

# NFPA 88A

## Parking Structures

### 1985



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The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

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**NFPA 88A**  
**Standard for**  
**Parking Structures**  
**1985 Edition**

This edition of NFPA 88A, *Standard for Parking Structures*, was prepared by the Technical Committee on Garages and Parking Structures and acted on by the National Fire Protection Association, Inc. at its Fall Meeting held November 12-15, 1984 in San Diego, California. It was issued by the Standards Council on December 7, 1984, with an effective date of December 27, 1984, and supersedes all previous editions.

The 1985 edition of this standard has been approved by the American National Standards Institute.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

#### **Origin and Development of NFPA 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 88, *Standard for Garages*, was adopted. Revisions were made in 1962 and 1968.

Prior to 1973, the subject of this standard was included in NFPA 88, *Standard for Garages*. In order to treat separately the occupancies of repair garages and parking structures, this standard and NFPA 88B, *Standard for Repair Garages*, were published separately in 1973.

In 1979 and 1985 partial revisions were made.

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*This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.*

NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or any document developed by the Committee on which the member serves.

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**Chapter 1 General**

**1-1 Scope.** This standard covers the construction and protection of, as well as the control of hazards in, open air, enclosed, basement and underground parking structures. This standard does not apply to one- and two-family dwellings.

**1-2 Purpose.** The purpose of this standard is to provide minimum fire protection standards for parking structures.

**Chapter 2 Definitions**

**Approved.** Acceptable to the "authority having jurisdiction."

NOTE: The National Fire Protection Association does not approve, inspect or certify any installations, procedures, equipment, or materials nor does it approve or evaluate testing laboratories. In determining the acceptability of installations or procedures, equipment or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization concerned with product evaluations which is in a position to determine compliance with appropriate standards for the current production of listed items.

**Authority Having Jurisdiction.** The "authority having jurisdiction" is the organization, office or individual responsible for "approving" equipment, an installation or a procedure.

NOTE: The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner since jurisdictions and "approval" agencies vary as do their responsibilities. Where public safety is primary, the "authority having jurisdiction" may be a federal, state, local or other regional department or individual such as a fire chief, fire marshal, chief of a fire prevention bureau, labor department, health department, building official, electrical inspector, or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the "authority having jurisdiction." In many circumstances the property owner or his designated agent assumes the role of the "authority having jurisdiction"; at government installations, the commanding officer or departmental official may be the "authority having jurisdiction."

**Basement and Underground Parking Structures.** 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.

**Enclosed Parking Structures.** 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.

**Labeled.** Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

**Listed.** Equipment or materials included in a list published by an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

NOTE: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The "authority having jurisdiction" should utilize the system employed by the listing organization to identify a listed product.

**Open-Air Parking Structures.** 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 the definition for enclosed parking structures. Dispensing of motor fuels and motor vehicle servicing are occasionally provided.

**Storage Garages.** Buildings, structures, or portions thereof, used solely for dead storage of motor vehicles.

**Chapter 3 Construction**

**3-1 General Requirements.**

**3-1.1** Parking structures shall be constructed of one of the types of construction defined in NFPA 220, *Standard on Types of Building Construction*, except as otherwise amended in this standard.

**3-1.2** 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) hrs. (See Section 3-5.)

**3-1.3** 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, *Standard on Types of Building Construction*) 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.

**3-1.4<sup>1</sup>** Parking structures shall be limited in height and area, depending upon the type of construction and private fire protection provided. (See Chapter 5, *Protection, Sections 5-1 and 5-2, for provisions where automatic sprinkler protection is required.*)

### 3-2 Internal Subdivision.

**3-2.1** Offices or other similar spaces of greater than 1500 sq ft (139.4 sq m) 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 (2) hrs.

**3-2.2** Offices, 1500 sq ft (139.4 sq m) in area or less, except for cashiers booths, shall be separated from parking areas by walls, partitions, floors, or floor-ceiling assemblies having a fire resistance rating of not less than one (1) hr.

**3-2.3** Employees' locker rooms and sanitary facilities and storage rooms shall be separated from parking areas by walls, partitions, floors, or floor-ceiling assemblies having a fire resistance rating of not less than one (1) hr.

### 3-3 Floors.

**3-3.1** When of combustible construction, floors shall be surfaced with approved liquidtight 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.

**3-3.2** 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.

**3-4 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 NFPA 101<sup>®</sup>, *Life Safety Code*<sup>®</sup>.

<sup>1</sup>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.

### 3-5 Openings in Fire Walls and Fire Partitions.

**3-5.1** Doorways and other openings in fire walls and fire partitions shall be protected with approved fire doors installed in accordance with NFPA 80, *Standard for Fire Doors and Windows*.

**3-5.2** 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 sq ft (11.1 sq m) in area, with no dimension greater than 12 ft (3.7 m). The aggregate width of all openings at any level shall not exceed 25 percent of the length of the wall.

**3-5.3** Where ducts must pass through fire walls or fire partitions, the openings shall be protected with approved fire doors or fire dampers installed in accordance with the requirements of NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*, or NFPA 91, *Standard for the Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying*.

**3-6 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 (2) hrs. For buildings less than four stories, such walls or partitions shall have a fire resistance rating of not less than one (1) hr.

*Exception No. 1: Ramps in open-air parking structures need not be enclosed.*

*Exception No. 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 mechanical ventilating system capable of exhausting smoke.

### 3-7 Open-Air Parking Structures.

**3-7.1** Open-air parking structures shall be of Type I or Type II construction as defined in NFPA 220, *Standard on Types of Building Construction*.

**3-7.2** Heights and floor areas of open-air parking structures of Type I, Type II (222) or Type II (111) construction may be unlimited.

*Exception: Open-air parking structures of Type II (000) construction used only for the parking of passenger automobiles may be of unlimited area when (a) not more than 75 ft (22.9 m) in height, and (b) 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 ft (61 m).*

**3-7.3** 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 4 Hazards

### 4-1 Lighting and Power.

4-1.1 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 NFPA 70, *National Electrical Code*<sup>®</sup>. Article 511 of NFPA 70, *National Electrical Code* shall apply to wiring and equipment within any hazardous area.

4-1.2 NFPA 30A, *Automotive and Marine Service Station Code*, shall be used to determine the extent of the hazardous area where flammable liquids are stored or handled.

4-1.3 In open-air parking structures electrical equipment, wiring and appliances need not comply with Article 511 of NFPA 70, *National Electrical Code* except where flammable liquids are stored, handled or dispensed.

### 4-2 Heating — General.

4-2.1 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.

4-2.2 All heating equipment in enclosed parking areas shall be of an approved type with all flames associated therewith being located 18 in. (45.72 cm) above the floor or protected by a partition not less than 18 in. (45.72 cm) high. Improvised furnaces, salamanders or space heaters shall not be permitted.

4-2.3 Heating equipment shall be installed to conform with the standards of the National Fire Protection Association: NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*; NFPA 31, *Standard for the Installation of Oil Burning Equipment*; NFPA 54, *National Fuel Gas Code*; NFPA 211, *Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances*; and NFPA 82, *Standard on Incinerators, Waste and Linen Handling Systems and Equipment*, as applicable, except as hereinafter specifically provided.

### 4-3<sup>1</sup> Ventilation.

4-3.1 Wherever mechanical ventilating systems are employed in parking structures they shall be installed in accordance with NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*. When blower and exhaust systems are installed for vapor removal, the systems shall be installed in accordance with NFPA 91, *Standard for the Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying*.

4-3.2 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.

<sup>1</sup>It is recognized that the ventilation requirements contained within Section 4-3 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.

### 4-4 Storage and Handling of Flammable Liquids and Liquefied Petroleum Gases.

4-4.1 The storage and handling of flammable liquids shall be in accordance with NFPA 30, *Flammable and Combustible Liquids Code*, except as amended by this standard. The storage and handling of liquefied petroleum gas shall be in compliance with NFPA 58, *Standard for the Storage and Handling of Liquefied Petroleum Gases*.

### 4-4.2 Dispensing Equipment.

4-4.2.1 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 NFPA 30A, *Automotive and Marine Service Station Code*, except as amended by this standard.

### 4-5 Housekeeping.

4-5.1 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.

4-5.2 Clear aisle space shall be maintained to permit ready access to, and the use of, fire fighting equipment.

4-5.3 Metal lockers shall be provided for employees' clothes.

4-5.4 Approved metal receptacles with self-closing covers shall be provided for the storage or disposal of oil-soaked waste or cloths.

4-5.5 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.

4-5.6 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 5 Protection

5-1 **Automatic Sprinkler Systems.** Approved automatic sprinkler equipment installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall be provided in parking structures under the following conditions:

(a) Basement and underground parking structures, the ceilings of which are less than 2 ft (1.7 m) above grade.

(b) Storage garages or enclosed parking structures of Type III or IV construction over 50 ft (15.2 m) in height.

5-2 **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.

### 5-3 Maintenance and Supervision of Fire Detection and Fire Extinguishing Systems.

5-3.1 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: NFPA 71, *Standard for the Installation, Maintenance, and Use of Central Station Signaling Systems*; NFPA 72A, *Standard for the Installation, Maintenance, and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm and Supervisory Service*; NFPA 72B, *Standard for the Installation, Maintenance, and Use of Auxiliary Protective Signaling Systems for Fire Alarm Service*; NFPA 72C, *Standard for the Installation, Maintenance, and Use of Remote Station Protective Signaling Systems*; NFPA 72D, *Standard for the Installation, Maintenance, and Use of Proprietary Protective Signaling Systems*; and NFPA 1221, *Standard for the Installation, Maintenance, and Use of Public Fire Service Communication Systems*.

5-3.2 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.

5-4 **Portable Fire Extinguishers.** Approved extinguishers, installed and maintained in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*, shall be provided in all parking structures.

*Exception: Where approved by the authority having jurisdiction, alternative first aid fire equipment may be used.*

5-5 **Standpipes.** Structures which exceed a height of 50 ft (15.2 m), or have parking levels below grade, shall be provided with one or more standpipes conforming to the provisions of NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*.

*Exception: Standpipe systems for open-air parking structures may be of the dry type without a permanent water supply.*

5-6<sup>1</sup> **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.

## Chapter 6 Referenced Publications

6-1 The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for each reference is current as of the date of the NFPA issuance of this document. These references are listed separately to facilitate updating to the latest edition by the user.

6-1.1 **NFPA Publications.** National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 10-1984, *Standard for Portable Fire Extinguishers*

NFPA 13-1985, *Standard for the Installation of Sprinkler Systems*

NFPA 14-1983, *Standard for the Installation of Standpipe and Hose Systems*

NFPA 30-1984, *Flammable and Combustible Liquids Code*

NFPA 30A-1984, *Automotive and Marine Service Station Code*

NFPA 31-1983, *Standard for the Installation of Oil Burning Equipment*

NFPA 54-1984, *National Fuel Gas Code*

NFPA 58-1983, *Standard for the Storage and Handling of Liquefied Petroleum Gases*

NFPA 70-1984, *National Electrical Code*

NFPA 71-1982, *Standard for the Installation, Maintenance, and Use of Central Station Signaling Systems*

NFPA 72A-1985, *Standard for the Installation, Maintenance, and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm and Supervisory Service*

NFPA 72B-1979, *Standard for the Installation, Maintenance, and Use of Auxiliary Protective Signaling Systems for Fire Alarm Service*

<sup>1</sup>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 NFPA 27, *Recommendations for Organization, Training and Equipment of Private Fire Brigades*.

NFPA 72C-1982, *Standard for the Installation, Maintenance, and Use of Remote Station Protective Signaling Systems*

NFPA 72D-1979, *Standard for the Installation, Maintenance, and Use of Proprietary Protective Signaling Systems*

NFPA 80-1983, *Standard for Fire Doors and Windows*

NFPA 82-1983, *Standard on Incinerators, Waste and Linen Handling Systems and Equipment*

NFPA 90A-1985, *Standard for the Installation of Air Conditioning and Ventilating Systems*

NFPA 91-1983, *Standard for the Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying*

NFPA 101-1985, *Life Safety Code*

NFPA 211-1984, *Standard for Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances*

NFPA 220-1979, *Standard on Types of Building Construction*

NFPA 1221-1984, *Standard for the Installation, Maintenance, and Use of Public Fire Service Communication Systems.*

#### Appendix A Referenced Publications

A-1 The following documents or portions thereof are referenced within this standard for informational purposes only and thus should not be considered part of the requirements of this document. The edition indicated for each reference is current as of the date of the NFPA issuance of this document. These references are listed separately to facilitate updating to the latest edition by the user.

**A-1.1 NFPA Publications.** National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 27-1981, *Recommendations for Organization, Training and Equipment of Private Fire Brigades.*