

NFPA®

80

Standard for
Fire Doors and Other
Opening Protectives

2022



NFPA[®] 80

Standard for Fire Doors and Other Opening Protectives

2022 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02269-9101
An International Codes and Standards Organization

Documents
Document Sharing Hub

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

NFPA® codes, standards, recommended practices, and guides (“NFPA Standards”), 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 NFPA 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 NFPA Standards. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making NFPA Standards 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 NFPA Standards. 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.

REVISION SYMBOLS IDENTIFYING CHANGES FROM THE PREVIOUS EDITION

Text revisions are shaded. A **Δ** before a section number indicates that words within that section were deleted and a **Δ** to the left of a table or figure number indicates a revision to an existing table or figure. When a chapter was heavily revised, the entire chapter is marked throughout with the **Δ** symbol. Where one or more sections were deleted, a **•** is placed between the remaining sections. Chapters, annexes, sections, figures, and tables that are new are indicated with an **N**.

Note that these indicators are a guide. Rearrangement of sections may not be captured in the markup, but users can view complete revision details in the First and Second Draft Reports located in the archived revision information section of each code at www.nfpa.org/docinfo. Any subsequent changes from the NFPA Technical Meeting, Tentative Interim Amendments, and Errata are also located there.

REMINDER: UPDATING OF NFPA STANDARDS

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Standards”) should be aware that these documents may be superseded at any time by the issuance of a new edition, may be amended with the issuance of Tentative Interim Amendments (TIAs), or be corrected by Errata. It is intended that through regular revisions and amendments, participants in the NFPA standards development process consider the then-current and available information on incidents, materials, technologies, innovations, and methods as these develop over time and that NFPA Standards reflect this consideration. Therefore, any previous edition of this document no longer represents the current NFPA Standard on the subject matter addressed. NFPA encourages the use of the most current edition of any NFPA Standard [as it may be amended by TIA(s) or Errata] to take advantage of current experience and understanding. An official NFPA Standard at any point in time consists of the current edition of the document, including any issued TIAs and Errata then in effect.

To determine whether an NFPA Standard has been amended through the issuance of TIAs or corrected by Errata, visit the “Codes & Standards” section at www.nfpa.org.

ADDITIONAL IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

Updating of NFPA Standards

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Standards”) should be aware that these documents may be superseded at any time by the issuance of a new edition, may be amended with the issuance of Tentative Interim Amendments (TIAs), or be corrected by Errata. It is intended that through regular revisions and amendments, participants in the NFPA standards development process consider the then-current and available information on incidents, materials, technologies, innovations, and methods as these develop over time and that NFPA Standards reflect this consideration. Therefore, any previous edition of this document no longer represents the current NFPA Standard on the subject matter addressed. NFPA encourages the use of the most current edition of any NFPA Standard [as it may be amended by TIA(s) or Errata] to take advantage of current experience and understanding. An official NFPA Standard at any point in time consists of the current edition of the document, including any issued TIAs and Errata then in effect.

To determine whether an NFPA Standard has been amended through the issuance of TIAs or corrected by Errata, visit the “Codes & Standards” section at www.nfpa.org.

Interpretations of NFPA Standards

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing the Development of NFPA Standards 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 referenced in, related to, or asserted in connection with an NFPA Standard. The users of NFPA Standards bear the sole responsibility for determining the validity of any such patent rights, as well as the risk of infringement of such rights, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on NFPA Standards.

NFPA adheres to the policy of the American National Standards Institute (ANSI) regarding the inclusion of patents in American National Standards (“the ANSI Patent Policy”), and hereby gives the following notice pursuant to that policy:

NOTICE: The user’s attention is called to the possibility that compliance with an NFPA Standard may require use of an invention covered by patent rights. NFPA takes no position as to the validity of any such patent rights or as to whether such patent rights constitute or include essential patent claims under the ANSI Patent Policy. If, in connection with the ANSI Patent Policy, a patent holder has filed a statement of willingness to grant licenses under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, copies of such filed statements can be obtained, on request, from NFPA. For further information, contact the NFPA at the address listed below.

Law and Regulations

Users of NFPA Standards 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

NFPA Standards are copyrighted. They are 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 these documents available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to these documents.

Use of NFPA Standards 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 Standards, contact NFPA at the address below.

For Further Information

All questions or other communications relating to NFPA Standards 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 standards 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; email: stds_admin@nfpa.org.

For more information about NFPA, visit the NFPA website at www.nfpa.org. All NFPA codes and standards can be viewed at no cost at www.nfpa.org/docinfo.

Copyright © 2021 National Fire Protection Association®. All Rights Reserved.

NFPA® 80

Standard for

Fire Doors and Other Opening Protectives

2022 Edition

This edition of NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, was prepared by the Technical Committee on Fire Doors and Windows and acted on by the NFPA membership during the 2021 NFPA Technical Meeting held June 14–July 2. It was issued by the Standards Council on August 26, 2021, with an effective date of September 15, 2021, and supersedes all previous editions.

This edition of NFPA 80 was approved as an American National Standard on September 15, 2021.

Origin and Development of NFPA 80

The origin of NFPA 80, *Standard for Fire Doors and Other Opening Protectives* can be traced to the early days of NFPA. Reports covering various phases of the problems of opening protectives were submitted to NFPA by several of the committees concerned and were adopted in 1897, 1898, 1899, 1900, 1901, 1902, and 1908. A standard on door openings was presented and adopted in 1911. In 1912, *Rules for Fire Protection Coverings for Openings in Walls and Partitions on the Interior of Buildings* was adopted. In 1915, the committee in charge of this document was renamed the Committee on Protection of Openings in Walls and Partitions. Revisions recommended by the committee were adopted by NFPA in 1916, 1917, 1918, 1926, 1927, 1928, 1931, 1937, and 1941.

In 1955, the committee was renamed the Committee on Fire Doors and Windows. A complete revision of the 1941 edition, including changing the title to correspond with the name of the committee, was adopted in 1959. The standard was revised again in 1961, 1962, 1965, 1966, 1967, 1968, 1970, 1973, 1974, 1975, 1977, 1979, 1981, 1983, 1986, and 1990.

In 1992, the committee changed the title of the document to *Standard for Fire Doors and Fire Windows*. Major changes in the 1992 edition included additions to the standard that recognized the technological changes in glazing materials for fire barrier openings and appendix material on radiant heat transfer. Radiant heat transfer, while not included in the performance requirements for fire doors and fire windows, is a consideration in the design of fire barriers.

The 1995 edition reorganized Chapter 2 for easier use, with many improvements in consistency. Appendix J was updated to provide more current information on radiant heat transfer.

The chapters were reorganized in the 1999 edition to correlate the section numbers and their requirements. Requirements that are common to all doors, such as clearances and detection, were moved to Chapter 1.

The 2007 edition included a major reorganization in accordance with the *Manual of Style for NFPA Technical Committee Documents* and a title change to accommodate the broader scope of the document. (The 8-year gap between the 1999 and 2007 editions was due to NFPA 80 being returned to the technical committee during the Fall 2002 revision cycle.) New chapters were added on fabric fire safety curtains and the installation, testing, and maintenance of fire dampers. Major technical changes pertained to the maximum clearance permitted under the bottom of doors, new provisions regarding the care and maintenance of fire doors and fire windows, the option for developing performance-based maintenance activities provisions, and provisions regarding chute doors, fire shutters, rolling steel doors, and service counter doors. New information concerning floor fire door assemblies and ratings associated with glazing materials was also added.

The 2010 edition included technical changes for installation of glazing material in vision panels for new wood doors, installation of glazing and light kits, repair of doors and windows, operation of chute doors, and replacement provisions. The terms *fire protection glazing* and *fire resistance glazing* were made consistent throughout the document to clarify the distinctions between the two. Updates

also were made to several definitions in Chapter 3. The document continued to make editorial changes and update terminology to be consistent with industry practices.

The 2013 edition of NFPA 80 included a complete editorial reorganization of Chapter 5 to better organize and present the provisions for the inspection, testing, and maintenance of fire doors. Technical revisions were made to Chapter 5 to clarify its application to include all fire doors, fire shutters, and fire window assemblies, as well as update provisions to field modifications and the requirement that acceptance testing for fire doors must be completed by a qualified person. Multiple annex notes were added to aid in the application of field modifications, generic use of opening protectives, periodic inspections, and inspection and testing reports. A new section on records for acceptance tests was included in Chapter 5.

In addition, the 2013 edition of NFPA 80 included provisions for the installation of fusible links in sleeves, new language to address continuous hinges, and revisions related to power operators for special-purpose horizontally sliding accordion or folding doors. The technical committee also updated definitions and terminology throughout the document to reflect current industry practices.

The 2016 edition of NFPA 80 addressed several new technical issues, including provisions for drilling raceways for wires when performed at the job site; detailed provisions for information required to be included on a label for fire doors, fire door frames, fire windows, and oversized doors; provisions for addressing fire doors too large to be fire tested; recognition of the use of products evaluated for fire doors that exceed the maximum allowable bottom clearance; provisions for field labeling procedures and field label information; and new provisions for the maximum allowable clearance between a pair of swinging doors and between the door and frame, depending on the door material. New provisions for acceptable testing of fire dampers and new detailed requirements for specific test methods required during periodic tests of fire dampers were also included. A new opening protective, fire protective curtain assemblies, was addressed in a new Chapter 21, which provided requirements related to the installation, inspection, testing, and maintenance of those assemblies installed to protect vertical openings.

Requirements for glazing labeling were included in Chapter 4 and duplicated the information in model building and life safety codes to make the application of glazing provisions more user friendly. Additional technical updates were made to provisions for actuation devices for fire doors, fire shutters, and fire windows, as well as fire door maintenance procedures.

Provisions for chute doors were revised to include extracted text from NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*. Finally, definitions were added and updated along with referenced publications to remain current with industry trends and practices.

The 2019 edition included new definitions in Chapter 3 for *inspection mark* and *field label* to assist in the application of inspection, testing, and maintenance provisions in Chapter 5. Chapter 4 provisions for job site preparation of fire doors for fire pins were updated. Subsection 4.8.4 was updated with new provisions for measuring clearance under the bottom of fire doors and with a new requirement addressing bottom clearance with the presence of latching hardware devices. Chapter 5 was updated to include fire protective curtain assemblies in its application and a new section that addressed inspection marks. New subsection 19.2.2 required damper manufacturer's installation and maintenance instructions be maintained on site for new damper installations. The detailed damper installation criteria from Chapter 19 were deleted and left with reliance on the damper manufacturer's installation instructions and the damper listing. Chapter 19 also updated the requirements for the inspection, testing, and maintenance of fire and combination fire/smoke dampers with the addition of new 19.5.2.3.3 for a remote inspection method. A new 19.5.1.3 clarified application of inspection requirements for single inaccessible dampers. Annex A added new and revised figures for typical steel door frame installations. UL 10B, *Fire Tests of Door Assemblies*, and UL 10C, *Positive Pressure Fire Tests of Door Assemblies*, were added as equivalent standards to NFPA 252 throughout the document.

Updates for the 2022 edition include new provisions in Chapter 1 to clarify that NFPA 80 applies to inspection, testing, and maintenance of all types of rated opening protectives, but does not apply to labeled fire door assemblies installed in openings that are not required to be protected. New definitions of *annual frequency*, *corridor damper*, and *trained rolling steel fire door systems technician* have been added to Chapter 3. Chapter 4 includes a new listing requirement for fusible links and revised provisions for fire door signage. Job site preparation criteria has been moved from Chapter 4 to Chapter 5, which also includes new and clarified inspection and testing provisions. Chapters 6 through 11 and 14 through 16 have been revised to provide consistent references to Chapters 4 and 5 for installation, inspection, testing, and maintenance. Chapter 7 has been completely rewritten and reorganized for clarity for consistency with other opening protective chapters and to be more comprehensive. Chapter 19 includes numerous revisions, including added requirements for corridor dampers; added listing requirements; relocated definitions to Chapter 3; revised acceptance testing provisions; and added clarification on field modifications involving damper remote position indicators. Referenced publications and extracts have been updated as needed.

Technical Committee on Fire Doors and Windows

Keith E. Pardoe, Chair
Pardoe Consulting LLC, VA [SE]

Chad E. Beebe, ASHE - AHA, WA [U]
Joanna Blaney, FM Global, MA [I]
Bruce G. Campbell, JENSEN HUGHES, TX [SE]
William Conner, Bill Conner Associates LLC, NY [SE]
Rep. American Society of Theater Consultants
David Dawdy, Cornell Iron Works, Inc., PA [IM]
Rep. International Door Association
Luc Durand, Saskatoon Fire Department, Canada [E]
David Feist, ANSI National Accreditation Board (ANAB), DC [U]
Marty Gissel, Greenheck Fan, WI [M]
Curtis Gonzales, Smoke Guard Inc., ID [M]
Jerrold S. Gorrell, Theatre Safety Programs, AZ [IM]
Rep. US Institute for Theatre Technology, Inc.
Howard J. Gruszynski, Badger International Engineering Consultants, WI [SE]
Aaron Gunzner, Air Movement and Control Association (AMCA) International, IL [M]
Steven C. Hahn, Lawrence Roll-Up Doors, Inc., CA [M]
Rep. Door & Access Systems Manufacturers Assn. International
Harold D. Hicks, Jr., Atlantic Code Consultants, PA [SE]
William E. Koffel, Koffel Associates, Inc., MD [M]
Rep. Glazing Industry Code Committee
Vernon Wesley Lewis, National Association of Architectural Metal Manufacturers (NAAMM), VA [M]
Rep. National Assn. of Architectural Metal Manufacturers
Keith Lippincott, University of Maryland, MD [E]
Rossen E. Marinov, Masonite, IL [M]
Rep. Window & Door Manufacturers Association

Kent Maune, Ruskin Manufacturing, MO [M]
Robert J. Muren, Liberty Mutual Insurance Company, IL [I]
James S. Peterkin, TLC Engineering, PA [U]
Rep. NFPA Health Care Section
Michael Puls, Intertek, WI [RT]
Rep. Intertek Testing Services
Steven P. Reynolds, The Peelle Company Ltd., Canada [M]
Rep. National Elevator Industry Inc.
Jerry Rice, DH Pace Company Inc., KS [IM]
James R. Richardson, Lisle Woodridge Fire District, IL [E]
Kurt A. Roeper, ASSA ABLOY, CT [M]
Rep. Steel Door Institute
Christopher A. Roth, Town of Brighton, NY [E]
Thomas M. Rubright, William S. Trimble Company, Inc., TN [M]
Rep. Door and Hardware Institute
Michael L. Savage, Sr., Marion County Building Safety, FL [E]
James M. Shea, Globe Technologies, MI [M]
Duane R. Smith, National Energy Management Institute Inc., IN [M]
Michael Tierney, Kellen Company, CT [M]
Rep. Builders Hardware Manufacturers Association
Garrett S. Tom, International Fire Door Inspector Association, NV [U]
Yunyong Pock Utiskul, Exponent, Inc., MD [SE]
Joshua Vann, MB Healthcare, NJ [U]
Luke C. Woods, UL LLC, MA [RT]
Joon Yoo, Department Of Defense, MD [U]

Alternates

Karen Bishop, Builders Hardware Manufacturers Association, OH [M]
(Alt. to Michael Tierney)
Joel Bonnell, Raynor Garage Doors, IL [M]
(Alt. to Steven C. Hahn)
Kevin L. Brinkman, National Elevator Industry, Inc., IL [M]
(Alt. to Steven P. Reynolds)
Daniel J. Culhane, Wenger Corporation, MN [IM]
(Alt. to Jerrold S. Gorrell)
Thomas Resciniti Demont, Technical Services Inc., PA [U]
(Alt. to Garrett S. Tom)
William F. Guffey, University of Maryland, MD [E]
(Alt. to Keith Lippincott)
Anne M. Guglielmo, Code Consultants, Inc., MO [U]
(Alt. to James S. Peterkin)
John Hamilton, National Energy Management Institute, MN [SE]
(Voting Alt.)
Daisy R. Harington, City Of Saskatoon Building Standards, Canada [E]
(Alt. to Luc Durand)
Justin Scott Hendricks, Intertek, WI [RT]
(Alt. to Michael Puls)
Thomas R. Janicak, Ceco Door Products, IL [M]
(Alt. to Kurt A. Roeper)
Marilyn Latham, Steelcraft Manufacturing, TN [M]
(Alt. to Vernon Wesley Lewis)

Craig Ordmandy, Door Control Services, Inc., TX [IM]
(Alt. to Jerry Rice)
Steven Orlovski, Windows & Door Manufactures Association (WDMA), DC [M]
(Alt. to Rossen E. Marinov)
Timothy J. Orris, AMCA International, Inc., IL [M]
(Alt. to Aaron Gunzner)
Alfredo M. Ramirez, UL LLC, IL [RT]
(Alt. to Luke C. Woods)
William Skene, FM Global, CT [I]
(Alt. to Joanna Blaney)
Garry Stewart, The Doorman Service Company, Inc., WA [IM]
(Alt. to David Dawdy)
Alex Talwar, Greenheck, WI [M]
(Alt. to Marty Gissel)
David V. Tomecek, JENSEN HUGHES, CO [SE]
(Alt. to Bruce G. Campbell)
Rodney Weaver, ASSA ABLOY Academy, VA [M]
(Alt. to Thomas M. Rubright)
Thomas Zarembo, Roetzel and Andress, OH [M]
(Alt. to William E. Koffel)

Nonvoting

Joseph N. Saino, Memphis, TN [SE]
(Member Emeritus)

Jen Sisco, 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 installation and maintenance of fire doors, windows, shutters, and other equipment used to restrict the spread of fire, including arrangements for automatic operation in case of fire. This includes installation to protect buildings against external fire and to restrict the spread of fire within buildings. Vault and record room doors are covered by the Technical Committee on Record Protection.

Contents

Chapter 1 Administration	80- 7	10.4 Assembly Components.	80- 30
1.1 Scope.	80- 7	Chapter 11 Rolling Steel Doors	80- 31
1.2 Purpose.	80- 7	11.1 Doors.	80- 31
1.3 Application.	80- 7	11.2 Supporting Construction.	80- 31
1.4 Retroactivity.	80- 7	11.3 Openings.	80- 31
1.5 Equivalency.	80- 7	11.4 Assembly Components.	80- 32
Chapter 2 Referenced Publications	80- 7	11.5 Weather Protection.	80- 32
2.1 General.	80- 7	Chapter 12 Fire Shutters	80- 32
2.2 NFPA Publications.	80- 7	12.1 Types.	80- 32
2.3 Other Publications.	80- 8	12.2 Requirements.	80- 32
2.4 References for Extracts in Mandatory Sections. ...	80- 8	12.3 Weather Protection.	80- 32
Chapter 3 Definitions	80- 8	Chapter 13 Service Counter Fire Doors	80- 33
3.1 General.	80- 8	13.1 Doors.	80- 33
3.2 NFPA Official Definitions.	80- 8	13.2 Supporting Construction.	80- 33
3.3 General Definitions.	80- 9	13.3 Counters.	80- 33
Chapter 4 General Requirements	80- 13	13.4 Automatic Closing.	80- 33
4.1 General Limitations.	80- 13	Chapter 14 Hoistway Doors for Elevators and	
4.2 Listed and Labeled Products.	80- 14	Dumbwaiters	80- 33
4.3 Classifications and Types of Doors.	80- 15	14.1 Doors.	80- 33
4.4 Glazing Material in Fire Doors.	80- 15	14.2 Types of Doors.	80- 33
4.5 Fire Resistance Glazing in Doors and Windows. ...	80- 15	14.3 Hoistway Door Vision Panels.	80- 35
4.6 Classification of Hardware for Fire Doors.	80- 15	14.4 Door Operation.	80- 35
4.7 Actuation Devices for Fire Doors, Fire Shutters, and Fire Windows.	80- 16	Chapter 15 Chute Doors	80- 35
4.8 Supporting Construction.	80- 17	15.1 Doors.	80- 35
Chapter 5 Inspection, Testing, and Maintenance	80- 18	15.2 Chute Discharge Doors.	80- 35
5.1 General.	80- 18	15.3 Chute Intake Doors.	80- 35
5.2 Inspection and Testing.	80- 19	15.4 Limited-Access Gravity Chutes.	80- 35
5.3 Retrofit Operators.	80- 21	15.5 Pneumatic Chute Intake Doors.	80- 35
5.4 Performance-Based Option.	80- 21	Chapter 16 Access Doors	80- 36
5.5 Maintenance.	80- 21	16.1 Doors.	80- 36
Chapter 6 Swinging Doors with Builders Hardware	80- 21	16.2 Types of Doors.	80- 36
6.1 Doors.	80- 21	Chapter 17 Fire Windows	80- 36
6.2 Supporting Construction.	80- 22	17.1 Windows.	80- 36
6.3 Openings.	80- 22	17.2 Glazing Material.	80- 36
6.4 Assembly Components.	80- 23	17.3 Types of Windows.	80- 37
6.5 Application, Installation, and Adjustment.	80- 25	17.4 Installation.	80- 37
Chapter 7 Swinging Doors with Fire Door Hardware	80- 25	17.5 Closing Devices.	80- 37
7.1 Doors.	80- 25	Chapter 18 Glass Block Assemblies	80- 38
7.2 Supporting Construction.	80- 26	18.1 General.	80- 38
7.3 Openings.	80- 26	18.2 Installation.	80- 38
7.4 Assembly Components.	80- 27	Chapter 19 Installation, Testing, and Maintenance of	
7.5 Applied Metals.	80- 27	Dampers	80- 38
Chapter 8 Horizontally Sliding Doors	80- 27	19.1 General.	80- 38
8.1 Doors.	80- 27	19.2 Installation.	80- 38
8.2 Supporting Construction.	80- 27	19.3 Operational Test.	80- 38
8.3 Openings. (Reserved)	80- 28	19.4 Acceptance Testing.	80- 39
8.4 Assembly Components.	80- 28	19.5 Periodic Testing.	80- 39
Chapter 9 Special-Purpose Horizontally Sliding		19.6 Maintenance.	80- 40
Accordion or Folding Doors	80- 29	19.7 Field Modifications.	80- 40
9.1 Doors.	80- 29	Chapter 20 Fabric Fire Safety Curtains	80- 40
9.2 Supporting Construction.	80- 29	20.1 General.	80- 40
9.3 Clearances Around Openings.	80- 29	20.2 Fabric Fire Safety Curtain Components.	80- 41
9.4 Assembly Components.	80- 29	20.3 Installation.	80- 41
Chapter 10 Vertically Sliding Fire Doors	80- 30	20.4 Fire Safety Curtain Assemblies.	80- 42
10.1 Doors.	80- 30	20.5 Supporting Construction.	80- 43
10.2 Supporting Construction.	80- 30	20.6 Rigging and Lifting Equipment.	80- 43
10.3 Clearances.	80- 30	20.7 Operation of the Fire Safety Curtain Assembly.	80- 44

20.8	Acceptance Testing.	80– 45	Annex D	Fire Door and Fire Window Classifications ..	80– 89
20.9	Care and Maintenance.	80– 45	Annex E	Surface Attachments to Swinging Door Faces	80– 89
Chapter 21	Fire Protective Curtain Assemblies	80– 45	Annex F	Door Hardware Locations	80– 90
21.1	General.	80– 45	Annex G	Types of Door Construction	80– 91
21.2	Mounting of Fire Protective Curtain Assemblies. .	80– 45	Annex H	Special Purpose Doors	80– 92
21.3	Assembly Components.	80– 45	Annex I	Radiant Heat Transfer	80– 93
21.4	Power Operators.	80– 45	Annex J	Performance-Based Option for the Inspection, Testing, and Maintenance of Fire Door Assemblies	80– 94
21.5	Installation.	80– 45	Annex K	General Information About Fire Doors	80– 95
21.6	Inspection, Testing, and Maintenance.	80– 46	Annex L	Informational References	80– 96
21.7	Acceptance Testing.	80– 46	Index		80– 98
21.8	Closing Devices.	80– 46			
21.9	Periodic Inspection and Testing.	80– 46			
21.10	Maintenance.	80– 46			
Annex A	Explanatory Material	80– 47			
Annex B	Fire Doors: Protection of Conveyor Openings	80– 85			
Annex C	Illustration of Types of Fire Window Components	80– 88			

NFPA 80

Standard for

Fire Doors and Other Opening Protectives

2022 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 Standards.” They can also be viewed at www.nfpa.org/disclaimers or obtained on request from NFPA.

UPDATES, ALERTS, AND FUTURE EDITIONS: New editions of NFPA codes, standards, recommended practices, and guides (i.e., NFPA Standards) are released on scheduled revision cycles. This edition may be superseded by a later one, or it may be amended outside of its scheduled revision cycle through the issuance of Tentative Interim Amendments (TIAs). An official NFPA Standard at any point in time consists of the current edition of the document, together with all TIAs and Errata in effect. To verify that this document is the current edition or to determine if it has been amended by TIAs or Errata, please consult the National Fire Codes® Subscription Service or the “List of NFPA Codes & Standards” at www.nfpa.org/docinfo. In addition to TIAs and Errata, the document information pages also include the option to sign up for alerts for individual documents and to be involved in the development of the next edition.

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. 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 and extracted publications can be found in Chapter 2 and Annex L.

Chapter 1 Administration

1.1* Scope. This standard regulates the installation and maintenance of assemblies and devices used to protect openings in walls, floors, and ceilings against the spread of fire and smoke within, into, or out of buildings.

1.1.1* With the exception of fabric fire safety curtain assemblies, this standard addresses assemblies that have been subjected to standardized fire tests. (See Chapter 20.)

1.1.2* Incinerator doors, record room doors, and vault doors are not covered in this standard.

1.1.3* Requirements for horizontally sliding, vertically sliding, and swinging doors as used in this standard do not apply to hoistway doors for elevators and dumbwaiters.

Δ 1.1.4* This standard does not cover fire resistance glazing materials and horizontally sliding accordion or folding assemblies fabricated for use as walls and tested as wall assemblies in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*.

N 1.1.5 This standard does not cover requirements for labeled fire door assemblies installed in openings not required to be fire rated.

1.2 Purpose.

1.2.1 The purpose of this document is to set national standards for the installation and maintenance of assemblies used to protect openings in walls, floors, and ceilings to prevent or retard the spread of fire and smoke within, into, or out of buildings.

1.2.2 This document is also intended to give guidance to authorities having jurisdiction (AHJs) so they can determine in the field if an assembly meets the requirements and standards outlined in this document and if maintenance standards have been maintained.

1.2.3* It is not the purpose of this standard to establish the degree of protection required or to constitute the approval of any product.

N 1.3* Application. This standard regulates the periodic inspection, testing, and maintenance of all types of fire-rated opening protectives.

1.4* Retroactivity.

1.4.1 This standard is based on product and engineering practices recognized as acceptable at the date of issue.

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

1.4.3 In those cases where it is determined by the AHJ that the existing situation involves a distinct hazard to life or property, retroactive application of the provisions of this document shall be permitted.

1.5 Equivalency.

1.5.1* This standard shall not prohibit the development of new, modified, or improved devices that meet the intent of these requirements.

1.5.2 It shall be the responsibility of the manufacturer to furnish the information necessary to update the requirements pertaining to such new and improved devices.

1.5.3 For devices not described in this standard, the AHJ shall request descriptive information from manufacturers that is provided by a testing laboratory concerning acceptable methods for satisfactory field installation based on fire tests and engineering studies for operation and maintenance considerations, where applicable.

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 4, *Standard for Integrated Fire Protection and Life Safety System Testing*, 2021 edition.

NFPA 72®, *National Fire Alarm and Signaling Code*®, 2022 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2021 edition.

NFPA 105, *Standard for Smoke Door Assemblies and Other Opening Protectives*, 2022 edition.

NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, 2017 edition.

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*, 2019 edition.

NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*, 2017 edition.

NFPA 288, *Standard Methods of Fire Tests of Horizontal Fire Door Assemblies Installed in Horizontal Fire Resistance-Rated Assemblies*, 2017 edition.

NFPA 701, *Standard Methods of Fire Tests for Flame Propagation of Textiles and Films*, 2019 edition.

2.3 Other Publications.

▲ 2.3.1 ASME Publications. American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.

ASME A17.1/CSA B44, *Safety Code for Elevators and Escalators*, 2016.

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

ASTM A36/A36M, *Standard Specification for Carbon Structural Steel*, 2019.

ASTM D4157, *Standard Test Method for Abrasion Resistance of Textile Fabrics (Oscillatory Cylinder Method)*, 2013, reapproved 2017.

ASTM D5034, *Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)*, 2009, reapproved 2017.

ASTM D6193, *Standard Practice for Stitches and Seams*, 2016.

ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, 2020.

ASTM E648, *Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source*, 2019a¹.

▲ 2.3.3 BHMA Publications. Builders Hardware Manufacturers Association, 355 Lexington Avenue, 15th Floor, New York, NY 10017.

ANSI/BHMA A156.1, *Standard for Butts and Hinges*, 2016.

ANSI/BHMA A156.4, *Standard for Door Controls (Closers)*, 2019.

ANSI/BHMA A156.17, *Standard for Self Closing Hinges & Pivots*, 2019.

ANSI/BHMA A156.26, *Standard for Continuous Hinges*, 2017.

2.3.4 FM Publications. FM Global, 270 Central Avenue, P.O. Box 7500, Johnston, RI 02919. www.fmglobal.com.

FM 3210, *Heat Detectors For Automatic Fire Alarm Signaling*, 2018.

2.3.5 GSA Publications. U.S. General Services Administration, 1800 F Street, NW, Washington, DC 20405.

Federal Specification A-A-1923A, *Shield Expansion (Lag, Machine and Externally Threaded Wedge)*, 1995.

Federal Specification A-A-1924A, *Shield, Expansion (Self Drilling Tubular Expansion Shell Bolt)*, 1995.

Federal Specification A-A-55614, *Shield, Expansion (Non-Drilling Expansion Anchors)*, 1995.

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

UL 9, *Fire Tests of Window Assemblies*, 2009, revised 2020.

UL 10A, *Tin-Clad Fire Doors*, 2009, revised 2018.

UL 10B, *Fire Tests of Door Assemblies*, 2008, revised 2020.

UL 10C, *Positive Pressure Fire Tests of Door Assemblies*, 2016.

UL 10D, *Fire Tests of Fire-Protective Curtain Assemblies*, 2017.

UL 14C, *Swinging Hardware for Standard Tin-Clad Fire Doors Mounted Singly and in Pairs*, 2006, revised 2017.

UL 33, *Heat Responsive Links for Fire-Protection Service*, 2010, revised 2020.

UL 263, *Fire Tests of Building Construction and Materials*, 2011, revised 2020.

UL 555, *Fire Dampers*, 2006, revised 2016.

UL 555C, *Ceiling Dampers*, 2014, revised 2017.

UL 555S, *Smoke Dampers*, 2014, revised 2016.

UL 864, *Control Units and Accessories for Fire Alarm Systems*, 2014, revised 2020.

2.3.7 Other Publications.

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

2.4 References for Extracts in Mandatory Sections.

NFPA 72®, *National Fire Alarm and Signaling Code*®, 2022 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, 2019 edition.

NFPA 101®, *Life Safety Code*®, 2021 edition.

NFPA 5000®, *Building Construction and Safety Code*®, 2021 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 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.4* 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.

3.2.5 Shall. Indicates a mandatory requirement.

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

3.2.7 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the *NFPA Manuals of Style*. When used in a generic sense, such as in the phrase “standards development process” or “standards development activities,” the term “standards” includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Access Door. A door assembly, for installation in fire-resistance-rated walls or for installation in ceilings of fire-resistance-rated floor/ceiling or roof/ceiling assemblies, that is used to provide access to shafts, chases, attics, spaces above ceilings, or other concealed spaces.

3.3.1.1 Horizontal Access Door. An access door installed in the horizontal plane used to protect openings in ceilings of fire-resistance-rated floor/ceiling or roof/ceiling assemblies.

3.3.1.2 Vertical Access Door. An access door installed in the vertical plane used to protect openings in fire-rated walls.

3.3.2 Active Leaf. The first operating door of a pair, which is usually the door in which a lock is installed.

3.3.3 Ambient. For the purposes of this standard, the temperature of the room in which the test is being conducted.

3.3.4 Anchor. A device for attaching frames to the surrounding structure.

N 3.3.5 Annual Frequency. Occurring once per year, with a minimum of 9 months and a maximum of 15 months between each occurrence.

3.3.6* Astragal.

3.3.6.1 Overlapping Astragal. A horizontal or vertical molding attached to one leaf of a pair of doors.

3.3.6.2* Split Astragal. A horizontal or vertical molding attached to both leaves of a pair of doors.

3.3.7 Automatic-Closing Device. A device that causes the door or window to close when activated by a fusible link or detector.

3.3.8* Automatic-Closing Door. A door that normally is open but that closes when the automatic-closing device is activated.

Δ 3.3.9* Automatic Fire Detector. A device designed to detect the presence of a fire signature and to initiate action. [72, 2022]

3.3.10 Automatic Louver. An opening in a door with a series of slats or blades to allow passage of air and designed to close automatically in the event of fire.

3.3.11 Automatic Top and Bottom Bolts. See 3.3.69.1, Automatic Flush Bolts.

3.3.12 Barrel. A cylindrical horizontal member at the head of the opening that supports the door curtain of a rolling steel door and contains the counterbalance springs.

3.3.13 Batten. A horizontal pipe, tube, or other structural shape in a pocket of or attached to a fire safety curtain.

3.3.14 Binders. Pieces of hardware used to hold a sliding door to the wall, preventing lateral movement of the door from the wall.

3.3.15 Biparting. A vertically sliding door in which half of the door moves up and half of the door moves down in order to open, or a horizontal sliding door in which one door moves to the right and one moves to the left in order to open.

3.3.16 Bottom Bar (Rolling Steel Door). A reinforcing member at the lower edge of the door curtain assembly.

• **3.3.17 Bumper (Fire Safety Curtain).** A filled fabric pocket below the bottom batten or frame member of a fire safety curtain designed to press against the floor.

3.3.18 Bumpers. Stops to limit the closing or opening movement of a sliding door.

N 3.3.19 Ceiling Radiation Damper. See 3.3.37.1.

3.3.20 Center Latch. A latch used to hold the two halves of a center-parting or biparting fire door together, which is usually two pieces surface-applied to doors and interlocked in the closed position.

3.3.21 Center Parting. See 3.3.15, Biparting.

3.3.22 Chafing Strip. A metal strip applied to the back surface of a sliding door to protect the door surface from damage from the wall.

3.3.23 Channel Frame. A frame that consists of head and jamb members of structural steel channels, either shop assembled or field assembled, to be used with masonry walls.

3.3.24* Classified. Products or materials of a specific group category that are constructed, inspected, tested, and subsequently reinspected in accordance with an established set of requirements.

3.3.25 Closed Position (Rolling Steel Fire Door). A position of the door curtain with the underside of the bottom bar, including a compressible seal or sensing edge, if provided, in contact with the sill along the entire width of the opening.

3.3.26 Closing Device. A means of closing a door from the partially or fully opened position.

N 3.3.27 Combination Fire and Smoke Damper. See 3.3.37.2.

3.3.28 Concrete Lintel. A precast concrete horizontal member spanning and carrying the load above an opening.

3.3.29 Continuous Glazing Molding. A continuous molding used to hold glass or glazing in a window.

3.3.30 Coordinator. A device used on pairs of swinging doors that prevents the active leaf from closing before the inactive leaf closes.

N 3.3.31 Corridor Damper. See 3.3.37.3.

3.3.32 Counterbalancing. A method by which the hanging weight of the door is balanced by helical torsion springs or weights.

3.3.33 Cover Plate. A plate to cover the joint between the sections of multiple panel doors, usually applied to the front and back of the vertical or horizontal slide door.

3.3.34 Crush Plates. Bearing plates provided where doors are mounted on concrete masonry wall units with hollow cells to accommodate through-wall bolts to prevent crushing of the hollow concrete masonry unit.

3.3.35 Curtain (Rolling Steel Fire Door). Interlocking curtain slats assembled together.

3.3.36 Curtain Slats. Formed sheet steel members that, when interlocked together, form the rolling steel door curtain.

N 3.3.37 Damper.

Δ 3.3.37.1 Ceiling Radiation Damper. A device installed in a ceiling membrane of a fire-resistance-rated floor/ceiling or roof/ceiling assembly to automatically limit the radiative heat transfer through an air inlet/outlet opening.

3.3.37.2 Combination Fire and Smoke Damper. A device that meets both the fire damper and smoke damper requirements. [5000, 2021]

N 3.3.37.3 Corridor Damper. A device intended for use where air ducts or air transfer openings penetrate the ceilings of fire-resistance-rated corridors, where the corridor ceiling is permitted to be constructed using an assembly tested as a wall.

Δ 3.3.37.4* Fire Damper. A device, installed in an air-distribution system, that is designed to close automatically upon detection of heat to interrupt migratory airflow and to restrict the passage of flame. [5000, 2021]

3.3.37.5 Smoke Damper. A device within an air-distribution system to control the movement of smoke. [5000, 2021]

3.3.38 Detector. See 3.3.9, Automatic Fire Detector.

3.3.39 Door.

3.3.39.1 Access Door. See 3.3.1.

3.3.39.2 Automatic-Closing Door. See 3.3.8.

3.3.39.3 Power-Operated Fire Door. See 3.3.96.

3.3.39.4 Self-Closing Door. See 3.3.104.

3.3.39.5 Service Counter Fire Door. See 3.3.107.

3.3.40 Door Closer (Swinging). A labeled device that, where applied to a door and frame, causes an open door to close by mechanical force. The closing speed can be regulated by this device.

3.3.41 Door Holder/Release Device. A labeled, fail-safe device, controlled by a detection device, used on an automatic-closing door to release the door at the time of fire.

3.3.42 Door Protection Plate. Protective material applied to the face of a door and generally made of approximately 0.05 in. (1.2 mm) thick brass, bronze, aluminum, or stainless steel or ⅛ in. (3.2 mm) thick laminated plastic.

3.3.43* Double Egress Doors. A pair of swinging doors, each leaf of which swings in the opposite direction of the other.

3.3.44 Dutch Door. A door divided horizontally so that the lower part can be shut while the upper part remains open.

3.3.45 Dynamic System. An HVAC system designed to maintain the movement of air within the system at the indication of a fire.

3.3.46 Egress Side. The side of an opening from which traffic exits.

3.3.47 Fail-Safe Device. A device that will provide its intended function upon loss of power.

3.3.48* Field Modifications. Changes, not otherwise permitted by this standard, made to a listed assembly or component after it has been manufactured.

3.3.49 Finish Frame. A subframe attached to a rough buck to which the door is attached.

N 3.3.50 Fire Damper. See 3.3.37.4.

3.3.51* Fire Door. The door component of a fire door assembly.

3.3.52 Fire Door Assembly. Any combination of a fire door, a frame, hardware, and other accessories that together provide a specific degree of fire protection to the opening.

3.3.53 Fire Door Frame. A component forming the perimeter of an opening in a fire door assembly that is supplied welded or knocked down and anchored to the surrounding structure.

3.3.54* Fire Door Frame for Lights. A frame that, in addition to a door opening, contains an opening(s) for use with glazing materials.

3.3.55* Fire Door Frame for Panels. A frame that, in addition to a door opening, contains an opening(s) for use with fixed panels of solid metal or wood.

3.3.56 Fire Door Hardware. Door hardware furnished for swinging and sliding fire doors by the door manufacturer as a component part of the listed door assembly.

3.3.57 Fire Exit Hardware. Labeled devices for swinging fire doors installed to facilitate safe egress of persons and generally consisting of a crossbar and various types of latch mechanisms that cannot hold the latch in a retracted locked position.

3.3.58* Fire Protection Glazing. Glazing that has a fire protection rating.

▲ **3.3.59 Fire Protection Rating.** For the purposes of this standard, the designation indicating the duration of the fire test exposure to which a fire door assembly or fire window assembly was exposed and for which it successfully met all acceptance criteria as determined in accordance with NFPA 252; UL 10B, *Fire Tests of Door Assemblies*, or UL 10C, *Positive Pressure Fire Tests of Door Assemblies*; or NFPA 257 or UL 9, *Fire Tests of Window Assemblies*. (See also Annex D.)

3.3.60 Fire Protective Curtain Assembly. An assembly typically consisting of a fabric curtain, a bottom bar, guides, a coil, and an operating and closing system.

3.3.61 Fire Resistance Glazing. Glazing that has a fire resistance rating.

▲ **3.3.62 Fire Resistance Rating.** The time, in minutes or hours, that materials or assemblies have withstood a fire exposure as established in accordance with the test procedures of ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*.

3.3.63 Fire Safety Curtain. A curtain of fire-resistant fabric and noncombustible framing materials.

3.3.63.1 Brail Fire Safety Curtain. A fire safety curtain that folds up and stores in the space above a proscenium opening.

3.3.63.2 Straight-Lift Fire Safety Curtain. A fire safety curtain consisting of one or more flat panel(s) that lifts up and stores above the proscenium opening.

3.3.63.3 Unframed Fire Safety Curtain. A straight lift fire safety curtain containing no internal vertical framing members.

3.3.64 Fire Safety Curtain Assembly. A fire safety curtain and all other components necessary to form a complete assembly.

3.3.64.1 Framed Fire Safety Curtain Assembly. A straight lift-type fire safety curtain assembly containing a rigid perimeter frame and internal members.

3.3.65 Fire Shutter. A fire door assembly used for the protection of a window opening in an exterior wall.

3.3.66 Fire Window Assembly. A window or glass block assembly having a fire protection rating.

• **3.3.67 Flame Baffle.** A hinged piece of sheet metal within the hood that, when released, closes the space between the top of the curtain and the hood of a rolling steel fire door.

3.3.68 Floor Fire Door Assembly. A combination of a fire door, a frame, hardware, and other accessories installed in a horizontal plane that together provide a specific degree of fire protection to a through-opening in a fire-resistance-rated floor.

3.3.69 Flush Bolts.

3.3.69.1 Automatic Flush Bolts. A mortised bolt installed near the top or bottom of the inactive leaf of a pair of doors that holds the inactive leaf in a closed position until the active leaf is opened.

3.3.69.2 Manual Flush Bolts. A mortised bolt installed near the top or bottom of the inactive leaf of a pair of doors in which the bolts are manually extended or retracted into or out of the header or sill by means of a lever.

3.3.70 Follow-Up Inspection Procedure. Documents provided by the listing agency that are referenced in routine follow-up inspections and, where appropriate, field inspections.

3.3.71 Fusible Link. For the purposes of this standard, a listed device consisting of pieces of metal held together by low-melting-point solder.

3.3.72* Glazing Angle Clips. Steel clips used to hold glass in place in windows glazed only with glazing compound.

3.3.73 Governor (Sliding, Vertical, and Rolling Steel Fire Doors). A device that limits the rate of descent of the door during automatic closure.

3.3.74 Guide (Rolling Doors). Vertical assembly in which the curtain travels and that is fastened to the jamb, retaining the edges of the door curtain, and closing the space between the curtain, edges, and the jamb.

3.3.75 Guide Rail (Sliding Door, Vertical). A steel member attached to the wall or frame; used with vertical sliding doors to guide the door.

3.3.76 Guide Shoe (Sliding Door, Vertical). A member attached to vertical sliding doors; used to guide and retain the door on the guide rail.

3.3.77 Guide Wall Angle (Rolling Steel Doors). The component of the guide assembly that is fastened to the jamb.

3.3.78 Hanger (Sliding Door, Horizontal). A member used to attach a horizontally sliding door to the track and to cause the door to roll on or in the track.

3.3.79 Heat-Actuated Device. Devices that include fixed temperature releases, rate-of-temperature-rise releases, and door closers with hold-open arms embodying a fusible link.

3.3.80 Hollow Metal Frame. A frame formed from sheet metal.

3.3.81 Hood (Rolling Steel Door). A sheet metal housing that mounts horizontally between the brackets, serving as an enclosure for the coiled curtain and closing the space between the door coil and the lintel.

3.3.82 Inactive Leaf. One door of a pair of doors that ordinarily is latched closed; the second operating door of a pair.

3.3.83 Inspection Mark. An identification applied to equipment or materials, denoting compliance with periodic inspection and testing requirements.

3.3.84 Keeper. A guide and a restraint used on latching devices.

3.3.85 Knocked-Down Frame. Door frame furnished by manufacturer in three or more basic parts for assembly in the field.

3.3.86 Label. See 3.2.3, *Labeled*.

3.3.86.1 Field Label. A label applied outside of the manufacturing facility.

3.3.87 Lap-Mounted Door (Sliding Door, Vertical Door, Horizontal Door, Swinging Door). Doors mounted on the face of a wall and overlapping the opening by a prescribed dimension.

3.3.88 Latching Device. A spring-loaded latch bolt or a gravity-operated steel bar that, after release by physical action, returns to its operating position and automatically engages the strike plate when it is returned to the closed position.

3.3.89 Lintel. A horizontal member spanning and carrying the load above an opening.

3.3.90 Mullion. A fixed or removable vertical member set in a double door opening that allows both leaves to be active or set between a door and a side light or a separate, framed, glazed area.

3.3.90.1 Window Mullion. The separate horizontal or vertical member or members used to join windows in a multiple window opening.

3.3.91* Multiple Opening Door Frame. A door assembly that consists of more than two doors.

3.3.92 Muntin. A bar member supporting and separating panes of glass within a sash, door, or glazing frame.

3.3.92.1 Window Muntin. A tee-shaped bar in a frame or ventilator, dividing the glass.

3.3.93 Noncombustible. Not capable of igniting and burning when subjected to a fire.

3.3.94 Pass Door. A swinging door in a sliding door for personnel use.

3.3.95 Plant-On. A decorative trim applied to the surface of a door. (See also *Annex E*.)

3.3.96 Power-Operated Fire Doors. Doors that normally are opened and closed electrically, pneumatically, or hydraulically.

3.3.97 Proscenium Wall. The wall that separates the stage from the auditorium or house. [5000, 2021]

3.3.98 Purchase Line (Hand Line). The line attached to the counterweight for manual opening and closing of the fire safety curtain.

3.3.99 Qualified Person. A person who, by possession of a recognized degree, certificate, professional standing, or skill, and who, by knowledge, training, and experience, has demonstrated the ability to deal with the subject matter, the work, or the project.

3.3.100 Retrofit Operator. A device labeled as a “retrofit rolling steel fire door operator” intended to replace operator and governor systems (including automatic-closing devices) used on existing listed rolling steel fire doors.

3.3.101 Roller Guide/Metal Track Side Edge Guide System. Continuous tracks with captive trolleys or rollers at each vertical edge of the curtain used to guide and restrain the fire safety curtain.

3.3.102* Rolling Steel Fire Door. A fire door assembly consisting of a curtain, a bottom bar, a barrel, brackets, guides, a hood, and an automatic-releasing device.

3.3.103 Rough Buck. A subframe, usually channel shaped, attached to an existing wall to which the finished frame is attached.

3.3.104 Self-Closing Doors. Doors that, when opened and released, return to the closed position.

3.3.105 Self-Latching Bolt. An automatic-latching device that engages in a keeper to hold a door leaf in a closed position and that can only be released manually.

3.3.106 Sensing Edge (Rolling Steel Fire Door). A device added to the underside of the bottom bar of a power-operated rolling steel fire door or fire shutter that stops or reverses the door curtain upon contact with an obstruction when closing under power.

3.3.107 Service Counter Fire Door. A labeled assembly consisting of a rolling steel fire door that incorporates a four-sided frame used for the protection of openings in walls where the primary purpose of the opening is for nonpedestrian use, such as counter service for food, a pharmaceutical dispensary, package and baggage transfer, or observation ports.

3.3.108 Shutter. A labeled door assembly that is used for the protection of a window opening in an exterior wall. (See also 3.3.65, *Fire Shutter*.)

3.3.109 Side Guide Cable System. A continuous vertical cable at each vertical edge of the curtain used to guide and restrain the fire safety curtain.

3.3.110 Side Light. An opening in a fire door frame alongside the fire door opening that is filled with glazing material.

3.3.111* Side Light Frame. A fire door frame prepared for the application of a glazing material alongside the door opening.

3.3.112* Side Panel Frame. A door frame prepared for the installation of a fixed solid metal or wood panel alongside the door opening.

3.3.113 Sill. A structural component of the building that forms the bottom part of an opening over which a door closes.

3.3.114 Sill (Rolling Steel Fire Door). The bottom part of an opening onto which the door curtain and bottom bar come to rest when in the closed position.

3.3.115 Sill (Service Counter Fire Door). The bottom part of a frame onto which the door curtain and bottom bar come to rest when in the closed position.

3.3.116 Single-Point Latch. A latch located in the edge of a door to engage either in the frame or in the edge of the inactive leaf of a pair of doors.

3.3.117 Sliding Hardware. A system of rails, hangers, rollers, guides, binders, and closing devices that are self-closing by means of gravity, weights, and pulleys or spring-actuated devices.

N 3.3.118 Smoke Damper. See 3.3.37.5.

3.3.119 Smoke Detector. A device that detects visible or invisible particles of combustion. [72, 2022]

3.3.120 Spring Hinge. A closing device in the form of a hinge with a built-in spring used to hang and close the door.

3.3.121 Spring Release Device (Rolling Steel Door). A device that, when activated, releases part of the spring counterbalancing force and causes the door to close.

3.3.122 Static System. An HVAC system designed to stop the movement of air within the system at the indication of a fire.

3.3.123 Stay Chain. A chain used to support the fire safety curtain.

3.3.124 Stay Rollers (Sliding Door, Horizontal). A device used on horizontally sliding doors at their back lower corners to guide the door and prevent the door from moving away from the wall under fire conditions.

3.3.125 Strike.

3.3.125.1 Electric Strike. A strike that, when activated, either releases or retains a projected latch or dead bolt.

3.3.125.2 Open Back Strike. A strike applied to the inactive leaf of a pair of doors and cut away at the back to allow either leaf to open or close independently.

3.3.126 Strike Plate. A wear plate for projecting hardware or a wear plate and keeper for a latch bolt.

3.3.127 Struts. Adjustable vertical members that extend from the head of the hollow metal door frame to the ceiling to hold the frame rigidly in place.

3.3.128 Temperature Rise. The temperature increase above ambient that has developed on the unexposed face of the fire door assembly at the end of 30 minutes of exposure to the standard fire test.

3.3.129 Threshold. A builders hardware component that is installed beneath a closed door.

3.3.130 Track Brackets (Sliding Doors). Hardware bolted to the wall that serves to support the track.

N 3.3.131 Trained Rolling Steel Fire Door Systems Technician. A technician employed in the rolling steel fire door industry with documented training by a recognized industry organization or by a manufacturer of a listed rolling steel fire door.

3.3.132 Transom. An opening in a fire door frame above the door opening that is filled by a solid panel or with glazing material.

3.3.133* Transom and Side Light Frame. A fire door frame prepared for the application of a glazing material above and alongside the door opening.

3.3.134* Transom and Side Panel Frame. A fire door frame prepared for the application of solid metal or wood panels above and alongside the door opening.

3.3.135* Transom Light Frame. A fire door frame prepared for the application of a glazing material above the door opening that has a horizontal member such as a transom bar provided to separate the glazed opening from the door opening.

3.3.136 Transom Panel. A panel, fixed or removable, installed in a frame above the door.

3.3.137* Transom Panel Frame. A fire door frame prepared for the application of a transom panel above the door opening that has a horizontal member such as a transom bar provided to separate the transom opening from the door opening unless the transom panel or the bottom of the panel and the top of the door are rabbeted.

3.3.138 Undercutting. Trimming the lowest edge of a door panel for clearance.

3.3.139 Vent (Sliding Door, Vertical and Horizontal Tin-Clad Only). A hole cut in a fire door to allow for venting of the products of combustion.

3.3.140 Vertical Guide Pocket. A partial enclosure at the vertical edge of the proscenium that protects the vertical edges and guides of a fire safety curtain.

3.3.141 Vertically Sliding Door. Labeled single-piece doors and sectional doors operating in a vertical direction.

3.3.142 Viewer. A viewing device installed in a door to allow observation of persons opposite the security side of the door without having to open the door.

3.3.143 Wedge (Sliding Door, Horizontal Tin-Clad and Flush Sheet Metal). A plate mounted on the face of a sliding door designed to force the door against the wall.

3.3.144 Window. Integral fabricated units, placed in an opening in a wall, primarily intended for the admission of light, or light and air, and not intended primarily for human entrance or exit.

3.3.145 Window Frame. The perimeter of a window.

3.3.146 Window Sash. The horizontal or vertical sliding component of a window.

3.3.147 Window Ventilator. The part of a projected window, casement window, or pivoted window that opens.

3.3.148 Wire Glazing Clips. Small, spring wire clips used to hold glass in place where windows are glazed only with glazing compound.

Chapter 4 General Requirements

4.1 General Limitations.

4.1.1 Classification. Fire doors and fire windows shall be classified by designating a required fire protection rating expressed in hours or fractions thereof. (See Annex D.)

4.1.2* Fusible Links.

4.1.2.1 The particular fusible link used shall depend on the temperature and load requirements of the application.

4.1.2.2 Multiple links shall be permitted to be used to meet the load rating requirements where the load rating of a single link is exceeded.

N 4.1.2.3 Fusible links shall be listed in accordance with UL 33, *Heat Responsive Links for Fire-Protection Service*.

4.1.3 Signage. Informational signs shall be permitted to be installed on the surfaces of fire doors in accordance with 4.1.3.1 through 4.1.3.4 or in accordance with the manufacturer's published listing.

4.1.3.1 Allowable Area. The total area of all attached signs shall comply with the following:

- (1) Signage comprising combustible materials shall not exceed 5 percent of the area of the face of the fire door.
- (2) Signage that is painted on with stencils or other similar methods shall not be limited in area.
- (3) Vinyl signage up to 0.008 in. (0.2 mm) in thickness shall not exceed 5 percent of the area of the face of the fire door.

(4) Metal signage up to 20 gauge thickness shall not exceed 200 in.² (0.13 m²).

4.1.3.2 Means of Attachment.

4.1.3.2.1 Signs shall be attached to fire doors by use of an adhesive.

4.1.3.2.2 Mechanical attachments such as screws or nails shall not be permitted, unless otherwise permitted by 4.1.3.2.3.

N 4.1.3.2.3 Up to four steel or stainless steel sheet metal screws up to U.S. size #8 (4.2 mm) or up to four other steel fasteners not exceeding 0.17 in. (4.2 mm) shall be permitted to penetrate one side of a fire door to attach metal signs.

Δ 4.1.3.3 Signs shall not be installed on glazing in fire doors.

4.1.3.4 Signs shall not be installed on the surface of fire doors in such a way that impairs or otherwise interferes with the proper operation of the fire door.

4.1.4 Sliding Doors.

4.1.4.1 Sliding doors shall be permitted to have integral swinging doors.

4.1.4.2 Where sliding doors include an integral swinging door, they shall be permitted to be used on exits to the exterior of the building.

4.2 Listed and Labeled Products. (See 3.2.3 and 3.2.4 for definitions.)

4.2.1* Listed items shall be identified by a label.

4.2.1.1 At a minimum, the label for fire doors shall contain the following information:

- (1) The words “fire door.”
- (2) The manufacturer’s name or a code that can be traced back to the manufacturer.
- (3) The marking of a third-party certification agency.
- (4) The fire protection rating of the door.
- (5) A unique serial number, if provided by the listing agency.
- (6) The fire test standard designation to which the assembly was tested.
- (7)* The temperature transmission rise at 30 minutes. If the temperature transmission rise of a fire door exceeds 650°F (361°C), the temperature rise shall be permitted to be omitted.

4.2.1.2 For swinging doors provided with builders hardware, the minimum latch throw shall also be shown. (See 4.3.3.)

4.2.1.3 Where applicable, a statement that no hose stream test was conducted shall be provided.

4.2.1.4 The label for fire door frames shall contain the following information:

- (1) The words “fire door frame”
- (2) The manufacturer’s company name or a code that can be traced back to the manufacturer
- (3) The marking of a third-party certification agency
- (4) The fire protection rating of the frame
- (5) The fire test standard designation to which it was tested

4.2.1.4.1 Fire door frames rated at 3 hours when installed with masonry anchors in masonry walls or rated at 1½ hours when provided with wood stud or steel stud anchors and installed in

gypsum board walls shall not be required to be provided with a fire protection rating.

4.2.1.4.2 In lieu of 4.2.1.4.1, fire door frames shall be marked with the label or embossment of the third-party certification agency and the manufacturer’s name or a code that can be traced back to the manufacturer.

4.2.1.4.3 Where applicable, a statement that no hose stream test was conducted shall be provided.

4.2.1.5 At a minimum, the label for fire window frames shall contain the following information:

- (1) The words “fire window frame”
- (2) The manufacturer’s company name or a code that can be traced back to the manufacturer
- (3) The marking of a third-party certification agency
- (4) The fire protection rating
- (5) The fire test standard designation to which it was tested

4.2.1.6 The label for oversized doors shall contain the following information:

- (1) The words “oversized fire door”
- (2) The manufacturer’s company name or a code that can be traced back to the manufacturer
- (3) The marking of a third-party certification agency
- (4) The basis of a fire protection rating

Δ 4.2.2* New fire protection and fire resistance glazing shall be marked in accordance with Table 4.2.2, and such marking shall be permanently affixed.

4.2.3 Labels shall be applied in locations that are readily visible and convenient for identification by the AHJ after installation of the assembly.

- 4.2.4 The label or the listing shall be considered evidence that samplings of such devices or materials have been evaluated by tests and that such devices or materials are produced under an in-plant, follow-up inspection program.

4.2.5 Specification of items of a generic nature, such as hinges, that are not labeled shall comply with the specifications contained in this standard.

Δ Table 4.2.2 Marking Fire-Rated Glazing Assemblies

Fire Test Standard	Marking	Definition of Marking
ASTM E119 or UL 263	W	Meets wall assembly criteria
NFPA 257 or UL 9	OH	Meets fire window assembly criteria, including the hose stream test
NFPA 252, UL 10B, or UL 10C	D	Meets fire door assembly criteria
	H	Meets fire door assembly hose stream test
	T	Meets 450°F (232°C) temperature rise criteria for 30 minutes
	XXX	The time, in minutes, of fire resistance or fire protection rating of the glazing assembly

[101:Table 8.3.3.6.3]

4.2.6 Components.

4.2.6.1 A fire door assembly shall consist of components that are separate products incorporated into the assembly and are allowed to have their own subcomponents.

4.2.6.2* Except where restricted by individual published listings, a fire door assembly shall be permitted to consist of the labeled, listed, or classified components of different organizations that are acceptable to the AHJ.

4.3 Classifications and Types of Doors.

4.3.1* Only labeled fire doors shall be used.

4.3.2 Swinging fire doors shall be permitted to be furnished separately from labeled door frames and builders hardware if the complete fire door assembly, including the door, frame, and builders hardware, comprises a labeled fire door assembly.

4.3.3 Fire doors furnished with or prepared for fire exit hardware shall bear a label stating "Fire Door to Be Equipped with Fire Exit Hardware."

4.3.4 The label described in 4.3.3 shall address the reinforcements necessary for the fire exit hardware, and the complete fire door assembly shall have been tested for egress panic load requirements.

4.3.5* Rolling steel fire doors shall be labeled and shall be furnished as a complete assembly that includes curtain, bottom bar, barrel, guides, brackets, hood, automatic closing device, vision lights, and any other components required by their listing for a complete assembly.

4.3.6 Elevator doors shall be in accordance with Section 14.2.

4.3.7 Access-type door assemblies shall consist of single swinging steel doors with frames, self-latching devices, and closing mechanisms.

4.3.8 Service counter fire doors shall be of the single- or two-speed counterbalanced types of flush design or the rolling steel type of formed steel and shall include wall guides, frame, sill, latching, and counterbalancing mechanism.

4.3.9* Oversized Doors.

4.3.9.1 Fire doors that are too large to be fire tested shall be considered oversized fire doors and shall bear a label by an approved agency or shall be provided with a certificate of inspection furnished by an approved testing agency.

4.3.9.2 When a certificate of inspection is provided by an approved testing agency, the certificate shall state that the door conforms to the requirements of design, materials, and construction but has not been subjected to the fire test.

4.4 Glazing Material in Fire Doors.

4.4.1* Only labeled fire resistance or fire protection glazing material shall be used in fire door assemblies when permitted by the door listing. (See A.3.3.58, *Fire Protection Glazing*.)

4.4.2 Fire protection glazing and fire resistance glazing shall meet all applicable impact safety standards.

4.4.3* Glazing materials in vision panels shall be installed in labeled glass light kits or in accordance with the fire door listing and shall be installed in accordance with the manufacturer's installation instructions.

4.4.3.1* For new wood doors, glazing materials in vision panels shall be installed in labeled glass light kits or in accordance with the fire door listing and shall be installed in accordance with inspection service procedure and under label service.

4.4.4* Fire protection glazing not exceeding 100 in.² (0.065 m²) shall be permitted in fire doors having a 3-hour fire protection rating or in fire doors having a 1½-hour fire protection rating for use in severe exterior fire exposure locations where the fire protection glazing has been tested for the desired rating period with no through-openings in accordance with NFPA 252, UL 10B, *Fire Tests of Door Assemblies*, or UL 10C, *Positive Pressure Fire Tests of Door Assemblies*.

4.4.5* Glazing material shall be permitted in fire doors having the fire protection ratings shown in Table 4.4.5 when tested in accordance with NFPA 252, UL 10B, *Fire Tests of Door Assemblies*, or UL 10C, *Positive Pressure Fire Tests of Door Assemblies*, and shall be limited in size and area in accordance with Table 4.4.5.

4.4.5.1 Maximum area of individual exposed lights shall be 1296 in.² (0.84 m²) with no dimension exceeding 54 in. (1.37 m) unless otherwise tested.

4.4.6 Each individual glazing unit shall be identified with a label that is visible after installation.

4.4.7 Viewers in fire doors shall be labeled.

4.5 Fire Resistance Glazing in Doors and Windows. Fire resistance glazing that limits the temperature rise on the unexposed surface and withstands the impact of the hose stream test as required for walls for the required duration in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*, and is subsequently tested in accordance with NFPA 252; UL 10B, *Fire Tests of Door Assemblies*, or UL 10C, *Positive Pressure Fire Tests of Door Assemblies*; or NFPA 257 or UL 9, *Fire Tests of Window Assemblies*, shall be permitted in fire doors or windows having a fire protection rating of 3 hours or less and shall be limited to the maximum area tested. (See 6.3.3.3, 6.3.3.4, and Annex D.)

4.6 Classification of Hardware for Fire Doors.

4.6.1 Hardware required for the installation of all types of fire doors shall be as specified in those sections covering installation.

4.6.2 Hardware for fire doors shall be referred to as builders hardware or fire door hardware.

4.6.2.1 Fire exit hardware shall be within the category of builders hardware.

Table 4.4.5 Fire Door Rating

Fire Door Rating (hr)	Maximum Area of Glazing (per Door Leaf ^a)
½, ⅓	Limited to maximum area tested
¾	Limited to maximum area tested ^b
1 ^c , 1½ ^{a,c}	Limited to maximum area tested
3 ^a	100 in. ² (0.065 m ²)

^aSee also requirements in 4.4.4.

^bSee 4.4.5.1.

^cFire protection glazing materials exceeding 100 in.² (0.065 m²) in area are not permitted in temperature rise-rated doors.

4.6.3 In this standard, builders hardware shall be applied only to swinging doors.

4.6.3.1* Builders hardware shall include hinges (full mortise, half mortise, half surface, full surface, olive knuckle, paumelle, or spring), single-, two-, or three-point locks and latches, top and bottom bolts (flush, surface, or concealed), and door closers.

4.6.3.2 Builders hardware shall not be required to be shipped from the factory with the fire doors.

4.6.3.3* Fire exit hardware shall consist of exit devices that have been labeled for both fire and panic protection.

4.6.4* Fire door hardware shall be applied to both swinging and sliding doors.

4.6.4.1 Fire door hardware that is applied to swinging doors shall consist of surface-mounted strap hinges, surface-applied latches, and closing devices.

4.6.4.2 In this standard, all hardware for sliding doors shall be fire door hardware.

4.6.4.3 Fire door hardware shall be shipped from the factory with the fire door.

4.7 Actuation Devices for Fire Doors, Fire Shutters, and Fire Windows.

4.7.1 General.

4.7.1.1* Actuation devices for the release of fire doors shall be permitted to be part of an overall system that releases the door.

4.7.1.2 Actuation devices and their components shall be installed in accordance with the manufacturers' instructions.

4.7.1.3 When the system or arrangement of detectors for an opening is not considered to be fail-safe, fusible links shall be used to ensure automatic closing of the door in the event of a power failure.

4.7.1.4 Fire doors that incorporate a device that delays activation of an automatic-closing, self-closing, or emergency power operation shall not delay the initiation of the closing or reclosing of the door for more than 10 seconds, unless acceptable to the authority having jurisdiction.

4.7.1.5* When actuation devices are used in conjunction with material handling systems, such as a conveyor, they shall be arranged in accordance with the following:

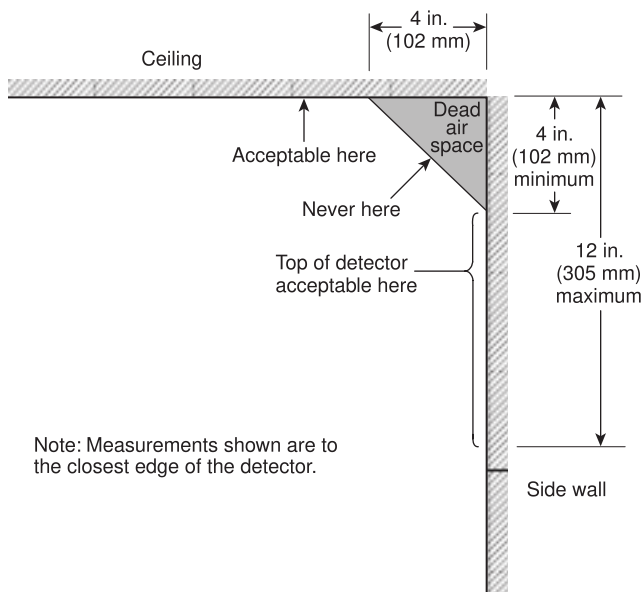
- (1) They shall stop the feed conveyor or otherwise initiate the mechanism that clears the path of the fire door.
- (2) They shall provide an adequate time delay to clear the opening that shall not exceed 10 seconds.
- (3) They shall activate the automatic- or self-closing mechanism.

4.7.2 Smoke Detectors. Where smoke detectors are used, they shall be located in accordance with *NFPA 72*.

4.7.3 Heat Detectors.

4.7.3.1 All heat detectors shall be placed as shown in Figure 4.7.3.1(a) and Figure 4.7.3.1(b), but in no event shall detectors be placed in the dead air space shown in Figure 4.7.3.1(a).

4.7.3.2 Unless otherwise acceptable to the AHJ, heat detectors shall be installed on both sides of the wall and interconnected



Note: Measurements shown are to the closest edge of the detector.

FIGURE 4.7.3.1(a) Proper Placement of Heat Detectors and Fusible Links.

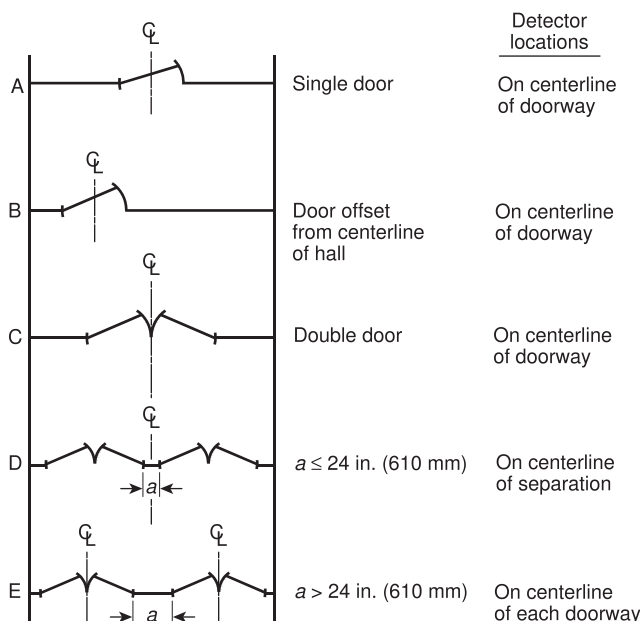


FIGURE 4.7.3.1(b) Heat Detector Locations.

so that the operation of any single heat detector causes the door to close.

4.7.4 Fusible Links.

4.7.4.1* Except as required by 4.7.4.2 and 4.7.4.3, fusible links shall be placed as shown in Figure 4.7.3.1(a).

4.7.4.2* Unless otherwise acceptable to the AHJ, fusible links shall be installed on both sides of the wall and interconnected so that the operation of any single fusible link causes the door to close.

4.7.4.3* Where fusible links are used, one fusible link shall be located near the top of the opening, and additional links shall be located at or near the ceiling on each side of the wall.

4.7.4.3.1 Where fusible links are installed on both sides of the wall, a sleeve shall be installed through the wall to provide an open pathway for the cable or chain connecting the fusible links.

4.7.4.3.2 The sleeve shall be $\frac{1}{2}$ in. (13 mm) diameter galvanized steel conduit or pipe, with ends deburred, and fitted with a collar or bushing at each end to secure the sleeve around the wall and allow free movement of the cable or chain through the sleeve upon fusing of the links.

4.7.4.4 Fusible links shall be used when the system or arrangement of detectors for an opening is not considered to be fail-safe.

4.8 Supporting Construction.

4.8.1 Walls.

4.8.1.1 Walls shall be plumb and true, present smooth surfaces, and have a fire resistance rating as required by the AHJ.

4.8.1.2 Walls shall be of brick, concrete, or concrete masonry unit construction except that, where hollow concrete masonry units are used, all hollow cells within a minimum of 16 in. (406 mm) of the opening shall be filled with concrete.

4.8.1.3 Door assemblies shall be used on walls of other construction only where listed for such installation.

4.8.1.4* Where hollow concrete masonry units are used and where tin-clad and sheet metal (corrugated) doors are mounted, the wall openings shall be reinforced to provide anchorage for door-mounting hardware equal to that of brick or concrete.

4.8.1.5* For tin-clad and sheet metal (corrugated) doors, continuous steel-bearing plates (crush plates) of $\frac{3}{16}$ in. $\times$ 3 in. (4.76 mm $\times$ 76.2 mm) minimum dimensions shall be permitted to be used to bridge the cavities and to prevent the through-wall bolts from crushing the hollow blocks.

4.8.1.6 Door assemblies shall be used on walls of other construction only if listed for such installation.

4.8.2 Sills.

4.8.2.1 In buildings with noncombustible floors, a sill shall not be required, provided the floor structure is extended through the door opening.

4.8.2.2 In buildings with combustible floors or combustible floor coverings, a sill shall be required if the floor structure is extended through the door opening, as combustible floor construction shall not be permitted to extend through the door opening.

4.8.2.3 Door openings required to be protected by $\frac{1}{2}$ -hour or $\frac{1}{3}$ -hour rated fire protection door assemblies shall be exempted from the requirements of 4.8.2.2.

4.8.2.4 Sills shall be constructed of noncombustible materials.

4.8.2.5* For swinging doors with builders hardware and special-purpose horizontally sliding accordion or folding doors with frames having a jamb depth of 4 in. (102 mm) or less, the sill width shall be equal to the jamb depth.

4.8.2.6* Where frames have a greater jamb depth, the sills shall have a minimum width of 4 in. (102 mm) and shall be installed so that the sill extends from the face of the frame on the door side into the frame.

4.8.2.7 For swinging doors with fire door hardware, sills shall extend at least the depth of the door frame for flush-mounted doors.

4.8.2.8* For lap-mounted doors, sills shall extend beyond the opening for a length equal to the projection of the installed door or doors.

4.8.2.9* For horizontally sliding fire doors and vertically sliding fire doors, sills shall be constructed of noncombustible material and shall extend 6 in. (152 mm) past the edge of the opening on each side and 4 in. (102 mm) out from the face of the wall.

4.8.2.10 Rolling Steel Fire Doors. For rolling steel fire doors, sills shall be constructed of noncombustible material, shall extend past each jamb as necessary to be completely under the guides, and shall extend out from the centerline of the guide groove a minimum of 4 in. (102 mm) on each side to accommodate deflection of the bottom bar.

4.8.2.11 For service counter fire doors, sills shall be provided as part of the fire door assembly.

4.8.2.12 Flush concrete sills shall extend to the wall opening on both sides.

4.8.2.13* For swinging doors with builders hardware, horizontally sliding doors, and special-purpose horizontally sliding accordion or folding doors, raised noncombustible sills or thresholds shall be permitted wherever combustible floor coverings are contemplated or are in use on one or both sides of the door openings.

4.8.3 Lintels.

4.8.3.1 Lintels shall be brick, concrete or masonry arches, steel, or reinforced concrete.

4.8.3.2 Lintels of other types of construction shall be allowed when acceptable to the AHJ.

4.8.4 Clearance.

4.8.4.1* Clearance under the bottom of a door shall be a maximum of $\frac{3}{4}$ in. (19 mm).

4.8.4.2* Clearance under the bottom of the door shall be measured vertically from the bottom of the door to the top of the finished floor or threshold.

4.8.4.2.1 Where latching hardware devices project from the bottom of the door, the maximum clearance dimension under the door shall be in accordance with the hardware manufacturer's installation instructions not to exceed $\frac{3}{4}$ in. (19 mm).

4.8.4.2.2 Where a threshold is installed under a fire door, the clearance shall be in accordance with the hardware manufacturer's installation instructions and listing.

4.8.4.3* Products evaluated for fire doors with a bottom clearance in excess of $\frac{3}{4}$ in. (19 mm) and listed for use at or under the bottom of the fire door shall be permitted where installed in accordance with their listings.

4.8.4.4 Where the bottom of the door is more than 38 in. (965 mm) above the finished floor, the maximum clearance shall not exceed $\frac{3}{8}$ in. (9.5 mm) or as specified by the manufacturer's label service procedure.

4.8.5 Floor Coverings.

4.8.5.1 Combustible floor coverings shall be permitted to extend through openings required to be protected by 1½-hour, 1-hour, or ¾-hour rated fire protection fire door assemblies without a sill where they have a minimum critical radiant flux of 0.22 W/cm² in accordance with NFPA 253 or with ASTM E648, *Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source*.

4.8.5.2 Combustible floor coverings shall not extend through openings protected by 3-hour rated fire protection door assemblies.

4.8.6* Where permitted by the individual door assembly listing, expansion anchors used in concrete, brick, or filled concrete masonry unit walls shall meet the following conditions:

- (1) Expansion anchors shall be manufactured from steel and shall be zinc-coated or cadmium-coated.
- (2) Expansion anchors shall conform to Federal Specification A-A-1923A, *Shield Expansion (Lag, Machine and Externally Threaded Wedge)*; A-A-1924A, *Shield, Expansion (Self Drilling Tubular Expansion Shell Bolt)*; or A-A-55614, *Shield, Expansion (Non-Drilling Expansion Anchors)*.
- (3) The compressive strength of the concrete shall not be less than 2000 psi (13,790 kPa), and the bolt load shall not exceed $\frac{1}{4}$ of the proof test load.
- (4) Where used in brick or filled concrete masonry unit walls, the bolt load shall not exceed $\frac{1}{2}$ of the proof test load.
- (5) The distance from the edge of the wall to the center of an expansion anchor shall be at least six times the diameter of the anchor. The distance between expansion anchors shall be at least eight times the diameter of the anchor.

Chapter 5 Inspection, Testing, and Maintenance

5.1* General.

5.1.1 Application.

5.1.1.1* This chapter shall cover the inspection, testing, and maintenance of fire doors, fire shutters, fire windows, and opening protectives other than fire dampers, fabric fire safety curtains, and fire protective curtain assemblies.

5.1.1.2 The requirements of this chapter shall apply to new and existing installations.

N 5.1.1.3 Where inspection criteria for door assemblies are not listed in this chapter, door assemblies shall be inspected in accordance with all of the following:

- (1)* The requirements of this standard that were in effect at the time of installation
- (2) The manufacturers' published listings and installation instructions
- (3)* The requirements of the respective door chapter, Chapter 4, and Chapter 5, as applicable, where the manufacturers' published listings and installation instructions are not available

5.1.2 Operability.

5.1.2.1* Doors, shutters, and windows shall be operable at all times.

5.1.2.2 Doors, shutters, and windows shall be kept closed and latched or arranged for automatic closing.

5.1.2.3 Prevention of Door Blockage.

5.1.2.3.1 Door openings and their surrounding areas shall be kept clear of anything that could obstruct or interfere with the free operation of the door.

5.1.2.3.2 Where necessary, a barrier shall be built to prevent the piling of material against sliding doors.

5.1.2.3.3 Blocking or wedging of doors in the open position shall be prohibited.

5.1.3 Replacement. Where it is necessary to replace fire doors, shutters, windows or their frames, glazing materials, hardware, and closing mechanisms, replacements shall meet the requirements for fire protection and shall be installed and tested as required by this standard for new installations.

5.1.4 Field Labeling.

Δ 5.1.4.1 Field labeling shall be performed only by individuals or companies that have been certified or listed, or by individuals or companies that are representatives of a labeling service that maintains periodic inspections of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

5.1.4.2 Individuals performing the service shall provide proof of qualifications to the authority having jurisdiction prior to performing work, as described in 5.1.4.1.

5.1.4.3 At a minimum, field labels shall contain the following information:

- (1) The words "field inspected" or "field labeled"
- (2) The words "fire door" or "fire door frame"
- (3) The marking of a third-party certification agency
- (4) The fire protection rating
- (5) A unique serial number (if provided by the listing agency)
- (6) The fire test standard designation to which the assembly was tested

5.1.4.4 Field modifications shall not be permitted to be made to a non-fire-rated door assembly to achieve a fire rating unless the field modification is completed under label service.

5.1.4.5 Doors in which a field modification in accordance with 5.1.4.4 has been completed shall be labeled.

5.1.4.6 When an opening with a non-fire-rated door requires a fire door, the door assembly shall be replaced.

Δ 5.1.5 Modifications. Modifications to fire doors shall comply with 5.1.5.1 except as permitted by 5.1.5.2.

Δ 5.1.5.1* Field Modifications.

N 5.1.5.1.1 In cases where a field modification to a fire door or a fire door assembly is desired, the laboratory with which the product or component being modified is listed shall be contacted through the manufacturer and a written or graphic description of the modifications shall be presented to that laboratory.

5.1.5.1.2 Field modifications shall be permitted without a field visit from the laboratory upon written authorization from that laboratory.

5.1.5.1.3 When the manufacturer is no longer available, the laboratory shall be permitted to provide an engineering evaluation supporting the field modification.

N 5.1.5.2 Job Site Preparation.

N 5.1.5.2.1 Preparation of fire door assemblies for locks, latches, hinges, remotely operated or remotely monitored hardware, concealed closers, glass lights, vision panels, louvers, astragals, and split astragals and the application of plant-ons and laminated overlays shall be performed in accordance with the manufacturer's inspection service procedure and under label service. (See Annex E and Annex F.)

N 5.1.5.2.2* The following job site preparations shall be permitted:

- (1) Holes for surface-applied hardware, function holes for mortise locks, and holes for labeled viewers
- (2) A maximum $\frac{3}{4}$ in. (19 mm) wood and composite door undercutting
- (3) Installation of protection plates (see 6.4.5)

N 5.1.5.2.2.1 Surface-applied hardware shall be applied to the door or frame without removing material other than drilling round holes to accommodate cylinders, spindles, similar operational elements, electrified hardware, and through-bolts in doors.

N 5.1.5.2.2.2 The holes described in 5.1.5.2.2.1 shall not exceed a diameter of 1 in. (25.4 mm), except holes for cylinders, unless otherwise permitted by 5.1.5.2.2.3.

N 5.1.5.2.2.3 Holes exceeding a diameter of 1 in. (25.4 mm) shall be permitted for surface-applied hardware installed in accordance with the door manufacturer's listing and the hardware manufacturer's listing.

N 5.1.5.2.2.4 When performed at the job site, drilling raceways for wires or preparation for fire pins shall be in accordance with the door manufacturer's listing and when permitted by the laboratory with which the door is listed.

N 5.1.5.2.2.5 Where the door manufacturer's listing does not contain provisions for drilling raceways, the raceways shall be considered field modifications in accordance with 5.1.5.1.

5.1.6 Removal of Door or Window. Where a fire door or fire window opening no longer functions as an opening, or the door or window is removed and not replaced, the opening shall be filled to maintain the required rating of the wall assembly.

5.2* Inspection and Testing.

5.2.1* Upon completion of the installation, door, shutters, and window assemblies shall be inspected and tested in accordance with 5.2.4.

5.2.2* A record of all inspections and testing shall be signed by the inspector and kept for inspection by the AHJ.

5.2.2.1 Records of acceptance tests shall be retained for the life of the assembly.

5.2.2.2* Unless a longer period is required by Section 5.4, records shall be retained for a period of at least 3 years.

5.2.2.3* The records shall be on a medium that will survive the retention period. Paper or electronic media shall be permitted. [72:14.6.2.3]

5.2.2.4 A record of all inspections and testing shall be provided that includes, but is not limited to, the following information:

- (1) Date of inspection
- (2) Name of facility
- (3) Address of facility
- (4) Name of person(s) performing inspections and testing
- (5) Company name and address of inspecting company
- (6) Signature of inspector of record
- (7) Individual record of each inspected and tested fire door assembly
- (8)* Opening identifier and location of each inspected and tested fire door assembly
- (9)* Type and description of each inspected and tested fire door assembly
- (10)* Verification of visual inspection and functional operation
- (11) Listing of deficiencies in accordance with 5.2.3, Section 5.3, and Section 5.4

5.2.3 Acceptance Testing.

5.2.3.1* Acceptance testing of fire door and window assemblies shall be performed by a qualified person with knowledge and understanding of the operating components of the type of assembly being subject to testing.

5.2.3.2* Before testing, a visual inspection shall be performed to identify any damaged or missing parts that can create a hazard during testing or affect operation or resetting.

5.2.3.3 Acceptance testing shall include the closing of the door by all means of activation.

5.2.3.4 A record of these inspections and testing shall be made in accordance with 5.2.2.

5.2.3.5 Swinging Doors with Builders Hardware or Fire Door Hardware.

5.2.3.5.1 Fire door assemblies shall be visually inspected from both sides to assess the overall condition of door assembly.

5.2.3.5.2 As a minimum, the following items shall be verified:

- (1) Labels are clearly visible and legible.
- (2) No open holes or breaks exist in surfaces of either the door or frame.
- (3) Glazing, vision light frames, and glazing beads are intact and securely fastened in place, if so equipped.
- (4) The door, frame, hinges, hardware, and noncombustible threshold are secured, aligned, and in working order with no visible signs of damage.
- (5) No parts are missing or broken.
- (6) Door clearances do not exceed clearances listed in 4.8.4 and 6.3.1.7.
- (7) The self-closing device is operational; that is, the active door completely closes when operated from the full open position.
- (8) If a coordinator is installed, the inactive leaf closes before the active leaf.
- (9) Latching hardware operates and secures the door when it is in the closed position.

- (10) Auxiliary hardware items that interfere or prohibit operation are not installed on the door or frame.
- (11)* No field modifications to the door assembly have been performed that void the label.
- (12) Meeting edge protection, gasketing and edge seals, where required, are inspected to verify their presence and integrity.
- (13) Signage affixed to a door meets the requirements listed in 4.1.3.

5.2.3.5.3* Inspection Mark. Upon completion of inspection, an inspection mark shall be permitted to be applied to the assembly.

N 5.2.3.6 Swinging Doors with Fire Door Hardware.

N 5.2.3.6.1 Fire door assemblies shall be visually inspected from both sides to assess the overall condition of the door assembly.

N 5.2.3.6.2 As a minimum, the following items shall be verified:

- (1) Labels are clearly visible and legible.
- (2) Frames for flush-mounted doors are rigidly secured to wall and floor construction.
- (3) The metal sheets forming the tin-cladding surfaces of the doors are intact, the seams are tightly closed, and the core material is completely covered.
- (4) Dry rot of the wood core is not evident.
- (5) Vent holes in tin-clad doors are exposed.
- (6) No other open holes or breaks exist in the surfaces of the door.
- (7) Glass lights, if so equipped, are fastened securely and glazing materials are intact.
- (8) Hinges, latches, and keepers are securely fastened in place and functioning properly.
- (9) No parts that affect operation or performance are missing or broken.
- (10) Door clearances do not exceed the dimensions listed in 7.2.3.3.
- (11) Pulleys, chains, cables, ropes, counterweights, brackets, and fusible links, if so equipped, are present, intact, and move freely in accordance with 5.2.4.7.
- (12) Movable parts of the release and closing device systems are not painted or coated with dust or grease that interferes with their operation in accordance with 5.2.3.9.
- (13) The self-closing device closes the door(s) completely from any open position.
- (14) If a coordinating device is installed, the standing door closes before the active door.
- (15) Fusible links, if so equipped, are in the correct location in accordance with 4.7.4 and are not coated with dust or grease.
- (16) Latching hardware operates and secures the door(s) in the closed position.
- (17) Auxiliary hardware items that interfere or prohibit operation are not installed on the door or frame.
- (18) No field modifications to the door assembly have been performed that void the label.
- (19) Signage affixed to a door meets the requirements listed in 4.1.3.

5.2.3.7 Horizontally Sliding, Vertically Sliding, and Rolling Doors.

5.2.3.7.1 Fire door assemblies shall be visually inspected from both sides to assess the overall condition of door assembly.

5.2.3.7.2 At a minimum, the following items shall be verified:

- (1) Labels are clearly visible and legible.
- (2) No open holes or breaks exist in surfaces of either the door or the frame.
- (3) Slats, endlocks, bottom bar, guide assembly, curtain entry, hood, and flame baffle are correctly installed and intact for rolling steel fire doors.
- (4) Glazing, vision light frames, and glazing beads are intact and securely fastened in place, if so equipped.
- (5) Curtain, barrel, and guides are aligned, level, plumb, and true for rolling steel fire doors.
- (6) Expansion clearance is maintained in accordance with the manufacturer's listing.
- (7) Drop release arms and weights are not blocked or wedged.
- (8) Mounting and assembly bolts are intact and secured.
- (9) Attachments to jambs are with bolts, expansion anchors, or as otherwise required by the listing.
- (10) Smoke detectors, if equipped, are installed and operational.
- (11) No parts are missing or broken.
- (12)* Fusible links, if equipped, are in the correct location; chain/cable, s-hooks, eyes, and so forth, are in good condition; the cable or chain is not kinked, pinched, twisted, or inflexible; and links are not painted or coated with dust or grease.
- (13) Auxiliary hardware items that interfere or prohibit operation are not installed on the door or frame.
- (14) No field modifications to the door assembly have been performed that void the label.
- (15) Doors have an average closing speed of not less than 6 in./sec (152 mm/sec) or more than 24 in./sec (610 mm/sec).

5.2.3.8 Closing Devices.

5.2.3.8.1 All fire doors, fire shutters, and fire window assemblies shall be inspected and tested to check for proper operation and full closure.

5.2.3.8.2 Resetting of the automatic-closing device shall be done in accordance with the manufacturer's instructions.

5.2.3.8.3 Rolling Steel Fire Doors.

5.2.3.8.3.1 Rolling steel fire doors shall be drop-tested twice.

5.2.3.8.3.2 The first test shall be to check for proper operation and full closure.

5.2.3.8.3.3 A second test shall be done to verify that the automatic-closing device has been reset correctly.

5.2.3.9* Fusible links, release devices, and any other moveable parts shall not be painted or coated with other materials that could interfere with the operation of the assembly.

Δ 5.2.4* Periodic Inspection and Testing.

5.2.4.1* Periodic inspections and testing shall be performed not less than annually.

N 5.2.4.2* For doors complying with Chapters 11 and 13, periodic inspections and testing shall be performed by a trained rolling steel fire door systems technician.

5.2.4.3 As a minimum, the provisions of 5.2.3 shall be included in the periodic inspection and testing procedure.

5.2.4.4 Inspection shall include an operational test for automatic-closing doors and windows to verify that the assembly will close under fire conditions.

5.2.4.4.1 The assembly shall be reset after a successful test.

5.2.4.4.2 Resetting of the release mechanism shall be done in accordance with the manufacturer's instructions.

5.2.4.5* Hardware shall be examined, and inoperative hardware, parts, or other defective items shall be replaced without delay.

5.2.4.6 Tin-clad and kalamein doors shall be inspected for dry rot of the wood core.

5.2.4.7 Chains, cables or ropes employed shall be inspected for excessive wear, stretching, degradation, and binding.

N 5.2.4.8 Undamaged and unmarked wired glass in existing labeled fire door assemblies shall be permitted to remain in accordance with codes applicable at the time of installation.

5.3 Retrofit Operators.

5.3.1 The operator, governor, and automatic-closing device on rolling steel fire doors shall be permitted to be retrofitted with a labeled retrofit operator under the conditions specified in 5.3.2 through 5.3.5.

5.3.2 The retrofit operator shall be labeled as such.

5.3.3 The retrofit operator shall be installed in accordance with its installation instructions and listing.

5.3.4 The installation shall be acceptable to the AHJ.

5.3.5 The retrofit operator shall be permitted to be provided by a manufacturer other than the original manufacturer of the rolling steel fire door on which it is retrofitted, provided its listing allows it to be retrofitted on that manufacturer's doors.

5.4* Performance-Based Option.

5.4.1 As an alternate means of compliance with 5.2.4, subject to the AHJ, fire door assemblies shall be permitted to be inspected, tested, and maintained under a written performance-based program.

5.4.2 Goals established under a performance-based program shall provide assurance that the fire door assembly will perform its intended function when exposed to fire conditions.

5.4.3 Technical justification for inspection, testing, and maintenance intervals shall be documented in writing.

5.4.4 The performance-based option shall include historical data acceptable to the AHJ.

5.5 Maintenance.

5.5.1* Repairs shall be made, and defects that could interfere with operation shall be corrected without delay.

5.5.2 Damaged glazing material shall be replaced with labeled glazing.

5.5.3 Replacement glazing materials shall be installed in accordance with their individual listing.

5.5.4* Any breaks in the face covering of doors shall be repaired without delay.

5.5.5 Where a fire door assembly or any part thereof is damaged to the extent that it could impair the door's proper emergency function, the following actions shall be performed:

- (1) The fire door assembly or any part thereof shall be repaired with listed or labeled parts or parts obtained from the original manufacturer.
- (2) The fire door assembly shall be tested to ensure emergency operation and closing upon completion of the repairs.

5.5.6 If repairs cannot be made with parts that are listed or labeled or that are obtained from the original manufacturer or retrofitted in accordance with Section 5.3, the fire door assembly or any part thereof shall be replaced.

5.5.7 When fastener holes are left in a door or frame due to changes or removal of hardware or plant-ons, the holes shall be repaired by the following methods:

- (1) Install steel fasteners that completely fill the holes.
- (2) Fill the screw or bolt holes with the same material as the door or frame.
- (3) Fill holes with material listed for this use and installed in accordance with the manufacturer's procedures.

5.5.8 Holes, other than those as described by 5.5.7, shall be treated as a field modification in accordance with 5.1.5.1.

N 5.5.9 Field painting of rolling steel fire doors and service counter fire doors shall be considered maintenance work.

5.5.10* Upon completion of maintenance or repair work, fire door assemblies shall be inspected and tested in accordance with 5.2.3.

5.5.10.1 A record of inspections and testing, as required by 5.5.10, shall be made in accordance with 5.2.2.

5.5.10.2 A record of maintenance performed on existing fire door assemblies shall include the following information:

- (1) Date of maintenance
- (2) Name of facility
- (3) Address of facility
- (4) Name of person(s) performing maintenance
- (5) Company name and address of maintenance personnel
- (6) Signature of maintenance personnel performing the work
- (7) Individual listings of each inspected and tested fire door assembly
- (8)* Opening identifier and location of each repaired fire door assembly
- (9)* Type and description of each repaired fire door assembly
- (10)* Description or listing of the work performed on each fire door assembly

Chapter 6 Swinging Doors with Builders Hardware

6.1 Doors.

6.1.1 General. This chapter shall cover the installation of new and existing swinging door assemblies with builders hardware.

N 6.1.1.1 New Doors.

N 6.1.1.1.1 New door assemblies shall be installed in accordance with this chapter and Chapter 4.

N 6.1.1.1.2 Upon completion of installation, acceptance testing of new door assemblies shall be performed in accordance with 5.2.3.

N 6.1.1.2 Existing Doors. Existing door assemblies shall be inspected and tested in accordance with 5.1.1.3 and 5.2.4.

N 6.1.1.3 Maintenance.

N 6.1.1.3.1 New and existing door assemblies shall be maintained in accordance with Section 5.5.

N 6.1.1.3.2 Upon completion of maintenance work that affects the operation and performance of the assembly, doors shall be inspected and tested in accordance with 5.5.10.

N 6.1.2 Field Modifications. Modifications made to door assemblies shall be in accordance with 5.1.5.

6.1.3 Mounting of Doors. Swinging composite, hollow metal, flush sheet metal, metal-clad (kalamein), and wood core doors with builders hardware shall be flush mounted in labeled door frames.

6.1.4 Operation of Doors. All swinging doors shall be closed and latched at the time of fire.

6.1.4.1 For the purposes of 6.1.4, the operation of doors shall be divided into the following categories:

- (1) Self-closing doors
- (2) Automatic-closing doors
- (3) Power-operated fire doors

6.1.4.2 Self-Closing Doors.

6.1.4.2.1 Self-closing doors shall swing easily and freely and shall be equipped with a closing device to cause the door to close and latch each time it is opened.

6.1.4.2.2 The closing mechanism shall not have a hold-open feature.

6.1.4.3 Automatic-Closing Doors. Automatic-closing doors shall be permitted to close automatically by means of the installation of a closing device and one of the following:

- (1) A separate, labeled, fail-safe door holder/release device or a hold-open mechanism that shall be permitted to be an integral part of the basic closing device
- (2) An integral closing device that allows the door to swing freely and that automatically closes the door during an alarm condition, provided the hold-open mechanisms are released by one or a combination of automatic fire detectors acceptable to the AHJ

6.1.4.3.1 The fire door shall latch upon closure.

6.1.4.4 Power-Operated Fire Doors. Power-operated fire doors shall be equipped with a releasing device that shall automatically disconnect the power operator at the time of fire, allowing a self-closing or automatic device to close and latch the door regardless of power failure or manual operation.

6.2 Supporting Construction.

6.2.1 Walls. Wall openings shall be constructed to readily accept the fire door frame.

6.2.1.1 The frame shall be considered to be non-load bearing except where specifically designed to carry loads.

6.2.1.2 Frames shall be anchored securely to the wall construction.

6.2.2 Sills. Sills shall be installed in accordance with 4.8.2.

6.2.3 Lintels. Separate reinforcing units shall be provided for pressed steel door frames, where necessary, to support overhead wall loads over door openings.

6.3 Openings.

6.3.1 Door Frames.

6.3.1.1* Only labeled door frames shall be used.

6.3.1.2* Methods of anchoring shall be as shown in the listing.

6.3.1.3* Door frames intended for drywall installation shall be of the flush butt-mounted or wrap-around type, and anchors shall be secured in accordance with the manufacturer's instructions.

6.3.1.4* Proprietary-type slip-on door frames shall be installed in accordance with the manufacturer's installation instructions.

6.3.1.5 Door frames provided with expansion bolt-type anchors shall be installed in masonry walls only.

6.3.1.6 Steel-faced composite, hollow metal, metal-clad (kalamein), and flush sheet metal doors shall be installed in pressed steel or steel channel frames.

6.3.1.7* Clearances.

6.3.1.7.1* Clearances dimensions between doors and frames and meeting stiles of paired doors shall be measured on the pull side of the assemblies.

6.3.1.7.2* The clearances between the top and vertical edges of hollow metal doors and the frame, and the meeting stiles of doors swinging in pairs, shall be $\frac{1}{8}$ in. $\pm$ $\frac{1}{16}$ in. (3.18 mm $\pm$ 1.59 mm).

6.3.1.7.3 High-pressure decorative laminate (HPDL)-faced doors, $\frac{1}{2}$ -hour-rated flush wood doors, and stile and rail wood doors installed in hollow metal door frames shall not have clearances greater than $\frac{1}{8}$ in. $\pm$ $\frac{1}{16}$ in. (3.18 mm $\pm$ 1.59 mm) between the door and frame and the meeting stiles of paired doors.

6.3.1.7.4* HPDL-faced doors, flush wood doors, and stile and rail wood doors with fire ratings greater than $\frac{1}{2}$ hour shall not have clearances greater than $\frac{1}{8}$ in. (3.18 mm) between the door and frame, regardless of the door frame construction, and the meeting stiles of paired doors.

6.3.1.7.5* Door leaves constructed of other materials shall not have clearances greater than $\frac{1}{8}$ in. (3.18 mm) between the top and vertical edges of doors and meeting stiles of paired doors, unless otherwise permitted in the door frame, door, and latching hardware manufacturers' published listings.

6.3.2 Frames for Lights or Panels. Where a frame assembly consists of both solid panels and glazed lights, the fire protection rating shall be based on the glazed area.

6.3.3 Frames for Transom Lights, Side Lights, or Both.

6.3.3.1 Transom or side lights shall be fixed.

6.3.3.2 Multiple-section transom and side light frames (*see G.10.3*) shall be field assembled using the assembly methods

that are in accordance with the manufacturer's installation instructions.

6.3.3.3* Frames with transom lights, side lights, or both shall be permitted where a fire protection rating of $\frac{3}{4}$ hour or less is required.

6.3.3.4* Frames with transom lights, side lights, or both, installed with fire resistance glazing tested as an assembly in accordance with ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or UL 263, *Fire Tests of Building Construction and Materials*, shall be permitted where a fire protection rating exceeding $\frac{3}{4}$ hour is required.

6.3.3.5 Only labeled fire protection glazing or fire resistance glazing shall be used to glaze the light openings.

6.3.4 Frames for Transom or Side Panels.

6.3.4.1 Side panels, transom panels, or both shall be fixed.

6.3.4.2 Removable transom panels shall be permitted to allow for movement of materials or equipment through the opening.

6.3.4.3 Frames with transom panels shall be permitted in situations where fire protection ratings up to and including 3 hours are required.

6.3.4.4 Louvers shall not be installed in either transom or side panels.

6.3.5 Multiple-Opening Door Frames.

6.3.5.1 Individual frames shall be of a maximum size as defined in the manufacturer's published listing but are not to exceed 12 ft 8 in. (3.9 m) in overall width.

6.3.5.2 Where multiple-opening frames are installed adjoining each other in a fire-resistance-rated wall, a 16 in. (406 mm) minimum wall section shall be provided between the frames.

6.3.5.3 The maximum fire protection rating of the door assembly shall not exceed $1\frac{1}{2}$ hours.

6.4 Assembly Components.

6.4.1 Closing Devices.

6.4.1.1* Unless otherwise permitted by the AHJ, a closing device shall be installed on every fire door.

6.4.1.2 Coordinating Device.

6.4.1.2.1 Where there is an astragal or projecting latch bolt that prevents the inactive door from closing and latching before the active door closes and latches, a coordinating device shall be used.

6.4.1.2.2 A coordinating device shall not be required where each door closes and latches independently of the other.

6.4.1.3 All components of closing devices used shall be attached securely to doors and frames by steel screws or through-bolts.

6.4.1.4* All closing mechanisms shall be adjusted to overcome the resistance of the latch mechanism so that positive latching is achieved on each door operation.

6.4.1.5 Spring hinges shall be adjusted to achieve positive latching when the door is allowed to close freely from an open position of no more than 30 degrees.

6.4.1.6 Where door holder/release devices are used, they shall be labeled.

6.4.2* Application of Door Holder/Release Devices. Door holder/release devices shall be installed in accordance with the manufacturer's instructions and only in conformance with the individual manufacturer's published listings.

6.4.3* Builders Hardware.

6.4.3.1 Hinges and Pivots. Hinges, spring hinges, continuous hinges, and pivots shall be as specified in individual door and hardware manufacturer's published listings or Table 6.4.3.1.

6.4.3.1.1* Doors up to 60 in. (1.52 m) in height shall be provided with at least two hinges.

6.4.3.1.2 Doors in excess of 60 in. (1.52 m) shall have an additional hinge for each additional 30 in. (0.76 m) of door height or fraction thereof, or in accordance with the manufacturer's published listing.

6.4.3.1.3 The distance between hinges shall be permitted to exceed 30 in. (0.76 m).

6.4.3.1.4 Where spring hinges are used, at least two shall be provided.

6.4.3.1.5 All hinges or pivots, except spring hinges, shall be of the ball bearing type.

6.4.3.1.5.1 Hinges or pivots employing other antifriction bearing surfaces shall be permitted if they meet the requirements of ANSI/BHMA A156.1, *Standard for Butts and Hinges*.

6.4.3.1.5.2 Spring hinges shall be labeled and shall meet the requirements of ANSI/BHMA A156.17, *Standard for Self Closing Hinges & Pivots*, Grade 1.

6.4.3.1.6 Hinges $4\frac{1}{2}$ in. (114 mm) high and 0.180 in. (4.57 mm) thick shall be permitted for use on wide and heavy doors or doors that are subjected to heavy use or unusual stress.

6.4.3.1.7 Fire doors with hinges of lighter weight that are not of the ball bearing type shall be permitted under the following conditions:

- (1) They are part of a listed assembly.
- (2) They meet the test requirements of ANSI/BHMA A156.1, *Standard for Butts and Hinges*.
- (3) They have been tested to a minimum of 350,000 cycles.

6.4.3.1.8 Pivot sets consisting of a floor or jamb-mounted bottom pivot and a head mounted top pivot, installed on door leaves up to 90 in. (2.29 m), in height shall have one intermediate pivot.

6.4.3.1.8.1 Pivot sets installed on door leaves greater than 90 in. (2.29 m) in height shall have one additional intermediate pivot for each additional 30 in. (0.76 m) of door height over 90 in. (2.29 m) or fraction thereof.

6.4.3.1.8.2 Where only intermediate pivots are used, two intermediate pivots shall be provided for door leaves up to 60 in. (1.52 m) in height, and an additional intermediate pivot shall be added for each additional 30 in. (0.76 m) of door height or fraction thereof.

6.4.3.1.8.3 Pivot sets made up of components that are smaller or of a lighter gauge than those shown in Table 6.4.3.1 shall be permitted to be used, provided they meet the requirements of

Table 6.4.3.1 Builders Hardware: Hinges, Spring Hinges, and Pivots

Maximum Door Rating (hr)	Maximum Door Size				Minimum Hinge Size				Hinge Type
	Width		Height		Height		Thickness		
	ft	m	ft	m	in.	mm	in.	mm	
For 1¾ in. (44.5 mm) or Thicker Doors									
3 or less	4	1.22	10	3.05	4½	114.3	0.180	4.57	Steel, mortise or surface
3 or less	4	1.22	8	2.44	4½	114.3	0.134	3.40	Steel, mortise or surface
1½ or less	3⅙	0.96	8	2.44	6	152.4	0.225	5.72	Steel, olive knuckle or paumelle
3 or less	4	1.22	10	3.05	4	101.6	0.225	5.72	Steel pivots (including top, bottom, and intermediate)
1½ or less	3	0.91	5	1.52	4	101.6	0.130	3.30	Steel, mortise or surface
1½ or less	2	0.61	3	0.91	3	76.2	0.092	2.34	Steel, mortise or surface
3 or less	3	0.91	7	2.13	4½	114.3	0.134	3.40	Steel, mortise or surface (labeled, self-closing, spring type)
3 or less	3	0.91	7	2.13	4	101.6	0.105	2.67	Steel, mortise or surface (labeled, self-closing, spring type)
For 1⅜ in. (34.93 mm) Doors									
3 or less	3	0.91	7	2.13	3½	88.9	0.123	3.12	Steel, mortise or surface
3 or less	2⅔	0.81	7	2.13	3½	88.9	0.105	2.67	Steel, mortise or surface (labeled, self-closing, spring type)

Note: Table 6.4.3.1 lists the most common applications of hinges, spring hinges, and pivots. Consult the door and hardware manufacturer's specific listings for applications not addressed in this table.

ANSI/BHMA A156.4, *Standard for Door Controls (Closers)*, and are in accordance with the manufacturer's label service procedures.

6.4.3.1.9 The length of continuous hinges shall be within 1 in. (25 mm) of the height of the door leaves.

Δ 6.4.3.1.10 Continuous hinges shall be labeled and shall meet the requirements of ANSI/BHMA A156.26, *Standard for Continuous Hinges*.

6.4.3.2 Attaching Hinges to Doors.

6.4.3.2.1 Hinges shall be secured in accordance with the listing and the manufacturer's installation instructions.

6.4.3.2.2 Mortise hinges shall be secured to reinforcements in the doors with steel machine screws.

6.4.3.2.3 Mortise hinges shall be secured to wood and plastic-covered composite doors or wood core doors with No. 12 × 1 $\frac{1}{4}$ in. (31.75 mm) flat, threaded-to-the-head, steel wood screws. Pilot holes shall be drilled that are $\frac{5}{32}$ in. (4 mm) in diameter.

6.4.3.2.4 Surface hinges shall be attached with steel through-bolts.

6.4.3.3 Attaching Hinges to Frames. Hinges shall be secured to frames with steel screws.

6.4.3.3.1 Types of screws shall be permitted to vary depending on the material used for the manufacture of labeled door frames.

6.4.3.3.2 The manufacturer's instructions and published listings for labeled door frames shall be referenced for specific screw requirements.

6.4.3.3.4 Shimming. When required to meet the clearances stated in 6.3.1.7, the shimming of hinges using steel shims shall be permitted.

6.4.4 Locks or Latches.

6.4.4.1 Only labeled locks and latches or labeled fire exit hardware (panic devices) meeting both life safety requirements and fire protection requirements shall be used.

6.4.4.2 Fire exit hardware shall be installed only on fire doors bearing a label stating "Fire Door to Be Equipped with Fire Exit Hardware."

6.4.4.2.1 Fire exit hardware shall be labeled for both fire and panic.

6.4.4.2.2 Fire exit hardware shall have a permanently attached label that bears the serial number and shows the manufacturer's name and type of approval.

6.4.4.2.3 The label shall differentiate between panic hardware, which is not acceptable for use on fire doors, and fire exit hardware.

N 6.4.4.3* Latching hardware shall be permitted to prevent operation of doors after exposure to elevated temperature in accordance with the listing, based on laboratory test procedures.

6.4.4.4 All single doors and active leaves of pairs of doors shall be provided with an active latch bolt that cannot be held in a retracted position as specified in the individual manufacturer's published listings.

6.4.4.4.1 Unless otherwise prohibited by applicable codes, doors shall be permitted to be provided with dead bolts in addition to the active latch bolts.

6.4.4.4.2 Locks with dead bolts that are interconnected with latch bolts and retract when the latch bolt is retracted shall be permitted for use on fire doors within a means of egress.

6.4.4.4.3 Latching arrangements that do not provide positive latching in the normal mode shall be permitted to be used

provided that, in a fire emergency, the door becomes positively latched by means of an automatic fail-safe device that is activated by an automatic fire detector. (See Section 4.7.)

6.4.4.5 Where both leaves are required for exit purposes, they shall be provided with labeled fire exit hardware.

6.4.4.5.1 Where permitted by the AHJ, pairs of doors not provided with an astragal shall be permitted to have labeled fire exit hardware and an open back strike installed on the inactive leaf, and either labeled fire exit hardware or any labeled latch capable of being opened by one obvious operation from the egress side installed on the active leaf.

6.4.4.6 Where a pair of doors is needed for the movement of equipment and where the inactive leaf of the pair of doors is not required for exit purposes, labeled, top and bottom, self-latching or automatic flush bolts, or labeled two-point latches shall be permitted.

6.4.4.6.1* Manually operated, labeled, top and bottom flush-mounted or surface-mounted bolts on the inactive leaf of a pair of doors shall be permitted to be used where acceptable to the AHJ, provided they do not pose a hazard to safety to life.

6.4.4.7 Throw.

6.4.4.7.1 The throw of single-point latch bolts shall not be less than the minimum shown on the fire door label.

6.4.4.7.2 The minimum throw shall be as specified in the manufacturer's installation instructions.

6.4.4.8 Door Attachments.

6.4.4.8.1 Locks, latches, surface-mounted top and bottom bolts, and fire exit hardware shall be secured to reinforcements in the doors with machine screws or shall be attached with through-bolts.

6.4.4.8.1.1 Pilot holes shall be drilled prior to lock and latch installation, in accordance with manufacturer's installation instructions.

6.4.4.8.2 Flush-mounted top and bottom bolts shall be secured to reinforcements in the doors with machine screws.

6.4.4.8.3 Locks and latches shall be attached to wood and plastic-covered composite doors or wood core doors with not less than No. 8, flat, threaded-to-the-head wood screws or shall be attached with through-bolts.

6.4.4.8.4 Fire exit hardware and surface-mounted top and bottom bolts shall be attached to wood and plastic-covered composite doors with through-bolts or with steel screws at locations specified in the door manufacturer's installation instructions.

6.4.4.9 Strike plates shall be secured to the frame with steel screws or other types of screws as indicated by the manufacturer's published listing or label service procedure.

6.4.4.10 Strike plates for doors swinging in pairs shall be secured to reinforcements in the inactive leaf with machine screws.

6.4.4.10.1 Pilot holes shall be drilled prior to strike plate installation, in accordance with manufacturer's installation instructions.

6.4.4.11* Open back strikes shall be permitted to be used in lieu of conventional strikes only where specifically provided for in the published listings.

6.4.4.12* Electric strikes shall be permitted to be used in lieu of conventional strikes in single swinging doors and pairs of doors where provided for in the published listings.

6.4.5 Protection Plates.

6.4.5.1 Factory-installed protection plates shall be labeled and installed in accordance with the listing of the door.

6.4.5.2 Field-installed protection plates shall be labeled and installed in accordance with their listing.

6.4.5.3 Labeling shall not be required where the top of the protection plate is not more than 16 in. (406 mm) above the bottom of the door.

6.4.6* Automatic Louvers. Only labeled fire door louvers shall be used in fire doors.

6.4.7* Astragals.

6.4.7.1 Doors swinging in pairs, where located within a means of egress, shall not be equipped with astragals that inhibit the free use of either leaf.

6.4.7.2* Pairs of doors that require astragals shall have at least one astragal attached in place as indicated in the individual published listings.

6.4.8* Gasketing. Gasketing on fire doors or frames shall be in accordance with the published listings of the door, frame, or gasketing material manufacturer.

6.4.9 Thresholds. When used, thresholds shall be noncombustible or listed.

6.5 Application, Installation, and Adjustment.

6.5.1 General. The installation of all components of a fire door assembly shall be in accordance with the listing of each component.

6.5.2 Manufacturers' Instructions. All components shall be installed in accordance with the manufacturers' installation instructions and shall be adjusted to function as described in the listing.

6.5.3 Attachment. All components of a fire door assembly shall be attached firmly to walls, doors, and frames in a manner acceptable to the AHJ.

6.5.4 Mounting. All mounting screws, bolts, or shields shall be steel except where otherwise permitted by this standard.

6.5.5 Anchorage. Attachments to doors with composite cores shall provide firm anchorage for anticipated use.

Chapter 7 Swinging Doors with Fire Door Hardware

7.1* Doors.

7.1.1 General. This chapter shall cover the installation of new and existing swinging door assemblies with fire door hardware.

N 7.1.1.1 New Doors.

N 7.1.1.1.1 New door assemblies shall be installed in accordance with this chapter and Chapter 4.

N 7.1.1.1.2 Upon completion of installation, acceptance testing of new door assemblies shall be performed in accordance with 5.2.3.

N 7.1.1.2 Existing Doors. Existing door assemblies shall be inspected and tested in accordance with 5.2.4.

N 7.1.1.3* Maintenance.

N 7.1.1.3.1 New and existing door assemblies shall be maintained in accordance with Section 5.5.

N 7.1.1.3.2 Upon completion of maintenance work that affects the operation and performance of the assembly, doors shall be inspected and tested in accordance with 5.5.10.

N 7.1.2 Field Modifications. Modifications made to door assemblies shall be in accordance with 5.1.5.

7.1.3 Mounting of Doors.

7.1.3.1 Swinging tin-clad doors and flush- or corrugated-type sheet metal doors with fire door hardware shall be flush or lap mounted.

7.1.3.2 Flush-mounted doors shall be hung in steel channel frames securely anchored to the wall construction.

7.1.3.3 Lap-mounted doors shall be hung on the surface of the wall and shall lap the opening at least 4 in. (102 mm) at the top and on each side.

7.1.4 Operation of Doors. Doors shall be closed and latched at the time of fire.

Δ 7.1.4.1 For the purposes of 7.1.4, the operation of doors shall be divided into the following two categories:

- (1) Self-closing doors
- (2) Automatic-closing doors

Δ 7.1.4.2 Self-Closing Doors.

N 7.1.4.2.1 Self-closing doors shall swing easily and freely and be equipped with a closing device to cause the door to close and latch, from any open position, after each time it is opened.

N 7.1.4.2.2 Hold-open features or mechanical hold-open devices shall not be permitted.

N 7.1.4.3 Automatic-Closing Doors.

N 7.1.4.3.1 Where permitted, automatic-closing doors shall be arranged to close automatically by means of the closing device required by 7.1.4.2 and at least one of the following:

- (1) Fusible links installed in accordance with 4.7.4
- (2) A separate, labeled, fail-safe door holder/release device that is activated by an actuation device, installed in accordance with Section 4.7

N 7.1.4.3.2 Doors shall latch upon closure.

7.2 Supporting Construction.

7.2.1 Walls. Walls shall be constructed in accordance with 4.8.1.

7.2.1.1 Attachment of the door assembly to the wall shall be by means of through-wall bolts.

7.2.1.2 As an alternative, expansion anchors shall be permitted to be used as specified in 4.8.6.

7.2.2 Sills. Sills shall be constructed in accordance with 4.8.2.

7.2.3 Door Construction. Tin-clad doors shall be constructed in accordance with UL 10A, *Tin-Clad Fire Doors*.

N 7.2.3.1 Lap-mounted doors shall be sized in height and width sufficient to extend beyond the wall opening by a minimum of 4 in. (102 mm) at the vertical and top edges.

N 7.2.3.2 Glass lights shall be secured in place by the manufacturer.

N 7.2.3.3 Clearance Dimensions.

N 7.2.3.3.1 For lap-mounted doors, clearance dimensions between the face of the door and the wall surface over which it rests in the closed position shall not exceed $\frac{3}{8}$ in. (10 mm).

N 7.2.3.3.2 For flush-mounted doors, where doors are installed in frames, clearance dimensions between the vertical and top edges of the doors and the frames shall not exceed dimensions as tested.

N 7.2.3.3.3 Clearance dimensions between the meeting edges of paired doors shall not exceed dimensions as tested.

N 7.2.3.3.4 Clearance under doors, in the closed position, shall not exceed $\frac{3}{8}$ in. (10 mm) above raised noncombustible sills and not more than $\frac{1}{4}$ in. (20 mm) above the floor where there is no raised noncombustible sill.

7.2.4 Vents.

7.2.4.1 Each tin-clad door formed of 14 in. × 20 in. (360 mm × 510 mm) sheets shall be provided with 3 in. (76.2 mm) diameter vent holes, in accordance with the locations shown in UL 10A, *Tin-Clad Fire Doors*.

N 7.2.4.2 Vent holes shall be permitted to be field or factory cut.

7.2.4.3 The vent holes shall be cut through the sheets on the face of the door on which the fire door hardware is mounted, using care to avoid interference with the hardware or damage to the wood core when cutting the holes in the sheets.

7.2.4.4 The metal covering around the opening shall be secured with small nails spaced about 1 in. (25.4 mm) apart, and the exposed wood shall be painted thoroughly.

7.3 Openings.

Δ 7.3.1 Lap-Mounted Doors. Lap-mounted doors shall be mounted to the surface of the wall.

N 7.3.1.1 Frames shall not be required.

N 7.3.1.2 Hinge and catch strips complying with UL 14C, *Swinging Hardware for Standard Tin-Clad Fire Doors Mounted Singly and in Pairs*, shall be through-bolted to the wall.

N 7.3.1.3 Crush plates complying with 4.8.1.5 shall be located on the opposite side of the wall to which hinge and catch strips are applied. (See Figure A.4.8.1.5.)

7.3.2* Frames for Flush-Mounted Doors.

7.3.2.1 Only labeled frames of the structural steel type shall be used for flush-mounted doors.

7.3.2.2 The frames shall be erected before the wall is built and securely anchored to the wall and floor in accordance with the manufacturer's installation instructions.

7.4 Assembly Components.

Δ 7.4.1* Closing Devices.

7.4.1.1 Doors shall be equipped with self-closing or automatic-closing device systems.

7.4.1.2 Other arrangements acceptable to the AHJ shall be permitted.

7.4.2 Coordinating Devices. Where the closing of a pair of doors requires the standing door to close before the active door, a coordinating device shall be installed.

• 7.4.3* Fire Door Hardware.

7.4.3.1 General.

N 7.4.3.1.1 Fire door hardware components shall comply with UL 14C, *Swinging Hardware for Standard Tin-Clad Fire Doors Mounted Singly and in Pairs*.

7.4.3.1.2* Only labeled or listed fire door hardware shall be used.

• 7.4.3.2* Hinges and Latches, Number and Length. The number and length of both the hinges and the latches shall be in accordance with the manufacturer's label service procedure and individual published listing.

7.4.3.3 Attaching Fire Door Hardware to Frames for Flush-Mounted Doors. Hinges and latch keepers shall be bolted, riveted, or welded to the frame.

7.4.3.4 Attaching of Wall Strips for Lap-Mounted Doors.

7.4.3.4.1 Hinges and latch keepers shall be mounted on wall strips bolted to or through the wall (see 7.2.1).

Δ 7.4.3.4.2 Bolts of not less than ¼ in. (19.05 mm) shall be used for attaching hinge wall strips.

N 7.4.3.4.3 Bolts not less than ½ in. (12.7 mm) shall be used for latch keeper wall strips.

N 7.5 Applied Metals. Metal protection plates or other metals shall not be applied to tin-clad doors.

Chapter 8 Horizontally Sliding Doors

8.1 Doors.

8.1.1 General. This chapter shall cover the installation of new and existing horizontally sliding door assemblies.

N 8.1.1.1 New Doors.

N 8.1.1.1.1 New door assemblies shall be installed in accordance with this chapter and Chapter 4.

N 8.1.1.1.2 Upon completion of installation, acceptance testing of new door assemblies shall be performed in accordance with 5.2.3.

N 8.1.1.2 Existing Doors. Existing door assemblies shall be inspected and tested in accordance with 5.1.1.3 and 5.2.4.

N 8.1.1.3 Maintenance.

N 8.1.1.3.1 New and existing door assemblies shall be maintained in accordance with Section 5.5.

N 8.1.1.3.2 Upon completion of maintenance work that affects the operation and performance of the assembly, doors shall be inspected and tested in accordance with 5.5.10.

N 8.1.2 Field Modifications. Modifications made to door assemblies shall be in accordance with 5.1.5.

8.1.3 Door Panels.

8.1.3.1 Door panels shall be permitted to be a single section or multiple sections.

8.1.3.2 Connection between the panels shall be in accordance with the manufacturer's instructions and the individual published listing.

8.1.3.3 Tin-clad and metal-clad (kalamein) doors shall not be furnished in more than two sections.

8.1.3.4 Hollow metal or composite doors shall be furnished in not more than five panels, constructed for either field or factory assembly.

8.1.3.5 For biparting doors, not more than four panels shall comprise a single leaf.

8.1.3.6 Personnel swinging-type pass doors shall be permitted to be used if tested with the sliding door and listed in the manufacturer's individual published listing.

8.1.3.7* Pass doors shall be provided with hinges, latchset, spring hinges, or closer.

8.1.4 Mounting of Doors.

8.1.4.1 General.

8.1.4.1.1* Horizontally sliding doors shall be wall mounted in a track attached to a wall or bottom roller mounted with a top guide in accordance with the manufacturer's instructions and individual published listing.

8.1.4.1.2 Doors in detention security applications shall be mounted to a listed detention sliding door device in accordance with the manufacturer's instructions and individual published listing.

8.1.4.1.3 When in the closed position, the clearance between the wall and the door or the frame and the door shall not be more than ¼ in. (19.05 mm) unless otherwise tested and listed in the manufacturer's individual published listings.

8.1.4.2 Lap.

8.1.4.2.1 Unless tested otherwise, doors shall lap openings at least 4 in. (102 mm) at the sides and top.

8.1.4.2.2 Where doors provide protection of openings located in walls above floor level and no projection sill is provided, the doors shall lap the bottom of the opening at least 4 in. (102 mm).

8.1.4.3 Biparting doors shall have an astragal securely attached in place so as to project a minimum of ¼ in. (19.05 mm) unless otherwise required or permitted in the individual manufacturer's published listing.

8.2 Supporting Construction.

8.2.1 Walls.

8.2.1.1 Walls shall be plumb and true and have a fire resistance rating as required by the AHJ.

8.2.1.2* Walls shall be of brick, concrete, or concrete masonry construction except that where tin-clad doors are used on hollow concrete masonry units, the wall opening shall be reinforced to provide anchorage for door-mounting hardware equal to that of brick or concrete.

8.2.1.3 Tin-clad doors used on hollow concrete masonry units shall be reinforced in accordance with 4.8.1.2.

8.2.1.4 Attachment of the door assembly to the wall shall be by means of through-wall bolts.

8.2.1.5 Expansion anchors shall be permitted to be used as specified in 4.8.6.

8.2.2 Sills. Sills shall be installed in accordance with 4.8.2.

8.2.3 Reserved.

8.2.4 Vents.

8.2.4.1 Tin-Clad Doors.

Δ 8.2.4.1.1 Each tin-clad door shall be provided with 3 in. (76.2 mm) diameter vent holes in accordance with the locations shown in UL 10A, *Tin-Clad Fire Doors*.

N 8.2.4.1.2 Vent holes shall be permitted to be field or factory cut.

Δ 8.2.4.1.3 Each section of spliced single doors and each leaf of center-parting doors shall be vented as indicated in UL 10A, *Tin-Clad Fire Doors*.

8.2.4.1.4 Other types of doors containing combustible core material shall be vented as provided by the manufacturer's procedure under label service.

8.2.4.2 The vent holes shall be cut through the sheets on the face of the door opposite the rear binder pockets, using care to avoid damage to the wood core when cutting the holes in the sheets.

8.2.4.3 The metal covering around the opening shall be secured with small nails spaced about 1 in. (25.4 mm) apart, and the exposed wood shall be painted thoroughly.

8.3 Openings. (Reserved)

8.4 Assembly Components.

8.4.1 Closing Devices.

8.4.1.1 Doors shall be equipped with self-closing or automatic-closing devices to ensure that they shall close or be closed at the time of a fire.

8.4.1.1.1* Closing devices shall be a system of weights or a listed closing device.

8.4.1.2 Closing Speed.

8.4.1.2.1 The average closing speed shall be not less than 6 in./sec (152 mm/sec), not including any initial delay time.

8.4.1.2.2 In buildings where access by the general public is not restricted, the average closing speed for doors used shall be not more than 24 in./sec (610 mm/sec).

8.4.2* Releasing Devices.

8.4.2.1 General.

8.4.2.1.1 Power-operated doors not equipped with standby or emergency power shall be equipped with an integral or a separate listed releasing device that shall automatically disconnect the door from the control of the power operator at the time of a fire.

8.4.2.1.2 The releasing device shall be activated at the time of the fire by detectors or fusible links installed on both sides of the wall and interconnected so that the operation of the single detector or fusible link shall allow the door to be disconnected and closed.

8.4.2.1.3 If closing is achieved by power operation, standby or emergency power shall be provided.

8.4.2.1.4 The standby or emergency power source shall have capacity to operate a minimum of 50 closing cycles of the door.

8.4.2.1.5 If door opening also is achieved by power operation, the standby or emergency power source shall have capacity to operate a minimum of 50 opening and closing cycles of the door.

8.4.2.2 Power operation shall not allow opening if temperatures on either side of the door reach 500°F (260°C).

8.4.3 Hardware.

8.4.3.1* Type. Only hardware listed for use with the door shall be permitted to be used.

8.4.3.2 Tracks. Tracks shall be inclined or level, depending on the manufacturer's specific label service procedure.

8.4.3.3 Bolts.

8.4.3.3.1 The wall bolts shall not be less than 5/8 in. (15.8 mm) in diameter unless so listed.

8.4.3.3.2 The bolt spacing shall be determined by the manufacturer's specific test and label service procedure.

8.4.3.4 Hangers.

8.4.3.4.1 No fewer than two hangers shall be provided for each door.

8.4.3.4.2 Tin-clad and sheet metal doors for openings in excess of 6 ft (1.83 m) shall have an additional hanger.

8.4.3.4.3 Two hangers shall be provided on each section of vertically spliced tin-clad doors.

8.4.3.5 Binders.

8.4.3.5.1* At least two binders shall be required on the vertical jambs, and at least one shall be required at the head unless otherwise listed.

8.4.3.5.2 Biparting sliding doors shall be provided with the sill binders or center guides if required by the individual manufacturer's label service procedure.

8.4.3.6* Stay Rollers. Stay rollers shall be installed in an approved manner.

8.4.3.7 Center Latch. Where doors are power operated, center-parting doors requiring a center latch shall be provided with a fusible link arrangement that shall hold the latch in an

unlatched position during day-to-day operation while causing the latch to operate and secure the door in the event of a fire.

8.4.3.8 Handles.

8.4.3.8.1 Handles shall be provided for opening the doors from either side.

8.4.3.8.2 If flush pulls are used, they shall not be located back-to-back on tin-clad doors.

Chapter 9 Special-Purpose Horizontally Sliding Accordion or Folding Doors

9.1 Doors.

9.1.1 General. This chapter shall cover the installation of new and existing special-purpose horizontally sliding accordion or folding door assemblies.

N 9.1.1.1 New Doors.

N 9.1.1.1.1 New door assemblies shall be installed in accordance with this chapter and Chapter 4.

N 9.1.1.1.2 Upon completion of installation, acceptance testing of new door assemblies shall be performed in accordance with 5.2.3.

N 9.1.1.2 Existing Doors. Existing door assemblies shall be inspected and tested in accordance with 5.1.1.3 and 5.2.4.

N 9.1.1.3 Maintenance.

N 9.1.1.3.1 New and existing door assemblies shall be maintained in accordance with Section 5.5.

N 9.1.1.3.2 Upon completion of maintenance work that affects the operation and performance of the assembly, doors shall be inspected and tested in accordance with 5.5.10.

N 9.1.2 Field Modifications. Modifications made to door assemblies shall be in accordance with 5.1.5.

9.1.3 Components. A special-purpose horizontally sliding accordion or folding door assembly shall consist of doors, frames, latches, hinges, and closers of special construction or for special use.

9.1.4 Mounting of Doors.

9.1.4.1* Horizontally sliding accordion or folding doors shall be ceiling or wall mounted in track or tracks attached to a lintel or wall in accordance with the manufacturer's instructions and individual published listings.

9.1.4.2 Doors shall lap the opening if mounted completely on the surface of the wall or shall extend across the opening if ceiling mounted or surface mounted.

9.1.4.2.1 Doors shall completely close the opening.

9.1.4.2.2 Where doors provide protection of openings located in walls above floor level and no projecting sill is provided, the doors shall extend below the bottom of the opening in accordance with the listing.

9.1.4.3* Single doors shall be affixed to a jamb at one wall and shall close against a strike jamb provided at the other wall in accordance with the individual manufacturers' published listings.

9.1.4.4 Biparting doors shall each be affixed to a jamb at a wall and shall close together at the meeting stiles in accordance with the individual manufacturers' published listings.

9.2 Supporting Construction.

9.2.1 Walls.

9.2.1.1 Jambs attached to drywall construction shall be installed in accordance with the manufacturer's installation instructions.

9.2.1.2 Structural support shall be provided.

9.2.1.3 Attachment of jambs to masonry, concrete, or brick shall be by expansion bolt-type anchors or in accordance with the individual manufacturers' published listings.

9.2.2 Sills. Sill shall be installed in accordance with 4.8.2.

9.2.3 Lintels.

9.2.3.1* Lintels shall be applied to or be an integral part of the ceiling.

9.2.3.2 If lintels are not a part of the ceiling assembly, they shall not reduce the fire resistance rating of the door assembly.

9.2.3.3 Applied lintels (headers) shall be in accordance with the manufacturer's published listings.

9.2.3.4 Fasteners, if required, shall be in accordance with the manufacturer's installation instructions with spacing over the door stack area equal to half that of normal spacing.

9.3* Clearances Around Openings. Clearances at the lintel, jambs, and meeting stiles shall not exceed 1/8 in. (3.18 mm).

9.4 Assembly Components.

9.4.1 Closing Devices.

Δ 9.4.1.1 Closing devices shall be listed in accordance with UL 864, *Control Units and Accessories for Fire Alarm Systems*.

9.4.1.2 Doors shall be self-closing or automatic-closing and shall not have a delay in the initiation of closing or reclosing of more than 10 seconds.

9.4.1.3 The average closing speed shall be not less than 6 in./sec (152 mm/sec) or more than 24 in./sec (610 mm/sec).

9.4.2 Power Operators.

9.4.2.1 Only labeled power operators listed for use on fire doors shall be permitted.

9.4.2.2 Where used in a means of egress, only labeled power operators listed in a category intended to facilitate safe egress of persons in case of emergency shall be used.

9.4.2.3 The power operator shall be rated for continuous use with unlimited duty cycle.

9.4.2.4 If closing is achieved by power operation, standby or emergency power shall be provided.

9.4.2.4.1 The standby or emergency power source shall have capacity to operate a minimum of 50 closing cycles of the door.

9.4.2.4.2 If door opening also is achieved by power operation, the standby or emergency power source shall have capacity to