

NFPA 90B

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

2006 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471
An International Codes and Standards Organization

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA DOCUMENTS

NOTICE AND DISCLAIMER OF LIABILITY CONCERNING THE USE OF NFPA DOCUMENTS

NFPA codes, standards, recommended practices, and guides, of which the document contained herein is one, are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in its codes and standards.

The NFPA disclaims liability for any personal injury, property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making this document available, the NFPA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the NFPA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the NFPA list, certify, test or inspect products, designs, or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the NFPA and is solely the responsibility of the certifier or maker of the statement.

ADDITIONAL NOTICES AND DISCLAIMERS

Updating of NFPA Documents

Users of NFPA codes, standards, recommended practices, and guides should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of Tentative Interim Amendments. An official NFPA document at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of Tentative Interim Amendments or corrected through the issuance of Errata, consult appropriate NFPA publications such as the National Fire Codes® Subscription Service, visit the NFPA website at www.nfpa.org, or contact the NFPA at the address listed below.

Interpretations of NFPA Documents

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing Committee Projects shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

Patents

The NFPA does not take any position with respect to the validity of any patent rights asserted in connection with any items which are mentioned in or are the subject of NFPA codes, standards, recommended practices, and guides, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on these documents. Users of these documents are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

NFPA adheres to applicable policies of the American National Standards Institute with respect to patents. For further information contact the NFPA at the address listed below.

Law and Regulations

Users of these documents should consult applicable federal, state, and local laws and regulations. NFPA does not, by the publication of its codes, standards, recommended practices, and guides, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

This document is copyrighted by the NFPA. It is made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of safe practices and methods. By making this document available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to this document.

Use of NFPA documents for regulatory purposes should be accomplished through adoption by reference. The term “adoption by reference” means the citing of title, edition, and publishing information only. Any deletions, additions, and changes desired by the adopting authority should be noted separately in the adopting instrument. In order to assist NFPA in following the uses made of its documents, adopting authorities are requested to notify the NFPA (Attention: Secretary, Standards Council) in writing of such use. For technical assistance and questions concerning adoption of NFPA documents, contact NFPA at the address below.

For Further Information

All questions or other communications relating to NFPA codes, standards, recommended practices, and guides and all requests for information on NFPA procedures governing its codes and standards development process, including information on the procedures for requesting Formal Interpretations, for proposing Tentative Interim Amendments, and for proposing revisions to NFPA documents during regular revision cycles, should be sent to NFPA headquarters, addressed to the attention of the Secretary, Standards Council, NFPA, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

For more information about NFPA, visit the NFPA website at www.nfpa.org.

Copyright © 2005, National Fire Protection Association, All Rights Reserved

NFPA 90B

Standard for the

Installation of Warm Air Heating and Air-Conditioning Systems

2006 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 and acted on by NFPA at its June Association Technical Meeting held June 6–10, 2005, in Las Vegas, NV. It was issued by the Standards Council on July 29, 2005, with an effective date of August 18, 2005, and supersedes all previous editions.

This edition of NFPA 90B was approved as an American National Standard on August 18, 2005.

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 “frame spread rating” to “frame spread index.”

Technical Committee on Air Conditioning

L. Jeffrey Mattern, *Chair*

FM Global, PA [I]

Rep. FM Global/FM Research

Charles E. Altizer, DHCD-Jackson Center, VA [E]

Rep. International Fire Marshals Association

Jesse J. Beitel, Hughes Associates, Inc., MD [SE]

Joseph A. Brooks, Air Movement & Control Association International, IL [M]

Rep. Air Movement & Control Association/HVI Division

James S. Buckley, CCRD Partners, TX [IM]

Rep. American Society for Heating, Refrigeration & Air Conditioning Engineers Inc.

Frederic B. Clarke, Benjamin Clarke Associates, Inc., VA [SE]

Michael Earl Dillon, Dillon Consulting Engineers, Inc., CA [SE]

Thomas M. Dusza, Schirmer Engineering Corporation, CA [I]

Victor Ferrante, U.S. Dept. of Housing and Urban Development, DC [U]

Frederick M. Foster, Fusion Data Comm., Inc., CT [IM]

James R. Hoover, The DuPont Company, DE [M]

Rep. Society of the Plastics Industry, Inc.

Winfield T. Irwin, Irwin Services, PA [M]

Rep. North American Insulation Manufacturers Association

Michael J. Jontry, State of Illinois, IL [E]

Philip R. Jose, U.S. Department of Veterans Affairs, NY [U]

Rep. American Society for Healthcare Engineering

Daniel J. Kaiser, Underwriters Laboratories Inc., IL [RT]

Marvin A. Koerber, ATCO Rubber Products, Inc., SC [M]

Rep. Air Diffusion Council

John M. Moritz, Jr., The Gitto/Global Corporation, PA [M]

Rep. Fire Retardant Chemicals Association/Plenum Cable Association

Richard P. Owen, City of St. Paul, MN [E]

Rep. National Electrical Code Correlating Committee

Frank Peri, Communications Design Corporation, MD [SE]

Rep. Association of Cabling Professionals

Suresh K. Shah, U.S. Department of Health and Human Services, TX [U]

Randolph W. Tucker, The RJA Group, Inc., TX [SE]

Robert J. Wasilewski, Sheet Metal & Air Conditioning Contractors National Association, VA [IM]

Rep. Sheet Metal & Air Conditioning Contractors National Association

Robert A. Wessel, Gypsum Association, DC [M]

Robert J. Wills, American Iron and Steel Institute, AL [M]

Rep. American Iron and Steel Institute

Alternates

Lee Applegate, Apollo Fire Detections Ltd., CA [M]
(Voting Alt. to NEMA Rep.)

Delbert F. Boring, Jr., American Iron and Steel Institute, OH [M]

(Alt. to R. J. Wills)

Douglas S. Erickson, American Society for Healthcare Engineering, VA [U]

(Alt. to P. R. Jose)

Marcelo M. Hirschler, GBH International, CA [M]

(Alt. to J. M. Moritz)

Eli Howard III, Sheet Metal & Air Conditioning Contractors National Association, VA [IM]

(Alt. to R. J. Wasilewski)

Ralph A. Koerber, ATCO Rubber Products, Inc., SC [M]

(Alt. to M. A. Koerber)

Randall K. Laymon, Underwriters Laboratories Inc., IL [RT]

(Alt. to D. J. Kaiser)

Peter J. Mulvihill, The RJA Group, Inc., NV [SE]

(Alt. to R. W. Tucker)

Thomas E. Ponder, CertainTeed Corporation, PA [M]

(Alt. to W. T. Irwin)

Michael J. Rzeznik, Schirmer Engineering of New York, NY [I]

(Alt. to T. M. Dusza)

Robert Van Becelaere, Ruskin Manufacturing, MO [M]

(Alt. to J. A. Brooks)

Allan Fraser, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the 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 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.

Contents

Chapter 1 Administration	90B- 4	Chapter 4 System Components	90B- 5
1.1 Scope	90B- 4	4.1 Supply Systems	90B- 5
1.2 Purpose	90B- 4	4.2 Return Systems	90B- 7
1.3 Application	90B- 4	4.3 Common Requirements	90B- 7
1.4 Equivalency	90B- 4	Chapter 5 Fire Integrity of Building	
Chapter 2 Referenced Publications	90B- 4	Construction	90B- 8
2.1 General	90B- 4	5.1 Clearances to Combustible Material	90B- 8
2.2 NFPA Publications	90B- 4	5.2 Firestopping	90B-13
2.3 Other Publications	90B- 4	Chapter 6 Equipment, Wiring, and Controls	90B-13
2.4 References for Extracts in Mandatory		6.1 Equipment	90B-13
Sections	90B- 5	6.2 Electric Wiring and Equipment	90B-14
Chapter 3 Definitions	90B- 5	6.3 Controls	90B-14
3.1 General	90B- 5	Annex A Explanatory Material	90B-14
3.2 NFPA Official Definitions	90B- 5	Annex B Informational References	90B-15
3.3 General Definitions	90B- 5	Index	90B-16

NFPA 90B**Standard for the****Installation of Warm Air Heating and
Air-Conditioning Systems****2006 Edition**

IMPORTANT NOTE: This NFPA document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading "Important Notices and Disclaimers Concerning NFPA Documents." They can also be obtained on request from NFPA or viewed at www.nfpa.org/disclaimers.

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

Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

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. Editorial changes to extracted material consist of revising references to an appropriate division in this document or the inclusion of the document number with the division number when the reference is to the original document. 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. This standard shall apply to all systems for the movement of environmental air in structures that serve the following:

- (1) One- or two-family dwellings
- (2) Spaces not exceeding 708 m³ (25,000 ft³) in volume in any occupancy
- (3) Buildings of combustible construction over three stories in height shall be in accordance 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*®, 2005 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2002 edition.

NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, 2006 edition.

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, 2004 edition.

2.3 Other Publications.

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

ANSI/ASHRAE 15, *Safety Code for Mechanical Refrigeration*, 1998.

2.3.2 ASTM Publications. American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM C 411, *Standard Test Method for Hot-Surface Performance of High-Temperature Thermal Insulation*, 1997.

ASTM D 93, *Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester*, 2000.

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, 6th edition, 1992.

HVAC Duct Construction Standards — Metal and Flexible, 2nd edition, 1995.

Installation Standards for Residential Heating and Air Conditioning Systems, 6th edition, 1988.

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

UL 94, *Standard for Safety Test for Flammability of Plastic Materials for Parts in Devices and Appliances*, 1991.

UL 181, *Standard for Safety Factory-Made Air Ducts and Air Connectors*, 1996.

UL 181A, *Standard for Safety Closure Systems for Use with Rigid Air Ducts and Air Connectors*, 1994.

UL 181B, *Standard for Safety Closure Systems for Use with Flexible Air Ducts and Air Connectors*, 1995.

UL 900, *Standard for Safety Air Filter Units*, 1994.