as specified for either vertical or horizontal tanks.

3. Underground Tanks.

a. At locations where there is no ample and dependable water supply, or where filling of underground tanks with liquids is impracticable because of the character of their contents, their use, or for other reasons, each tank shall be safeguarded against movement when empty and submerged by high ground water or flood waters by anchoring, weighting with concrete or other approved solid loading material, or securing by other means. Each such tank shall be so constructed and installed that it will safely resist external pressures due to high ground water or flood waters.

b. At locations where there is an ample and dependable water supply available, underground tanks containing flammable or combustible liquids, so installed that more than 70 per cent of their storage capacity will be submerged at the maximum flood stage, shall be so anchored, weighted, or secured by other means, as to prevent movement of such tanks when filled with flammable or combustible liquids, and submerged by flood waters to the established flood stage.

4. Pipe Connections.

Pipe connections below the allowable liquid level in a tank shall be provided with valves or cocks located as closely as practicable to the tank shell. Such valves and their connections to tanks

shall be of steel or other material suitable for use with the liquid being stored. Cast iron shall not be permitted.

5. Independent Water Supply Facilities.

a. At locations where an independent water supply is required, it shall be entirely independent of public power and water supply. Independent sources of water shall be available when flood waters reach a level not less than 10 feet below the bottom of the lowest tank on a property.

b. The self-contained power and pumping unit shall be so located or so designed that pumping into tanks may be carried on continuously throughout the rise in flood waters from a level 10 feet below the lowest tank to the level of the potential flood stage.

c. Capacity of the pumping unit shall be such that the rate of rise of water in all tanks shall be equivalent to the established potential average rate of rise of flood waters at any stage.

d. Each independent pumping unit shall be tested periodically to insure that it is in satisfactory operating condition.

6. Structural Guides.

a. Structural guides for holding floating tanks above their foundations shall be so designed that there will be no resistance to the free rise of a tank, and shall be constructed of noncombustible material.

b. The strength of the structure shall be adequate to resist lateral movement of a tank subject to a horizontal force in any direction equivalent to not less than 25 pounds per square foot acting on the projected vertical cross-sectional area of the tank.

c. Where tanks are situated on exposed points or bends in a shore line where swift currents in flood waters will be present, the structures shall be designed to withstand a unit force of not less than 50 pounds per square foot.

7. Safe Practices.

a. WATER LOADINGS:

(1) The filling of a tank to be protected by water loading shall be started as soon as flood waters reach a dangerous flood stage. The rate of filling shall be at least equal to the rate of rise of flood waters (or the established average potential rate of rise).

(2) Sufficient fuel to operate the water pumps shall be available at all times to insure adequate power to fill all tankage with water.

(3) All valves on connecting pipe lines shall be closed and locked in closed position when water loading has been completed.

b. FLOATING TANKS:

(1) Where structural guides are provided for the protection of floating tanks, all rigid connections between tanks and pipe lines shall be disconnected and blanked off or blinded before the flood waters reach the bottom of the tank, unless control valves and their connections to the tank are of a type designed to prevent breakage between the valve and the tank shell.

(2) All valves attached to tanks other than those used in connection with water loading operations shall be closed and locked.

(3) If a tank is equipped with a swing line, the swing pipe shall be raised to and secured at its highest position.

8. Inspections.

a. The Bureau of Fire Prevention shall make periodic inspections of all plants where the storage of flammable or combustible liquids is such as to require compliance with the foregoing provisions, in order to assure the following:

(1) That all flammable or combustible liquid storage tanks are in compliance with these requirements and so maintained.

(2) That detailed printed instructions of what to do in flood emergencies are properly posted.

(3) That station operators and other employees depended upon to carry out such instruction are thoroughly informed as to the location and operation of such valves and other equipment necessary to effect the intent of these provisions.

APPENDIX B

ABANDONMENT OR REMOVAL OF UNDERGROUND TANKS

1. Methods.

a. Underground tanks taken out of service shall be safeguarded or disposed of by any one of the three following means:

(1) Placed in a "temporarily out of service" condition. Tanks shall be rendered "temporarily out of service" only when it is planned that they will be returned to active service at the location or pending removal within 90 days.

(2) Abandoned in place, with proper safeguarding.

(3) Removed.

2. Records.

a. In cases where tanks are either rendered "temporarily out of service" or permanently abandoned, records shall be kept of tank size, location, date of abandonment, and method used for placing the abandoned tank in a safe condition. With any of the methods described in section 1, no cutting torch or other flame or spark producing equipment shall be used until the tank has been completely purged or otherwise rendered safe. In each case, the steps given shall be carried out successively.

3. Tanks Rendered Temporarily Out of Service.

a. With tanks rendered "temporarily out of service",

(1) The fill line, gage opening, and pump suction shall be capped and secured against tampering.

(2) The vent line shall be left open.

4. Tanks Abandoned in Place.

a. With underground tanks abandoned in place,

(1) All flammable or combustible liquid shall be removed from the tank and from all connecting lines.

(2) The suction, inlet, gage, and vent lines shall be disconnected.

(3) The tank and any remaining stubs shall be filled completely with a nonshrinking inert solid material.

(4) All tank inlets and outlets shall be capped.

5. Tanks Removed.

a. When underground tanks are removed,

(1) All flammable or combustible liquids in the tank and connecting lines shall be removed.

(2) The suction, inlet, gage and vent lines shall be disconnected. Sections of connecting lines which are not to be used shall be removed. Inlets, outlets, and leaks, if any, shall be capped or plugged.

(3) After removal, the tank shall be gas freed; on the premises if it can be done safely at that location, or transported to an area not accessible to the public and the tank gas freed at that location.

6. Tanks That Are Junked.

a. If a tank is to be disposed of as junk, it shall be retested for flammable vapors, and, if necessary, rendered gas free. After junking and before releasing to junk dealer, a sufficient number of holes or openings shall be made in it to render it unfit for further use.

7. Tanks That Are Reused.

a. Used tanks which are to be reused for flammable or combustible liquid service shall meet all the provisions of article 16 for the installation of underground tanks.