80A

# NFPA 80A Recommended Practice for Protection of Buildings from Exterior Fire Exposure 1996 Edition

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An International Codes and Standards Organization

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### Policy Adopted by NFPA Board of Directors on December 3, 1982

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

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**NFPA 80A**

**Recommended Practice for**

# Protection of Buildings from Exterior Fire Exposures

**1996 Edition**

This edition of NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*, was prepared by the Technical Committee on Exposure Fire Protection and acted on by the National Fire Protection Association, Inc., at its Annual Meeting held May 20–23, 1996, in Boston, MA. It was issued by the Standards Council on July 18, 1996, with an effective date of August 9, 1996, 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 80A was approved as an American National Standard on July 26, 1996.

## Origin and Development of NFPA 80A

In 1924, the NFPA Committee on Protection of Openings in Walls and Partitions developed a *Suggested Practice for Protection Against Exposure of Openings in Fire-Resistive Walls* to meet the demand for a method of evaluating the severity of exposure and a uniform practice for specifying protection. This pamphlet was submitted as a tentative recommended practice and was adopted by the NFPA in 1925.

In 1930, this pamphlet was added to the *Standard for the Protection of Openings in Walls and Partitions Against Fire* as an appendix, but it was not published until the 1944 edition of the *National Fire Codes®*, Vol. III, except as part of the "NFPA Proceedings." It also was summarized in the 9th edition (1941) of the *Handbook of Fire Protection*.

In 1963, a new NFPA Committee on Exposure Fire Protection was formed and was charged with the task of updating the 1925 edition of NFPA 80A. The committee submitted a complete revision of the 1925 text to the Association for tentative adoption in 1967 and a revision of the tentative text for official adoption in 1970.

In the 1987 edition, there were substantive and editorial changes. In 1993, revisions continued to examine the effect of fire on an exposed structure and calculative methods to help ensure a reduction in fire impact due to exposure fires.

In the 1996 edition, some editorial changes were made in addition to changes in the Appendix B examples.

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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.*

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 protection of buildings from fire exposure, excluding installation details for outside sprinklers, which are handled by the Technical Committee on Automatic Sprinklers.

## Contents

# NFPA 80A

## Recommended Practice for

# Protection of Buildings from Exterior Fire Exposures

## 1996 Edition

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

NOTE: Metric units of measurement in this recommended practice are in accordance with the modernized metric system known as the International System of Units (SI). The liter unit, which is outside of but recognized by SI, is commonly used in fire protection and is, therefore, used in this recommended practice. In this document, values for measurements are followed by an equivalent in SI units. The first stated value shall be regarded as the recommendation because the given equivalent value might be approximate.

Information on referenced publications can be found in Chapter 5 and Appendix C.

## Foreword

The hazards of exposure to a structure from adjacent exposing fires and the multiple conditions under which such exposure can occur make it impossible to develop a table, formula, or set of rules that adequately covers all conditions. The user of this recommended practice should become familiar with the general theory of radiation exposure hazard as outlined in A-1-3, "Exposure Severity."

## Chapter 1 General Information

**1-1 Scope.** These recommendations are intended to protect combustibles within, and on the exterior of, an exposed building. They contemplate effective fire-fighting activity.

**1-2 Purpose.** This pamphlet is prepared for the guidance of persons concerned with the protection of property from external building fires.

**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.

**Exposure.** The heat effect from an external fire that might cause ignition of, or damage to, an exposed building or its contents.

**Exposure Severity.*** The intensity of an exposing fire.

**Noncombustible Materials.** Materials of which no part ignites and burns when subjected to fire.

**Pilot Ignition.** The ignition of a material by radiation where a local high temperature igniting source is located in the stream of gases and volatiles issuing from the exposed material. In practice, a glowing ember or a flash of flame might constitute the high temperature ignition source, which often serves to ignite the flammable gases and volatiles.

This mechanism differs from spontaneous ignition by radiation in which there is no local high temperature igniting source and for which higher intensities of radiation are necessary.

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

**1-4 Types of Exposure.** There are two basic types of exposure to be considered, as described in 1-4.1 and 1-4.2.

**1-4.1 Exposure to Radiation.** Exposure to radiation can result:

(a) From radiant energy passing through windows or other openings in the facade of a burning building;

(b) From flames issuing from the windows of a burning building; or

(c) From flames issuing from the burning facade of a building.

**1-4.2 Exposure to Flames.** Exposure to flames results from flames issuing from the roof or top of a burning building in cases where the exposed building is higher than the burning building.

## Chapter 2 Classification of Exposures and Recommended Separation Distances

**2-1 Exposure from Buildings of Greater or Equal Height.** Where a building is exposed by a building of greater or equal height, only the thermal radiation from the walls or wall openings of the exposing building should be considered. Separation distances should be determined so that pilot ignition of the exposed building or its contents is unlikely, assuming no means of protection are installed in connection with either building.

**2-2 Explanation.** Paragraphs 2-2.1 through 2-2.5 explain the column headings in Tables 2-3 and 2-4.

**2-2.1 Width of Exposing Fire (w).** The length in ft (m) of the exposing wall between interior fire separations or between exterior end walls where no fire separations exist. Fire separations (such as partition walls or fire walls) should have sufficient fire resistance to contain the expected fire.

**2-2.2 Height of Exposing Fire (h).** The height in ft (m) of the number of stories involved in the exposing fire, considering such factors as the building construction, closure of vertical openings, and fire resistance of floors. The relevant fire separations should have sufficient fire resistance to contain the expected fire.

**2-2.3 Percent of Opening in Exposing Wall Area.** The percentage of the exposing wall made up of doors, windows, or other openings within the assumed height and width of the exposing fire. Walls without the ability to withstand fire penetration for more than 20 minutes should be treated as having 100-percent openings. Walls having the ability to withstand fire penetration for more than 20 minutes, but less than the expected duration of the fire, should be treated as having 75-percent openings.

**2-2.4 Severity.** Three levels of exposure severity are assumed: light, moderate, and severe. Two of the important properties influencing fire severity are:

(a) The average combustible load per unit of floor area.

(b) The characteristics and average flame spread ratings of the interior wall and ceiling finishes.

Tables 2-2.4(a) and 2-2.4(b) serve as guides in assessing severity based on these properties. In using these tables, the more severe of the two classifications should govern.

**Table 2-2.4(a) Severity of Fire Load**

| Fire Loading of Floor Area ($lb/ft^2$) | ($kg/m^2$) | Classification of Severity |
|---|---|---|
| 0–7[1] | 0–34 | Light |
| 8–15 | 35–73 | Moderate |
| 16 and up | 74 | Severe |

[1] Excluding any appreciable quantities of rapidly burning materials such as certain foamed plastics, excelsior, or flammable liquids. Where these materials are found in substantial quantities, the severity should be classed as moderate or severe.

**Table 2-2.4(b) Severity of Interior Wall and Ceiling Finish**

| Average Flame Spread Rating of Interior Wall and Ceiling Finish[2] | Classification of Severity[1] |
|---|---|
| 0–25 | Light |
| 26–75 | Moderate |
| 76 and up | Severe |

[1] Where only a portion of the exposing building has combustible interior finish (e.g., some rooms only, ceiling only, some walls only), this factor is considered in judging severity classification.
[2] See NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials.*

**2-2.5 Width vs. Height or Height vs. Width.** A measure of the configuration of the exposing facade expressed as a ratio.

**2-3* Separation Distances.** Table 2-3 determines the separation distance necessary between two buildings so that pilot ignition of the exposed building or its contents is unlikely, assuming no means of protection are installed in connection with either building. Guide numbers are obtained from this table. To determine distances, the lesser dimension of either width (w) or height (h) should be multiplied by the guide number and 5 ft (1.52 m) added to the result. Table 2-3 is based on a maximum tolerable level of incident radiation (I) at the facade of an unprotected exposed building of 12.5 $kW/m^2$ (0.3 $cal/cm^2/sec$ or 66 $Btu/ft^2/min$). This assumes that the facade is constructed of typical cellulosic materials. Where other combustible materials are used and I is indicated by appropriate tests to be less than 12.5 $kW/m^2$ (0.3 $cal/cm^2/sec$ or 66 $Btu/ft^2/min$) or where I is indicated to be greater than 12.5 $kW/m^2$ (0.3 $cal/cm^2/sec$ or 66 $Btu/ft^2/min$) and where there are no openings in the facade of the exposed building, the percentage openings should be adjusted by multiplying by the ratio of 12.5 $kW/m^2/I$ (0.3 $cal/cm^2/sec/I$ or 66 $Btu/ft^2/min/I$). Recommended separation distances contemplate fire department response. Where no organized fire-fighting facilities are available, the distances derived from guide numbers in Table 2-3 should be increased by a factor of up to 3.

**2-4* Exposure from Buildings of Lesser Height.** Where the exposing building is of lesser height than the exposed building, the separation distance should first be determined from Table 2-3. Where the roof assembly of the exposing building is combustible and has no fire resistance rating, means of protection should be provided above the roof level of the exposing building in accordance with Table 2-4.

**Table 2-3 Guide Numbers for Minimum Separation Distances**

| Severity | | | Width/Height or Height/Width | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Openings[1] | | | Guide Number (multiply by lesser dimension, add 5 ft (1.52 m), to obtain building–to–building separation) | | | | | | | | | | | | | | | | |
| Light | Moderate | Severe | 1.0 | 1.3 | 1.6 | 2.0 | 2.5 | 3.2 | 4 | 5 | 6 | 8 | 10 | 13 | 16 | 20 | 25 | 32 | 40 |
| 20 | 10 | 5 | 0.36 | 0.40 | 0.44 | 0.46 | 0.48 | 0.49 | 0.50 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 | 0.51 |
| 30 | 15 | 7.5 | 0.60 | 0.66 | 0.73 | 0.79 | 0.84 | 0.88 | 0.90 | 0.92 | 0.93 | 0.94 | 0.94 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| 40 | 20 | 10 | 0.76 | 0.85 | 0.94 | 1.02 | 1.10 | 1.17 | 1.23 | 1.27 | 1.30 | 1.32 | 1.33 | 1.33 | 1.34 | 1.34 | 1.34 | 1.34 | 1.34 |
| 50 | 25 | 12.5 | 0.90 | 1.00 | 1.11 | 1.22 | 1.33 | 1.42 | 1.51 | 1.58 | 1.63 | 1.66 | 1.69 | 1.70 | 1.71 | 1.71 | 1.71 | 1.71 | 1.71 |
| 60 | 30 | 15 | 1.02 | 1.14 | 1.26 | 1.39 | 1.52 | 1.64 | 1.76 | 1.85 | 1.93 | 1.99 | 2.03 | 2.05 | 2.07 | 2.08 | 2.08 | 2.08 | 2.08 |
| 80 | 40 | 20 | 1.22 | 1.37 | 1.52 | 1.68 | 1.85 | 2.02 | 2.18 | 2.34 | 2.48 | 2.59 | 2.67 | 2.73 | 2.77 | 2.79 | 2.80 | 2.81 | 2.81 |
| 100 | 50 | 25 | 1.39 | 1.56 | 1.74 | 1.93 | 2.13 | 2.34 | 2.55 | 2.76 | 2.95 | 3.12 | 3.26 | 3.36 | 3.43 | 3.48 | 3.51 | 3.52 | 3.53 |
| — | 60 | 30 | 1.55 | 1.73 | 1.94 | 2.15 | 2.38 | 2.63 | 2.88 | 3.13 | 3.37 | 3.60 | 3.79 | 3.95 | 4.07 | 4.15 | 4.20 | 4.22 | 4.24 |
| — | 80 | 40 | 1.82 | 2.04 | 2.28 | 2.54 | 2.82 | 3.12 | 3.44 | 3.77 | 4.11 | 4.43 | 4.74 | 5.01 | 5.24 | 5.41 | 5.52 | 5.60 | 5.64 |
| — | 100 | 50 | 2.05 | 2.30 | 2.57 | 2.87 | 3.20 | 3.55 | 3.93 | 4.33 | 4.74 | 5.16 | 5.56 | 5.95 | 6.29 | 6.56 | 6.77 | 6.92 | 7.01 |
| — | — | 60 | 2.26 | 2.54 | 2.84 | 3.17 | 3.54 | 3.93 | 4.36 | 4.82 | 5.30 | 5.80 | 6.30 | 6.78 | 7.23 | 7.63 | 7.94 | 8.18 | 8.34 |
| — | — | 80 | 2.63 | 2.95 | 3.31 | 3.70 | 4.13 | 4.61 | 5.12 | 5.68 | 6.28 | 6.91 | 7.57 | 8.24 | 8.89 | 9.51 | 10.05 | 10.50 | 10.84 |
| — | — | 100 | 2.96 | 3.32 | 3.72 | 4.16 | 4.65 | 5.19 | 5.78 | 6.43 | 7.13 | 7.88 | 8.67 | 9.50 | 10.33 | 11.15 | 11.91 | 12.59 | 13.15 |

[1] Where the percent openings or width/height or height/width ratio is between tables values provided, interpolation between respective guide numbers should be made. See A-2-3 for treatment of unequally distributed windows.

**Table 2-4 Minimum Separation Distances for Exposing Buildings with Combustible/Nonrated Roof Assemblies**

| Number of Stories Likely to Contribute to Flaming through the Roof | Horizontal Separation Distance or Height of Protection above Exposing Fire (ft) | (m) |
|---|---|---|
| 1 | 25 | 7.6 |
| 2 | 32 | 9.8 |
| 3 | 40 | 12.2 |
| 4 | 47 | 14.3 |

Where separation distances derived from Table 2-3 are less than the distances indicated in Table 2-4, means of protection should be applied on the exposed building wall to a height equal to the separation distance, commencing at the height of the roof of the exposing building.

**2-4.1** Where the roof of the exposing building has a sufficient fire resistance rating to contain the expected fire (based on the fire loading within the area), no exposure hazard is considered to exist throughout the roof.

**2-4.2** Where the roof has a fire resistance rating less than necessary to contain an expected fire, means of protection should be provided in accordance with Table 2-4, taking into consideration the fire stability of the roof assembly involved, the fuel it could contribute, including roof insulation and covering, and its tendency to inhibit flaming through the roof.

**2-4.3** Subject to 2-4.1 and 2-4.2, the number of stories expected to contribute to flaming through the roof should be considered to be the top story together with those successively located beneath that story that are not separated from it as indicated in 2-2.2.

**2-4.4** High attic spaces should be counted as a story subject to 2-4.1 and 2-4.2. Where the height of the attic is low, interpolation between the values provided in Table 2-4 should be made.

## Chapter 3 Means of Protection

**3-1 Types.** The various means of protecting buildings from fire damage resulting from exterior exposure are provided in 3-1.1 through 3-1.3. They do not appear in any specific order with regard to adequacy.

**3-1.1 Buildings.**

(a) Clear space between buildings, and

(b) Total automatic sprinkler protection.

**3-1.2 Walls.**

(a) Blank walls of noncombustible materials,

(b) Barrier walls (self-supporting) between the building and exposure,

(c) Extension of exterior masonry walls to form parapets or wings, and

(d) Automatic outside water curtains for combustible walls.

**3-1.3 Wall Openings.**

(a) Elimination of openings by filling with equivalent construction,

(b) Glass block panels in openings,

(c) Wired glass in steel sash (fixed or automatic closing) in openings,

(d) Automatic or deluge sprinklers outside over openings,

(e) Automatic (rolling steel) fire shutters on openings,

(f) Automatic fire doors on door openings, and

(g) Automatic fire dampers on wall openings.

**3-1.4** Additional means of protection that can be developed also should be considered. Examples of such protection might include double-glazed glass in metal sash, flame-retardant coatings, and other arrangements. Before implementing such means of protection, they should be approved.

**3-2 Evaluation.** In evaluating the suitability of any of the types of protection specified, the adverse effects of convected heat, flame impingement, and small flying brands associated with winds, as well as the beneficial effects of fire department operations, have been considered. Large flying brands have not been considered.

**3-3 Means of Protection.** The means of protection selected should be approved for the individual application and should be installed in accordance with appropriate standards (e.g., fire doors installed in accordance with NFPA 80, *Standard for Fire Doors and Fire Windows*; automatic sprinklers installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*).

**3-4 Manual Operation.** Manually operated window shutters or sprinklers should not be used. The excessive time needed to close or activate them at the time of a fire incident and the fact that the property exposed might be vacant or uninhabited at the time of the fire incident make their value questionable.

## Chapter 4 Application of Means of Protection

**4-1 Application.** Application of the various means of protection indicated in Chapter 3 allows a reduction of the separation distances indicated in Table 2-3 and Table 2-4 in accordance with the guidelines provided in Section 4-2.

**4-2* Separation Adjustments.**

**4-2.1 Frame or Combustible Exposed Exterior Walls.**

| Means of Protection | Separation Distance Adjustment |
|---|---|
| (a) Replace with blank fire-resistive wall (3-hour minimum) | reduce to 0 ft (0 m) |
| (b) Install automatic deluge water curtain over entire wall with no windows or with wired glass windows or with windows closed by ¾-hour protection | reduce to 5 ft (1.52 m) |
| (c) Install automatic deluge water curtain over entire wall with ordinary glass windows | reduce 50 percent |

**4-2.2 Frame or Combustible Exposed Exterior Wall [I Greater than 12.5 kW/m² (0.3 cal/cm²/sec or 66 Btu/ft²/min)] with Openings.**

| Means of Protection | Separation Distance Adjustment |
|---|---|
| (a) Replace with blank fire-resistive wall (3-hour minimum) | reduce to 0 ft (0 m) |
| (b) Install automatic deluge water curtain over entire wall with no windows or with wired glass windows or with windows closed by ¾-hour protection | reduce to 5 ft (1.52 m) |
| (c) Install automatic deluge water curtain over entire wall with ordinary glass windows | reduce 50 percent |
| (d) Close all wall openings with material equivalent to wall, or close with ¾-hour protection and eliminate combustible projections that have I less than wall | reduce to Table 2-3 values |

**4-2.3 Noncombustible Exposed Exterior Wall (Fire Resistance Less than 3 Hours).**

| Means of Protection | Separation Distance Adjustment |
|---|---|
| (a) Replace wall with blank fire-resistive wall (3-hour minimum) | reduce to 0 ft (0 m) |
| (b) Close all wall openings with material equivalent to wall, or close with ¾-hour protection and eliminate combustible projections | reduce 50 percent |
| (c) Install automatic deluge water curtain over entire wall with no windows or with wired glass windows or with windows closed by ¾-hour protection | reduce to 5 ft (1.52 m) |
| (d) Install automatic deluge water curtain on all wall openings equipped with ordinary glass and on combustible projections | reduce 50 percent |

**4-2.4 Veneered Exposed Exterior Wall [Combustible Construction Covered by a Minimum of 4 in. (100 mm) of Masonry].**

| Means of Protection | Separation Distance Adjustment |
|---|---|
| (a) Replace wall with blank fire-resistive wall (3-hour minimum) | reduce to 0 ft (0 m) |
| (b) Close all wall openings with ¾-hour protection and eliminate combustible projections | reduce 50 percent |
| (c) Close all wall openings with material equivalent to wall construction and eliminate combustible projections | reduce to 5 ft (1.52 m) |
| (d) Install automatic deluge water curtain over windows equipped with wired glass or over ¾-hour closed openings and on combustible projections | reduce to 5 ft (1.52 m) |
| (e) Install automatic deluge water curtain over windows equipped with ordinary glass and on combustible projections | reduce 50 percent |

**4-2.5 Fire-Resistive Exposed Exterior Wall (Minimum 3-Hour Rating).**

| Means of Protection | Separation Distance Adjustment |
|---|---|
| (a) Close all openings with material equivalent to wall or protect all wall openings with 3-hour protection | reduce to 0 ft (0 m) |
| (b) Protect all openings with 1½-hour protection | reduce 75 percent [max. recommended = 10 ft (3 m)] |
| (c) Protect all wall openings with ¾-hour protection | reduce 50 percent [max. recommended = 20 ft (6.1 m)] |
| (d) Install automatic deluge water curtain on all wall openings with wired glass or with ¾-hour or 1½-hour protection | reduce to 5 ft (1.52 m) |
| (e) Install automatic deluge water curtain on all wall openings equipped with ordinary glass | reduce 50 percent |

**4-3 Combustible Eaves.** Where combustible eaves, cornices, and other exterior ornamentation occur on exposed buildings, they should be treated as unprotected openings. Protection in accordance with Section 4-2 should be provided in these cases.

**4-4* Protected Exposing Building.** Where the exposing building or structure is protected throughout by an approved properly maintained system of automatic sprinklers of adequate design for the hazard involved, no exposure hazard is considered to exist.

**4-5* Protected Exposed Building.** Where the exposed building or structure is protected throughout by an approved properly maintained system of automatic sprinklers of adequate design for the hazard involved, the exposure hazard to the total exposed building and its contents is substantially reduced.

## Chapter 5 Referenced Publications

**5-1** The following documents or portions thereof are referenced within this recommended practice and should be considered part of the recommendations of this document.

The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

**5-1.1 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 80, *Standard for Fire Doors and Fire Windows*, 1995 edition.

NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, 1996 edition.

## Appendix A Explanatory Material

*This Appendix is not a part of the recommendations 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 concerned with product evaluations that is 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 Exposure Severity.** For the purpose of this document, exposure severity has been defined as "the intensity of an exposing fire." It is intended to be a measure of the radiation level developed per unit window area by the exposing fire. It represents a combination of radiation emitted through the window itself as well as that produced from the flames that project out the window and up the front of the building. Thus, since radiant transfer from the flames as well as the interior room walls is involved, the flame emissivity, dependent on fuel character as well as flame dimensions, can be of great importance.

The emission of flames and hot gases from the window of a room or building compartment during a fire can result from the establishment of a thermal pump. This pump is created by buoyancy differences between the hot combustion products and the surrounding outside ambient air and provides a positive means for furnishing fresh air to the fire and discharging of flames and combustion products through the window. If the room involved is provided with only a single window and no internal source of air, the window serves a dual purpose as a passage for the entry of fresh air and the discharge of flames and other hot combustion products. If, however, an internal duct or passage is available for the supply of fresh air to the fire room, a much larger fraction of the window can be used effectively for the discharge of flaming gases. Winds also could significantly influence the ventilation behavior of a building fire and, thus, the exposure severity.

In addition to ventilation, a number of other system variables influence exposure severity. The most important of these can be:

(a) The combustible load, including both the occupancy and building construction combustibles.

(b) The fuel dispersion or surface-to-volume ratio of the fuel.

(c) The size, geometry, and surface-to-volume ratio of the room involved.

(d) The thermal properties, conductivity, specific heat, and density of the interior finish.

The current state of the art of fire protection engineering is such that it is not possible to define clearly how all or even a few of these variables interact to influence exposure severity. However, this general discussion provides a guide to trends.

**A-2-3 Separation Distances.**

(a) *Derivation of Table 2-3.* The principles underlying the derivation of the separations specified in Table 2-3 are discussed in detail in "Fire and the Spatial Separation of Buildings" (*Fire Technology*, Vol. 1, No. 4, November 1965, published by NFPA).

The spread of fire from one building to another across a vacant space can be caused by convective or radiative heat transfer or flying brands. The hazard created by large flying brands was not considered in these recommendations. Convective heat transfer is also disregarded where the source of hazard is associated with openings in the facade of the exposing building, because ignition by radiation can occur at distances substantially greater than those at which flame impingement and convective heat transfer usually constitute a hazard. Therefore, ignition as a result of radiative heat transfer is the event that these recommendations are intended to combat.

The applicable equation that expresses the relationship for radiant heat transfer is $I = I_O\phi$, or the intensity at an exposed building is equal to the unit intensity at the exposing building multiplied by the configuration factor ($\phi$) based on radiator size, geometry, and spatial distance.

The maximum tolerable level of radiation (I) at the facade of an unprotected exposed building has been established as 12.5 kW/m$^2$ (0.3 cal/cm$^2$/sec or 66 Btu/ft$^2$/min). This value, originally derived from work done by the Joint Fire Research Organization in the United Kingdom, is now generally accepted as that below which the pilot ignition of most cellulosic materials is unlikely to occur. Substantially

higher levels of radiation are necessary to cause spontaneous ignition. It is believed that a local high temperature ignition source usually is present; thus, the selection of pilot ignition is indicated. Where materials are located in an enclosure irradiated through a small opening, appreciably lower levels can cause ignition. This factor has been ignored because irradiation times of more than 30 minutes usually are involved.

Since Table 2-3 was created, new building materials other than cellulosic (wood) and having greater or lesser ability to resist ignition have been developed. Greater separation distances are needed for materials with greater propensity to ignite. Those offering greater resistance to ignition can be separated at lesser distances.

Information on the radiation levels ($I_O$) near burning buildings was established by a number of case histories and by a series of experimental burns known as the "St. Lawrence Burns." The most important findings of the latter experiments were that radiation levels were related to the percentage of openings in building walls and that combustible interior walls or ceiling linings give rise to particularly high levels of radiation outside the building.

Another notable conclusion of the St. Lawrence Burns was that maximum radiation levels were not greatly affected by the type of exterior covering. In all the experiments, the exterior walls were not close to penetration by the fire during times of maximum radiation.

The St. Lawrence Burns produced maximum levels of radiation so high that protection against them would involve unduly large distances of separation. However, much lower levels prevailed for at least the first 20 minutes. It was decided to base separation distance recommendations on these lower values. It was believed that the likelihood of fire department attendance at an early stage of a fire justified this approach. Subsequently, a field incident has confirmed that the recommended separations cannot be considered universally adequate and that an unusual combination of adverse conditions could allow fire spread even where the recommended separation distances are used.

In calculating the recommended separations, a uniform rectangular radiator has been assumed, the emissive power being taken as proportional to the percentage of window openings. The expression for the configuration factor ($\phi$) of a rectangular radiator at an elemental receiving surface (i.e., the ratio of the radiant intensity at the receiver to that at the radiator) is as follows:

$$\phi = \frac{2}{\pi}\left[\frac{X}{\sqrt{X^2+Y^2}}\arctan\left(\frac{Z}{\sqrt{X^2+Y^2}}\right)+\frac{Z}{\sqrt{Y^2+Z^2}}\arctan\left(\frac{X}{\sqrt{Y^2+Z^2}}\right)\right]$$

Where:
x = half-length of rectangular radiating surface
z = half-height of rectangular radiating surface
y = separation distance between radiator and receiving surface

Three levels of radiation from a burning building were considered: light, moderate, and severe hazard. For light, moderate, and severe hazard levels, configuration factors of 0.14, 0.07, and 0.035, respectively, were adopted.

An additional 5 ft (1.52 m) were added to the computed values of separation distance to account for the horizontal projection of flames from windows and to guard against the risk of ignition by direct flame impingement where small separations were involved.

(b) *Uniformity of Openings.* The derivation of Table 2-3 assumes that openings are uniformly distributed on the facade and that the separation (blank wall) between openings is small (i.e., no more than 1/3 of the separation between the buildings). Where this is not the case, insufficient spatial separations can be predicted. The following measures remedy this deficiency substantially:

1. Where an area of the facade includes a large number of windows, a separate calculation should be made with respect to the smallest rectangle conveniently including all the windows in this area. In many cases, a single window constitutes this rectangle. The spatial separation chosen for this area should be the largest value determined by any of the calculations involving the windows for the area.

2. Where the separation (blank wall) between openings is appreciably more than 1/3 of the separation between the buildings (as provisionally estimated), an additional calculation for a single window should be made. If a higher building spatial separation results, this value should be used.

It is fundamental to the derivation of Table 2-3 that a row of results relating to a percentage of window openings of less than 20 percent (severe hazard), 10 percent (moderate hazard), or 5 percent (light hazard) is not valid for inclusion in the table. Separations less than those provided by the first row of the table can, however, often be derived by considering individual windows or groups of windows. The radiation level opposite a particular point on a facade is hardly influenced by radiation from a region of the facade further removed from the point than twice the estimated separation between buildings recommended. If windows or groups of windows are separated by more than this distance (which is likely if the percentage of openings is small), individual calculations are considered valid. The resulting building separations then can be used even though they need to be lower than those that would be predicted in association with a large area of facade and the smallest percentage opening area provided by the table.

**A-2-4 Derivation of Table 2-4.** The NFPA carried out a search of its photographic records of building fires in which flames penetrated the roof. Of thousands of photographs, 176 showed flames above roofs at what appeared to be maximum or near maximum heights. No significant correlation between flame height and occupancy was apparent, and, in fact, the principal relationship was the number of stories involved in the fire. Table A-2-4 provides the average of the flame heights illustrated in some of the records. This table is reproduced from the May 1968 issue of *Fire Journal*.

**Table A-2-4 Average Flame Heights Where Flames Penetrated Roof**

| No. of Stories Burning | Flame Height above Roof |
|---|---|
| 1 | 1.4 stories |
| 2 | 1.8 stories |
| 3 | 2.2 stories |
| 4 | 2.6 stories |
| 5 | 2.9 stories |
| 6 | 3.1 stories |

The relationships shown in the table do not agree with those suggested by British and Japanese work based on theory and experiments, which, in general, would produce

much higher values. The NFPA study does indicate that flame heights can be great under unusual circumstances, such as the heavy involvement of liquid fuels. The recommendations provided here are not intended to provide adequate protection under such circumstances.

In the event of a moderate wind, flames can be expected to extend horizontally for as great a distance as they might otherwise extend upward. It is for this reason that protection is recommended where the separation between the two buildings is no more than the height to which the flames might otherwise extend.

**A-4-2 Distance Modifications.** Varying reductions in separation distance for blank fire-resistive walls with less than 3-hour ratings have not been made, since current test data are insufficient to evaluate appropriate reductions properly. It is hoped that future studies and tests will produce varying reductions with varying resistance ratings. Three-hour fire-resistance-rated walls are assumed to be clad with noncombustible material.

**A-4-4** Where the exposing building is properly protected by automatic sprinklers, a fire in that building is assumed to be controlled, and exposure, therefore, also is controlled.

**A-4-5** Where the exposed building is properly protected by automatic sprinklers, ignition within the exposed building is possible where separation distances are less than recommended or where means of protection are not provided on exposed openings, walls, or projections with lesser separation distances. Such an ignition, however, is assumed to be controlled by sprinklers in the exposed structures.

Where water curtain protection is provided for exposed openings in sprinklered buildings, as recommended in Section 4-2, such sprinklers could be located on the inside of the building adjacent to the opening being protected and in a position where the sprinkler can sense the exposing fire. Under these conditions, such sprinklers could be of the closed type supplied by the wet pipe system within the building. Their water demand, however, should be calculated in addition to or separate from the demand of the remainder of the system.

## Appendix B Example

*This Appendix is not part of the recommendations of this NFPA document but is included for informational purposes only.*

**Construction:**

Walls: North — 4-hour openings as illustrated
South — 4-hour openings as illustrated
East — 4-hour openings as illustrated
West — Nonrated wall

Floors: Reinforced concrete — 3 hours
Floor openings: 2-hour enclosures
Roof: 2 hours
Interior finish: Noncombustible, except ceiling of office has a flame spread rating of 100

**Occupancy:**

Second floor: Office
First floor: Receiving and shipping
Manufacturing — electronic parts
Warehouse — palletized storage to 26 ft (7.9 m) in height

**Analysis of Exposure:**

*North:* Width of exposing fire (w) — 75 ft (22.9 m) (The blank wall casts no exposure, and the wall is of sufficient fire resistance to contain the expected fire.)
Height of exposing fire (h) — 15 ft (4.6 m). [The floor is of sufficient fire resistance to contain the expected fire, and openings are protected. If openings in the floor are unprotected, h is 30 ft (9.1 m).]
Severity [from Tables 2-2.4(a) and 2-2.4(b)]:
Office fire loading — light
Average interior finish — moderate
Shipping and receiving fire loading — moderate
Interior finish — light
Severity is classed as moderate
w/h or h/w — 75 ft/15 ft (22.9 m/4.6 m) = 5
Percent openings — 30 percent
Guide number (from Table 2-3) — 1.85
Separation distance — [1.85 x 15 ft (4.6 m)] + 5 ft (1.52 m) = 28 ft (8.5 m) + 5 ft (1.52 m) = 33 ft (10 m)

*South:* Exposure hazard from the two-story section of the building is the same as the north wall. The one-story section then should be calculated.
Width of exposing fire (w) — 125 ft (38 m)
Height of exposing fire (h) — 15 ft (4.6 m)
Severity [from Tables 2-2.4(a) and 2-2.4(b)]:
Fire loading — moderate
Interior finish — light
Severity is classed as moderate
w/h or h/w — 125 ft/15 ft (38 m/4.6 m) = 8.3
Percent openings — 20 percent
Guide number (from Table 2-3) — 1.32
Separation distance — [1.32 x 15 ft (4.6 m)] + 5 ft (1.52 m) = 20 ft (6.1 m) + 5 ft (1.52 m) = 25 ft (7.6 m)
Separation distance from south wall, therefore, should be 33 ft (10 m) (the recommended separation distance from the two-story section, which is calculated as greater than that from the one-story section).

*East :* Width (w) — 200 ft (61 m)
Height (h) — 15 ft (4.6 m)
Severity — moderate
w/h or h/w — 200 ft/15 ft (61 m/4.6 m) = 13.3
Percent openings — 80 percent
Guide number — 5.04
Separation distance — [5.04 x 15 ft (4.6 m)] + 5 ft (1.52 m) = 75.6 ft (23 m) + 5 ft (1.52 m) = 80.6 ft (24.6 m)

*West :* Manufacturing area:
Width (w) — 100 ft (30.5 m)
Height (h) — 15 ft (4.6 m)
Severity — moderate
w/h or h/w — 100 ft/15 ft (30.5 m/4.6 m) = 6.7
Percent openings — 100 percent (nonrated wall)
Guide number — 4.89
Separation distance — [4.89 x 15 ft (4.6 m)] + 5 ft (1.52 m) = 73.4 ft (22.4 m) + 5 ft (1.52 m) = 78.4 ft (23.9 m)
Warehouse:
Width (w) — 100 ft (30.5 m)

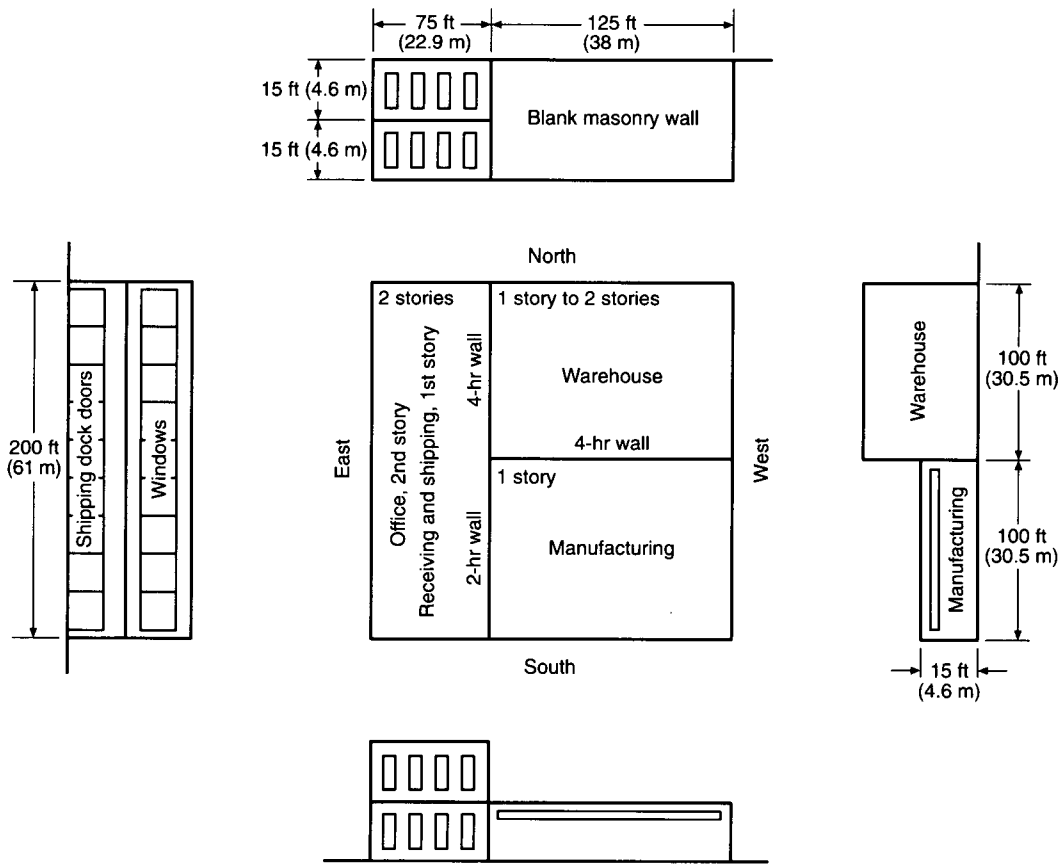


**Figure B-1 Illustration for example of application of NFPA 80A.**

Height (h) — 30 ft (9.1 m)
Severity [from Tables 2-2.4(a) and 2-2.4(b)]:
Fire loading — severe
Interior finish — light
Severity — severe
w/h or h/w — 100 ft/30 ft (30.5 m/9.1 m) = 3.3
Percent openings — 100 percent
Guide number — 5.27
Separation distance — [5.27 x 30 ft (9.1 m)] + 5 ft (1.52 m) = 158.1 ft (48.1 m) + 5 ft (1.52 m) = 163.1 ft (49.7 m)

## Appendix C Referenced Publications

**C-1** The following documents or portions thereof are referenced within this recommended practice for informational purposes only and thus are not considered part of the recommendations of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

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

Los Angeles Fire Department, *Operation School Burning No. 2*, 1961.

*Fire Protection Handbook*, 17th ed., 1991.

McGuire, J. H., "Fire and the Spatial Separation of Buildings," reprinted from *Fire Technology*, Vol. 1, No. 4, Nov. 1965, pp. 278-287. Technical paper No. 212, NRC 8901, Feb. 1966, National Research Council of Canada, Division of Building Research, Ottawa.

Moysey, E. B., "Space Separation for Prevention of Farm Fire Spread," *Fire Technology*, Vol. 1, No. 1, Feb. 1965, pp. 62-68.

Moysey, E. B. and Muir, W. E., "Pilot Ignition of Building Materials by Radiation," *Fire Technology*, Vol. 4, No. 1, Feb. 1968, pp. 46-50.

Nelson, H. E., "Radiant Energy Transfer in Fire Protection Engineering Problem Solving," *Fire Technology*, Vol. 4, No. 3, Aug. 1968, pp. 196-205.

Salzberg, F. and Waterman, T. E., "Studies of Building Fires with Models," *Fire Technology*, Vol. 2, No. 3, Aug. 1966, pp. 196-203.

Shorter, G. W. et al., "The St. Lawrence Burns," NFPA Reprint Q53-17, *Quarterly of the National Fire Protection Association*, Vol. 53, No. 4, Apr. 1960, pp. 300-316.

"Conflagrations in America Since 1900," *NFPA Quarterly*, Vol. 44, No. 4, Part, 2, Apr. 1951.

**C-1.2 Other Publications.**

**C-1.2.1 Books.**

Bird, E. L. and Docking, S. J., *Fire in Buildings*, Van Nostrand, New York.

Giedt, W. H., *Principles of Engineering Heat Transfer*, Van Nostrand, New York, 1957.

Gross, D. and Robertson, A. F., "Experimental Fire in Enclosures, Fire Research," *Tenth Symposium (International) on Combustion*, Combustion Institute, Pittsburgh, PA, 1965, pp. 931-942.

Thomas, P. H., "Size of Flames from Natural Fires, Colloquium on Modeling Principles," *Ninth Symposium (International) on Combustion*, Academic Press, New York, 1963, pp. 844-859.

Wilkes, G. B., *Heat Insulation*, Wiley, New York, 1950.

**C-1.2.2 Journal Articles.**

Eickner, H. W., "Basic Research on the Pyrolysis and Combustion of Wood" (Technical Paper 107, Forest Products Laboratory, U.S. Department of Agriculture, Oct. 1961), *Forest Products Journal*, Vol. 12, No. 4, Apr. 1962, pp. 194-199.

Lawson, D. I., "Ignition of Wood by Radiation," *British Journal of Applied Physics*, Vol. 3, No. 9, Sept. 1952, pp. 288-292.

Simms, D. L., "On the Pilot Ignition of Wood by Radiation," *Combustion and Flame*, Vol. 7, No. 9, Sept. 1963, pp. 253-261.

Simms, D. L. and Law, M., "The Ignition of Wet and Dry Wood by Radiation," *Combustion and Flame*, Vol. 11, No. 5, Oct. 1967, pp. 377-388.

**C-1.2.3 Transactions or Proceedings.**

Muir, W. E., Moysey, E. B., and Scott, W. A., "Ignition of Some Building Materials," Canadian Society of Agricultural Engineers, Jun. 28-30, 1966.

**C-1.2.4 Reports.**

Browne, F. L., "Theories of the Combustion of Wood and Its Control," Report No. 2136, Dec. 1958, Forest Products Laboratory, U.S. Department of Agriculture, Madison, WI.

Bruce, H. D., "Experimental Dwelling-Room Fires," Report No. 1941, Apr. 1959, reaffirmed 1965, Forest Products Laboratory, U.S. Department of Agriculture, Madison, WI.

Butcher, E. G., Chitty, T. B., and Ashton, L. A., "The Temperatures Attained by Steel in Building Fires," Fire Research Technical Paper No. 15, 1966, Ministry of Technology and Fire Offices Committee, Joint Fire Research Organization, Her Majesty's Stationery Office, London.

*Fire Research 1958, Report of the Fire Research Board with the Report of the Director of Fire Research for the year 1958-1959*, Department of Scientific and Industrial Research and Fire Offices Committee, Her Majesty's Stationery Office, London (out of print).

Gross, D., "Field Burnout Tests of Apartment Dwelling Units," Building Science Series No. 10, Sept. 1967, U.S. Department of Commerce, National Bureau of Standards, Washington, DC.

Ingberg, S. H., "Fire Resistance Classifications of Building Constructions," Building Materials and Structures Report BMS 92, Oct. 1942, U.S. Department of Commerce, National Bureau of Standards, Washington, DC.

Ingberg, S. H., Dunham, J. W., and Thompson, J. P., "Combustible Contents in Buildings," Building Materials and Structures Report BMS 149, Jul. 1957, U.S. Department of Commerce, National Bureau of Standards, Washington, DC.

Keough, J. J., "Diagrams for the Approximate Assessment of Radiation Exposure Hazards from Fires in Buildings," UP 153, Jul. 1963, Commonwealth Experimental Building Station, Commonwealth Department of Works, Chatswood, N.S.W., Australia.

Langdon-Thomas, G. J. and Law, M., "Fire and the External Wall," Fire Note No. 8, 1966, Ministry of Technology and Fire Offices Committee, Joint Fire Research Organization, Her Majesty's Stationery Office, London.

Law, M., "Heat Radiation from Fires and Building Separation," Fire Research Technical Paper No. 5, 1963, Department of Scientific and Industrial Research and Fire Offices Committee, Joint Fire Research Organization, Her Majesty's Stationery Office, London.

Law, M., "Radiation from Fires in a Compartment," Fire Research Technical Paper No. 20, 1968, Ministry of Technology and Fire Offices Committee, Joint Fire Research Organization, Her Majesty's Stationery Office, London.

"Life Hazard of Interior Finishes (Development of Method)," Report No. 11760, Jun. 1950, and "Life Hazard Tests on Wood Interior Finish," Report No. 11975, Oct. 1951, Factory Mutual Laboratories, reproduced 1952, National Lumber Manufacturing Association, Washington, DC.

McGuire, J. H., "Heat Transfer by Radiation," Fire Research Special Report No. 2, 1953, Department of Scientific and Industrial Research and Fire Offices Committee, Her Majesty's Stationery Office, London.

McGuire, J. H., "Ignition of Materials Behind Common 1/8-inch-Thick Window Glass," Technical Note No. 456, Sept. 1965, National Research Council of Canada, Division of Building Research, Ottawa.

Scott, W. A., "Spacing of Farm Buildings for Fire Control," 1964, University of Saskatchewan.

Yokoi, S., "Study of the Prevention of Fire Spread Caused by Hot Upward Current," Report No. 34, Nov. 1960, Building Research Institute, Ministry of Construction, Japan.

# Index

# The NFPA Codes and Standards Development Process

Since 1896, one of the primary purposes of the NFPA has been to develop and update the standards covering all areas of fire safety.

**Calls for Proposals**
The code adoption process takes place twice each year and begins with a call for proposals from the public to amend existing codes and standards or to develop the content of new fire safety documents.

**Report on Proposals**
Upon receipt of public proposals, the technical committee members meet to review, consider, and act on the proposals. The public proposals – together with the committee action on each proposal and committee-generated proposals – are published in the NFPA's Report on Proposals (ROP). The ROP is then subject to public review and comment.

**Report on Comments**
These public comments are considered and acted upon by the appropriate technical committees. All public comments – together with the committee action on each comment – are published as the Committee's supplementary report in the NFPA's Report on Comments (ROC).

The committee's report and supplementary report are then presented for adoption and open debate at either of NFPA's semi-annual meetings held throughout the United States and Canada.

**Association Action**
The Association meeting may, subject to review and issuance by the NFPA Standards Council, (a) adopt a report as published, (b) adopt a report as amended, contingent upon subsequent approval by the committee, (c) return a report to committee for further study, and (d) return a portion of a report to committee.

**Standards Council Action**
The Standards Council will make a judgement on whether or not to issue an NFPA document based upon the entire record before the Council, including the vote taken at the Association meeting on the technical committee's report.

**Voting Procedures**
Voting at an NFPA Annual or Fall Meeting is restricted to members of record for 180 days prior to the opening of the first general session of the meeting, except that individuals who join the Association at an Annual or Fall Meeting are entitled to vote at the next Fall or Annual Meeting.

"Members" are defined by Article 3.2 of the Bylaws as individuals, firms, corporations, trade or professional associations, institutes, fire departments, fire brigades, and other public or private agencies desiring to advance the purposes of the Association. Each member shall have one vote in the affairs of the Association. Under Article 4.5 of the Bylaws, the vote of such a member shall be cast by that member individually or by an employee designated in writing by the member of record who has registered for the meeting. Such a designated person shall not be eligible to represent more than one voting privilege on each issue, nor cast more than one vote on each issue.

Any member who wishes to designate an employee to cast that member's vote at an Association meeting in place of that member must provide that employee with written authorization to represent the member at the meeting. The authorization must be on company letterhead signed by the member of record, with the membership number indicated, and the authorization must be recorded with the President of NFPA or his designee before the start of the opening general session of the Meeting. That employee, irrespective of his or her own personal membership status, shall be privileged to cast only one vote on each issue before the Association.

# Sequence of Events Leading to Publication of an NFPA Committee Document

Call for proposals to amend existing document or for recommendations on new document.

▼

Committee meets to act on proposals, to develop its own proposals, and to prepare its report.

▼

Committee votes on proposals by letter ballot. If two-thirds approve, report goes forward. Lacking two-thirds approval, report returns to committee.

▼

Report is published for public review and comment. (Report on Proposals - ROP)

▼

Committee meets to act on each public comment received.

▼

Committee votes on comments by letter ballot. If two-thirds approve, supplementary report goes forward. Lacking two-thirds approval, supplementary report returns to committee.

▼

Supplementary report is published for public review. (Report on Comments - ROC).

▼

NFPA membership meets (Annual or Fall Meeting) and acts on committee report (ROP and ROC).

▼

Committee votes on any amendments to report approved at NFPA Annual or Fall Meeting.

▼

Complaints to Standards Council on Association action must be filed within 20 days of the NFPA Annual or Fall Meeting.

▼

Standards Council decides, based on all evidence, whether or not to issue standard or to take other action, including hearing any complaints.

▼

Appeals to Board of Directors on Standards Council action must be filed within 20 days of Council action.

## FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

**Mail to: Secretary, Standards Council**
**National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269-9101**
**Fax No. 617-770-3500**

Note: All proposals must be received by 5:00 p.m. EST/EDST on the published proposal-closing date.

**If you need further information on the standards-making process, please contact the Standards Administration Department at 617-984-7249.**
**For technical assistance, please call NFPA at 617-770-3000**

Please indicate in which format you wish to receive your ROP/ROC: ☐ electronic or ☐ paper

**Date** _____ **Name** _____ **Tel. No.** _____

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**Please Indicate Organization Represented (if any)** _____

**1. a) NFPA Document Title** _____ **NFPA No. & Year** _____

**b) Section/Paragraph** _____

**2. Proposal Recommends: (Check one)**
- ❑ **new text**
- ❑ **revised text**
- ❑ **deleted text**

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**Log #** _____
**Date Rec'd** _____

**3. Proposal (include proposed new or revised wording, or identification of wording to be deleted):** (Note: Proposed text should be in legislative format: i.e., use underscore to denote wording to be inserted (inserted wording) and strike-through to denote wording to be deleted (~~deleted wording~~).

**4. Statement of Problem and Substantiation for Proposal:** (Note: State the problem that will be resolved by your recommendation; give the specific reason for your proposal including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.)

**5. ❑ This Proposal is original material.** (Note: Original material is considered to be the submitter's own idea based on or as a result of his/her own experience, thought, or research and, to the best of his/her knowledge, is not copied from another source.)

**❑ This Proposal is not original material; its source (if known) is as follows:** _____

Note 1: Type or print legibly in black ink.
Note 2: If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee.

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