Office of the State Fire Marshal

Fire Rated Doors

Fire Rated Doors

These doors serve a purpose. They are manufactured in a way that is to help reduce the spread of fire and smoke. Fire rated doors allow occupants time to safely exit the structure during a fire or to allow for an area of refuge within the building that protects them until fire service can arrive. These doors are also part of the building's design and serve to protect fire service personnel during fire suppression.

When the door is not properly latched in its frame it loses its effectiveness. When they are not properly maintained they are of no value during a fire making the design and purpose of the door obsolete.

Not all doors are fire doors. Fire doors are composed of a combination of materials, including steel, gypsum and other fire resistant materials. Some have fire rated windows, which must be listed for use. These windows may include wire mesh glass, liquid sodium silicate between to window panes, ceramic glass or borosilicate glass.

Fire doors are needed when a door has an "exit" sign near or on it, when a door leads to stairwells and horizontal exits, or when a door heads to a hazardous area such as a room used to store flammable liquids.

All fire rated doors and frames must be equipped with labels indicating they have met all testing requirements. The label must be provided by a certified testing agency, such as Underwriters Laboratory. It may be embossed or mechanically fastened to the door itself. Labels must indicate the door's fire rated duration such as 90 minutes and may not be painted over or tampered with in any way.

The labels will typically be located on the door near the hardware or on the door frame.

Code References

IBC Model Building Code

IFC Fire Rated Construction

NFPA 80 Fire Rated Doors

NFPA 105 Smoke Doors

The state has adopted IBC and IFC 2006 editions. You will need to determine what editions your local jurisdiction has adopted to determine which set of standards your facility will follow.

NFPA 80, Appendix A, 15-2-1

Fire Doors, shutters and windows are of no value unless they are properly maintained and closed or are able to close at the time of a fire. A periodic inspection and maintenance program should be the responsibility of the property manager.

Maintenance

IBC 2006
3401.2 Buildings and structures, and parts thereof shall be maintained in a safe and sanitary condition. Devices or safeguards which are required buy this code shall be maintained in conformance with the code edition under which installed.

IFC 2006
703.2 Opening protective shall be maintained in an operative condition in accordance with NFPA 80. Fire doors and smoke barrier doors shall not be blocked or obstructed or otherwise made inoperable.

NFPA 80, 1999

15-1.4 Repairs shall be made and defects that could interfere with operation shall be corrected immediately.

(Photos courtesy of idighardware.com)

15-1.2 Doors, shutters, and windows shall be operable at all times. They shall be kept closed and latched or arranged for automatic closing.

IBC 2006

3401.2 The owner or owner's designated agent shall be responsible for the maintenance of buildings and structures.

EXAMPLE:
The Station Fire, Warwick, RI
February 20, 2003
100 people died/200 were injured

This was one of the worst fires in history. Because of this tragedy code officials made many changes to buildings concerning life safety measures. The claims against the state fire marshal stated that they were responsible for inspecting commercial structures and for enforcing the state's fire and building code laws, yet failed to do so. The victims contended that the fire marshal failed to enforce occupancy restrictions and exit requirements at The Station and that they also failed to properly train and supervise state personnel responsible for enforcing the fire safety laws.

The point being, we as fire officials are all responsible for enforcing code. The total settlement with The Station Nightclub fire was $176 million dollars and many lives lost.

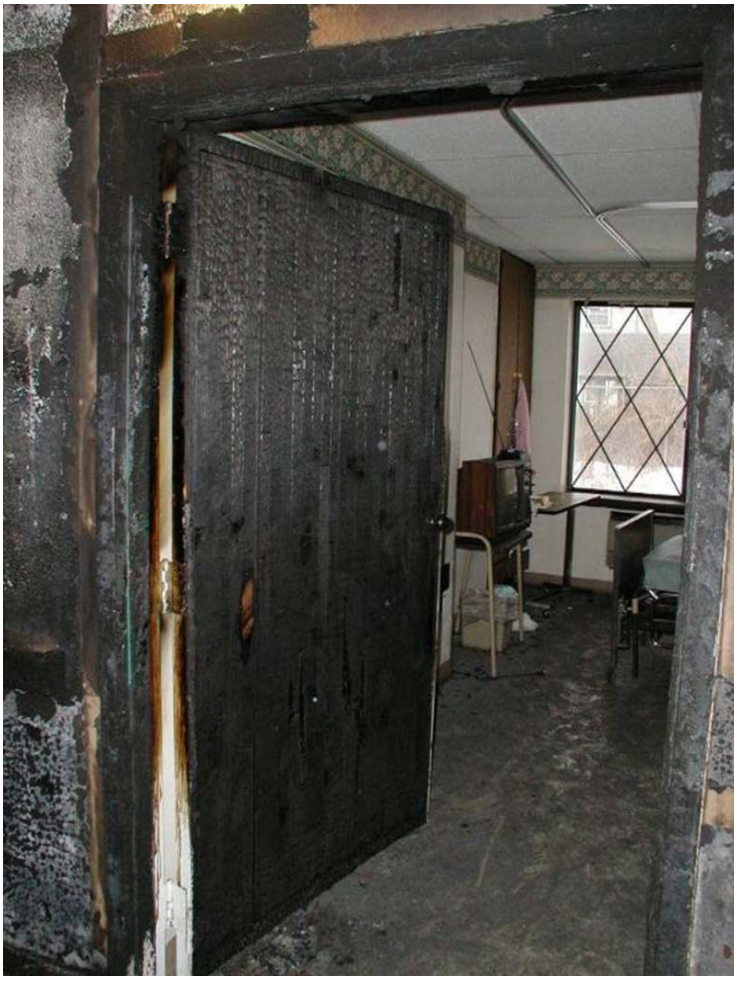
NFPA 80, 1999
15-2.1 Hardware shall be examined frequently and any parts found to be inoperative shall be replaced immediately.
15-2.4.1 Self-closing devices shall be kept in proper working conditions at all times.

NFPA 80, 1999

15-2.4.2 Swinging doors normally held in the open position and equipped with automatic closing devices shall be operated at frequent intervals to ensure proper operation.

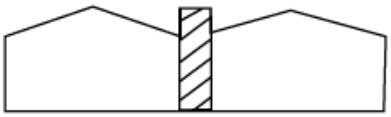
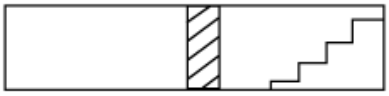
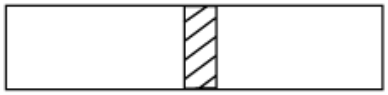
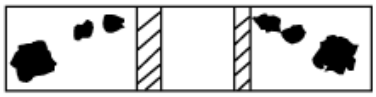
(Magnetic hold open device, automatically releases the door when fire alarm is initiated)

(Fire Side)

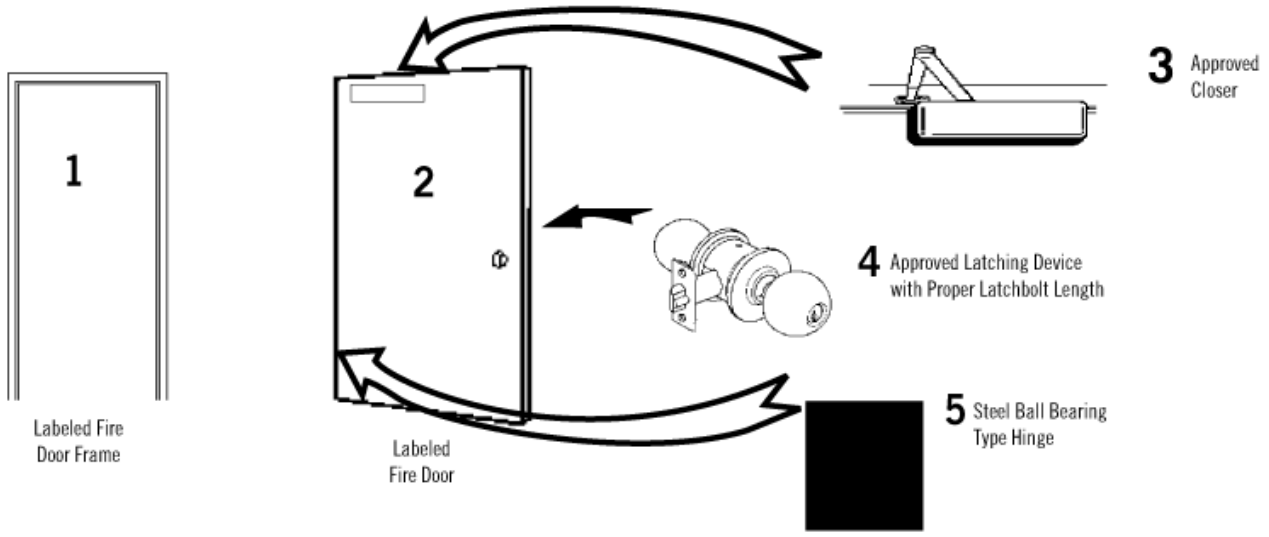


(Non- Fire Side)

Fire Door Classified Openings

Opening	Class	Rating		Glass
	A	3 Hours		100 Sq. In. per Door Leaf Fire Lite Glass ONLY
	B	1½ Hours		100 Sq. In. per Door Leaf
	C	¾ Hours		1296 Sq. In. per Light more than 1 light allowed
	D	1½ Hours		None
	E	¾ Hours		1296 Sq. In per Light
	No Class Designation	⅓ Hours (20 Minutes)		1296 Sq. In per Light

The Five Basic Requirements for a Fire Rated Opening



Common questions regarding fire rated doors

Q) Once a fire door has a penetration in it, does that door become ineffective?

NFPA 80 requires holes to be repaired without replacing the entire door. Holes left in a door or door frame from the removal of existing hardware have either one or two ways of remedying the penetration. One, installing steel fasteners that completely fill the hole or two, fill the screw or bolt holes with the same material as the door frame. Modifications to fire rated doors need to be handled carefully to ensure the rating of the door is not compromised in any way.

Q) I am a teacher in a high school and it is convenient for me to prop my door open because of the students coming in and out of the classroom. Can I put something over the hardware to keep the door closed but not locked?

It is convenient to keep doors open especially in classrooms. However, keeping the door propped open by a wedge, or other unapproved device such as tie-backs, or blocks only puts those in your building at risk when there is a fire. Even when a fire door is closed, they should never have their hardware taped over from keeping it unlocked. During a fire, if hardware is taped over, hot gases build up pressure and could blow the fire door open, making them ineffective. An electromagnetic hold open device that automatically releases when the fire alarm is activated is the only alternative to keeping these doors open.

Q) I am told I have a fire rated door but there is no label on the door? How do I know if it is rated?

First, make sure that no part of the door or frame has a label that could be painted over or covered up. If you do not find the label you can check your plans for your building to double check that it is indeed a fire door.

Q) I want to change the hardware on a fire rated door but I have been told it will lose its rating if I do this?

As long as the hardware you are changing to is either equal to or exceeding the labeled fire door rating. Then the door will not lose its effective fire rating.

CHECKLIST FOR SWINGING DOORS
Per NFPA 80 Section 5.2.4.2

- No open holes or break exist in surface of either the door or frame
- Glazing, vision light frames, and glazing beads are intact and securely fastened in place, is so equipped.
- The door, frame, hinges, hardware and noncombustible threshold are secured aligned, and in working order with no visible signs of damage
- No parts are missing or broken
- Door clearances at the door edge to the fame, on the pull side of the door, do not exceed clearance listed 4.8.4 and 6.3.1
- The self-closing device is operational, that is, the active door completely closes when operated from the full open position
- If a coordinator is installed, the inactive leaf closes before the active leaf
- Latching hardware operates and secures the door when it is in the closed position
- Auxiliary hardware items that interfere or prohibit operation are not installed on the door or frame
- No field modifications to the door assembly have been performed that void the label
- Gasketing and edge seals, where required, are inspected to verify their presence and integrity

CHECKLIST FOR SLIDING AND ROLLING DOORS
Per NFPA 80 Section 5.2.5.2

- No open holes or break exist in surface of either the door or frame
- Glazing, vision light frames, and glazing beads are intact and securely fastened in place, is so equipped.
- No parts are missing or broken
- Auxiliary hardware items that interfere or prohibit operation are not installed on the door or frame
- No field modifications to the door assembly have been performed that void the label
- Slats, endlocks, bottom bar, guide assembly, curtain entry hood, and flame baffle are correctly installed and intact
- Curtain, barrel and guides are aligned, level, plumb and true
- Expansion clearance is maintained in accordance with manufacturers' listing
- Drop release arms and weights are not blocked or wedged
- Mounting and assembly bolts are intact and secured
- Attachment to jambs are with bolts, expansion anchors, or as otherwise required by listing
- Smoke detectors, if equipped, are installed and operational
- Fusible links, if equipped are in the location: chain/cable, s-hooks, eyes, and so forth, are in good condition and links are not painted or coated with grease or dust

Closers are classified in sizes from 2 to 6 with an increased closing force for higher numbers. Generally, a size 4 minimum closer should be used on exterior fire doors and a size 3 minimum closer should be used on interior fire doors. Door widths greater than $3^1/_6$ ft (0.97 m) exterior and $3^1/_3$ ft (1.02 m) interior, parallel or single lever arm applications, and abnormal air pressures usually require an increase to the next size. A combination of these factors could necessitate an increase of two sizes. Individual manufacturer recommendations should be consulted.

Spring hinges should be adjusted to achieve positive latching when allowed to close freely from an open position of 30 degrees.

A-2-4.2 Labeled door holder/release devices for swinging doors should, wherever possible, be installed at the top of the door as close as possible to the lock edge and should be located to avoid interference with any other hardware. If necessary, the holder/release may be permitted to be located at the bottom of the door as close as possible to the lock edge with the device installed on the wall or floor.

A-2-4.3 Individual listed or labeled hardware products are usually suitable for fire door assemblies of any construction or hourly rating. There are, however, some exceptions because of limitations found either in individual door or frame construction or in the hardware products.

Some latches, for example, are listed for use only in $^1/_3$-hour assemblies. Another example is that some pairs of doors might be equipped only with latches having a latch throw of $^3/_4$ in. (19 mm), while those produced by a different manufacturer might have been tested with latches having a latch throw of $^1/_2$ in. (12.7 mm).

Other products such as concealed door closers, electric strikes, open back strikes, viewers, or spring hinges are limited in use either by door and frame construction, size, or maximum hourly protection.

Organizations offering a labeling and listing service should indicate such limitations on the label or supplementary marking. The authority having jurisdiction should refer to the individual manufacturer's published listings when specific information is needed.

A-3-3.2 Structural steel frames consist of head and jamb members, either shop or field assembled.

A-3-4.1 Self-closing devices for these doors consist of a system of weights suspended by ropes, wire cables, or chains over pulleys arranged to return the door to the normally closed position each time it is used.

Automatic-closing devices consist of a system of weights suspended by ropes, wire cables, or chains over pulleys and a hold-open device with a release mechanism that is activated by an automatic fire detector. Upon the detection of fire, additional closing weights are released, causing the door to close and latch.

The automatic-closing system described above may be permitted to be used with a listed releasing device in addition to fusible links and in conjunction with a fire detection system in order to actuate the closing system.

All weights shall be enclosed in a substantial metal enclosure for their entire length of travel. Pulleys over which the weight cable or chain passes should be shielded to prevent the cable or chain from jumping off the pulley and thereby possibly preventing the door from closing. Typical arrangements are shown in Figures B-30 and B-32.

A-4-4.2 If the power operator is of a type that does not close under power failure, then the door should be disconnected from the operator and caused to close under fire conditions. This is accomplished by a listed releasing device activated by the closing system that then closes the fire door. If the power operator is to close the door under fire conditions, its logic circuit should be such that, upon a signal from the fire detection system, it closes under power operation.

A-5-4.3.1.2 The length of the track is expressed in terms of the height of the opening, with 4 in. (102 mm) allowed for the lap of the door, 4 in. (102 mm) for the attachment of the bumper, and 1 in. (25.4 mm) for clearance when the door is fully open.

A-6-4.3.3 A flame baffle might be an integral part of the hood or curtain and utilized where required to protect the opening.

A-7-3.1 Where door assemblies are used for smoke or draft control, gasketing or reduced clearances might be necessary. *(See NFPA 105, Recommended Practice for the Installation of Smoke-Control Door Assemblies.)*

A-9-1.2 Some chute doors, depending on location, might be required to have a temperature rise of not more than 250°F (121°C) at the end of a 30-minute exposure to the standard fire test as described in NFPA 252, *Standard Methods of Fire Tests of Door Assemblies.*

A-10-3.2 Shutters may be permitted to be installed on the inside or outside of an opening or between jambs, but preferably on the inside or between jambs for ease of maintenance and protection from adverse weather conditions.

A-13-2.2 The authority having jurisdiction should be consulted on local building code requirements that might have more restrictive limitations on the maximum size and the total area of fire windows and borrowed lights required to protect openings in interior partitions and exterior walls.

A-15-1 Walls with openings have less fire resistance than unpierced walls. Fire doors, shutters, and fire windows are designed to protect the opening under normal conditions of use, with clear spaces on both sides of the opening. Where the opening is not used and combustible material could be piled against or near the door, window, or shutter, the designed protection cannot be expected.

A-15-2.1 Fire doors, shutters, and windows are of no value unless they are properly maintained and closed or are able to close at the time of fire. A periodic inspection and maintenance program should be implemented and should be the responsibility of the property management.

A-15-2.1.1 Hinges, catches, closers, latches, and stay rolls are especially subject to wear.

Appendix B Drawings of Fire Door Assemblies and Components

This appendix is not a part of the requirements of this NFPA document but is included for informational purposes only.

B-1 Figures B-1 through B-72 illustrate standard good practice. Other methods acceptable to the authority having jurisdiction may be permitted to be used.

actually fire-resistive walls tested in accordance with NFPA 251. Such systems can be permitted to be used as fire-resistive walls and are not within the scope of this standard.

There are developments in the area of glazing that demonstrate a resistance to the passage of heat beyond that discussed in Annex I. Historically, the fire protection performance of glazing has been based on wired glass, which is capable of successfully meeting the fire exposure test criteria of NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*, and which has been accepted as having a fire protection rating of 45 minutes. The fire protection–rated glazing materials are now capable of meeting the fire test criteria of NFPA 257 for as much as 3 hours, and some have a low radiant heat transfer capability for as much as 1 hour and 1½ hours. Safety glazing is also an important consideration where glazing materials are used in fire doors and in fire resistance–rated walls that could be subject to accidental human impact. In such applications, all model building codes contain requirements for safety glazing based on 16 CFR 1201, U.S. Consumer Product Safety Commission "Standard for Architectural Glazing."

K.7 Fire doors, shutters, or fire windows are of value only if properly maintained so that they close or are closed at the time of fire. Periodic inspection of doors, shutters, and fire windows, with immediate attention to any necessary repairs and correction of any defects that could interfere with operation, is an important responsibility of the management of the property. *(See Chapter 5.)*

K.8 The use of swinging, nonrated doors mounted in openings in fire walls, which could interfere with the closing of the fire doors, should not be permitted.

Annex L Informational References

L.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

L.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 72®, National Fire Alarm Code®, 2007 edition.

NFPA 80A, *Recommended Practice for Protection of Buildings from Exterior Fire Exposures*, 2007 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, 2004 edition.

NFPA *101®, Life Safety Code®*, 2006 edition.

NFPA 105, *Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives*, 2007 edition.

NFPA 232, *Standard for the Protection of Records*, 2007 edition.

NFPA 251, *Standard Methods of Tests of Fire Resistance of Building Construction and Materials*, 2006 edition.

NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, 2003 edition.

NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*, 2007 edition.

NFPA 288, *Standard Methods of Fire Tests of Floor Fire Door Assemblies Installed Horizontally in Fire Resistance–Rated Floor Systems*, 2007 edition.

Fire Protection Handbook, 19th ed., 2002, Section 12, Chap 5, "Confinement of Fire in Buildings," pp. 12–103 to 12–108, "Protection of Openings."

SFPE Handbook of Fire Protection Engineering, 3rd edition, 2002.

L.1.2 Other Publications.

L.1.2.1 AMCA Publications. Air Movement & Control Association International, Inc., 30 W. University Drive, Arlington Heights, IL 60004.

AMCA 503, *Fire, Ceiling (Radiation), Smoke and Fire/Smoke Dampers Application Manual*, 2003.

L.1.2.2 ASME Publications. American Society of Mechanical Engineers, Three Park Avenue, New York, NY 10016-5990.

ASME A17.1, *Handbook on Safety Code for Elevators and Escalators*, 2004.

L.1.2.3 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P. O. Box C700, West Conshohocken, PA 19428-2959.

ASTM D 5034, *Standard Test Method for Breaking Strength and Elongation of Textile Fabrics (Grab Test)*, 2001.

ASTM E 90, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*, 2002.

ASTM E 413, *Classification for Rating Sound Insulation*, 2004.

ASTM E 2010, *Standard Test Method for Positive Pressure Fire Tests of Window Assemblies*, 2001.

ASTM E 2074, *Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies*, 2000e1.

L.1.2.4 CSA Publications. Canadian Standards Association, 500 Spectrum Way, Suite 100, Mississauga, ON L4W 5N6.

CSA B44, *Safety Code for Elevators*, 2004.

L.1.2.5 ISO Publications. International Organization for Standardization, 1, rue de Varembé, Case postale 56, CH-1211 Geneve 20, Switzerland.

ISO 3009, *Fire Resistance Tests — Glazed Elements*, 1976/Amd 1:1984.

L.1.2.6 NAAMM/HMMA Publications. National Association of Architectural Metal Manufacturers/Hollow Metal Manufacturers Association, 8 South Michigan Avenue, Suite 1000, Chicago, IL 60603.

NAAMM/HMMA-862, *Guide Specifications for Commercial Security Hollow Metal Doors and Frames*, 2003.

NAAMM/HMMA-863, *Guide Specifications for Detention Security Hollow Metal Doors and Frames*, 5th ed., 2005.

NAAMM/HMMA-866, *Guide Specifications for Stainless Steel Hollow Metal Doors and Frames*, 2001.

L.1.2.7 SMACNA Publications. Sheet Metal and Air Conditioning Contractors' National Association, 4201 Lafayette Center Drive, Chantilly, VA 20151-1209.

Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems, 2002.

L.1.2.8 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 9, *Standard for Safety Fire Tests of Window Assemblies*, 2000.

UL 10B, *Standard for Safety Fire Tests of Door Assemblies*, 1997.

UL 10C, *Standard for Positive Pressure Fire Tests of Door Assemblies*, 1998.

UL 752, *Standard for Safety Bullet-Resisting Equipment*, 2005.

Fire Resistance Directory, 2005.

CHAPTER 34
EXISTING STRUCTURES

[EB] SECTION 3401
GENERAL

3401.1 Scope. The provisions of this chapter shall control the alteration, repair, addition and change of occupancy of existing structures.

Exception: Existing bleachers, grandstands and folding and telescopic seating shall comply with ICC 300-02.

3401.2 Maintenance. Buildings and structures, and parts thereof, shall be maintained in a safe and sanitary condition. Devices or safeguards which are required by this code shall be maintained in conformance with the code edition under which installed. The owner or the owner's designated agent shall be responsible for the maintenance of buildings and structures. To determine compliance with this subsection, the building official shall have the authority to require a building or structure to be reinspected. The requirements of this chapter shall not provide the basis for removal or abrogation of fire protection and safety systems and devices in existing structures.

3401.3 Compliance with other codes. Alterations, repairs, additions and changes of occupancy to existing structures shall comply with the provisions for alterations, repairs, additions and changes of occupancy in the *International Fire Code, International Fuel Gas Code, International Plumbing Code, International Property Maintenance Code, International Private Sewage Disposal Code, International Mechanical Code, International Residential Code* and ICC *Electrical Code*.

[EB] SECTION 3402
DEFINITIONS

3402.1 Definitions. The following term shall, for the purposes of this chapter and as used elsewhere in the code, have the following meaning:

TECHNICALLY INFEASIBLE. An alteration of a building or a facility that has little likelihood of being accomplished because the existing structural conditions require the removal or alteration of a load-bearing member that is an essential part of the structural frame, or because other existing physical or site constraints prohibit modification or addition of elements, spaces or features which are in full and strict compliance with the minimum requirements for new construction and which are necessary to provide accessibility.

[EB] SECTION 3403
ADDITIONS, ALTERATIONS OR REPAIRS

3403.1 Existing buildings or structures. Additions or alterations to any building or structure shall conform with the requirements of the code for new construction. Additions or alterations shall not be made to an existing building or structure which will cause the existing building or structure to be in violation of any provisions of this code. An existing building plus additions shall comply with the height and area provisions of Chapter 5. Portions of the structure not altered and not affected by the alteration are not required to comply with the code requirements for a new structure.

Exception: For buildings and structures in flood hazard areas established in Section 1612.3, any additions, alterations or repairs that constitute substantial improvement of the existing structure, as defined in Section 1612.2, shall comply with the flood design requirements for new construction and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

3403.2 Structural. Additions or alterations to an existing structure shall not increase the force in any structural element by more than 5 percent, unless the increased forces on the element are still in compliance with the code for new structures, nor shall the strength of any structural element be decreased to less than that required by this code for new structures. Where repairs are made to structural elements of an existing building, and uncovered structural elements are found to be unsound or otherwise structurally deficient, such elements shall be made to conform to the requirements for new structures.

3403.2.1 Existing live load. Where an existing structure heretofore is altered or repaired, the minimum design loads for the structure shall be the loads applicable at the time of erection, provided that public safety is not endangered thereby.

3403.2.2 Live load reduction. If the approved live load is less than required by Section 1607, the areas designed for the reduced live load shall be posted in with the approved load. Placards shall be of an approved design.

3403.3 Nonstructural. Nonstructural alterations or repairs to an existing building or structure are permitted to be made of the same materials of which the building or structure is constructed, provided that they do not adversely affect any structural member or the fire-resistance rating of any part of the building or structure.

3403.4 Stairways. An alteration or the replacement of an existing stairway in an existing structure shall not be required to comply with the requirements of a new stairway as outlined in Section 1009 where the existing space and construction will not allow a reduction in pitch or slope.

[EB] SECTION 3404
FIRE ESCAPES

3404.1 Where permitted. Fire escapes shall be permitted only as provided for in Sections 3404.1.1 through 3404.1.4.

3404.1.1 New buildings. Fire escapes shall not constitute any part of the required means of egress in new buildings.

3404.1.2 Existing fire escapes. Existing fire escapes shall be continued to be accepted as a component in the means of egress in existing buildings only.

CHAPTER 7
FIRE-RESISTANCE-RATED CONSTRUCTION

SECTION 701
GENERAL

701.1 Scope. The provisions of this chapter shall specify the requirements for and the maintenance of fire-resistance-rated construction and requirements for enclosing floor openings and shafts in existing buildings. New construction shall comply with the *International Building Code*.

SECTION 702
DEFINITIONS

702.1 Terms defined in Chapter 2. Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.

SECTION 703
FIRE-RESISTANCE-RATED CONSTRUCTION

703.1 Maintenance. The required fire-resistance rating of fire-resistance-rated construction (including walls, firestops, shaft enclosures, partitions, smoke barriers, floors, fire-resistive coatings and sprayed fire-resistant materials applied to structural members and fire-resistant joint systems) shall be maintained. Such elements shall be properly repaired, restored or replaced when damaged, altered, breached or penetrated. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings and holes made for any reason shall be protected with approved methods capable of resisting the passage of smoke and fire. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing doors of approved construction meeting the fire protection requirements for the assembly.

703.1.1 Fireblocking and draftstopping. Required fireblocking and draftstopping in combustible concealed spaces shall be maintained to provide continuity and integrity of the construction.

703.1.2 Smoke barriers. Required smoke barriers shall be maintained to prevent the passage of smoke and all openings protected with approved smoke barrier doors or smoke dampers.

703.2 Opening protectives. Opening protectives shall be maintained in an operative condition in accordance with NFPA 80. Fire doors and smoke barrier doors shall not be blocked or obstructed or otherwise made inoperable. Fusible links shall be replaced promptly whenever fused or damaged. Fire door assemblies shall not be modified.

703.2.1 Signs. Where required by the fire code official, a sign shall be permanently displayed on or near each fire door in letters not less than 1 inch (25 mm) high to read as follows:

1. For doors designed to be kept normally open: FIRE DOOR—DO NOT BLOCK.
2. For doors designed to be kept normally closed: FIRE DOOR—KEEP CLOSED.

703.2.2 Hold-open devices and closers. Hold-open devices and automatic door closers, where provided, shall be maintained. During the period that such device is out of service for repairs, the door it operates shall remain in the closed position.

703.2.3 Door operation. Swinging fire doors shall close from the full-open position and latch automatically. The door closer shall exert enough force to close and latch the door from any partially open position.

703.3 Ceilings. The hanging and displaying of salable goods and other decorative materials from acoustical ceiling systems that are part of a fire-resistance-rated floor/ceiling or roof/ceiling assembly, shall be prohibited.

703.4 Testing. Horizontal and vertical sliding and rolling fire doors shall be inspected and tested annually to confirm proper operation and full closure. A written record shall be maintained and be available to the fire code official.

SECTION 704
FLOOR OPENINGS AND SHAFTS

704.1 Enclosure. Interior vertical shafts, including but not limited to stairways, elevator hoistways, service and utility shafts, that connect two or more stories of a building shall be enclosed or protected as specified in Table 704.1.

704.2 Opening protectives. When openings are required to be protected, opening protectives shall be maintained self-closing or automatic-closing by smoke detection. Existing fusible-link-type automatic door-closing devices are permitted if the fusible link rating does not exceed 135°F (57°C).

13-3.2.2 Maximum Size Openings. Maximum size openings for hollow metal windows shall be as follows:

(a) Single window, other than casement: 5 ft × 5 ft (1.52 m × 1.52 m);

(b) Multiple window, other than casement: 7 ft × 10 ft (2.13 m × 3.05 m);

(c) Single casement window: 3½ ft × 10 ft (1.07 m × 3.05 m);

(d) Multiple casement window: 7 ft × 10 ft (2.13 m × 3.05 m).

13-3.3 Hot-Rolled or Extruded Steel Section Window.

13-3.3.1 The heavy intermediate window frame and ventilator sections shall be a minimum depth of 1⁵⁄₁₆ in. (33 mm) with integrally rolled weathering contacts.

13-3.3.2 The standard intermediate window frame and ventilator sections shall be a minimum depth of 1¼ in. (32 mm) with integrally rolled weathering contacts.

13-3.3.3 The residential-type window frame and ventilator sections shall be a minimum depth of 1 in. (24.5 mm) with integrally rolled weathering contacts.

13-3.3.4 The industrial-type window frame and ventilator sections shall be a minimum depth of 1¼ in. (32 mm) with applied weathering contacts.

13-3.3.5 Maximum Size Openings. Maximum openings for hot-rolled or extruded steel section windows are as follows:

(a) The heavy intermediate and industrial types shall be used for openings not exceeding 84 ft² (7.8 m²), with neither dimension exceeding 12 ft (3.66 m). Where multiple units are installed, the distance between unprotected vertical steel mullions shall not exceed 7 ft (2.13 m).

(b) The standard intermediate types shall be used for openings not exceeding 60 ft² (5.57 m²), with neither dimension exceeding 10 ft (3.05 m). Where multiple units are installed, the distance between unprotected vertical steel mullions shall not exceed 6½ ft (1.98 m).

(c) Residential-type windows shall be used for openings not exceeding 6½ ft (1.98 m) for either dimension. Where multiple units are installed, the distance between unprotected vertical steel mullions shall not exceed 3½ ft (1.07 m).

13-3.4 Hollow Metal Plate Steel (Combination) Window.

13-3.4.1 Hollow metal plate steel windows shall consist of formed sheet steel frame sections at the head, jambs and sill, and a plate steel window. They shall be of the double-hung, counterbalanced, or stationary type.

13-3.4.2 Maximum Size Openings. Maximum size openings for hollow metal plate steel windows are as follows:

(a) Single window: 5 ft × 5 ft (1.52 m × 1.52 m);

(b) Multiple window: 7 ft × 10 ft (2.13 m × 3.05 m).

13-3.5 Borrowed Lights. Borrowed lights shall be limited to the maximum size openings indicated in their individual listings.

13-4 Installation.

13-4.1 Frames shall be fastened securely to the wall and shall be capable of resisting all wind stresses and any other stresses for which the window was designed.

13-4.2 Fire Lock Angles.

13-4.2.1 Fire lock angles shall be designed to hold the ventilator in the frame as the assembly expands under exposure to fire.

13-4.2.2 Where the window is provided with fire lock angles, the fire lock angles shall be adjusted so that they pass one another with a minimum of clearance.

13-4.3 Installation of the Glazing Material.

13-4.3.1 The clearance between the edges of the glazing material and the frame shall not exceed ⅛ in. (3.18 mm).

13-4.3.2 Wire clips, glazing angle clips, continuous glazing channels, or continuous glazing angles shall be used to retain the glazing material. Where wire clips or glazing angle clips are used for glazing the window, one wire clip or glazing angle clip shall be installed in each mounting hole. Where continuous glazing angles or channels are used, a screw or bolt and nut shall be installed in each mounting hole.

13-4.3.3 Wire glass shall be well imbedded in putty, and all exposed joints between the frame and the glass shall be struck and pointed. Glazing materials shall be installed in accordance with their individual listing.

13-5 Closing Devices. All fire windows shall be of a fixed type or shall be automatic closing. The automatic closing device can be an integral part of the assembly or a separate system, such as weights suspended by ropes, wire cables, or chains over pulleys, arranged so that operation of the automatic fire detector shall cause the ventilator to close.

Chapter 14 Installation of Glass Block

14-1 Classification.

14-1.1 Only labeled glass block shall be used.

14-1.2 Glass block shall be permitted for the protection of openings not exceeding 120 ft² (11.15 m²), with neither the width nor height exceeding 12 ft (3.66 m).

14-2 Installation. Glass block shall be installed in accordance with its individual listing.

Chapter 15 Care and Maintenance

15-1* General.

15-1.1 Where a door or window opening is no longer in use, the opening shall be filled with construction equivalent to that of the wall.

15-1.2 Doors, shutters, and windows shall be operable at all times. They shall be kept closed and latched or arranged for automatic closing.

15-1.3 Where it is necessary to replace fire doors, shutters, windows or their frames, hardware, and closing mechanisms, replacements shall meet the requirements for fire protection and shall be installed as required by this standard for new installations.

15-1.4 Repairs shall be made and defects that could interfere with operation shall be corrected immediately.

15-2 Specific Requirements.

15-2.1* Inspections.

15-2.1.1* Hardware shall be examined frequently, and any parts found to be inoperative shall be replaced immediately.

15-2.1.2 Tinclad and Kalamein doors shall be inspected regularly for dry rot.

15-2.1.3 Chains or cables employed on suspended doors shall be inspected frequently for excessive wear and stretching.

15-2.2 Lubrication and Adjustments.

15-2.2.1 Guides and bearings shall be kept well lubricated to facilitate operation.

15-2.2.2 Chains or cables on biparting, counterbalanced doors shall be checked frequently and adjustments shall be made to ensure proper latching and to keep the doors in proper relation to the opening.

15-2.3 Prevention of Door Blockage.

15-2.3.1 Door openings and the surrounding areas shall be kept clear of anything that could obstruct or interfere with the free operation of the door.

15-2.3.2 Where necessary, a barrier shall be built to prevent the piling of material against sliding doors.

15-2.3.3 Blocking or wedging of doors in the open position shall be prohibited.

15-2.4 Maintenance of Closing Mechanisms.

15-2.4.1 Self-closing devices shall be kept in proper working condition at all times.

15-2.4.2 Swinging doors normally held in the open position and equipped with automatic closing devices shall be operated at frequent intervals to ensure proper operation.

15-2.4.3 All horizontal or vertical sliding and rolling fire doors shall be inspected and tested annually to check for proper operation and full closure. Resetting of the release mechanism shall be done in accordance with the manufacturer's instructions. A written record shall be maintained and shall be made available to the authority having jurisdiction.

15-2.4.4 Fusible links or other heat-actuated devices and release devices shall not be painted.

15-2.4.5 Care shall be taken to prevent paint accumulation on stay rolls.

15-2.5 Repair of Fire Doors and Windows.

15-2.5.1 Broken or damaged glazing material shall be replaced with labeled glazing. Wire glass shall be well embedded in putty, and all exposed joints between the frame and the glass shall be struck and pointed. Other glazing materials shall be installed in accordance with their individual listing.

15-2.5.2 Any breaks in the face covering of doors shall be repaired immediately.

15-2.5.3 Where a fire door, frame, of any part of its appurtenances is damaged to the extent that it could impair the door's proper emergency function, it shall be repaired with parts obtained from the door's manufacturer. Upon completion of the repairs, the door shall be tested to ensure emergency operation and closing.

15-2.6 Fire Prevention. Combustible material shall be kept well away from openings.

Chapter 16 Referenced Publications

16-1 The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

16-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 72, *National Fire Alarm Code*, 1993 edition.

NFPA 81, *Standard for Fur Storage, Fumigation and Cleaning*, 1986 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, 1994 edition.

NFPA 232, *Standard for the Protection of Records*, 1995 edition.

NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*, 1995 edition.

NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, 1995 edition.

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*, 1995 edition.

NFPA 257, *Standard for Fire Tests of Window Assemblies*, 1990 edition.

16-1.2 Other Publications.

16-1.2.1 ANSI Publications. American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

ANSI A133.1, *Tin-Clad Fire Doors Mounted Singly and in Pairs*, 1993.

ANSI A156.1, *Butts and Hinges*, 1988.

ANSI A156.4, *Door Controls (Closers)*, 1992.

16-1.2.2 ASME Publication. American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

ASME/ANSI A17.1, *Safety Code for Elevators and Escalators*, 1993.

16-1.2.3 CSA Publication. Canadian Standards Association, 178 Rexdale Boulevard, Rexdale (Toronto), Ontario, Canada M9W 1R3.

CAN 3-B44, *Safety Code for Elevators*, including Supplement No. 1, 1987.

16-1.2.4 U.S. Government Publication. Specification Sales, GSA 3FRSBS, Washington Navy Yard, Bldg. 197, Stop 249, Washington, DC 20407.

Federal Specification FF-S-325 (September 1957) and Interim Amendment 3 (July 1965).

13-3.5 Borrowed Lights. Borrowed lights shall be limited to the maximum size openings indicated in their individual listings.

13-4 Installation.

13-4.1 Frames. Frames shall be fastened securely to the wall and shall be capable of resisting all wind stresses and any other stresses for which the window was designed.

13-4.2 Fire Lock Angles.

13-4.2.1 Fire lock angles shall be designed to hold the ventilator in the frame as the assembly expands under exposure to fire.

13-4.2.2 Where the window is provided with fire lock angles, the fire lock angles shall be adjusted so that they pass one another with a minimum of clearance.

13-4.3 Glazing Material.

13-4.3.1 Wire clips, glazing angle clips, continuous glazing channels, or continuous glazing angles shall be used to retain the glazing material. Where wire clips or glazing angle clips are used for glazing the window, one wire clip or glazing angle clip shall be installed in each mounting hole. Where continuous glazing angles or channels are used, a screw or bolt and nut shall be installed in each mounting hole.

13-4.3.2 Glazing materials shall be installed in accordance with their individual listing.

13-5 Closing Devices. All fire windows shall be of a fixed type or shall be automatic closing. The automatic-closing device can be an integral part of the assembly or a separate system, such as weights suspended by ropes, wire cables, or chains over pulleys, arranged so that operation of the automatic fire detector shall cause the ventilator to close.

Chapter 14 Glass Block

14-1 General. This chapter covers the installation of glass block.

14-1.1 Labeled. Only labeled glass block shall be used.

14-1.2 Size. Glass block shall be permitted for the protection of openings not exceeding 120 ft^2 (11.15 m^2) with neither the width nor height exceeding 12 ft (3.66 m).

14-2 Installation. Glass block shall be installed in accordance with its individual listing.

Chapter 15 Care and Maintenance

15-1* General. This chapter covers the care and maintenance of fire doors and fire windows.

15-1.1 Removal of Window. Where a door or window opening is no longer in use, the opening shall be filled with construction equivalent to that of the wall.

15-1.2 Operability. Doors, shutters, and windows shall be operable at all times. They shall be kept closed and latched or arranged for automatic closing.

15-1.3 Replacement. Where it is necessary to replace fire doors, shutters, windows or their frames, hardware, and closing mechanisms, replacements shall meet the requirements for fire protection and shall be installed as required by this standard for new installations.

15-1.4 Repairs. Repairs shall be made and defects that could interfere with operation shall be corrected immediately.

15-2 Specific Requirements.

15-2.1* Inspections.

15-2.1.1* Hardware shall be examined frequently and any parts found to be inoperative shall be replaced immediately.

15-2.1.2 Tin clad and Kalamein doors shall be inspected regularly for dry rot.

15-2.1.3 Chains or cables employed on suspended doors shall be inspected frequently for excessive wear and stretching.

15-2.2 Lubrication and Adjustments.

15-2.2.1 Guides and bearings shall be kept well lubricated to facilitate operation.

15-2.2.2 Chains or cables on biparting, counterbalanced doors shall be checked frequently and adjustments shall be made to ensure proper latching and to keep the doors in proper relation to the opening.

15-2.3 Prevention of Door Blockage.

15-2.3.1 Door openings and the surrounding areas shall be kept clear of anything that could obstruct or interfere with the free operation of the door.

15-2.3.2 Where necessary, a barrier shall be built to prevent the piling of material against sliding doors.

15-2.3.3 Blocking or wedging of doors in the open position shall be prohibited.

15-2.4 Maintenance of Closing Mechanisms.

15-2.4.1 Self-closing devices shall be kept in proper working condition at all times.

15-2.4.2 Swinging doors normally held in the open position and equipped with automatic-closing devices shall be operated at frequent intervals to ensure proper operation.

15-2.4.3 All horizontal or vertical sliding and rolling fire doors shall be inspected and tested annually to check for proper operation and full closure. Resetting of the release mechanism shall be done in accordance with the manufacturer's instructions. A written record shall be maintained and shall be made available to the authority having jurisdiction.

15-2.4.4 Fusible links or other heat-actuated devices and release devices shall not be painted.

15-2.4.5 Care shall be taken to prevent paint accumulation on any movable part such as, but not limited to, stay rolls, gears, and closing mechanisms.

15-2.5 Repair of Fire Doors and Windows.

15-2.5.1 Broken or damaged glazing material shall be replaced with labeled glazing. Wire glass shall be well embedded in putty and all exposed joints between the frame and the glass shall be struck and pointed. Other glazing materials shall be installed in accordance with their individual listing.

15-2.5.2 Any breaks in the face covering of doors shall be repaired immediately.

15-2.5.3 Where a fire door, frame, or any part of its appurtenances is damaged to the extent that it could impair the door's proper emergency function, it shall be repaired with parts obtained from the door's manufacturer. Upon completion of the repairs, the door shall be tested to ensure emergency operation and closing.

15-2.5.4 When 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:

(a) Install steel fasteners that adequately fill the holes

(b) Fill the screw or bolt holes with the same material as the door or frame

15-2.6 Fire Prevention.

15-2.6.1 Combustible material shall be kept well away from openings.

15-2.6.2 Devices that utilize an open flame shall not be used to test fusible links, heat, smoke, or other automatic devices.

Chapter 16 Referenced Publications

16-1 The following documents or portions thereof are referenced within this standard as mandatory requirements and shall be considered part of the requirements of this standard. The edition indicated for each referenced mandatory document is the current edition as of the date of the NFPA issuance of this standard. Some of these mandatory documents might also be referenced in this standard for specific informational purposes and, therefore, are also listed in Appendix K.

16-1.1 **NFPA Publications.** National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 72, *National Fire Alarm Code®*, 1996 edition.

NFPA 82, *Standard on Incinerators and Waste and Linen Handling Systems and Equipment*, 1999 edition.

NFPA 232, *Standard for the Protection of Records*, 1995 edition.

NFPA 251, *Standard Methods of Tests of Fire Endurance of Building Construction and Materials*, 1995 edition.

NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, 1995 edition.

NFPA 253, *Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source*, 1995 edition.

NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*, 1996 edition.

16-1.2 **Other Publications.**

16-1.2.1 **ANSI Publications.** American National Standards Institute, Inc., 11 West 42nd Street, 13th floor, New York, NY 10036.

ANSI A133.1, *Tin-Clad Fire Doors Mounted Singly and in Pairs*, 1993.

ANSI A156.1, *Standard for Butts and Hinges*, 1988.

ANSI A156.4, *Door Controls (Closers)*, 1992.

16-1.2.2 **ASME Publication.** American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

ASME/ANSI A17.1, *Safety Code for Elevators and Escalators*, 1993.

16-1.2.3 **CSA Publication.** Canadian Standards Association, 178 Rexdale Boulevard, Rexdale, Ontario M9W 1R3.

CAN 3-B44, *Safety Code for Elevators*, including Supplement No. 1, 1987.

16-1.2.4 **U.S. Government Publication.** U.S. Government Printing Office, Washington, DC 20402.

Federal Specification FF-S-325 (September 1957) and Interim Amendment 3 (July 1965).

Appendix A Explanatory Material

Appendix A is not a part of the requirements of this NFPA document but is included for informational purposes only. This appendix contains explanatory material, numbered to correspond with the applicable text paragraphs.

A-1-1

(a) Each class of device (e.g., doors, shutters, windows) has certain advantages and limitations, and the importance of each of these characteristics needs to be considered for the specific opening under consideration. A device cannot be expected to perform properly except under the condition for which it was designed. Assemblies incorporating fire-resistant glazing materials also have been developed that have been tested and evaluated as components of fire doors or fire-resistive walls rather than as glass lights or fire windows. Users first should ascertain from the authority having jurisdiction which type of device or material, if any, is acceptable in the location proposed, and the contract should be subject to the approval of the authority having jurisdiction.

(b) Fire door assemblies for the protection of openings depend on the use of labeled fire doors and frames, listed or labeled latching devices, listed swinging and sliding hardware, and closing devices having the required fire protection ratings that close or are closed at the time of fire. The effectiveness of the entire assembly as a fire barrier could be destroyed if any component is omitted or if one of substandard quality is used. Except where restricted by individual published listings, a fire door assembly may be permitted to consist of the labeled, listed, or classified components of different organizations that are acceptable to the authority having jurisdiction.

(c) Where fire doors are used in a means of egress, NFPA *101®, Life Safety Code®*, specifies that they are required to swing with the exit travel except for doors on individual small rooms, which may be permitted to swing in; and that for horizontal exits, where fire doors are required on both sides of the wall, one door may be permitted to be an automatic horizontally sliding door, normally open, and the other door may be permitted to be a self-closing door that swings with the exit travel, normally closed. The following types of doors may not be permitted to be used on exits:

1. Rolling steel doors or shutters
2. Vertical sliding doors
3. Jackknife doors

(d) Labeled fire exit hardware that meets the requirements for safety to life and fire protection is available for use on labeled fire doors. Fire doors for use with this hardware are required to bear the following marking on the label: "Fire Door To Be Equipped with Fire Exit Hardware."

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.

4.1.3 Appurtenances.

4.1.3.1 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.)*

4.1.3.2 For job site preparation of surface-applied hardware, function holes for mortise locks, and holes for labeled viewers, a maximum ¾ in. (19 mm) wood and composite door undercutting, and protection plates *(see 6.4.5)* shall be permitted.

4.1.3.3 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, and through-bolts in doors.

4.1.3.4 The holes described in 4.1.3.3 shall not be permitted to exceed a diameter of 1 in. (25.4 mm) with the exception of cylinders.

4.1.4 Signage. Informational signs shall be permitted to be installed on the surfaces of fire doors in accordance with 4.1.4.1 through 4.1.4.4 or in accordance with the manufacturer's published listing.

4.1.4.1 The total area of all attached signs shall not exceed 5 percent of the area of the face of the fire door to which they are attached.

4.1.4.2 Means of Attachment.

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

4.1.4.2.2 Mechanical attachments such as screws or nails shall not be permitted.

4.1.4.3 Signs shall not be installed on glazing material in fire doors.

4.1.4.4 Signs shall not be installed on the surface of fire doors so as to impair or otherwise interfere with the proper operation of the fire door.

4.1.5 Sliding Doors.

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

4.1.5.2 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.

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

4.2.3 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.

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

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 fire exit hardware shall bear a label reading "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 exit devices, 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, 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 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* Authorities having jurisdiction shall be consulted for information on the size of oversize doors that shall be permitted in a given location.

4.4 Glazing Material in Fire Doors.

4.4.1* Only labeled fire resistance–rated or fire protection–rated glazing material shall be used in fire door assemblies when permitted by the door listing. *(See A.3.3.71, Glazing Material.)*

4.4.2 Where required, the glazing material shall also meet 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.

4.4.4* Glazing material not exceeding 100 in.^{2} (0.065 m^2) 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 glazing material has been tested for the desired rating period with no through-openings in accordance with NFPA 252, *Standard Methods of 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, *Standard Methods of Fire Tests of Door Assemblies*, and shall be limited in size and area in accordance with Table 4.4.5.

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)

[a]See also requirements in 4.4.4.
[b]See 4.4.5.1.
[c]Fire protection–rated glazing materials exceeding 100 in.^{2} (0.065 m^2) in area are not permitted in temperature rise–rated doors.

4.4.5.1 Maximum area of individual exposed lights shall be 1296 in.^{2} (0.84 m^2) 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 Transparent Composite Panels. Transparent composite panels that limit the temperature rise on the unexposed surface and withstand the impact of the hose stream test as required for walls for the required duration in accordance with NFPA 251, *Standard Methods of Tests of Fire Resistance of Building Construction and Materials*, and subsequently tested in accordance with NFPA 252, *Standard Methods of Fire Tests of Door Assemblies*, or NFPA 257, *Standard on Fire Test for Window and Glass Block Assemblies*, shall be limited to the maximum area tested in doors or windows having a fire protection rating of 1½ hours or less. *(See 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.

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 Placement of Detectors.

4.7.1 All detectors, including fusible links, shall be placed as shown in Figure 4.7.1(a) and Figure 4.7.1(b), but in no event shall detectors be placed in the dead air space shown in Figure 4.7.1(a).

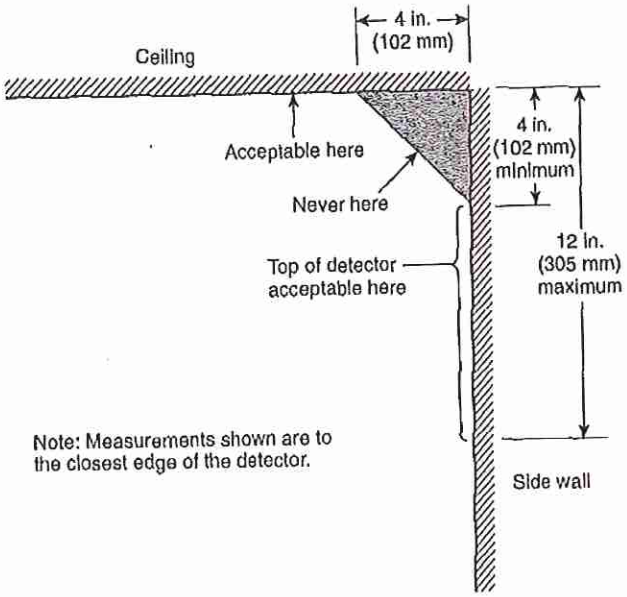


FIGURE 4.7.1(a) Proper Placement of Detectors.

4.7.2 Detectors for the release of fire doors shall be permitted to be part of an overall system, such as a fire alarm, water flow alarm, or carbon dioxide release system, that releases the door.

4.7.3 Where smoke detectors are used, they shall be located in accordance with *NFPA 72, National Fire Alarm Code.*

4.7.4 Detectors and their components shall be installed in accordance with the manufacturers' instructions.

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

4.7.5.1 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.

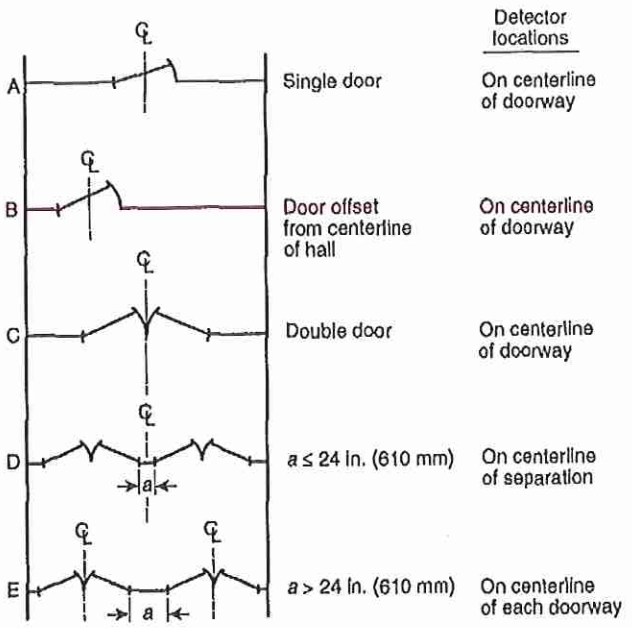


FIGURE 4.7.1(b) Detector Locations.

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. (0.41 m) of the opening shall be filled with concrete.

4.8.1.3* 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.

4.8.1.4* For tin-clad and sheet metal (corrugated) doors, continuous steel-bearing plates (crush plates) of 3/16 in. × 3 in. (4.76 mm × 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.

4.8.1.5 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, special sill construction 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, special sill construction 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 ½-hour or ⅓-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.

4.8.2.10.1 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 The clearance under the bottom of a door shall be a maximum of ¾ inch (19 mm).

4.8.4.2 Where the bottom of the door is more than 38 in. (965 mm) above the finished floor, the maximum clearance shall not exceed ⅜ 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, *Standard Method of Test 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 ¼ of the proof test load.
(4) Where used in brick or filled concrete masonry unit walls, the bolt load shall not exceed 1/12 of the proof test load.
(5) No expansion anchor shall be set closer to the edge of the wall opening than six times the diameter of the anchor or closer to another anchor than eight times the diameter of the anchor.

4.9* Testing.

4.9.1 Upon completion of installation, all fire door and fire window assemblies shall be tested to confirm operation of the automatic closing device and full closure.

4.9.2 Resetting of the automatic closing device shall be in accordance with the manufacturer's written instructions.

4.9.3 A written record shall be maintained and shall be made available to the AHJ.

Chapter 5 Care and Maintenance

5.1* General.

5.1.1 Application.

5.1.1.1 This chapter shall cover the care and maintenance of fire doors and fire windows.

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

5.1.2 Removal of Door or Window. Where a door or window opening is no longer in use, the opening shall be filled with construction equivalent to that of the wall.

5.1.3 Operability.

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

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

5.1.4 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 as required by this standard for new installations.

5.1.5 Repairs and Field Modifications.

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

5.1.5.2 Field Modifications.

5.1.5.2.1 In cases where a field modification to a fire door assembly is desired, the laboratory whose label is on the assembly shall be contacted and a description of the modifications shall be presented to the laboratory.

5.1.5.2.2 If the laboratory finds that the modifications will not compromise the integrity and fire resistance capabilities of the assembly, the modifications shall be permitted to be authorized by the laboratory without a field visit from the laboratory.

5.2* Inspections.

5.2.1* Fire door assemblies shall be inspected and tested not less than annually, and a written record of the inspection shall be signed and kept for inspection by the AHJ.

5.2.2* Performance-Based Option.

5.2.2.1 As an alternate means of compliance with 5.2.1, subject to the AHJ, fire door assemblies shall be permitted to be inspected, tested, and maintained under a written performance-based program.

5.2.2.2 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.

5.2.2.3 Technical justification for inspection, testing, and maintenance intervals shall be documented.

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

5.2.3 Functional Testing.

5.2.3.1 Functional testing of fire door and window assemblies shall be performed by individuals with knowledge and understanding of the operating components of the type of door 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.

5.2.4 Swinging Doors with Builders Hardware or Fire Door Hardware.

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

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

(1) No open holes or breaks exist in surfaces of either the door or frame.
(2) Glazing, vision light frames, and glazing beads are intact and securely fastened in place, if so equipped.
(3) The door, frame, hinges, hardware, and noncombustible threshold are secured, aligned, and in working order with no visible signs of damage.
(4) No parts are missing or broken.
(5) Door clearances at the door edge to the frame, on the pull side of the door, do not exceed clearances listed in 4.8.4 and 6.3.1.
(6) The self-closing device is operational, that is, the active door completely closes when operated from the full open position.
(7) If a coordinator is installed, the inactive leaf closes before active leaf.
(8) Latching hardware operates and secures the door when it is in the closed position.

(9) Auxiliary hardware items that interfere or prohibit operation are not installed on the door or frame.
(10) No field modifications to the door assembly have been performed that void the label.
(11) Gasketing and edge seals, where required, are inspected to verify their presence and integrity.

5.2.5 Horizontally Sliding, Vertically Sliding, and Rolling Doors.

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

5.2.5.2 The following items shall be verified:

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

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

5.2.7 Assembly shall be reset after a successful test.

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

5.2.9 Hardware shall be examined, and inoperative hardware, parts, or other defects shall be replaced without delay.

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

5.2.11 Chains or cables employed shall be inspected for excessive wear and stretching.

5.2.12 Lubrication and Adjustments.

5.2.12.1 Guides and bearings shall be kept well lubricated to facilitate operation.

5.2.12.2 Chains or cables on biparting, counterbalanced doors shall be checked and adjustments shall be made to ensure latching and to keep the doors in proper relation to the opening.

5.2.13 Prevention of Door Blockage.

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

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

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

5.2.14 Maintenance of Closing Mechanisms.

5.2.14.1 Self-closing devices shall be kept in working condition at all times.

5.2.14.2 Swinging doors normally held in the open position and equipped with automatic-closing devices shall be operated at frequent intervals to ensure operation.

5.2.14.3 All horizontal or vertical sliding and rolling fire doors shall be inspected and tested annually to check for operation and full closure.

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

5.2.14.3.2 A written record shall be maintained and shall be made available to the AHJ.

5.2.14.3.3 When conducting the annual test for operation and full closure, rolling steel fire doors shall be drop tested twice.

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

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

5.2.14.4 Fusible links or other heat-actuated devices and release devices shall not be painted.

5.2.14.5* Paint shall be prevented from accumulating on any movable part.

5.2.15 Repair of Fire Doors and Windows.

5.2.15.1 Damaged glazing material shall be replaced with labeled glazing.

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

5.2.15.2 Any breaks in the face covering of doors shall be repaired immediately.

5.2.15.3 Where a fire door, frame, or any part of its appurtenances 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, frame, or any part of its appurtenances shall be repaired with parts obtained from the door's manufacturer.
(2) The door shall be tested to ensure emergency operation and closing upon completion of the repairs.

5.2.15.4 When 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

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.

Chapter 6 Swinging Doors with Builders Hardware

6.1 Doors.

6.1.1 General. This chapter shall cover the installation of swinging doors with builders hardware.

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

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

6.1.4.4 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 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 The clearances between the top and vertical edges of the door and the frame, and the meeting edges of doors swinging in pairs, shall be ⅛ in. ± 1/16 in. (3.18 mm ± 1.59 mm) for steel doors and shall not exceed ⅛ in. (3.18 mm) for wood doors.

6.3.1.7.2 Clearances shall be measured from the pull face of the door(s).

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 label service procedures.

6.3.3.3 Frames with transom lights, side lights, or both shall be permitted where a ¾-hour fire protection rating or less is required.

6.3.3.4 Frames with transom lights, side lights, or both, installed with fire resistance–rated glazing tested as an assembly in accordance with NFPA 251, *Standard Methods of Tests of Fire Resistance of Building Construction and Materials*, shall be permitted where a fire protection rating exceeding ¾ hour is required.

6.3.3.5 Only labeled glazing material 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-resistive 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 1½ 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 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. Hinges shall be as specified in individual door 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 two hinges and an additional hinge for each additional 30 in. (0.76 m) of door height or fraction thereof.

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

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

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

6.4.3.1.2.1 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.*

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

Table 6.4.3.1 Builders Hardware Mortise, Surface, and Full-Length Hinges, Pivots, or Spring Hinges for Swinging Doors

	Maximum Door Size				Minimum Hinge Size				
	Width		Height		Height		Thickness		
Door Rating (hr)	ft	m	ft	m	in.	mm	in.	mm	Hinge Type
For 1¾ in. (44.5 mm) or Thicker Doors									
3, 1½, 1, ¾, ½, ⅓	4	1.22	10	3.05	4½	114.3	0.180	4.57	Steel, mortise or surface
3, 1½, 1, ¾, ½, ⅓	4	1.22	8	2.44	4½	114.3	0.134	3.40	Steel, mortise or surface
1½, ¾, ½, ⅓	3⅓	0.96	8	2.44	6	152.4	0.225	5.72	Steel, olive knuckle or paumelle
3, 1½, ¾, ½, ⅓	4	1.22	10	3.05	4	101.6	0.225	5.72	Steel pivots (including top, bottom, and intermediate)
1½, 1, ¾, ½, ⅓	3	0.91	5	1.52	4	101.6	0.130	3.30	Steel, mortise or surface
1½, 1, ¾, ½, ⅓	2	0.61	3	0.91	3	76.2	0.092	2.34	Steel, mortise or surface
3, 1½, 1, ¾, ½, ⅓	3	0.91	7	2.13	4½	114.3	0.134	3.40	Steel, mortise or surface (labeled, self-closing, spring type)
3, 1½, 1, ¾, ½, ⅓	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, 1½, ¾, ½, ⅓	3	0.91	7	2.13	3½	88.9	0.123	3.12	Steel, mortise or surface
3, 1½, 1, ¾, ½, ⅓	2⅔	0.81	7	2.13	3½	88.9	0.105	2.67	Steel, mortise or surface (labeled, self-closing, spring type)

6.4.3.1.3 Hinges 4½ 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.

6.4.3.1.4 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.

6.4.3.1.5 Pivot sets made up of components that are smaller or of a lighter gauge than shown in Table 6.4.3.1 shall be permitted to be used, provided they meet the requirements of ANSI/BHMA A156.4, *Standard for Door Controls (Closers),* and are in accordance with the manufacturer's label service procedures.

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 × 1¼ in. (31.75 mm) flat, threaded-to-the-head, steel wood screws. Pilot holes shall be drilled that are 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 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.

6.4.3.4 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 the marking "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.

6.4.4.3 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.

6.4.4.3.1 Doors other than those used in means of egress shall be permitted to be provided with dead bolts in addition to the active latch bolts or as otherwise permitted by the AHJ.

6.4.4.3.2 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.

6.4.4.3.3 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.)*

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

6.4.4.4.1 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.

6.4.4.5 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.

6.4.4.5.1* 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.

6.4.4.6 Throw.

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

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

6.4.4.7 Door Attachments.

6.4.4.7.1 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.

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

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

6.4.4.7.3 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.

6.4.4.7.4 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.

6.4.4.8 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.

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

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

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

6.4.4.11* 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 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 attached in place to project approximately ¾ in. (19 mm) or as otherwise indicated in the individual published listings.

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

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 specific 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 swinging doors with fire door hardware.

7.1.2 Components. A fire door assembly shall consist of components that are separate products incorporated into the assembly.

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.

7.1.4.1 The doors shall swing easily and freely on their hinges.

7.1.4.2 The latches shall operate freely.

7.2 Supporting Construction.

7.2.1 Walls.

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 installed in accordance with 4.8.2.

7.2.3 Reserved.

7.2.4 Vents.

7.2.4.1 Each tin-clad door formed of 14 in. × 20 in. (0.36 m × 0.51 m) sheets shall be provided with 3 in. (76.2 mm) diameter vent holes.

7.2.4.2 The vent holes shall be cut through the sheets on the face of the door to be provided with the fire door hardware, using care to avoid interference with the hardware or injury to the wood core when cutting the holes in the sheets.

7.2.4.3 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.

7.3 Openings.

7.3.1 Frames for Lap-Mounted Doors. Frames shall not be required for lap-mounted doors.

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.

7.4 Assembly Components.

7.4.1* Closing Devices for Swinging Tin-Clad and Sheet Metal Fire Doors.

7.4.1.1 Swinging tin-clad and sheet metal fire doors shall be equipped with self-closing or automatic-closing devices to ensure that they are closed and latched at the time of fire.

7.4.1.2 Other arrangements acceptable to the AHJ shall be permitted.

7.4.2 Coordinating Devices.

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

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

7.4.3 Fire Door Hardware.

7.4.3.1 General.

7.4.3.1.1 Only labeled fire door hardware shall be used.

7.4.3.1.2 The design and construction of typical fire door hardware for swinging fire doors shall be as illustrated in UL 14C, *Swing Hardware for Tin-Clad Fire Doors Mounted Singly and in Pairs.*

7.4.3.2 Components. Fire door hardware shall include hinge brackets, hinges, latches, latch keepers, and operating handle mechanisms, and hardware for inactive door or pairs of doors shall include top and bottom bolts and keepers.

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

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

7.4.3.5 Attaching of Wall Strips for Lap-Mounted Doors.

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

7.4.3.5.2 Bolts of not less than ¾ in. (19.05 mm) shall be used for attaching hinge wall strips, and bolts not less than ½ in. (12.7 mm) shall be used for latch keeper wall strips.

Chapter 8 Horizontally Sliding Doors

8.1 Doors.

8.1.1 General. This chapter shall cover the installation of horizontally sliding doors.

8.1.2 Door Panels.

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

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

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

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

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

8.1.2.6 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.

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

8.1.3 Mounting of Doors.

8.1.3.1 General.

8.1.3.1.1* 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.

8.1.3.1.2 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.

8.1.3.1.3 When in the closed position, the clearance between the wall and the door or the frame and the door shall not be more than ¾ in. (19.05 mm) unless otherwise tested and listed in the manufacturer's individual published listings.

8.1.3.2 Lap.

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

8.1.3.2.2 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).

8.1.3.3 Biparting doors shall have an astragal securely attached in place so as to project a minimum of ¾ 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.

8.2.4.1.1 Each tin-clad door formed of 14 in. × 20 in. (0.36 m × 0.51 m) sheets shall be provided with 3 in. (76.2 mm) diameter vent holes that shall be permitted to be field or factory cut and shall be located as shown in UL 10A, *Standard for Tin-Clad Fire Doors.*

4.5.6.1 Smoke door assemblies installed where pressurization is provided to restrict smoke movement shall be required to have a bottom seal.

4.5.7 Louvers shall not be installed in smoke door assemblies unless otherwise tested and listed.

Chapter 5 Maintenance

5.1 **General.** This chapter shall cover the care and maintenance of smoke door assemblies.

5.1.1 **Removal of Smoke Doors.** Where a door or opening is no longer in use, the opening shall be filled with construction equivalent to that of the wall.

5.1.2 **Operability.** Doors shall be operable at all times.

5.1.2.1 The doors shall be kept closed or arranged for automatic closing.

5.1.2.2 Where required, the doors shall be latched.

5.1.3 **Replacement.** Where it is necessary to replace all or part of a smoke door assembly, replacement components shall be installed to meet the requirements of this standard and the manufacturer's instructions.

5.1.4* **Repairs.** Damage and impairments to smoke door assemblies shall be corrected.

5.1.4.1 Damaged glazing material shall be replaced.

5.1.4.2 Replacement glazing material shall be installed in accordance with its individual listing, where required, and the manufacturer's listing.

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

(1) Installation of steel fasteners that completely fill the holes
(2) Filling of the screw or bolt holes with the same material as the door or frame

5.2 **Specific Requirements.**

5.2.1* **Inspections.**

5.2.1.1 Smoke door assemblies shall be inspected annually.

5.2.1.2 Doors shall be operated to confirm full closure.

5.2.1.3 Hardware and gaskets shall be inspected annually, and any parts found to be damaged or inoperative shall be replaced.

5.2.1.4 Tin clad and Kalamein doors shall be inspected regularly for dry rot.

5.2.1.5 A written record shall be maintained and shall be made available to the authority having jurisdiction.

5.2.1.6 Records shall be maintained for not less than 3 years.

5.2.2 **Prevention of Door Blockage.**

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

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

5.2.3 **Maintenance of Closing Mechanisms.**

5.2.3.1 Self-closing and automatic closing devices shall be kept in working condition at all times.

5.2.3.2 Care shall be taken to prevent paint accumulation on any movable parts such as, but not limited to, stay rolls, gears, and closing mechanisms.

Chapter 6 Installation, Testing, and Maintenance of Smoke Dampers

6.1 **General.**

6.1.1* This chapter covers the requirements of the installation, testing, and maintenance of smoke dampers and combination fire and smoke dampers.

6.2 **Definitions.**

6.2.1 **Smoke Damper.** A device within an air distribution system to control the movement of smoke.

6.2.2 **Combination Fire/Smoke Damper.** A device that meets both the fire damper and smoke damper requirements.

6.3 **Installation.**

6.3.1 **Dampers.**

6.3.1.1 Smoke dampers shall be installed within 24 in. (610 mm) of the partition and before any branch line or opening other than access panel and shall be installed in accordance with the manufacturer's installation instructions and the listing.

6.3.1.2 Damper actuator and linkage to operate the smoke damper shall be supplied and installed at the factory.

6.3.2 Dampers equipped with fusible links and/or internal operators shall be provided with an access door that is not less than 12 in.^{2} (7742 mm^2) or provided with a removable duct section.

6.3.2.1 Dampers that are installed behind registers, diffusers, or grilles shall be serviceable by removal of these covers.

6.3.2.2 A smoke damper access panel shall be labeled with the words "Smoke Damper" in letters not less than 1 in. (25.4 mm) in height. External insulation shall not conceal any access panel unless there is a label attached to the insulation clearly indicating the exact location of the access panel and the insulation is installed for ease of removal or ease of removal with the access panel.

6.3.2.3 Unobstructed access shall be provided through a ceiling or wall for inspection and service of the damper's working parts.

6.3.2.4 Installation of combination fire/smoke dampers shall be in accordance with the installation of fire dampers in NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, Section 6.3.

6.3.2.5 Smoke detectors used to control smoke dampers or fire/smoke dampers shall be spaced and installed per the requirements of *NFPA 72, National Fire Alarm Code*.

6.4 **Operational Test.**

6.4.1 **Smoke and Combination Fire/Smoke Dampers.** An operational test shall be conducted after the building's HVAC system has been balanced.

6.4.1.1 The test shall be adequate to determine that the damper has been installed and functions as intended.

such means of egress shall be permitted to be equipped with a horizontal-sliding door assembly complying with 7.2.1.14.

7.2.1.13 Balanced Door Assemblies. If panic hardware is installed on balanced door leaves, the panic hardware shall be of the push-pad type, and the pad shall not extend more than approximately one-half the width of the door leaf, measured from the latch stile. *[See 7.2.1.7.1(1).]*

7.2.1.14 Horizontal-Sliding Door Assemblies. Horizontal-sliding door assemblies shall be permitted in means of egress, provided that the following criteria are met:

(1) The door leaf is readily operable from either side without special knowledge or effort.
(2) The force that, when applied to the operating device in the direction of egress, is required to operate the door leaf is not more than 15 lbf (67 N).
(3) The force required to operate the door leaf in the direction of travel is not more than 30 lbf (133 N) to set the leaf in motion and is not more than 15 lbf (67 N) to close the leaf or open it to the minimum required width.
(4) The door leaf is operable using a force of not more than 50 lbf (222 N) when a force of 250 lbf (1100 N) is applied perpendicularly to the leaf adjacent to the operating device, unless the door opening is an existing horizontal-sliding exit access door assembly serving an area with an occupant load of fewer than 50.
(5) The door assembly complies with the fire protection rating, if required, and, where rated, is self-closing or automatic-closing by means of smoke detection in accordance with 7.2.1.8 and is installed in accordance with NFPA 80, *Standard for Fire Doors and Other Opening Protectives.*

7.2.1.15 Inspection of Door Openings.

7.2.1.15.1 Where required by Chapters 11 through 43, door assemblies for which the door leaf is required to swing in the direction of egress travel shall be inspected and tested not less than annually in accordance with 7.2.1.15.2 through 7.2.1.15.8.

7.2.1.15.2 Fire-rated door assemblies shall be inspected and tested in accordance with NFPA 80, *Standard for Fire Doors and Other Opening Protectives.*

7.2.1.15.3 The inspection and testing interval for fire-rated and nonrated door assemblies shall be permitted to exceed 12 months under a written performance-based program in accordance with 5.2.2 of NFPA 80, *Standard for Fire Doors and Other Opening Protectives.*

7.2.1.15.4 A written record of the inspections and testing shall be signed and kept for inspection by the authority having jurisdiction.

7.2.1.15.5 Functional testing of door assemblies shall be performed by individuals who can demonstrate knowledge and understanding of the operating components of the type of door being subjected to testing.

7.2.1.15.6 Door assemblies shall be visually inspected from both sides of the opening to assess the overall condition of the assembly.

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

(1) Floor space on both sides of the openings is clear of obstructions, and door leaves open fully and close freely.
(2) Forces required to set door leaves in motion and move to the fully open position do not exceed the requirements in 7.2.1.4.5.
(3) Latching and locking devices comply with 7.2.1.5.
(4) Releasing hardware devices are installed in accordance with 7.2.1.5.9.1.
(5) Door leaves of paired openings are installed in accordance with 7.2.1.5.10.
(6) Door closers are adjusted properly to control the closing speed of door leaves in accordance with accessibility requirements.
(7) Projection of door leaves into the path of egress does not exceed the encroachment permitted by 7.2.1.4.3.
(8) Powered door openings operate in accordance with 7.2.1.9.
(9) Signage required by 7.2.1.4.1(3), 7.2.1.5.4, 7.2.1.6, and 7.2.1.9 is intact and legible.
(10) Door openings with special locking arrangements function in accordance with 7.2.1.6
(11) Security devices that impede egress are not installed on openings, as required by 7.2.1.5.11.

7.2.1.15.8 Door openings not in proper operating condition shall be repaired or replaced without delay.

7.2.2 Stairs.

7.2.2.1 General.

7.2.2.1.1 Stairs used as a component in the means of egress shall conform to the general requirements of Section 7.1 and to the special requirements of 7.2.2, unless otherwise specified in 7.2.2.1.2.

7.2.2.1.2 The requirement of 7.2.2.1.1 shall not apply to the following:

(1) Aisle stairs in assembly occupancies, as provided in Chapters 12 and 13
(2) Approved existing noncomplying stairs

7.2.2.2 Dimensional Criteria.

7.2.2.2.1 Standard Stairs.

7.2.2.2.1.1 Stairs shall meet the following criteria:

(1) New stairs shall be in accordance with Table 7.2.2.2.1.1(a) and 7.2.2.2.1.2.
(2)* Existing stairs shall be permitted to remain in use, provided that they meet the requirements for existing stairs shown in Table 7.2.2.2.1.1(b).
(3) Approved existing stairs shall be permitted to be rebuilt in accordance with the following:
   (a) Dimensional criteria of Table 7.2.2.2.1.1(b)
   (b) Other stair requirements of 7.2.2
(4) The requirements for new and existing stairs shall not apply to stairs located in industrial equipment access areas where otherwise provided in 40.2.5.2.

7.2.2.2.1.2 Minimum New Stair Width.

(A) Where the total occupant load of all stories served by the stair is fewer than 50, the minimum width clear of all obstructions, except projections not more than 4½ in. (114 mm) at or below handrail height on each side, shall be 36 in. (915 mm).

(B)* Where stairs serve occupant loads exceeding that permitted by 7.2.2.2.1.2(A), the minimum width clear of all obstructions, except projections not more than 4½ in. (114 mm) at or below handrail height on each side, shall be in accordance with Table 7.2.2.2.1.2(B) and the requirements of 7.2.2.2.1.2(C), (D), (E), and (F).

12.4.9.2.5 The maximum number of seats permitted between the farthest seat in an aisle in folding and telescopic seating shall not exceed that shown in Table 12.4.8.2.5.

12.4.9.3 Guards and Railings.

12.4.9.3.1 Railings or guards not less than 42 in. (1065 mm) above the aisle surface or footrest, or not less than 36 in. (915 mm) vertically above the center of the seat or seat board surface, whichever is adjacent, shall be provided along those portions of the backs and ends of all folding and telescopic seating where the seats are more than 48 in. (1220 mm) above the floor or the finished ground level.

12.4.9.3.2 The requirement of 12.4.9.3.1 shall not apply where an adjacent wall or fence affords equivalent safeguard.

12.4.9.3.3 Where the front footrest of folding or telescopic seating is more than 24 in. (610 mm) above the floor, railings or guards not less than 33 in. (825 mm) above such footrests shall be provided.

12.4.9.3.4 The railings required by 12.4.9.3.3 shall be permitted to be not less than 26 in. (660 mm) high where the front row of seats includes backrests.

12.4.9.3.5 Cross aisles located within the seating area shall be provided with rails not less than 26 in. (660 mm) high along the front edge of the cross aisle.

12.4.9.3.6 The railings specified by 12.4.9.3.5 shall not be required where the backs of the seats in front of the cross aisle project 24 in. (610 mm) or more above the surface of the cross aisle.

12.4.9.3.7 Vertical openings between guardrails and footboards or seat boards shall be provided with intermediate construction so that a 4 in. (100 mm) diameter sphere cannot pass through the opening.

12.4.9.3.8 An opening between the seat board and footboard located more than 30 in. (760 mm) above the finished ground level shall be provided with intermediate construction so that a 4 in. (100 mm) diameter sphere cannot pass through the opening.

12.4.10 Airport Loading Walkways.

12.4.10.1 Airport loading walkways shall conform to NFPA 415, *Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways*, and the provisions of 12.4.10.2 and 12.4.10.3.

12.4.10.2 Doors in the egress path from the aircraft through the airport loading walkway into the airport terminal building shall meet the following criteria:

(1) They shall swing in the direction of egress from the aircraft.
(2)*They shall not be permitted to have delayed-egress locks.

12.4.10.3 Exit access shall be unimpeded from the airport loading walkway to the nonsecured public areas of the airport terminal building.

12.5 Building Services.

12.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

12.5.2 Heating, Ventilating, and Air-Conditioning Equipment. Heating, ventilating, and air-conditioning equipment shall comply with the provisions of Section 9.2.

12.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

12.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

12.6 Reserved.

12.7 Operating Features.

12.7.1 Means of Egress Inspection.

12.7.1.1 The building owner or agent shall inspect the means of egress to ensure it is maintained free of obstructions, and correct any deficiencies found, prior to each opening of the building to the public.

12.7.1.2 The building owner or agent shall prepare and maintain records of the date and time of each inspection on approved forms, listing any deficiencies found and actions taken to correct them.

12.7.1.3 Inspection of Door Openings. Door openings shall be inspected in accordance with 7.2.1.15.

12.7.2 Special Provisions for Food Service Operations.

12.7.2.1 All devices in connection with the preparation of food shall be installed and operated to avoid hazard to the safety of occupants.

12.7.2.2 All devices in connection with the preparation of food shall be of an approved type and shall be installed in an approved manner.

12.7.2.3 Food preparation facilities shall be protected in accordance with 9.2.3 and shall not be required to have openings protected between food preparation areas and dining areas.

12.7.2.4 Portable cooking equipment that is not flue-connected shall be permitted only as follows:

(1) Equipment fueled by small heat sources that can be readily extinguished by water, such as candles or alcohol-burning equipment, including solid alcohol, shall be permitted to be used, provided that precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible materials.
(2) Candles shall be permitted to be used on tables used for food service where securely supported on substantial noncombustible bases located to avoid danger of ignition of combustible materials and only where approved by the authority having jurisdiction.
(3) Candle flames shall be protected.
(4) "Flaming sword" or other equipment involving open flames and flamed dishes, such as cherries jubilee or crêpes suzette, shall be permitted to be used, provided that precautions subject to the approval of the authority having jurisdiction are taken.
(5)*Listed and approved LP-Gas commercial food service appliances shall be permitted to be used where in accordance with NFPA 58, *Liquefied Petroleum Gas Code*.

12.7.3 Open Flame Devices and Pyrotechnics. No open flame devices or pyrotechnic devices shall be used in any assembly occupancy, unless otherwise permitted by the following:

(1) Pyrotechnic special effect devices shall be permitted to be used on stages before proximate audiences for ceremonial or religious purposes, as part of a demonstration in

13.4.10.2 Doors in the egress path from the aircraft through the airport loading walkway into the airport terminal building shall meet the following criteria:

(1) They shall swing in the direction of egress from the aircraft.
(2)*They shall not be permitted to have delayed-egress locks.

13.4.10.3 Exit access shall be unimpeded from the airport loading walkway to the nonsecured public areas of the airport terminal building.

13.5 Building Services.

13.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

13.5.2 Heating, Ventilating, and Air-Conditioning Equipment. Heating, ventilating, and air-conditioning equipment shall comply with the provisions of Section 9.2.

13.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

13.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

13.6 Reserved.

13.7 Operating Features.

13.7.1 Means of Egress Inspection.

13.7.1.1 The building owner or agent shall inspect the means of egress to ensure it is maintained free of obstructions, and correct any deficiencies found, prior to each opening of the building to the public.

13.7.1.2 The building owner or agent shall prepare and maintain records of the date and time of each inspection on approved forms, listing any deficiencies found and actions taken to correct them.

13.7.1.3 Inspection of Door Openings. Door openings shall be inspected in accordance with 7.2.1.15.

13.7.2 Special Provisions for Food Service Operations.

13.7.2.1 All devices in connection with the preparation of food shall be installed and operated to avoid hazard to the safety of occupants.

13.7.2.2 All devices in connection with the preparation of food shall be of an approved type and shall be installed in an approved manner.

13.7.2.3 Food preparation facilities shall be protected in accordance with 9.2.3 and shall not be required to have openings protected between food preparation areas and dining areas.

13.7.2.4 Portable cooking equipment that is not flue-connected shall be permitted only as follows:

(1) Equipment fueled by small heat sources that can be readily extinguished by water, such as candles or alcohol-burning equipment, including solid alcohol, shall be permitted to be used, provided that precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible materials.
(2) Candles shall be permitted to be used on tables used for food service where securely supported on substantial noncombustible bases located to avoid danger of ignition of combustible materials and only where approved by the authority having jurisdiction.
(3) Candle flames shall be protected.
(4) "Flaming sword" or other equipment involving open flames and flamed dishes, such as cherries jubilee or crêpe suzette, shall be permitted to be used, provided that precautions subject to the approval of the authority having jurisdiction are taken.
(5)*Listed and approved LP-Gas commercial food service appliances shall be permitted to be used where in accordance with NFPA 58, *Liquefied Petroleum Gas Code.*

13.7.3 Open Flame Devices and Pyrotechnics. No open flame devices or pyrotechnic devices shall be used in any assembly occupancy, unless otherwise permitted by the following:

(1) Pyrotechnic special effect devices shall be permitted to be used on stages before proximate audiences for ceremonial or religious purposes, as part of a demonstration in exhibits, or as part of a performance, provided that both of the following criteria are met:
   (a) Precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible material.
   (b) Use of the pyrotechnic device complies with NFPA 1126, *Standard for the Use of Pyrotechnics Before a Proximate Audience.*
(2) Flame effects before an audience shall be permitted in accordance with NFPA 160, *Standard for the Use of Flame Effects Before an Audience.*
(3) Open flame devices shall be permitted to be used in the following situations, provided that precautions satisfactory to the authority having jurisdiction are taken to prevent ignition of any combustible material or injury to occupants:
   (a)*For ceremonial or religious purposes
   (b) On stages and platforms where part of a performance
   (c) Where candles on tables are securely supported on substantial noncombustible bases and candle flame is protected
(4) The requirement of 13.7.3 shall not apply to heat-producing equipment complying with 9.2.2.
(5) The requirement of 13.7.3 shall not apply to food service operations in accordance with 13.7.2.
(6) Gas lights shall be permitted to be used, provided that precautions are taken, subject to the approval of authority having jurisdiction, to prevent ignition of any combustible materials.

13.7.4 Furnishings, Decorations, and Scenery.

13.7.4.1 Fabrics and films used for decorative purposes, all draperies and curtains, and similar furnishings shall be in accordance with the provisions of 10.3.1.

13.7.4.2 The authority having jurisdiction shall impose controls on the quantity and arrangement of combustible contents in assembly occupancies to provide an adequate level of safety to life from fire.

13.7.4.3* Exposed foamed plastic materials and unprotected materials containing foamed plastic used for decorative purposes or stage scenery shall have a heat release rate not exceeding 100 kW where tested in accordance with ANSI/UL 1975, *Standard for Fire Tests for Foamed Plastics Used for Decorative Purposes.*

14.5.2 Heating, Ventilating, and Air-Conditioning Equipment.

14.5.2.1 Heating, ventilating, and air-conditioning equipment shall comply with the provisions of Section 9.2.

14.5.2.2 Unvented fuel-fired heating equipment, other than gas space heaters in compliance with NFPA 54/ANSI Z223.1, *National Fuel Gas Code*, shall be prohibited.

14.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

14.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

14.6 Reserved.

14.7 Operating Features.

14.7.1 Emergency Plan. Emergency plans shall be provided in accordance with Section 4.8.

14.7.2 Emergency Egress Drills.

14.7.2.1* Emergency egress drills shall be conducted in accordance with Section 4.7 and the applicable provisions of 14.7.2.3 as otherwise provided in 14.7.2.2.

14.7.2.2 Approved training programs designed for education and training and for the practice of emergency egress to familiarize occupants with the drill procedure, and to establish conduct of the emergency egress as a matter of routine, shall be permitted to receive credit on a one-for-one basis for not more than four of the emergency egress drills required by 14.7.2.3, provided that a minimum of four emergency egress drills are completed prior to the conduct of the first such training and practice program.

14.7.2.3 Emergency egress drills shall be conducted as follows:

(1) Not less than one emergency egress drill shall be conducted every month the facility is in session, unless both of the following criteria are met:
   (a) In climates where the weather is severe, the monthly emergency egress drills shall be permitted to be deferred.
   (b) The required number of emergency egress drills shall be conducted, and not less than four shall be conducted before the drills are deferred.
(2) All occupants of the building shall participate in the drill.
(3) One additional emergency egress drill, other than for educational occupancies that are open on a year-round basis, shall be required within the first 30 days of operation.

14.7.2.4 All emergency drill alarms shall be sounded on the fire alarm system.

14.7.3 Inspection.

14.7.3.1* It shall be the duty of principals, teachers, or staff to inspect all exit facilities daily to ensure that all stairways, doors, and other exits are in proper condition.

14.7.3.2 Open plan buildings shall require extra surveillance to ensure that exit paths are maintained clear of obstruction and are obvious.

14.7.3.3 Inspection of Door Openings. Door openings shall be inspected in accordance with 7.2.1.15.

14.7.4 Furnishings and Decorations.

14.7.4.1 Draperies, curtains, and other similar furnishings and decorations in educational occupancies shall be in accordance with the provisions of 10.3.1.

14.7.4.2 Clothing and personal effects shall not be stored in corridors, unless otherwise permitted by the following:

(1) This requirement shall not apply to corridors protected by an automatic sprinkler system in accordance with Section 9.7.
(2) This requirement shall not apply to corridor areas protected by a smoke detection system in accordance with Section 9.6.
(3) This requirement shall not apply to storage in metal lockers, provided that the required egress width is maintained.

14.7.4.3 Artwork and teaching materials shall be permitted to be attached directly to the walls in accordance with the following:

(1) The artwork and teaching materials shall not exceed 20 percent of the wall area in a building that is not protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.
(2) The artwork and teaching materials shall not exceed 50 percent of the wall area in a building that is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

14.7.5 Open Flames. Approved open flames shall be permitted in laboratories and vocational/technical areas.

Chapter 15 Existing Educational Occupancies

15.1 General Requirements.

15.1.1 Application.

15.1.1.1 The requirements of this chapter shall apply to existing buildings or portions thereof currently occupied as educational occupancies.

15.1.1.2 Educational facilities that do not meet the definition of an educational occupancy shall not be required to comply with this chapter but shall comply with the following requirements:

(1) Instructional building — business occupancy
(2) Classrooms under 50 persons — business occupancy
(3) Classrooms, 50 persons and over — assembly occupancy
(4) Laboratories, instructional — business occupancy
(5) Laboratories, noninstructional — industrial

15.1.2 Multiple Occupancies.

15.1.2.1 General. Multiple occupancies shall be in accordance with 6.1.14.

15.1.2.2 Assembly and Educational.

15.1.2.2.1 Spaces subject to assembly occupancy shall comply with Chapter 13, including 13.1.2.2, which provides that, where auditorium and gymnasium egress lead through corridors or stairways also serving as egress for other parts of the building, the egress capacity shall be sufficient to allow simultaneous egress from auditorium and classroom sections.

15.1.2.2.2 In the case of an assembly occupancy of a type suitable for use only by the school occupant load, and therefore not subject to simultaneous occupancy, the same egress capacity shall be permitted to serve both sections.

(2)*The following shall apply to buildings protected throughout by an approved automatic sprinkler system with valve supervision in accordance with Section 9.7:
   (a) Corridor walls shall not be required to be rated, provided that such walls form smoke partitions in accordance with Section 8.4.
   (b) The provisions of 8.4.3.5 shall not apply to normally occupied classrooms.
(3) Where the corridor ceiling is an assembly having a minimum ½-hour fire resistance rating where tested as a wall, the corridor wall shall be permitted to terminate at the corridor ceiling.
(4) Lavatories shall not be required to be separated from corridors, provided that they are separated from all other spaces by walls having a minimum ½-hour fire resistance rating in accordance with Section 8.3.
(5) Lavatories shall not be required to be separated from corridors, provided that the building is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7.

15.3.7 Subdivision of Building Spaces.

15.3.7.1 Educational occupancies shall be subdivided into compartments by smoke partitions having not less than a 1-hour fire resistance rating and complying with Section 8.4 where one or both of the following conditions exist:

(1) The maximum area of a compartment, including the aggregate area of all floors having a common atmosphere, exceeds 30,000 ft^2 (2800 m^2).
(2) The length or width of the building exceeds 300 ft (91 m).

15.3.7.2 The requirement of 15.3.7.1 shall not apply to the following:

(1) Where all classrooms have exterior exit access in accordance with 7.5.3
(2) Buildings protected throughout by an approved automatic sprinkler system in accordance with Section 9.7

15.3.7.3 The area of any smoke compartment required by 15.3.7.1 shall not exceed 30,000 ft^2 (2800 m^2), with no dimension exceeding 300 ft (91 m).

15.4 Special Provisions.

15.4.1 Limited Access Buildings and Underground Buildings. Limited access buildings and underground buildings shall comply with Section 11.7.

15.4.2 High-Rise Buildings. High-rise buildings shall comply with 11.8.3.1.

15.4.3 Flexible Plan and Open Plan Buildings.

15.4.3.1 Flexible plan and open plan buildings shall comply with the requirements of this chapter as modified by 15.4.3.2 through 15.4.3.5.

15.4.3.2 Each room occupied by more than 300 persons shall have two or more means of egress entering into separate atmospheres.

15.4.3.3 Where three or more means of egress are required, the number of means of egress permitted to enter into the same atmosphere shall not exceed two.

15.4.3.4 Flexible plan buildings shall be permitted to have walls and partitions rearranged periodically only if revised plans or diagrams have been approved by the authority having jurisdiction.

15.4.3.5 Flexible plan buildings shall be evaluated while all folding walls are extended and in use as well as when they are in the retracted position.

15.5 Building Services.

15.5.1 Utilities. Utilities shall comply with the provisions of Section 9.1.

15.5.2 Heating, Ventilating, and Air-Conditioning Equipment.

15.5.2.1 Heating, ventilating, and air-conditioning equipment shall comply with the provisions of Section 9.2.

15.5.2.2 Unvented fuel-fired heating equipment, other than gas space heaters in compliance with NFPA 54/ANSI Z223.1, *National Fuel Gas Code*, shall be prohibited.

15.5.3 Elevators, Escalators, and Conveyors. Elevators, escalators, and conveyors shall comply with the provisions of Section 9.4.

15.5.4 Rubbish Chutes, Incinerators, and Laundry Chutes. Rubbish chutes, incinerators, and laundry chutes shall comply with the provisions of Section 9.5.

15.6 Reserved.

15.7 Operating Features.

15.7.1 Emergency Plan. Emergency plans shall be provided in accordance with Section 4.8.

15.7.2 Emergency Egress Drills.

15.7.2.1* Emergency egress drills shall be conducted in accordance with Section 4.7 and the applicable provisions of 15.7.2.3 as otherwise provided by 15.7.2.2.

15.7.2.2 Approved training programs designed for education and training and for the practice of emergency egress to familiarize occupants with the drill procedure, and to establish conduct of the emergency egress as a matter of routine, shall be permitted to receive credit on a one-for-one basis for not more than four of the emergency egress drills required by 15.7.2.3, provided that a minimum of four emergency egress drills are completed prior to the conduct of the first such training and practice program.

15.7.2.3 Emergency egress drills shall be conducted as follows:

(1) Not less than one emergency egress drill shall be conducted every month the facility is in session, unless both of the following criteria are met:
   (a) In climates where the weather is severe, the monthly emergency egress drills shall be permitted to be deferred.
   (b) The required number of emergency egress drills shall be conducted, and not less than four shall be conducted before the drills are deferred.
(2) All occupants of the building shall participate in the drill.
(3) One additional emergency egress drill, other than for educational occupancies that are open on a year-round basis, shall be required within the first 30 days of operation.

15.7.2.4 All emergency drill alarms shall be sounded on the fire alarm system.

15.7.3 Inspection.

15.7.3.1* It shall be the duty of principals, teachers, or staff to inspect all exit facilities daily to ensure that all stairways, doors, and other exits are in proper condition.

15.7.3.2 Open plan buildings shall require extra surveillance to ensure that exit paths are maintained clear of obstruction and are obvious.

15.7.3.3 Inspection of Door Openings. Door openings shall be inspected in accordance with 7.2.1.15.

15.7.4 Furnishings and Decorations.

15.7.4.1 Draperies, curtains, and other similar furnishings and decorations in educational occupancies shall be in accordance with the provisions of 10.3.1.

15.7.4.2 Clothing and personal effects shall not be stored in corridors, unless otherwise permitted by the following:

(1) This requirement shall not apply to corridors protected by an automatic sprinkler system in accordance with Section 9.7.
(2) This requirement shall not apply to corridor areas protected by a smoke detection system in accordance with Section 9.6.
(3) This requirement shall not apply to storage in metal lockers, provided that the required egress width is maintained.

15.7.4.3 Artwork and teaching materials shall be permitted to be attached directly to the walls in accordance with the following:

(1) The artwork and teaching materials shall not exceed 20 percent of the wall area in a building that is not protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.
(2) The artwork and teaching materials shall not exceed 50 percent of the wall area in a building that is protected throughout by an approved automatic sprinkler system in accordance with Section 9.7.

15.7.5 Open Flames. Approved open flames shall be permitted in laboratories and vocational/technical areas.

Chapter 16 New Day-Care Occupancies

16.1 General Requirements.

16.1.1* Application.

16.1.1.1 The requirements of this chapter shall apply to new buildings or portions thereof used as day-care occupancies. *(See 1.3.1.)*

16.1.1.2 The requirements of Sections 16.1 through 16.5 and Section 16.7 shall apply to day-care occupancies in which more than 12 clients receive care, maintenance, and supervision by other than their relative(s) or legal guardian(s) for less than 24 hours per day.

16.1.1.3 The requirements of Section 16.1 (other than 16.1.6) and Sections 16.4 through 16.7 (other than 16.7.4.1) shall apply to day-care homes as defined in 16.1.3.

16.1.1.4 Where a facility houses more than one age group or self-preservation capability, the strictest requirements applicable to any group present shall apply throughout the day-care occupancy or building, as appropriate to a given area, unless the area housing such a group is maintained as a separate fire area.

16.1.1.5 Places of religious worship shall not be required to meet the provisions of this chapter where providing day care while services are being held in the building.

16.1.2 Multiple Occupancies.

16.1.2.1 Multiple occupancies shall be in accordance with 6.1.14.

16.1.2.2 Where the mixed occupancies provisions of 6.1.14.3 are utilized, the provisions of 16.1.2.2.1 and 16.1.2.2.2 shall also apply.

16.1.2.2.1 General. The day-care occupancy shall be separated from the other occupancies by not less than 1-hour fire resistance–rated barriers constructed in accordance with Section 8.3.

16.1.2.2.2 Day-Care Occupancies in Apartment Buildings. If the two exit accesses from a day-care occupancy enter the same corridor as an apartment occupancy, the exit accesses shall be separated in the corridor by a smoke partition complying with both of the following:

(1) It shall have not less than a 1-hour fire resistance rating and shall be constructed in accordance with Section 8.4.
(2) It shall be located so that it has an exit on each side.

16.1.3 Special Definitions. A list of special terms used in this chapter follows:

(1) Day-Care Home. See 3.3.131.1.
(2) Flexible Plan and Open Plan Educational or Day-Care Building. See 3.3.32.6.
(3) Self-Preservation (Day-Care Occupancy). See 3.3.224.
(4) Separate Atmosphere. See 3.3.23.2.

16.1.4 Classification of Occupancy. See 6.1.4.

16.1.4.1 General. Occupancies that include part-day preschools, kindergartens, and other schools whose purpose is primarily educational, even though the children who attend such schools are of preschool age, shall comply with the provisions of Chapter 14.

16.1.4.2 Adult Day-Care Occupancies.

16.1.4.2.1 Adult day-care occupancies shall include any building or portion thereof used for less than 24 hours per day to house more than three adults requiring care, maintenance, and supervision by other than their relative(s).

16.1.4.2.2 Clients in adult day-care occupancies shall be ambulatory or semiambulatory and shall not be bedridden.

16.1.4.2.3 Clients in adult day-care occupancies shall not exhibit behavior that is harmful to themselves or to others.

16.1.4.3* Conversions. A conversion from a day-care home to a day-care occupancy with more than 12 clients shall be permitted only if the day-care occupancy conforms to the requirements of this chapter for new day-care occupancies with more than 12 clients.

16.1.5 Classification of Hazard of Contents. The contents of day-care occupancies shall be classified as ordinary hazard in accordance with Section 6.2.

16.1.6 Minimum Construction Requirements.

16.1.6.1 Day-care occupancies, other than day-care homes, shall be limited to the building construction types specified in Table 16.1.6.1 based on the number of stories in height as defined in 4.6.3. *(See 8.2.1.)*

16.1.6.2 Where day-care occupancies, other than day-care homes, with clients who are 24 months or less in age or who are incapable of self-preservation, are located one or more

23.7.1.3.2 The plan shall be coordinated with, and reviewed by, the fire department legally committed to serve the facility.

23.7.1.4 Employees of detention and correctional occupancies shall be instructed in the proper use of portable fire extinguishers and other manual fire suppression equipment.

23.7.1.4.1 The training specified in 23.7.1.4 shall be provided to new staff promptly upon commencement of duty.

23.7.1.4.2 Refresher training shall be provided to existing staff at not less than annual intervals.

23.7.2 **Combustible Personal Property.** Books, clothing, and other combustible personal property allowed in sleeping rooms shall be stored in closable metal lockers or an approved fire-resistant container.

23.7.3 **Heat-Producing Appliances.** The number of heat-producing appliances, such as toasters and hot plates, and the overall use of electrical power within a sleeping room shall be controlled by facility administration.

23.7.4* **Furnishings, Mattresses, and Decorations.**

23.7.4.1 Draperies and curtains, including privacy curtains, in detention and correctional occupancies shall be in accordance with the provisions of 10.3.1.

23.7.4.2 Newly introduced upholstered furniture within detention and correctional occupancies shall be tested in accordance with the provisions of 10.3.2.1(2) and 10.3.3.

23.7.4.3* Newly introduced mattresses within detention and correctional occupancies shall be tested in accordance with the provisions of 10.3.2.2 and 10.3.4.

23.7.4.4 Combustible decorations shall be prohibited in any detention or correctional occupancy unless flame-retardant.

23.7.4.5 Wastebaskets and other waste containers shall be of noncombustible or other approved materials. Waste containers with a capacity exceeding 20 gal (76 L) shall be provided with a noncombustible lid or lid of other approved material.

23.7.5 **Keys.** All keys necessary for unlocking doors installed in a means of egress shall be individually identified by both touch and sight.

23.7.6 **Portable Space-Heating Devices.** Portable space-heating devices shall be prohibited in all detention and correctional occupancies.

23.7.7 **Door Inspection.** Doors and door hardware in means of egress shall be inspected monthly by an appropriately trained person. The inspection shall be documented.

Chapter 24 One- and Two-Family Dwellings

24.1 **General Requirements.**

24.1.1 **Application.**

24.1.1.1* The requirements of this chapter shall apply to one- and two-family dwellings, which shall include those buildings containing not more than two dwelling units in which each dwelling unit is occupied by members of a single family with not more than three outsiders, if any, accommodated in rented rooms.

24.1.1.2 The requirements of this chapter shall apply to new buildings and to existing or modified buildings according to the provisions of 1.3.1 of this *Code*.

24.1.2 **Multiple Occupancies.**

24.1.2.1 Multiple occupancies shall be in accordance with 6.1.14.

24.1.2.2 No dwelling unit of a residential occupancy shall have its sole means of egress pass through any nonresidential occupancy in the same building, unless otherwise permitted by 24.1.2.2.1 or 24.1.2.2.2.

24.1.2.2.1 In buildings that are protected by an automatic sprinkler system in accordance with Section 9.7, dwelling units of a residential occupancy shall be permitted to have their sole means of egress pass through a nonresidential occupancy in the same building, provided that the following criteria are met:

(1) The dwelling unit of the residential occupancy shall comply with Chapter 24.
(2) The sole means of egress from the dwelling unit of the residential occupancy shall not pass through a high hazard contents area as defined in 6.2.2.4.

24.1.2.2.2 In buildings that are not protected by an automatic sprinkler system in accordance with Section 9.7, dwelling units of a residential occupancy shall be permitted to have their sole means of egress pass through a nonresidential occupancy in the same building, provided that the following criteria are met:

(1) The sole means of egress from the dwelling unit of the residential occupancy to the exterior shall be separated from the remainder of the building by fire barriers having a minimum 1-hour fire resistance rating.
(2) The dwelling unit of the residential occupancy shall comply with Chapter 24.
(3) The sole means of egress from the dwelling unit of the residential occupancy shall not pass through a high hazard contents area as defined in 6.2.2.4.

24.1.2.3 Multiple dwelling units of a residential occupancy shall be permitted to be located above a nonresidential occupancy only where one of the following conditions exists:

(1) Where the dwelling unit of the residential occupancy and exits therefrom are separated from the nonresidential occupancy by construction having a minimum 1-hour fire resistance rating
(2) Where the nonresidential occupancy is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7
(3) Where the nonresidential occupancy is protected by an automatic fire detection system in accordance with Section 9.6

24.1.3 **Special Definitions.** Special terms applicable to this chapter are defined in Chapter 3 of this *Code*. Where necessary, other terms are defined in the text.

24.1.4 **Classification of Occupancy.** See 6.1.8 and 24.1.1.1.

24.1.5 **Classification of Hazard of Contents.** The contents of residential occupancies shall be classified as ordinary hazard in accordance with 6.2.2.

24.1.6 **Minimum Construction Requirements.** (No special requirements.)

24.1.7 **Occupant Load.** (No requirements.)

32.7.5.2* New upholstered furniture within board and care facilities shall comply with 32.7.5.2.1 or 32.7.5.2.2.

32.7.5.2.1 New upholstered furniture shall be tested in accordance with the provisions of 10.3.2.1(1) and 10.3.3.

32.7.5.2.2 Upholstered furniture belonging to residents in sleeping rooms shall not be required to be tested, provided that a smoke alarm is installed in such rooms; battery-powered single-station smoke alarms shall be permitted in such rooms.

32.7.5.3* Newly introduced mattresses within board and care facilities shall comply with 32.7.5.3.1 or 32.7.5.3.2.

32.7.5.3.1 Newly introduced mattresses shall be tested in accordance with the provisions of 10.3.2.2 and 10.3.4.

32.7.5.3.2 Mattresses belonging to residents in sleeping rooms shall not be required to be tested, provided that a smoke alarm is installed in such rooms; battery-powered single-station smoke alarms shall be permitted in such rooms.

32.7.6 Staff. Staff shall be on duty and in the facility at all times when residents requiring evacuation assistance are present.

32.7.7 Inspection of Door Openings. Door assemblies for which the door leaf is required to swing in the direction of egress travel shall be inspected and tested not less than annually in accordance with 7.2.1.15.

Chapter 33 Existing Residential Board and Care Occupancies

33.1 General Requirements.

33.1.1* Application.

33.1.1.1 General. The requirements of this chapter shall apply to existing buildings or portions thereof currently occupied as residential board and care occupancies.

33.1.1.2* Chapter 32 Compliance. Any facility meeting the requirements of Chapter 32 shall not be required to meet those of Chapter 33.

33.1.1.3 Chapter Sections. This chapter is divided into five sections as follows:

(1) Section 33.1 — General Requirements
(2) Section 33.2 — Small Facilities (that is, sleeping accommodations for not more than 16 residents)
(3) Section 33.3 — Large Facilities (that is, sleeping accommodations for more than 16 residents)
(4) Section 33.4 — Suitability of an Apartment Building to House a Board and Care Occupancy *(Sections 33.5 and 33.6 are reserved.)*
(5) Section 33.7 — Operating Features

33.1.1.4 Conversion. For the purposes of this chapter, exceptions for conversions shall apply only for a change of occupancy from an existing residential or health care occupancy to a residential board and care occupancy.

33.1.2 Multiple Occupancies.

33.1.2.1 Multiple occupancies shall comply with 6.1.14 in buildings other than those meeting the requirement of 33.1.2.2.

33.1.2.2 The requirement of 33.1.2.1 shall not apply to apartment buildings housing residential board and care occupancies in conformance with Section 33.4. In such facilities, any safeguards required by Section 33.4 that are more restrictive than those for other housed occupancies shall apply only to the extent prescribed by Section 33.4.

33.1.2.3 No board and care occupancy shall have its sole means of egress or means of escape pass through any nonresidential or non-health care occupancy in the same building.

33.1.2.4 No board and care occupancy shall be located above a nonresidential or non-health care occupancy, unless one of the following conditions is met:

(1) The board and care occupancy and exits therefrom are separated from the nonresidential or non-health care occupancy by construction having a minimum 2-hour fire resistance rating.
(2) The nonresidential or non-health care occupancy is protected throughout by an approved, supervised automatic sprinkler system in accordance with Section 9.7 and is separated therefrom by construction having a minimum 1-hour fire resistance rating.

33.1.3 Special Definitions. A list of special terms used in this chapter follows:

(1) **Evacuation Capability.** See 3.3.70.
(2) **Impractical Evacuation Capability.** See 3.3.70.1.
(3) **Personal Care.** See 3.3.192.
(4) **Point of Safety.** See 3.3.197.
(5) **Prompt Evacuation Capability.** See 3.3.70.2.
(6) **Residential Board and Care Occupancy.** See 3.3.178.12.
(7) **Residential Board and Care Resident.** See 3.3.215.
(8) **Slow Evacuation Capability.** See 3.3.70.3.
(9) **Staff (Residential Board and Care).** See 3.3.245.
(10) **Thermal Barrier.** See 3.3.27.3.

33.1.4 Acceptability of Means of Egress or Escape. No means of escape or means of egress shall be considered as complying with the minimum criteria for acceptance, unless emergency evacuation drills are regularly conducted using that route in accordance with the requirements of 33.7.3.

33.1.5* Fire Resistance–Rated Assemblies. Fire resistance–rated assemblies shall comply with Section 8.3.

33.1.6 Changes in Facility Size. A change in facility size from small to large shall be considered a change in occupancy subclassification and shall require compliance with the provisions applicable to new construction.

33.1.7* Changes in Group Evacuation Capability. A change in evacuation capability to a slower level shall be permitted where the facility conforms to the requirements applicable to new construction, conversions, and the new evacuation capability.

33.2 Small Facilities.

33.2.1 General.

33.2.1.1 Scope.

33.2.1.1.1 Section 33.2 shall apply to residential board and care occupancies providing sleeping accommodations for not more than 16 residents.

33.2.1.1.2 Where there are sleeping accommodations for more than 16 residents, the occupancy shall be classified as a large facility in accordance with Section 33.3.

33.2.1.2 Requirements Based on Evacuation Capability.

33.2.1.2.1 Small facilities, other than those meeting the requirement of 33.2.1.2.1.1 or 33.2.1.2.1.2, shall comply with the

personnel, written copies of a plan for protecting all persons in the event of fire, for keeping persons in place, for evacuating persons to areas of refuge, and for evacuating persons from the building when necessary.

33.7.1.2 The emergency plan shall include special staff response, including the fire protection procedures needed to ensure the safety of any resident, and shall be amended or revised whenever any resident with unusual needs is admitted to the home.

33.7.1.3 All employees shall be periodically instructed and kept informed with respect to their duties and responsibilities under the plan, and such instruction shall be reviewed by the staff not less than every 2 months.

33.7.1.4 A copy of the plan shall be readily available at all times within the facility.

33.7.2 Resident Training.

33.7.2.1 All residents participating in the emergency plan shall be trained in the proper actions to be taken in the event of fire.

33.7.2.2 The training required by 32.7.2.1 shall include actions to be taken if the primary escape route is blocked.

33.7.2.3 If the resident is given rehabilitation or habilitation training, training in fire prevention and the actions to be taken in the event of a fire shall be a part of the training program.

33.7.2.4 Residents shall be trained to assist each other in case of fire to the extent that their physical and mental abilities permit them to do so without additional personal risk.

33.7.3 Emergency Egress and Relocation Drills. Emergency egress and relocation drills shall be conducted in accordance with 33.7.3.1 through 33.7.3.6.

33.7.3.1 Emergency egress and relocation drills shall be conducted not less than six times per year on a bimonthly basis, with not less than two drills conducted during the night when residents are sleeping, as modified by 33.7.3.5 and 33.7.3.6.

33.7.3.2 The emergency drills shall be permitted to be announced to the residents in advance.

33.7.3.3 The drills shall involve the actual evacuation of all residents to an assembly point, as specified in the emergency plan, and shall provide residents with experience in egressing through all exits and means of escape required by this *Code*.

33.7.3.4 Exits and means of escape not used in any drill shall not be credited in meeting the requirements of this *Code* for board and care facilities.

33.7.3.5 Actual exiting from windows shall not be required to comply with 33.7.3; opening the window and signaling for help shall be an acceptable alternative.

33.7.3.6 If the board and care facility has an evacuation capability classification of impractical, those residents who cannot meaningfully assist in their own evacuation or who have special health problems shall not be required to actively participate in the drill. Section 19.7 shall apply in such instances.

33.7.4 Smoking.

33.7.4.1* Smoking regulations shall be adopted by the administration of board and care occupancies.

33.7.4.2 Where smoking is permitted, noncombustible safety-type ashtrays or receptacles shall be provided in convenient locations.

33.7.5* Furnishings, Mattresses, and Decorations.

33.7.5.1 New draperies, curtains, and other similar loosely hanging furnishings and decorations in board and care facilities shall be in accordance with the provisions of 10.3.1.

33.7.5.2* New upholstered furniture within board and care facilities shall comply with 33.7.5.2.1 or 33.7.5.2.2.

33.7.5.2.1 New upholstered furniture shall be tested in accordance with the provisions of 10.3.2.1(1) and 10.3.3.

33.7.5.2.2 Upholstered furniture belonging to residents in sleeping rooms shall not be required to be tested, provided that a smoke alarm is installed in such rooms; battery-powered single-station smoke alarms shall be permitted in such rooms.

33.7.5.3* Newly introduced mattresses within board and care facilities shall comply with 33.7.5.3.1 or 33.7.5.3.2.

33.7.5.3.1 Newly introduced mattresses shall be tested in accordance with the provisions of 10.3.2.2 and 10.3.4.

33.7.5.3.2 Mattresses belonging to residents in sleeping rooms shall not be required to be tested, provided that a smoke alarm is installed in such rooms; battery-powered single-station smoke alarms shall be permitted in such rooms.

33.7.6 Staff. Staff shall be on duty and in the facility at all times when residents requiring evacuation assistance are present.

33.7.7 Inspection of Door Openings. Door assemblies for which the door leaf is required to swing in the direction of egress travel shall be inspected and tested not less than annually in accordance with 7.2.1.15.

Chapter 34 Reserved

Chapter 35 Reserved

Chapter 36 New Mercantile Occupancies

36.1 General Requirements.

36.1.1 Application.

36.1.1.1 The requirements of this chapter shall apply to new buildings or portions thereof used as mercantile occupancies. *(See 1.3.1.)*

36.1.1.2 The provisions of this chapter shall apply to life safety requirements for all new mercantile buildings. Specific requirements shall apply to suboccupancy groups, such as Class A, Class B, and Class C mercantile occupancies; covered malls; and bulk merchandising retail buildings, and are contained in paragraphs pertaining thereto.

36.1.1.3 Additions to existing buildings shall comply with 36.1.1.3.1, 36.1.1.3.2, and 36.1.1.3.3.

36.1.1.3.1 Additions to existing buildings shall conform to the requirements of 4.6.8.