

NFPA[®]

90B

**Standard for the Installation
of Warm Air Heating and
Air-Conditioning Systems**

2015



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NFPA® 90B

Standard for the

Installation of Warm Air Heating and Air-Conditioning Systems

2015 Edition

This edition of NFPA 90B, *Standard for the Installation of Warm Air Heating and Air-Conditioning Systems*, was prepared by the Technical Committee on Air Conditioning. It was issued by the Standards Council on April 29, 2014, with an effective date of May 19, 2014, and supersedes all previous editions.

This edition of NFPA 90B was approved as an American National Standard on May 19, 2014.

Origin and Development of NFPA 90B

This standard dates from 1899, when committee attention was first given to blower and exhaust systems. Prior to 1936, the subject of air conditioning was covered in NFPA standards on blower systems. In 1937, it was decided to prepare a separate standard on air-conditioning, warm air heating, and ventilating systems. This standard was initially adopted in 1937 with subsequent amendments in 1938, 1939, 1940, 1942, 1950, 1952, 1955, 1956, 1960, 1961, 1963, 1964, 1965, 1968, 1971, 1973, 1976, 1980, 1984, and 1989. The 1993 and 1996 editions were reconfirmations of the 1989 edition. The 1999 edition contained changes that were mainly editorial in nature.

The 2002 edition incorporated format changes to comply with the *Manual of Style for NFPA Technical Committee Documents* and new provisions for the removal of accessible abandoned materials in concealed spaces and plenums.

The only changes to the 2006 edition were to update “flame spread rating” to “flame spread index.”

The major change in the 2009 edition was to replace the references to NFPA 255 with ANSI/UL 723 and ASTM E 84, since NFPA 255 had been withdrawn. All three test standards are quite similar.

The changes in the 2012 edition were for the purpose of updating the editions of the referenced standards.

For the 2015 edition, the changes that have been made consist of primarily editorial alterations, reference updates, and clarifications of existing language. A section and test method for air dispersion systems has also been added.



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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 the construction, installation, operation, and maintenance of systems for air conditioning, warm air heating, and ventilating including filters, ducts, and related equipment to protect life and property from fire, smoke, and gases resulting from fire or from conditions having manifestations similar to fire.

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NFPA 90B

Standard for the
Installation of Warm Air Heating and
Air-Conditioning Systems

2015 Edition

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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 Annex A.

A reference in brackets [] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex B. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

1.1* Scope. This standard shall cover construction, installation, operation, and maintenance of systems for warm air heating and air conditioning, including filters, ducts, and related equipment to protect life and property from fire, smoke, and gases resulting from fire or from conditions having manifestations similar to fire.

1.2 Purpose. This standard shall prescribe provisions based on minimum requirements for safety to life and property.

1.3 Application.

1.3.1 This standard shall apply to all systems for the movement of environmental air in structures that serve the following, except as described in 1.3.2:

- (1) One- or two-family dwellings
- (2) Spaces not exceeding 708 m³ (25,000 ft³) in volume in any occupancy

1.3.2 This standard shall not apply to systems for the movement of environmental air in buildings of combustible construction over three stories in height, which shall comply with NFPA 90A.

1.4 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.

1.4.1 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

1.4.2 The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 70®, *National Electrical Code*®, 2014 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2015 edition.

NFPA 286, *Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*, 2011 edition.

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, 2010 edition.

2.3 Other Publications.

2.3.1 ANSI/ASHRAE Publications. American National Standards Institute, Inc., 25 West 43rd Street, 4th floor, New York, NY 10036.

ANSI/ASHRAE 15, *Safety Code for Mechanical Refrigeration*, 2004.

2.3.2 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM C 411, *Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation*, 2011.

ASTM D 93, *Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester*, 2013.

ASTM E 84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2013a.

ASTM E 2231, *Standard Practice for Specimen Preparation and Mounting of Pipe and Duct Insulation Materials to Assess Surface Burning Characteristics*, 2009.

ASTM E 2688, *Standard Practice for Specimen Preparation and Mounting of Tapes to Assess Surface Burning Characteristics*, 2012.

ASTM E 2690, *Standard Practice for Specimen Preparation and Mounting of Caulks and Sealants to Assess Surface Burning Characteristics*, 2010e2.

2.3.3 SMACNA Publications. Sheet Metal and Air Conditioning Contractors' National Association, Inc., 4201 Lafayette Center Drive, Chantilly, VA 20151-1209.

Fibrous Glass Duct Construction Standards, 7th edition, 2003.

HVAC Duct Construction Standards — Metal and Flexible, 3rd edition, 2005.

Residential Comfort System Installation Standards Manual, 7th edition, 1998.

2.3.4 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 94, *Standard for Safety Test for Flammability of Plastic Materials for Parts in Devices and Appliances*, 1996, revised 2012.

ANSI/UL 181, *Standard for Safety Factory-Made Air Ducts and Air Connectors*, 2013.

ANSI/UL 181A, *Standard for Safety Closure Systems for Use with Rigid Air Ducts*, 2013.

ANSI/UL 181B, *Standard for Safety Closure Systems for Use with Flexible Air Ducts and Air Connectors*, 2013.

ANSI/UL 723, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2008, revised 2013.

ANSI/UL 900, *Standard for Air Filter Units*, 2004, revised 2012.

UL 2518, *Outline of Investigation for Air Dispersion System Materials*, 2005.

2.3.5 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2015 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3* 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 appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.4 Shall. Indicates a mandatory requirement.

3.2.5 Should. Indicates a recommendation or that which is advised but not required.

3.3 General Definitions.

3.3.1 Accessible. Capable of being removed or exposed without damaging the building structure or finish, or not permanently closed in by the structure or finish of the building. [90A, 2015]

3.3.2 Air Filter. A device used to reduce or remove airborne solids from heating, ventilating, and air-conditioning systems.

3.3.3 Central Warm Air Heating System. A heating system consisting of a heat exchanger with an outer casing or jacket, a solar collection system, or an electric heating unit that is connected to a supply system and a return system.

3.3.3.1 Forced Air System. A central warm air heating system that is equipped with a fan or blower that provides the primary means for circulation of air.

3.3.3.2* Gravity System. A central warm air heating system through which air is circulated by gravity.

3.3.4 Combustible Material. A material capable of undergoing combustion.

3.3.5 Duct Covering. A material such as adhesive, insulation, banding, coating(s), film, and jackets used to cover the outside surface of a duct, fan casing, or duct plenum.

3.3.6 Duct Lining. A material such as adhesive, insulation, coating(s), and film used to line the inside surface of a duct, fan casing, or duct plenum.

3.3.7 Heat Pump. A refrigeration system arranged to accomplish either heating or heating and cooling.

3.3.8 Noncombustible Material. See Section 4.1.

3.3.9 Plenum. A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system.

3.3.10 Return System. An assembly of connected ducts, air passages, or plenums and fittings through which air from the space or spaces to be conditioned is conducted back to the heat exchanger.

3.3.11 Rooms Large in Comparison with Size of Equipment. Rooms having a volume equal to at least 12 times the total volume of a furnace or air-conditioning appliance and at least 16 times the total volume of a boiler. The total volume of the appliance is determined from exterior dimensions and is to include fan compartments and burner vestibules, when used. When the actual ceiling height of a room is greater than 2.44 m (8 ft), the volume of a room is figured on the basis of a ceiling height of 2.44 m (8 ft).

3.3.12 Supply System. An assembly of connected ducts, air passages, or plenums and fittings through which air is conducted to the space or spaces to be conditioned.

Chapter 4 System Components

4.1* Supply Systems.

4.1.1 Duct Materials.

4.1.1.1* Supply Ducts. Supply ducts shall be made of either of the following materials:

- (1) Class 0 or Class 1 rigid or flexible air ducts tested in accordance with ANSI/UL 181
- (2) Sheet metal having a nominal thickness as shown in Table 4.1.1.1

4.1.1.1.1 Supply ducts that are completely encased in not less than 51 mm (2 in.) of concrete in a floor slab shall not be required to meet the requirements of 4.1.1.1.

4.1.1.1.1.1 The supply ducts shall meet the requirements of 4.1.1.1(1) and 4.1.1.1(2) within 0.61 m (2 ft) of the furnace supply plenum and within 0.61 m (2 ft) of a vertical connection to a riser or register.

4.1.1.1.2 Supply ducts for a separate air cooling system, not interconnected to any warm air heating system, serving a single-family dwelling shall not be required to meet the requirements of 4.1.1.1, provided that they are not closer than 0.61 m (2 ft) to any furnace or its supply plenum, boiler, or other heat-producing appliances and that they comply with 4.2.1.1, 4.2.1.3, 4.2.2, 4.2.3, and 4.2.4 as specified for return ducts.