

NFPA® 92B

Standard for Smoke Management Systems in Malls, Atria, and Large Spaces

2009 Edition



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An International Codes and Standards Organization

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NFPA® 92B

Standard for

Smoke Management Systems in Malls, Atria, and Large Spaces

2009 Edition

This edition of NFPA 92B, *Standard for Smoke Management Systems in Malls, Atria, and Large Spaces*, was prepared by the Technical Committee on Smoke Management Systems. It was issued by the Standards Council on May 30, 2008, with an effective date of July 18, 2008, and supersedes all previous editions.

This edition of NFPA 92B was approved as an American National Standard on July 18, 2008.

Origin and Development of NFPA 92B

The NFPA Standards Council established the Technical Committee on Smoke Management Systems in 1985 and charged it with addressing the need for guidelines and materials on building fire smoke management. The Committee's first document, NFPA 92A, *Recommended Practice for Smoke-Control Systems*, was published in 1988 and addressed smoke control utilizing barriers, airflows, and pressure differentials so as to confine the smoke of a fire to the zone of fire origin to maintain a tenable environment in other zones. The complex problem of maintaining tenable conditions within large zones of fire origin, such as atria and shopping malls, represented a more difficult issue in terms of the physics involved and thus was reserved for the document, NFPA 92B, *Guide for Smoke Management Systems in Malls, Atria, and Large Areas*. The first edition was published in 1991; the second edition was published in 1995.

The 2000 edition was a substantial rewrite of the document to reflect the best current information on smoke management in malls, atria, and other large spaces. Major changes included new and updated definitions, additional data on the impact of sprinklers on smoke management, extensive discussion on basic principles and limitations, additional information on estimating heat release rates of fires, and new criteria for system verification.

The 2005 edition was a major revision from the previous edition. The document was rewritten as a standard with mandatory provisions regarding the design, installation, and testing of smoke management systems. In addition, the document was reorganized to comply with the *Manual of Style for NFPA Technical Committee Documents*. Some technical changes included the revision of some equations used to determine the minimum number of exhaust inlets and the introduction of advisory information on how to calculate smoke temperature when plugholing is being considered. Text was also revised to clarify the application of certain equations and to provide guidance on determining the effective smoke layer interface and the application of virtual origin concept. Example problems were revised to reflect changes made in the standard.

The 2009 edition includes changes that specify design criteria to maintain tenable spaces, provision for plume design for a variety of geometrics, and a method to calculate smoke densities. This edition also incorporates the Tentative Interim Amendments (TIAs) issued for the 2005 edition, which modified a number of the equations.

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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 design, installation, testing, operation, and maintenance of systems for the control, removal, or venting of heat or smoke from fires in buildings.

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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 J. 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 J.

Chapter 1 Administration**1.1* Scope.**

1.1.1 This standard provides methodologies for estimating the location of smoke within a large-volume space due to a fire either in the large-volume space or in an adjacent space.

1.1.1.1 These methodologies comprise the technical basis for assisting in the design, installation, testing, operation, and maintenance of new and retrofitted smoke management systems for the management of smoke within the space where the fire exists or between spaces not separated by smoke barriers.

1.1.1.2 Buildings within the scope of this standard include those with atria, covered malls, and similar large-volume spaces.

1.1.1.3 This standard is not intended to apply to warehouses, manufacturing facilities, or other similar spaces.

1.1.1.4 This standard does not provide methodologies to assess the effects of smoke exposure on people, property, or mission continuity.

1.1.2 The algebraic approaches to smoke management contained in this standard assume either that the smoke removal will be by mechanical means or that the smoke will fill the large space.

1.2 Purpose.

1.2.1* The purpose of this standard is to provide requirements for implementing smoke management systems to accomplish one or both of the following:

- (1) Maintain a tenable environment in the means of egress from large-volume building spaces during the time required for evacuation
- (2) Control and reduce the migration of smoke between the fire area and adjacent spaces

1.2.2 Specific design objectives are established in other codes and standards.

1.3 Retroactivity.

1.3.1 Unless otherwise noted, the provisions of this standard are not intended to be applied to facilities, equipment, structures, or installations that were existing or approved for construction or installation prior to the effective date of this standard.

1.3.2 In those cases where the authority having jurisdiction determines that the existing situation involves a distinct hazard to life or property, retroactive application of the provisions of this standard shall be permitted.

1.3.3 Where a smoke management system is being altered, extended, or renovated, the requirements of this standard shall apply only to the work being undertaken.

1.3.4 Verification is required to ensure that new or modified systems do not adversely affect the performance of existing smoke management systems.

1.4 Equivalency.

1.4.1 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.

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

1.4.3 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*®, 2008 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2009 edition.

2.3 Other Publications.

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

ANSI/UL 555, *Standard for Fire Dampers*, 2006.

ANSI/UL 555S, *Standard for Smoke Dampers*, 2006.

ANSI/UL 864, *Standard for Control Units and Accessories for Fire Alarm Systems*, 2006.

