

NFPA 88A

Standard for Parking Structures

1998 Edition



National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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NFPA 88A

Standard for Parking Structures

1998 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 Annual Meeting held May 18–21, 1998, in Cincinnati, OH. It was issued by the Standards Council on July 16, 1998, with an effective date of August 5, 1998, and supersedes all previous editions.

This edition of NFPA 88A was approved as an American National Standard on August 6, 1998.

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, 1968, 1979, 1985, and 1995.

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 1991 partial revisions were made, and the 1995 edition contained editorial changes. The 1998 edition contains definitions clarifying the various configurations of parking structures. It further contains changes increasing the area of office space related to the parking structure and further clarifies the requirements for vertical opening protection and automatic sprinkler installation. This edition also includes new requirements for natural gas powered vehicles.

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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. A key to classifications is found at the back of this document.

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.

Committee Scope: This Committee shall have primary responsibility for documents on construction, control of fire hazards, ventilation, fire protection, and maintenance of garages and parking structures.

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Appendix A.

Information on referenced publications can be found in Chapter 6 and Appendix B.

Chapter 1 General

1-1 Scope. This standard shall cover the construction and protection of, as well as the control of hazards in, open, enclosed, basement, and underground parking structures. This standard shall 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.

1-3 Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard, provided technical documentation is submitted to the authority having jurisdiction to demonstrate equivalency and the system, method, or device is approved for the intended purpose.

1-4 Retroactivity.

1-4.1 The provisions of this document are considered necessary to provide a reasonable level of protection from loss of life and property from fire and explosion. They reflect situations and the state of the art prevalent at the time the standard was issued.

1-4.2 Unless otherwise noted, it is not intended that the provisions of this document be applied to facilities, equipment, structures, or installations that were existing or approved for construction or installation prior to the effective date of the document, except in those cases where it is determined by the authority having jurisdiction that the existing situation involves a distinct hazard to life or adjacent property.

Chapter 2 Definitions

2-1 Definitions.

Approved.* Acceptable to the authority having jurisdiction.

Authority Having Jurisdiction.* The organization, office, or individual responsible for approving equipment, an installation, or a procedure.

Basement and Underground Parking Structures. Parking structures that are located below grade. A basement parking structure has other occupancies above it; an underground parking structure has no occupancy other than parking above it. Basement and underground parking structures are considered as specific cases of enclosed parking structures.

Enclosed Parking Structure. Any parking structure that is not an open parking structure.

Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is 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, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets identified standards or has been tested and found suitable for a specified purpose.

Open Parking Structures. A parking structure that, at each parking level, has wall openings open to the atmosphere, for an area of not less than 1.4 ft² (0.13 m²) for each linear foot (0.3 m) of its exterior perimeter. Such openings are distributed over 40 percent of the building perimeter or uniformly over two opposing sides. Interior walls lines and column lines are at least 20 percent open, with openings distributed to provide ventilation.

Parking Structure. A building, structure, or portion thereof used for the parking, or storage, or both, of motor vehicles. A parking structure shall be permitted to be enclosed or open, shall be permitted to use ramps, and shall be permitted to use mechanical control push-button-type elevators to transfer vehicles from one floor to another. Motor vehicles are permitted to be parked by the driver or an attendant, or are permitted to be parked mechanically by automatic facilities. Where automatic parking is provided, the operator of those facilities shall be permitted either to remain at the entry level or to travel to another level. Motor fuel shall be permitted to be dispensed, and motor vehicles shall be permitted to be serviced in a parking structure.

Chapter 3 Construction

3-1 General Requirements.

3-1.1* Parking structures shall be built using 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 Those parts of parking structures located within, immediately below, attached to, or less than 10 ft (3.0 m) from a building used for any other purpose shall be separated by walls, partitions, floors, or floor-ceiling assemblies having a fire resistance rating of not less than 2 hours.

Exception: No fire-rated separation is required when parts of a parking structure and a building used for any other purpose, separated by 10 ft (3.0 m) or more, are attached only via open pedestrian balconies or bridges or open vehicle bridges.

3-1.3* Those portions of an open parking structure located within or immediately below a building used for another purpose shall have the principal supporting members 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.

3-2 Internal Subdivision. Offices or other similar spaces that are related to the operation of the parking structure and are less than 3000 ft² (279 m²) in area shall be separated from parking areas by walls or partitions that resist the passage of smoke.

Exception: Cashier or attendant booths shall be permitted to be open to the parking structure.

3-3 Floors.

3-3.1 Floor surfaces shall be of noncombustible material.

3-3.1.1 Where combustible construction is permitted, floor surfaces shall be noncombustible and liquid tight.

3-3.1.2* Asphalt shall be permitted on grade.

3-3.2 Floors shall be graded and equipped with drains.

3-3.3 Floors in areas of parking structures where motor fuels are dispensed shall be designed in accordance with NFPA 30A, *Automotive and Marine Service Station Code*.

3-4 Means of Egress. Means of egress shall conform with the provisions set forth in NFPA 101®, *Life Safety Code*®.

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 Fire Windows*.

3-5.2 Where ducts pass through fire walls or fire partitions, the openings shall be protected in accordance with NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*.

3-6 Vertical Openings in Enclosed Parking Structures. 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 2 hours. For buildings less than four stories, such walls or partitions shall have a fire resistance rating of not less than 1 hour.

Ramps in enclosed parking structures, shall not be required to be enclosed when either of the following safeguards is provided:

(a) *An approved, automatic sprinkler system fully protecting the parking structure*

(b) *An approved, automatic, supervised fire detection system installed throughout the parking structure using detectors sensing products of combustion other than heat and a mechanical ventilation system in accordance with 4-3.2.*

3-7 Open Parking Structures.

3-7.1 Open 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 parking structures of Type I, Type II (222), or Type II (111) construction shall be permitted to be unlimited.

3-7.3 Open parking structures of Type II (000) construction shall be permitted to be of unlimited area where the following conditions are met:

(a) The height does not exceed 75 ft (22.9 m).

(b) The horizontal distance from any point on any parking level to an exterior wall opening on a street, an alley, a courtyard, or other similar permanent open space does not exceed 200 ft (61 m).

Chapter 4 Hazards

4-1 Lighting and Power.

4-1.1 Electric wiring for light, power, heat, and signal or control circuits and for electrically operated tools, portable appliances, and devices shall be in accordance with the provisions of NFPA 70, *National Electrical Code*®.

4-1.2 Areas where flammable liquids are stored, handled, or dispensed shall be delineated and classified for the installation of electrical equipment in accordance with NFPA 30A, *Automotive and Marine Service Station Code*.

4-2 Heating.

4-2.1 Heating equipment shall conform with 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*; and NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, as applicable.

4-2.2 All flames associated with heating equipment shall be located a minimum of 18 in. (457.2 mm) below the floor-ceiling assembly or 18 in. (457.2 mm) above the floor.

Exception: Heating equipment located in such a manner that it is protected by a partition not less than 18 in. (457.2 mm) above the floor.

4-2.3 Improvised furnaces, salamanders, or space heaters shall not be used.

4-3 Ventilation.

4-3.1 A mechanical ventilation system shall not be required in an open parking structure.

4-3.2* All enclosed parking structures shall be ventilated by a mechanical system capable of providing a minimum of 1.0 cfm per sq ft of floor area (0.3 m³ per minute per m²) per hour during hours of normal operation.

4-3.3 Mechanical ventilating systems shall be installed in accordance with NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*. Ductwork shall be constructed of noncombustible material.

4-4 Storage and Handling of Flammable Liquids and Liquefied Petroleum Gas and Natural Gas.

4-4.1 The storage and handling of flammable liquids shall conform with NFPA 30, *Flammable and Combustible Liquids Code*. The storage and handling of liquefied petroleum gas shall conform with NFPA 58, *Liquefied Petroleum Gas Code*. The storage and handling of natural gas fuels shall conform with NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code*, or NFPA 57, *Standard for Liquefied Natural Gas (LNG) Vehicular Fuel Systems*.

4-4.2 Dispensing Equipment. The design and installation of equipment and storage tanks used for the dispensing of flammable liquids shall conform with the requirements for service stations in NFPA 30A, *Automotive and Marine Service Station Code*. The equipment and storage tanks used for the dispensing

ing of natural gas fuels shall conform with NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code*, or NFPA 57, *Standard for Liquefied Natural Gas (LNG) Vehicular Fuel Systems*. The equipment and storage tanks used for the dispensing of liquefied petroleum gas shall conform with NFPA 58, *Liquefied Petroleum Gas Code*.

4.5 Housekeeping.

4.5.1 Daily inspections of the parking structure shall be made for the removal or repair of any hazardous condition. Equipment and safety devices shall be maintained, and hazardous accumulations of combustible material shall be removed from the structure.

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 Covered metal containers shall be used for combustible trash.

Exception: Containers of 55 gal (208 L) or less capacity.

4.5.6 Floors shall be kept clean and free of oil and grease.

Chapter 5 Protection

5.1 Automatic Sprinkler Systems, Fire Alarm Systems, and Signaling Systems.

5.1.1 Automatic sprinkler systems, where required, shall conform with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

5.1.2 Fire alarm systems, where required, shall conform with NFPA 72, *National Fire Alarm Code*®.

5.1.3 Automatic sprinklers and fire alarm systems shall not be required in open parking structures.

5.1.4 Automatic sprinkler systems shall be installed in basement and underground parking structures, the ceilings of which are less than 2 ft (1.7 m) above grade, and in enclosed parking structures of Type III or Type IV construction over 50 ft (15.2 m) in height.

5.2 Automatic Sprinkler Systems or Fire Detection and Smoke Removal. Enclosed parking structures located at or above grade, within or immediately below a building used for another occupancy, shall have one of the following systems:

- (a) An approved, automatic sprinkler system fully protecting the parking area
- (b) An approved, automatic, supervised fire detection system installed throughout the parking areas using detectors sensing products of combustion other than heat, and a mechanical ventilation system in accordance with 4-3.2

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 supervised adequately to ensure reliable

operation in accordance with 5-3.1.1 through 5-3.1.3 as appropriate.

5.3.1.1 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 where the building is located. System actuation shall initiate the alarm sequence.

5.3.1.2 Where a system might 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.

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

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.

5.3.3 Automatic fire sprinkler systems and standpipe systems shall be inspected, tested, and maintained in accordance with NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*.

5.4 Standpipes. Structures exceeding a height of 50 ft (15.2 m) or having parking levels below grade shall have Class I standpipes conforming to the provisions of NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*.

Exception: In open parking structures of any height, Class I standpipe systems of the manual dry type shall be permitted.

5.5* 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 equipment.

Chapter 6 Referenced Publications

6.1 The following documents or portions thereof are referenced within this standard as mandatory requirements and shall be considered part of the requirements of this standard. The edition indicated for each referenced mandatory document is the current edition as of the date of the NFPA issuance of this standard. Some of these mandatory documents might also be referenced in this standard for specific informational purposes and, therefore, are also listed in Appendix B.

6.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 1996 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 1996 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 1998 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 1996 edition.

NFPA 30A, *Automotive and Marine Service Station Code*, 1996 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, 1997 edition.

- | NFPA 52, *Compressed Natural Gas (CNG) Vehicular Fuel Systems Code*, 1998 edition.
- | NFPA 54, *National Fuel Gas Code*, 1996 edition.
- | NFPA 57, *Standard for Liquefied Natural Gas (LNG) Vehicular Fuel Systems*, 1996 edition.
- | NFPA 58, *Liquefied Petroleum Gas Code*, 1998 edition.
- | NFPA 70, *National Electrical Code*®, 1999 edition.
- | NFPA 72, *National Fire Alarm Code*®, 1996 edition.
- | NFPA 80, *Standard for Fire Doors and Fire Windows*, 1995 edition.
- | NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*, 1996 edition.
- | NFPA 101®, *Life Safety Code*®, 1997 edition.
- | NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*, 1996 edition.
- | NFPA 220, *Standard on Types of Building Construction*, 1995 edition.

Appendix A Explanatory Material

Appendix A is not a part of the requirements of this NFPA document but is included for informational purposes only. This appendix contains explanatory material, numbered to correspond with the applicable text paragraphs.

A-2-1 Approved. 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, 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 that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A-2-1 Authority Having Jurisdiction. 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, or 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 or her 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.

A-2-1 Listed. The means for identifying listed equipment may vary for each organization concerned with product evaluation; some organizations 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.

A-3-1.1 Building codes generally contain provisions limiting the heights and areas of parking structures of various types of construction.

A-3-1.3 See NFPA 220, *Standard on Types of Building Construction*.

A-3-3.1.2 Asphalt pavement applied over earth substrates is an acceptable method of surfacing.

A-4-3.2 This ventilation requirement is also intended to address vehicles that use natural gas [compressed natural gas (CNG), or liquefied natural gas (LNG)]. A natural gas leak should pose no greater risk than leaks of conventional motor fuels.

A-5-5 Parking structures that are not within the protection area of an organized public fire department should have a fire brigade that is organized, equipped, and drilled in accordance with NFPA 600, *Standard on Industrial Fire Brigades*.

Appendix B Referenced Publications

B-1 The following documents or portions thereof are referenced within this standard for informational purposes only and are thus not considered part of the requirements of this standard unless also listed in Chapter 6. The edition indicated here for each reference is the current edition as of the date of the NFPA issuance of this standard.

B-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 220, *Standard on Types of Building Construction*, 1995 edition.

NFPA 600, *Standard on Industrial Fire Brigades*, 1996 edition.

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- Basement and underground parking structures
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