

NFPA 88B

Standard for Repair Garages

1997 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 88B
Standard for
Repair Garages
1997 Edition

This edition of NFPA 88B, *Standard for Repair Garages*, 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 19–22, 1997, in Los Angeles, CA. It was issued by the Standards Council on July 24, 1997, with an effective date of August 15, 1997, and supersedes all previous editions.

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.

This edition of NFPA 88B was approved as an American National Standard on August 15, 1997.

Origin and Development of NFPA 88B

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* (NFPA 88) was adopted. Revisions were made in 1962, 1968, 1979, and 1985.

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

In 1979, 1985, 1991, and 1997 partial revisions were made.

With the completion of this edition, responsibility for development will be transferred from the Technical Committee on Garages and Parking Structures to the Technical Committee on Automotive and Marine Service Stations.

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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.

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

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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 5 and Appendix B.

Chapter 1 Application and Definitions

1-1 Scope and Application.

1-1.1 Scope. This standard covers the construction and protection of, as well as the control of hazards in, garages used for major repair and maintenance of motorized vehicles and any sales and servicing facilities associated therewith.

1-1.2 Reference shall be made to NFPA 30A, *Automotive and Marine Service Station Code*, for requirements for automotive and marine service stations and buildings used for lubrication, inspection, and minor automotive maintenance work such as tune-ups and brake system repair.

1-2 Purpose. The purpose of this standard is to provide minimum fire protection standards for repair garages.

1-3 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.

Commercial and Truck Repair Garages. Buildings, structures, or portions thereof used for the storage, maintenance, and repair of commercial motor vehicles or trucks, including fleets of motor vehicles operated by utilities, large businesses, mercantile, rental agencies, and other similar concerns. Facilities for the dispensing of motor fuels are commonly provided in connection with these garages.

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.

Repair Garages. Buildings, structures, or portions thereof wherein major repair, painting, or body and fender work is performed on motorized vehicles or automobiles; includes associated floor space used for offices, parking, or showrooms.

Taxicab and Bus Repair Garages.* Buildings, structures, or portions thereof used for storage, maintenance, and repair of fleets of taxicabs, sedan-limousine-type motor vehicles, or

motor buses. Facilities for the dispensing of motor fuels are commonly provided in connection with these garages.

Chapter 2 Construction

2-1 General Requirements.

2-1.1 Repair garages shall be built using one of the types of construction defined in NFPA 220, *Standard on Types of Building Construction*, except as amended within this standard.

2-1.2* Repair garages shall be limited in height and area, depending upon the type of construction and private fire protection provided. (See Section 4-1 for provisions where automatic sprinkler protection is required.)

2-1.3 A repair garage shall not be located within or attached to a building or structure used for any purpose other than a repair garage unless separated by walls or partitions and floor or floor-ceiling assemblies having a fire resistance rating of not less than 2 hours.

2-2 Internal Subdivisions.

2-2.1 Any single area occupied for salesrooms, showrooms, offices, or similar spaces of 1500 ft² (139.4 m²) or more in area shall be separated from vehicle repair or parking areas by walls or partitions and floor or floor-ceiling assemblies having a fire resistance rating of not less than 2 hours.

2-2.2 Any single area occupied for salesrooms, showrooms, offices, or similar spaces of 1500 ft² (139.4 m²) or less in area shall be separated from vehicle repair or parking areas by walls or partitions and floor or floor-ceiling assemblies constructed in such a manner as to restrict the passage of smoke, vehicle exhaust gases, and odors from the repair or parking area to these spaces.

2-2.3 Parts storage areas exceeding 1500 ft² (139.4 m²) shall be separated from all other portions of the building by walls or partitions and floor or floor-ceiling assemblies having a fire resistance rating of not less than 2 hours.

2-2.4 Garage occupancies shall be separated from other portions of a multitenanted building as required in 2-1.3. Heating equipment shall be separated or enclosed in accordance with 3-2.2.

2-3 Floors.

2-3.1 In areas of repair garages used for repair or servicing of vehicles, floor assemblies shall be constructed of noncombustible materials or, if combustible materials are used in the assembly, shall be surfaced with approved noncombustible material. Floors shall be liquidtight to prevent the leakage or seepage of liquids and shall be sloped to facilitate the movement of water, fuel, or other liquids to floor drains.

2-3.2 In areas of repair garages where motor fuels are dispensed or where vehicles are serviced, if floor drains are provided, they shall be properly trapped and shall discharge through an oil separator to the sewer or to an outside vented sump.

2-3.3* The contents of oil separators and traps of floor drainage systems shall be collected at sufficiently frequent intervals to prevent oil from being carried into the sewers.

2-4 Means of Egress. In repair garages, the required number, location, and construction of means of egress shall conform with the provisions set forth for "Special Purpose Industrial Occupancies" in NFPA 101®, *Life Safety Code*®.

2-5 Openings in Fire Walls and Fire Partitions.

2-5.1 Openings in fire walls and fire partitions shall be protected with approved fire doors or fire dampers installed in accordance with NFPA 80, *Standard for Fire Doors and Fire Windows*, or NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*.

2-5.2 Doorways and other openings in a fire wall shall be protected with an automatic-closing or self-closing fire door or doors approved for Class A locations. No openings in a fire wall shall exceed 120 ft² (11.1 m²) 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.

2-5.3 Where ducts must pass through fire walls or fire partitions, the openings shall be protected with approved fire doors or 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 Exhaust Systems for Air Conveying of Materials*.

2-6 Vertical Openings.

2-6.1 Elevator shafts and other 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 in height, such walls or partitions shall have a fire resistance rating of not less than 1 hour. In all buildings of Type I or Type II construction, such walls or partitions shall be entirely constructed of noncombustible materials.

2-6.2 Those ramps that are not portions of the required means of egress, connecting not more than three floor levels, need not be enclosed as required in 2-6.1, provided the repair garage is fully protected by an approved, automatic fire-extinguishing system.

2-7 Pits and Sub-Floor Work Areas. Pits and sub-floor work areas shall comply with the following:

- (a) Walls, floors, and piers shall be constructed of masonry, concrete, or other suitable noncombustible material.
- (b) Pits shall have a minimum of two unobstructed means of egress to prevent trapping of personnel in the event of fire. Steps shall be noncombustible, slip resistant, and constructed with no accessible storage space beneath.
- (c) Ventilation and drainage of pits and sub-floor work areas shall be in accordance with the provisions of 3-4.5 of this standard.

2-8 Tunnels and Ducts. Tunnels and ducts, except motor vehicle exhaust ventilating systems, that are located below the finished floor level of areas occupied for repair and servicing shall be provided with the following safeguards:

- (a) Continuous mechanical ventilation at a minimum rate providing at least six air changes per hour (Air shall be exhausted to atmosphere and not reused. Installation of the system shall conform with the provisions set forth in NFPA 91, *Standard for Exhaust Systems for Air Conveying of Materials*.)
- (b) An approved, fixed, automatic fire-extinguishing system protecting the tunnel or duct
- (c) Electrical equipment of a type suitable for use in hazardous areas as detailed by Article 511, Commercial Garages, Repair and Storage, of NFPA 70, *National Electrical Code*®
- (d) A liquidtight curb installed at the floor penetration to prevent the entrance of flammable liquids into the tunnel or duct

Chapter 3 Hazards

3-1 Lighting and Power.

3-1.1* Electrical wiring for light, power, heat, and signal or control circuits, as well as electrically operated tools, portable appliances, and devices shall be in accordance with the provisions of Article 511, Commercial Garages, Repair and Storage, of NFPA 70, *National Electrical Code*, shall apply to wiring and equipment within the hazardous areas. Where compressed natural gas (CNG) vehicles are repaired or stored, the area within 18 in. of the ceiling shall be classified as Class 1, Division 2 except where ventilation of at least 4 air changes per hour is provided.

3-1.2 NFPA 30, *Flammable and Combustible Liquids Code*, and NFPA 30A, *Automotive and Marine Service Station Code*, as applicable, shall be used to delineate and classify areas for the purpose of installation of electrical equipment where flammable liquids are stored and handled.

3-2 Heating.

3-2.1 General.

3-2.1.1* Heating equipment shall be of an approved type. Improvised furnaces, salamanders, or space heaters shall not be permitted.

3-2.1.2* When compressed natural gas (CNG) or liquefied natural gas (LNG) fueled vehicles are repaired or stored, open flame heaters or heating equipment with exposed surfaces having a temperature in excess of 750°F (399°C) shall not be permitted.

3-2.1.3 Fuels used shall be of the type and quality specified by the manufacturer of the heating appliance. Crankcase drainings shall not be used in oil-fired units.

Exception: Heating equipment using crankcase drainings in accordance with NFPA 31, *Standard for the Installation of Oil-Burning Equipment*.

3-2.1.4 Heating equipment shall be installed to 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*; NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*; and NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, as applicable, except as hereinafter specifically provided.

3-2.2 Location of Heating Equipment. Heating equipment shall be installed in a detached building or room. It shall be separated from repair areas by walls or partitions and floor or floor-ceiling assemblies that are constructed so as to prohibit the transmission of vapors and having a fire resistance rating of not less than 1 hour, with no openings in the wall separating the repair area within 8 ft (2.4 m) of the floor. Wall penetrations shall be firestopped. Air for combustion purposes shall be obtained from outside the building. The heating room shall not be used for storage of combustible materials, except for fuel storage as permitted by the standards referenced in 3-2.1.4.

Exception No. 1: Unit heaters, where installed in accordance with 3-2.3. Ventilation requirements of this section do not apply.

Exception No. 2: Heating equipment for vehicle repair areas where there is no dispensing or transferring of Class I or II flammable or combustible liquids, or liquefied petroleum gas, shall be installed in accordance with NFPA 30A, *Automotive and Marine Service Station Code*.

3-2.3 Suspended Unit Heaters.

3-2.3.1 Approved suspended unit heaters shall be located not less than 8 ft (2.4 m) above the floor and installed in accordance with the conditions of their approval.

3-2.3.2 A distance shall be maintained between the heater and its vent and any adjacent combustible material (which is part of the building or its contents) in conformance with NFPA 54, *National Fuel Gas Code*, or NFPA 31, *Standard for the Installation of Oil-Burning Equipment*.

3-2.4 Warm Air Heating.

3-2.4.1 Return air openings in motor vehicle repair or parking areas shall be not less than 18 in. (.5 m) above floor level measured to the bottom of the openings.

3-2.4.2 Recirculated air shall not be taken from any floors below grade level.

3-3* Ventilation.

3-3.1* General. Mechanical ventilating systems employed in repair garages shall be installed in accordance with NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*, except as modified within this standard. Blower and exhaust systems installed for vapor removal shall be installed in accordance with NFPA 91, *Standard for Exhaust Systems for Air Conveying of Materials*.

3-3.2 Combination of Ventilation and Heating Systems. Combined ventilation and heating systems shall not recirculate air from areas below grade level.

3-3.3 Below-Grade Areas. Below-grade areas occupied for repairing, or communicating areas located below a repair garage, shall be continuously ventilated by a mechanical ventilating system having positive means for exhausting indoor air at a rate of not less than 1 ft³/min per ft² (1 m³/min per m²) of floor area. An approved means shall be provided for introducing an equal amount of outdoor air.

3-3.4* Duct Openings. Exhaust duct openings for required ventilation shall be so located as to effectively remove vapor accumulations at floor level from all parts of the repair area.

3-4 Repair Areas.

3-4.1 General. Repairing of motor vehicles shall be restricted to areas specifically provided for such purposes.

3-4.2 Welding or Open Flame Operations.

3-4.2.1 Operations involving open flame or electric arcs, including fusion gas and electric welding, shall be restricted to areas specifically provided for such purposes. Cutting and welding, and related fire prevention precautions, shall be in accordance with the requirements of NFPA 51B, *Standard for Fire Prevention in Use of Cutting and Welding Processes*.

3-4.2.2 Electric arc welding generators or transformers shall conform to NFPA 70, *National Electrical Code*. Gas fusion welding apparatus and storage of compressed gas cylinders shall be in accordance with the provisions of NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*.

3-4.2.3* The grounded side of an electric welding circuit shall be attached to the part being welded.

3-4.2.4 Compressed gases shall be stored in accordance with Chapter 2 of NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*.

3-4.2.5 Gas fusion welding equipment shall be periodically inspected for worn or injured hoses and defective or damaged valves, gauges, and reducing devices.

3-4.2.6 Cylinders stored outside in the open shall have valves and safety devices protected against the accumulation of ice and snow.

3-4.3 Spray Painting and Undercoating.

3-4.3.1 Spray painting shall conform to NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*.

3-4.3.2 Where only a small portion of a vehicle is spray painted and no accumulations of paint residue are allowed to form, such occasional painting shall be permitted in the open in the structure if located not less than 20 ft (6.1 m) horizontally from all open flame devices or spark-producing electrical equipment or appliances.

3-4.3.3 Undercoating spray operations conducted in any area having adequate natural or mechanical ventilation shall be exempt from the requirements pertaining to spray finishing operations where the undercoating materials are nonflammable or where the solvents used have a flash point in excess of 100°F (37.8°C) (closed cup). There shall be no open flame devices or spark-producing electrical equipment or appliances within 20 ft (6.1 m) horizontally while such operations are conducted. Undercoating materials shall be dry before starting the engine of the undercoated vehicle.

3-4.3.4 Undercoating spray operations not conforming to the provisions of 3-4.3.3 shall conform to all requirements of NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*.

3-4.4 Drying Apparatus. Drying and baking apparatus in connection with the spray application of flammable finishes shall conform to NFPA 86, *Standard for Ovens and Furnaces*, and NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials*.

3-4.5 Inspection and Repair Pits.

3-4.5.1 Pits so arranged that natural ventilation cannot be used shall be provided with an individual ventilating system capable of providing a complete air change every 5 min with the intake located near floor level.

3-4.5.2 Fixed lighting fixtures in pits shall be installed in accordance with Article 511, Commercial Garages, Repair and Storage, of NFPA 70, *National Electrical Code*.

3-4.5.3 Where floor drains are provided, they shall be installed in accordance with Section 2-3.

3-4.6 Repair of Fuel Tanks.

3-4.6.1 Prior to repair work on fuel tanks of vehicles involving flame- or heat-producing devices, the tank shall be drained and purged, or inerted, and tested in accordance with applicable procedures outlined in NFPA 327, *Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers Without Entry*.

3-4.6.2 In lieu of draining the fuel tank outside the building, an approved portable pump and storage tank shall be permitted to be used.

3-4.6.3 Fuel drained from vehicle tanks that is not to be disposed of shall be stored in approved safety cans or returned to standard underground storage tanks.

3-4.6.4 Fuel to be disposed of shall be stored in tanks or drums suitable for such purpose that shall be located outside of the building until removal from the premises. Such containers shall be identified as having flammable contents.

3-4.6.5 Repair work on compressed and liquefied gas fuel tanks shall be performed only by a qualified cylinder or tank manufacturer in accordance with the U.S. Department of Transportation regulations.

3-4.7 Parts Cleaning.

3-4.7.1 Cleaning of parts shall be performed with a nonflammable solvent.

Exception: A combustible liquid with a flash point above 100°F (37.8°C) (closed cup) shall be permitted to be used for this purpose provided adequate ventilation is supplied and no sources of ignition are present in the cleaning area.

3-4.7.2 Devices used to heat nonflammable solvent shall conform to the requirements of one or both of the following: NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, or NFPA 54, *National Fuel Gas Code*. These heating devices shall be installed in accordance with the requirements set forth in 3-2.2 of this standard.

3-4.7.3 A device for heating solvents that give off flammable or toxic vapors when heated shall be provided with a limit control to prevent the solvent from exceeding a temperature 50°F (10°C) below the point at which flammable or toxic vapors are released.

3-4.7.4 Direct-fired parts cleaners shall not be installed or used below grade.

3-4.8 Chassis Cleaning.

3-4.8.1 Chassis cleaning shall not be performed with flammable liquids having flash points below 140°F (60°C) (closed cup). If steam is used, it shall be supplied from a boiler located, installed, and safeguarded in accordance with the applicable requirements for heating equipment set forth in Section 3-2 of this standard and in the following documents: NFPA 31, *Standard for the Installation of Oil-Burning Equipment*; NFPA 54, *National Fuel Gas Code*; NFPA 8501, *Standard for Single Burner Boiler Operation*; and NFPA 8502, *Standard for the Prevention of Furnace Explosions/Implosions in Multiple Burner Boiler-Furnaces*.

3-4.8.2 Steam cleaning devices shall be of an approved type.

3-5 Storage and Handling of Flammable Liquids, Liquefied Petroleum Gases, and Compressed Natural Gases.

3-5.1 The storage and handling of flammable liquids shall be in accordance with NFPA 30, *Flammable and Combustible Liquids Code*. The storage and handling of liquefied petroleum gas shall be in accordance with NFPA 58, *Standard for the Storage and Handling of Liquefied Petroleum Gases*. The storage and handling of flammable compressed gas fuels shall be in accordance with NFPA 55, *Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders*, and NFPA 52, *Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems*.

3-5.2 Dispensing of Flammable Liquids. 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 30, *Flammable and Combustible Liquids Code*.

3-6 Housekeeping.

3-6.1 An authorized employee, an officer of the firm, or the owner shall make daily inspections of the garage 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.

3-6.2 Clear aisle space shall be maintained to permit ready access to and the use of fire-fighting equipment.

3-6.3 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.

3-6.4 Metal lockers shall be provided for employees' clothes.

3-6.5 Approved metal receptacles with self-closing covers shall be provided for the storage or disposal of oil-soaked waste or cloths.

3-6.6 Combustible rubbish shall be placed in covered metal receptacles until removed to a safe place for disposal. Contents of such containers shall be removed daily.

3-6.7 Smoking shall be prohibited except in designated areas subject to the approval of the authority having jurisdiction.

Chapter 4 Protection

4-1 Automatic Sprinklers. Approved automatic sprinkler equipment installed in conformance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, shall be provided in repair garages under the following conditions:

(a) Repair garages more than one story in height or located beneath another occupancy that exceed an area on any one floor of 10,000 ft² (929 m²) if of Type I construction; 8000 ft² (743 m²) if of Type II (222) or Type II (111) construction; or 6000 ft² (557 m²) if of Type II (000), Type III, Type IV, or Type V construction

(b) One-story repair garages exceeding an area of 15,000 ft² (1394 m²) if of Type I construction; 12,000 ft² (1115 m²) if of Type II (222) or Type II (111) construction; 9000 ft² (836 m²) if of Type II (000), Type III, or Type IV construction; or 6000 ft² (558 m²) if of Type V construction

(c) All below-grade floors of repair garages, the ceilings of which are less than 2 ft (.61 m) above grade

4-2* Maintenance and Supervision of Automatic Sprinkler Systems.

4-2.1 Where an automatic sprinkler system is provided as a requirement of this standard, the system shall be adequately supervised to assure reliable operation as follows:

(a) The automatic sprinkler 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 could become inoperable due to closing of valves, interruption of power, or other reasons, ade-

quate 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 automatic sprinkler 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 following NFPA standards: NFPA 72, *National Fire Alarm Code* and NFPA 1221, *Standard for the Installation, Maintenance, and Use of Public Fire Service Communication Systems*.

4-2.2 Every automatic 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 that the system will perform as expected in a fire emergency.

4-3 Portable Fire Extinguishers. Approved extinguishers, installed and maintained in accordance with NFPA 10, *Standard for Portable Fire Extinguishers*, shall be provided in all repair garages.

4-4 Standpipes. All repair garages that exceed a height of 50 ft (15.2 m), have parking levels below grade, or are unsprinklered and more than one story in height shall be provided with one or more standpipes conforming to the provisions of NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*.

4-5* Employee Instruction. Employees of all repair garages 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 5 Referenced Publications

5-1 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 A.

5-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 10, *Standard for Portable Fire Extinguishers*, 1994 edition.

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 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 33, *Standard for Spray Application Using Flammable or Combustible Materials*, 1995 edition.

NFPA 51, *Standard for the Design and Installation of Oxygen-Fuel Gas Systems for Welding, Cutting, and Allied Processes*, 1997 edition.

NFPA 51B, *Standard for Fire Prevention in Use of Cutting and Welding Processes*, 1994 edition.

NFPA 52, *Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems*, 1995 edition.

NFPA 54, *National Fuel Gas Code*, 1996 edition.

NFPA 55, *Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders*, 1993 edition.

NFPA 58, *Standard for the Storage and Handling of Liquefied Petroleum Gases*, 1995 edition.

NFPA 70, *National Electrical Code®*, 1996 edition.

NFPA 72, *National Fire Alarm Code*, 1996 edition.

NFPA 80, *Standard for Fire Doors and Fire Windows*, 1995 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, 1994 edition.

NFPA 86, *Standard for Ovens and Furnaces*, 1995 edition.

NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems*, 1996 edition.

NFPA 91, *Standard for Exhaust Systems for Air Conveying of Materials*, 1995 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.

NFPA 327, *Standard Procedures for Cleaning or Safeguarding Small Tanks and Containers Without Entry*, 1993 edition.

NFPA 1221, *Standard for the Installation, Maintenance, and Use of Public Fire Service Communication Systems*, 1994 edition.

NFPA 8501, *Standard for Single Burner Boiler Operation*, 1997 edition.

NFPA 8502, *Standard for the Prevention of Furnace Explosions/Implosions in Multiple Burner Boilers*, 1995 edition.

Appendix A Explanatory Material

This appendix is not a part of the requirements of this NFPA document but is included for informational purposes only.

A-1-3 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-1-3 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-1-3 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-1-3 Taxicab and Bus Repair Garages. Motor freight terminals are covered in NFPA 513, *Standard for Motor Freight Terminals*.

A-2-1.2 Building codes generally contain provisions limiting the heights and areas of repair garages 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.

A-2-3.3 For requirements for inspection and repair pits, see 3-4.5.

A-3-1.1 The intent is that the electrical equipment be placed below a volume located at the highest area of the building equal to 150 percent of the released volume of the largest CNG tank.

A-3-2.1.1 Heating of repair garages should be by indirect means with low pressure steam, hot water, or warm air. Electric heaters or gas heaters that have been examined and listed for this application can be used. The use of an open flame for heating purposes is prohibited.

A-3-2.1.2 Enclosed rooms or spaces should prohibit the transmission of gases from the room or space repairing or storing CNG or LNG fueled vehicles to other areas of the building. Other areas outside of the enclosure, if not repairing or storing CNG or LNG fueled vehicles, can use other heating methods. Facilities that turn off noncomplying heaters, including pilot lights, to repair or store CNG or LNG fueled vehicles can comply with this section.

A-3-3 It is recognized that the ventilation requirements contained in Section 3-3 do not consider exhaust emissions from motor vehicle engines being tested. Authorities having jurisdiction should be consulted to determine precautions necessary to protect against this health hazard.

A-3-3.1 Manual control switches for the supply and exhaust ventilating systems should be located close to the entrance door. In buildings protected by an automatic sprinkler or fire alarm system, it is recommended that the necessary devices and connections be installed to shut down fans when sprinklers or fire alarms operate.

A-3-3.4 For required protection for duct openings in fire walls, see 2-5.3. See 3-2.2 for required protection of duct open-

ings in walls or partitions separating heater rooms from motor vehicle repair or parking areas.

A-3-4.2.3 Never attach the ground wire to the chassis if welding a fender, as the electrical resistance between the two could be sufficient to cause a fire or personal injury. Do not use monorail and hoist as the ground side for the same reason.

A-4-2 It is recommended that all repair garages be provided with approved guard service, an approved automatic fire alarm system, or, if the garage is sprinklered, with approved sprinkler supervisory service. Guards should make rounds at least hourly through all portions of the garage at night and at all other times when not open for regular business. Details of facilities for approved guard, fire alarm, and supervisory service are contained in the standards referenced in 4-2.1 (d).

A-4-5 Repair garages not within the protection area of an organized public fire department should have a fire brigade 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 5. 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 513, *Standard for Motor Freight Terminals*, 1994 edition.
NFPA 600, *Standard on Industrial Fire Brigades*, 1996 edition.

Appendix C Bibliography

This appendix is not a part of the requirements of this NFPA document, but is included for informational purposes only.

C-1 U.S. Government Publications. U.S. Government Printing Office, Washington, DC 20402.

Clean Air Program, *Compressed Natural Gas Safety in Transit Operations*, U.S. Department of Transportation Federal Transit Administration. DOT-FTA-MA-90-7007-95-2, October 1995.

Clean Air Program, *Summary Assessment of the Safety, Health, Environmental and System Risks of Alternate Fuel*, U.S. Department of Transportation Federal Transit Administration. DOT-FTA-MA-90-7007-95-1, August 1995.