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Standard for

Parking Structures

NFPA No. 88A — 1973

1973 Edition of No. 88A

This 1973 edition of the NFPA Standard on Parking Structures replaces in part the 1968 edition of the NFPA Standard on Garages. It was prepared by the NFPA Committee on Garages and Parking Structures and adopted at the 1973 NFPA Annual Meeting, held May 14–18 in St. Louis, MO. Together with No. 88-B, 1973, this edition represents a complete revision of and supersedes NFPA No. 88–1968.

Origin and Development of No. 88A

Work on fire protection safeguards for garages was initiated by the NFPA in 1927 with the appointment of a committee. After extensive deliberations and the publication of successive drafts, the standard was adopted in 1932. Subsequently, the committee was discharged as it appeared that no further activity was needed in this field. In 1952 the present Committee was created. This Committee prepared a number of redrafts of the 1932 text and in 1957 a revised NFPA Standard for Garages (No. 88) was adopted. Revisions were made in 1962 and 1968.

Prior to 1973, the subject of this standard was included in the Standard for Garages (No. 88). In order to treat separately the occupancies of repair garages and parking structures, this standard and the NFPA Standard on Repair Garages (No. 88-B) were published separately in 1973.

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Standard for

Parking Structures

NFPA No. 88A — 1973

Chapter 1 Introduction

1-1 Enclosed Parking Structures are buildings, structures or portions thereof used for the parking of motor vehicles and having exterior enclosure walls which have less than 25 percent of the total wall area open to atmosphere at each level using at least two sides of the structure. Parking facilities may involve the use of conventional type elevators, attendant operated; mechanical control push-button type elevators; or ramps. Motor vehicles may be parked by attendants, the driver, or be mechanically parked by automatic facilities where the attendant or operator may or may not be required to leave the grade or ground floor. Dispensing of motor fuels, and motor vehicle servicing are occasionally provided at these parking structures.

1-2 Open Air Parking Structures are buildings, structures, or portions thereof, used for parking motor vehicles and having not less than 25 percent of the total wall area open to atmosphere at each level, utilizing at least two sides of the structure. These structures may be of the ramp type in which the motor vehicles are parked by attendants or the driver; or they may have the mechanical parking facilities as described in 1-1. Dispensing of motor fuels, and motor vehicle servicing are occasionally provided.

1-3 Storage Garages are buildings, structures, or portions thereof, used solely for dead storage of motor vehicles.

1-4 Basement and Underground Parking Structures are buildings, structures, or portions thereof, located below grade, used solely for parking purposes. Motor vehicles may be parked by an attendant or by the driver. A basement parking structure has other occupancies above; an underground parking structure has no occupancy other than parking above it.

Chapter 2 Construction

2-1 General Requirements

2-1.1 Parking structures shall be constructed of one of the types of construction defined in the *Standard for Standard Types of Building Construction* (*NFPA 220–1961*) except as otherwise amended in this Standard.

2-1.2 Enclosed, open-air, and basement and underground parking structures shall not be located within or attached to a building used for any other purpose unless separated by walls, partitions, floors, or floor-ceiling assemblies having a fire resistance rating of not less than two (2) hours. See 2-5.

2-1.3 Those portions of an open-air parking structure located within or immediately below a building used for another purpose shall have the principal supporting members (*see NFPA 220-1961*) and bearing walls in all levels of the parking structure protected to provide a fire resistive rating equivalent to that required for the other occupancy.

2-1.4[1] Parking structures shall be limited in height and area, depending upon the type of construction and private fire protection provided. (See Chapter 4, Protection, Sections 4-1 and 4-2, for provisions where automatic sprinkler protection is required.)

2-2 Internal Subdivision

2-2.1 Offices or other similar spaces of greater than 1500 sq. ft. in area shall be separated from parking areas by walls, partitions, floors, or floor-ceiling assemblies having a fire resistance rating of not less than two hours.

2-2.2 Offices, 1500 sq. ft. in area or less, except for cashiers booths, shall be separated from parking areas by walls, partitions, floor, or floor-ceiling assemblies having a fire resistance rating of not less than one (1) hour.

2-2.3 Employees' locker rooms and sanitary facilities and storage rooms shall be separated from parking areas by walls, partitions, floor or floor-ceiling assemblies having a fire resistance rating of not less than one hour.

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[1]Building Codes generally contain provisions limiting the heights and areas of parking structures of various types of construction. Excessive heights and large undivided floor areas are undesirable inasmuch as moderate areas are essential to the effective use of hose streams where reliance is placed on manual fire fighting tactics.

2-3 Floors

2-3.1 When of combustible construction, floors shall be surfaced with approved liquid-tight noncombustible material; where concrete is used for floor surface it shall be finished to facilitate cleaning. Floors shall be so graded and equipped with floor drains as to minimize the possibility of water or fuel standing on the floor. Nothing in the foregoing shall be construed to eliminate the use of asphalt at grade.

2-3.2 In areas of parking structures where motor fuels are dispensed, each floor drain shall be properly trapped and shall discharge through an oil separator to the sewer or to an outside vented sump.

2-4 Means of Egress. Means of Egress in parking structures with respect to their required number, location, and construction shall conform with the provisions set forth in Section 15–2 of the *Life Safety Code* (*NFPA 101-1973*).

2-5 Openings in Fire Walls and Fire Partitions

2-5.1 Doorways and other openings in fire walls and fire partitions shall be protected with approved fire doors installed in accordance with the *Standard for Installation of Fire Doors and Windows* (*NFPA 80-1973*).

2-5.2 Each opening in a fire wall shall be protected with an automatic-closing or self-closing fire door or doors approved for Class A locations. No opening in a fire wall shall exceed 120 square feet in area, with no dimension greater than twelve feet. The aggregate width of all openings at any level shall not exceed 25 percent of the length of the wall.

2-5.3 Where ducts must pass through fire walls or fire partions, the openings shall be protected with approved fire doors or fire dampers installed in accordance with the requirements of the *Standard for the Installation of Air Conditioning and Ventilation Systems* (*NFPA 90A-1973*) or the *Standard for the Installation of Blower and Exhaust Systems, Dust, Stock and Vapor Removal or Conveying* (*NFPA 91-1973*).

2-6 Vertical Openings. Vertical openings through floors in buildings four stories or more in height shall be enclosed with walls or partitions having a fire resistance rating of not less than two hours.

For buildings less than four stories, such walls or partitions shall have a fire resistance rating of not less than one hour.

Exception 1: Ramps in open-air parking structures need not be enclosed.

Exception 2: Ramps in enclosed parking structures, storage garages, and basement and underground parking structures need not be enclosed provided the following safeguards are provided:

a. An approved, automatic fire extinguishing system fully protecting the parking structure or

b. An approved, automatic, supervised fire detection system installed throughout the parking structure using detectors sensing products of combustion other than heat, and

c. A mechancial ventilating system capable of exhausting smoke.

2-7 Open-Air Parking Structures

2-7.1 Open-air parking structures shall be of fire-resistive or noncombustible construction, as defined in the *Standard for Standard Types of Building Construction* (*NFPA 220-1961*).

2-7.2 Heights and floor areas of open-air parking structures of fire-resistive construction and protected noncombustible construction may be unlimited.

2-7.3 Open-air parking structures of unprotected noncombustible construction may be unlimited in area, but shall not exceed 75 feet in height. The horizontal distance on any parking level to an exterior wall opening on a street, alley, courtyard or other similar permanent open space shall not exceed 200 feet.

2-7.4 The required open side areas of each story or parking level shall not be enclosed or restricted by any material which would limit free movement of air.

Chapter 3 Hazards

3-1 Lighting and Power

3-1.1 Electric wiring for light, power, heat and signal or control circuits, and electrically operated tools, portable appliances and devices shall be in accordance with the provisions of the *National Electrical Code* (*NFPA 70-1971*). Article 511 of the *National Electrical Code* shall apply to wiring and equipment within any hazardous area.

3-1.2 Section 74 of the *Flammable and Combustible Liquids Code* (*NFPA 30-1973*) shall be used to determine the extent of the hazardous area where flammable liquids are stored or handled.

3-1.3 In open-air parking structures electrical equipment, wiring and appliances need not comply with Article 511 of the *National Electrical Code* except where flammable liquids are stored, handled or dispensed.

3-2 Heating-General

3-2.1 No heater employing an open flame or glowing element shall be installed in enclosed parking areas, or sections communicating therewith, except as hereinafter specifically provided.

3-2.2 All heating equipment in enclosed parking areas shall be of an approved type with all flames associated therewith being located 18 inches above the floor or protected by a partition not less than 18 inches high. Improvised furnaces, salamanders or space heaters shall not be permitted.

3-2.3 Heating equipment shall be installed to conform with the Standards of the National Fire Protection Association on the *Installation of Air-Conditioning and Ventilating Systems* (*NFPA 90A-1973*), *Installation of Oil Burning Equipment* (*NFPA 31-1972*), *Installation of Gas Appliances and Gas Piping* (*NFPA 54-1969*), *Chimneys, Fireplaces and Venting Systems* (*NFPA 211-1971*), and *Incinerators and Rubbish Handling* (*NFPA 82-1972*) as applicable, except as hereinafter specifically provided.

3-3[1] Ventilation

3-3.1 Wherever mechanical ventilating systems are employed in parking structures they shall be installed in accordance with the *Standard for the Installation of Air-Conditioning and Ventilating Systems (NFPA 90A-1973)*. When blower and exhaust systems are installed for vapor removal, the systems shall be installed in accordance with the *Standard for Blower and Exhaust Systems (NFPA 91-1973)*.

3-3.2 All enclosed, basement, and underground parking structures shall be continuously ventilated by a mechanical system capable of providing a minimum of six air changes per hour.

3-4 Storage and Handling of Flammable Liquids and Liquefied Petroleum Gases

3-4.1 The storage and handling of flammable liquids shall be in accordance with the *Flammable and Combustible Liquids Code (NFPA 30-1973)*, except as amended by this Standard. The storage and handling of liquefied petroleum gas shall be in compliance with the *Standard for the Storage and Handling of Liquefied Petroleum Gases (NFPA 58-1968)*.

3-4.2 Dispensing Equipment

3-4.2.1 The design and installation of equipment used for the dispensing of flammable liquids shall be in accordance with the requirements for service stations as set forth in Section 72, NFPA 30–1973 except as amended by this Standard.

3-4.2.2 Dispensing devices shall be located above grade and within 20 feet of an outside door and the floor shall have a definite downward slope toward the door with a minimum of one inch for each ten feet. Such dispensing areas shall be separated from all other areas by walls, partitions, floors or floor-ceiling assemblies having a fire resistance rating of not less than two hours.

3-5 Housekeeping

3-5.1 An authorized employee, an officer of the firm or the owner shall make daily inspections of the parking facility, and shall be responsible for the prompt removal or repair of any hazardous condition, including proper maintenance of equipment and safety devices and the immediate removal of accumulations of combustible materials.

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[1]It is recognized that the ventilation requirements contained within Section 3–3 do not consider exhaust emissions from motor vehicle engines. Authorities having jurisdiction should be consulted to determine precautions necessary to protect against this health hazard.

3-5.2 Clear aisle space shall be maintained to permit ready access to, and the use of, fire fighting equipment.

3-5.3 Metal lockers shall be provided for employees' clothes.

3-5.4 Approved metal receptacles with self-closing covers shall be provided for the storage or disposal of oil-soaked waste or cloths.

3-5.5 Combustible rubbish shall be placed in covered metal receptacles until removed to a safe place for disposal. Contents of such container shall be removed daily.

3-5.6 Floors shall be kept clean and free of oil and grease. Only approved water solutions or detergents, floor sweeping compounds and grease absorbents shall be used for cleaning floors.

Chapter 4 Protection

4-1 Automatic Sprinkler Systems. Approved automatic sprinkler equipment installed in accordance with the *Standard for the Installation of Sprinkler Systems* (*NFPA 13–1973*) shall be provided in parking structures under the following conditions:

a. Basement and underground parking structures, the ceilings of which are less than two feet above grade.

b. Storage garages or enclosed parking structures of heavy timber or ordinary construction over 50 feet in height.

4-2 Automatic Sprinkler Systems or Fire Detection and Smoke Removal. Storage garages and enclosed parking structures located within or immediately below a building used for another purpose shall be provided with the following safeguards:

a. An approved, automatic sprinkler system fully protecting the parking area or,

b. An approved, automatic, supervised fire detection system installed throughout the parking areas using detectors sensing products of combustion other than heat, and

c. A mechanical ventilating system capable of exhausting smoke.

4-3 Maintenance and Supervision of Fire Detection and Fire Extinguishing Systems

4-3.1 Where an automatic fire alarm or automatic fire extinguishing system is installed as a requirement of this Standard, the system shall be adequately supervised to assure reliable operation as follows:

a. The extinguishing or alarm system shall be electrically connected, either directly or through a central station facility or by another approved method, to the fire department legally committed to serve the area in which the building is located. System actuation shall initiate the alarm sequence.

b. Where a system may become inoperable due to closing of valves, interruption of power or other reasons, adequate supervision shall be provided to sound at least a local trouble alarm when the system is disabled.

c. Where building fire alarm facilities are provided, actuation of the fire detection or fire extinguishing system shall cause the building alarm to sound.

d. Signaling system details, with respect to design, shall conform to the requirements set forth in the various NFPA Standards as follows: *Standards for the Installation, Maintenance and Use of Central Station Protective Signaling Systems (NFPA 71–1972)*, *Local Protective Signaling Systems (NFPA 72A–1972)*, *Auxiliary Protective Signaling Systems (NFPA 72B–1972)*, *Remote Station Protective Signaling Systems (NFPA 72C–1972)*, *Proprietary Protective Signaling Systems (NFPA 72D–1973)*, and *Municipal Fire Alarm Systems (NFPA 73–1973)*.

4-3.2 Every automatic fire alarm or fire extinguishing system required by this Standard shall be continuously maintained in reliable operating condition at all times and such periodic inspections and tests shall be made as are necessary to assure the system will perform as expected in a fire emergency.

4-4 Portable Fire Extinguishers. Approved extinguishers, installed and maintained in accordance with the *Standard for the Installation of Portable Fire Extinguishers (NFPA 10–1973)* and the *Recommended Good Practice for the Maintenance and Use of Portable Fire Extinguishers (NFPA 10A–1973)*, shall be provided in all parking structures.

4-5 Standpipes. Structures which exceed a height of 50 feet, or have parking levels below grade, shall be provided with one or more standpipes conforming to the provisions of the *Standard for the Installation of Standpipes and Hose Systems (NFPA 14–1973)*.

4-6[1] Employee Instruction. Employees of all parking structures shall be instructed with respect to the importance of transmitting fire alarms promptly and shall be trained in the use of available private fire-fighting facilities.

[1]Parking Structures which are not within the protection area of an organized public fire department should have a fire brigade which is organized, equipped and drilled in accordance with the NFPA *Recommendations for the Organization, Training and Equipment of Private Fire Brigades (NFPA 27–1967)*.

Appendix

This Appendix is not a part of this NFPA Standard for Parking Structures but is included for information purposes only.

The text of this Standard references the following NFPA codes and standards and the year dates shown indicate the latest editions available:

Standard for Standard Types of Building Construction, NFPA 220–1961

Code for Safety to Life from Fire in Buildings and Structures, NFPA 101–1973

Standard for Installation of Fire Doors and Windows, NFPA 80–1973

Standard for the Installation of Air Conditioning and Ventilating Systems, NFPA 90A–1973

Standard for the Installation of Blower and Exhaust Systems, Dust, Stock and Vapor Removal or Conveying, NFPA 91–1973

National Electrical Code, NFPA 70–1971

Flammable and Combustible Liquids Code, NFPA 30–1973

Standard for the Installation of Oil Burning Equipment, NFPA 31–1972

Standard for the Installation of Gas Appliances and Gas Piping, NFPA 54–1969

Standard for Chimneys, Fireplaces and Venting Systems, NFPA 211–1972

Standard on Incinerators and Rubbish Handling, NFPA 82–1972

Standard for the Storage and Handling of Liquefied Petroleum Gases, NFPA 58–1972

Standard for the Installation of Sprinkler Systems, NFPA 13–1973

Standard for the Installation, Maintenance and Use of Central Station Protective Signaling Systems, NFPA 71–1972

Standard for Local Protective Signaling Systems, NFPA 72A–1972

Standard for Auxiliary Protective Signaling Systems, NFPA 72B–1972

Standard for Remote Station Protective Signaling Systems, NFPA 72C–1972