

**Table A.4.2.2 Minimum Fire Ratings for Opening Protectives in Fire Resistance–Rated Assemblies and Fire-Rated Glazing Markings**

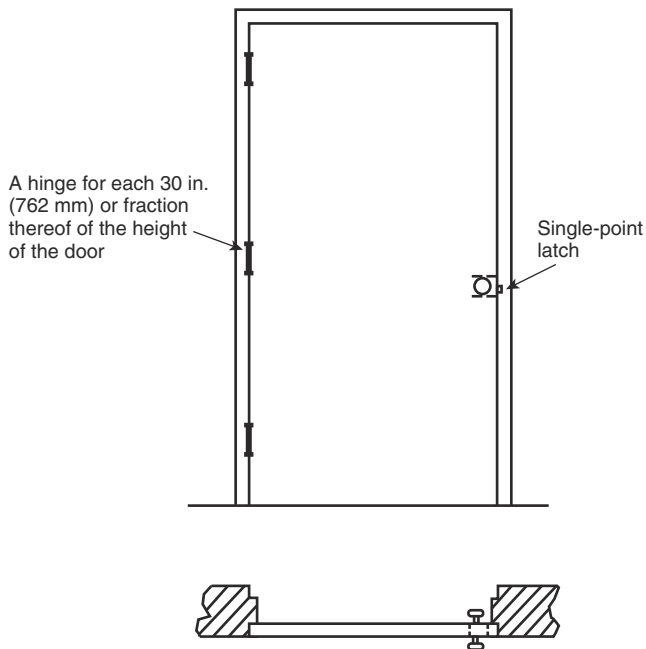
Component	Walls and Partitions (hr)	Fire Door Assemblies (hr)	Door Vision Panel Maximum Size (in. <sup>2</sup> )	Fire-Rated Glazing Marking Door Vision Panel	Minimum Side Light/Transom Assembly Rating (hr)		Fire-Rated Glazing Marking Side Light/Transom Panel		Minimum Fire-Rated Windows Rating <sup>a,b</sup> (hr)		Fire-Rated Window Marking	
					Fire protection	Fire resistance	Fire protection	Fire resistance	Fire protection	Fire resistance	Fire protection	Fire resistance
Elevator hoistways	2	1½	155 in. <sup>2 c</sup>	D-H-90 or D-H-W-90	NP	2	NP	D-H-W-120	NP	2	NP	W-120
	1	1	155 in. <sup>2 c</sup>	D-H-60 or D-H-W-60	NP	1	NP	D-H-W-60	NP	1	NP	W-60
	½	⅓	85 in. <sup>2 d</sup>	D-20 or D-W-20	⅓	⅓	D-H-20	D-W-20	⅓	⅓	OH-20	W-30
Elevator lobby (per 7.2.13.4)	1	1	100 in. <sup>2 a</sup>	≤100 in. <sup>2</sup> , D-H-T-60 or D-H-W-60 >100 in. <sup>2</sup> , D-H-W-60	NP	1	NP	D-H-W-60	NP	1	NP	W-60
Vertical shafts (including stairways, exits, and refuse chutes)	2	1½	Maximum size tested	D-H-90 or D-H-W-90	NP	2	NP	D-H-W-120	NP	2	NP	W-120
	1	1	Maximum size tested	D-H-60 or D-H-W-60	NP	1	NP	D-H-W-60	NP	1	NP	W-60
Replacement panels in existing vertical shafts	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-W-20	⅓	⅓	OH-20	W-30
Horizontal exits	2	1½	Maximum size tested	D-H-90 or D-H-W-90	NP	2	NP	D-H-W-120	NP	2	NP	W-120
Horizontal exits served by bridges between buildings	2	¾	Maximum size tested <sup>e</sup>	D-H-45 or D-H-W-45	¾ <sup>e</sup>	¾ <sup>e</sup>	D-H-45	D-H-W-45	¾	¾	OH-45	W-120
Exit access corridors <sup>f</sup>	1	⅓	Maximum size tested	D-20 or D-W-20	¾	¾	D-H-45	D-H-W-45	¾	¾	OH-45	W-60
	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-H-W-20	⅓	⅓	OH-20	W-30
Other Fire barriers	3	3	100 in. <sup>2 a</sup>	≤100 in. <sup>2</sup> , D-H-180 or D-H-W-180 >100 in. <sup>2</sup> , D-H-W-180	NP	3	NP	D-H-W-180	NP	3	NP	W-180
	2	1½	Maximum size tested	D-H-90 or D-H-W-90	NP	2	NP	D-H-W-120	NP	2	NP	W-120
	1	¾	Maximum size tested <sup>e</sup>	D-H-45 or D-H-W-45	¾ <sup>e</sup>	¾ <sup>e</sup>	D-H-45	D-H-W-45	¾	¾	OH-45	W-60
	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-H-W-20	⅓	⅓	OH-20	W-30
Smoke barriers <sup>f</sup>	1	⅓	Maximum size tested	D-20 or D-W-20	¾	¾	D-H-45	D-H-W-45	¾	¾	OH-45	W-60
	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-H-W-20	⅓	⅓	OH-20	W-30
Smoke partitions <sup>f,g</sup>	1	⅓	Maximum size tested	D-20 or D-W-20	¾	¾	D-H-45	D-H-W-45	¾	¾	OH-45	W-60
	½	⅓	Maximum size tested	D-20 or D-W-20	⅓	⅓	D-H-20	D-H-W-20	⅓	⅓	OH-20	W-30

For SI units, 1 in.<sup>2</sup> = 0.00064516 m<sup>2</sup>.

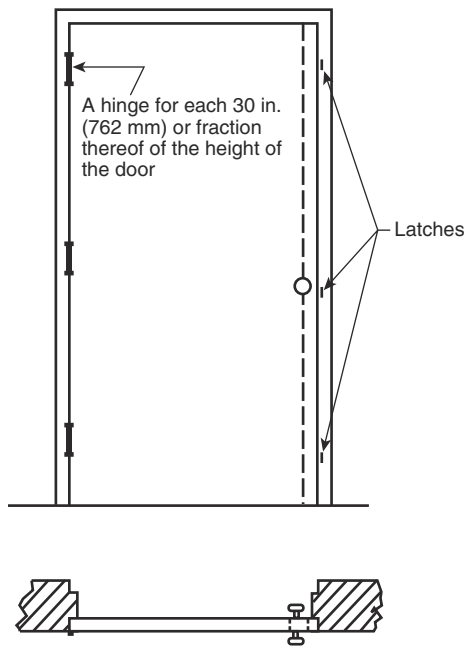
NP: Not permitted.

<sup>a</sup>Fire resistance–rated glazing tested to ASTM E119, *Standard Test Methods for Fire Tests of Building Construction and Materials*, or ANSI/UL 263, *Standard for Fire Tests of Building Construction and Materials*, shall be permitted in the maximum size tested (see 8.3.3.6.8 of NFPA 101).<sup>b</sup>Fire-rated glazing in exterior windows shall be marked in accordance with Table 8.3.3.6.3.<sup>c</sup>See ASME A17.1/CSA B44–2016, *Safety Code for Elevators and Escalators*, for additional information.<sup>d</sup>See ASME A17.3/CSA B44–2015, *Safety Code for Existing Elevators and Escalators*, for additional information.<sup>e</sup>Maximum area of individual exposed lights shall be 1296 in.<sup>2</sup> (0.84 m<sup>2</sup>), with no dimension exceeding 54 in. (1.37 m) unless otherwise tested.<sup>f</sup>Fire doors are not required to have a hose stream test per ANSI/UL 10B, *Standard for Fire Tests of Door Assemblies*, or ANSI/UL 10C, *Standard for Positive Pressure Fire Tests of Door Assemblies*.<sup>g</sup>For residential board and care, see 32.2.3.1 and 33.2.3.1 of NFPA 101.

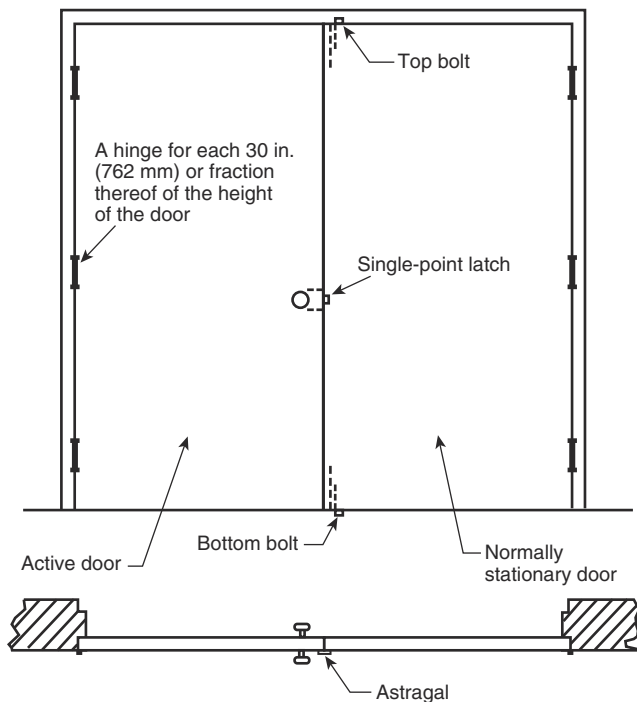
[101:Table 8.3.3.2.2]



**FIGURE A.4.6.3.1(a) Builders Hardware for Single Swinging Door with Single-Point Latch — Flush Mounted.**

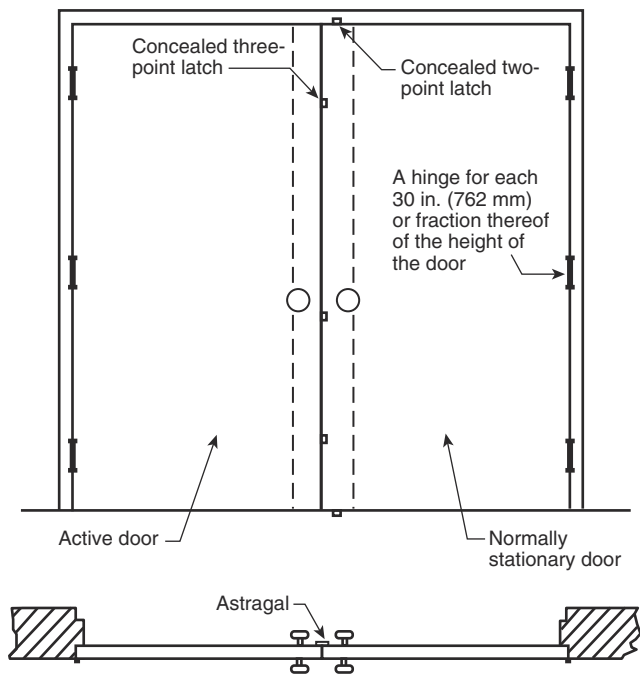


**FIGURE A.4.6.3.1(c) Builders Hardware for Single Swinging Door with Concealed Three-Point Latch — Flush Mounted.**

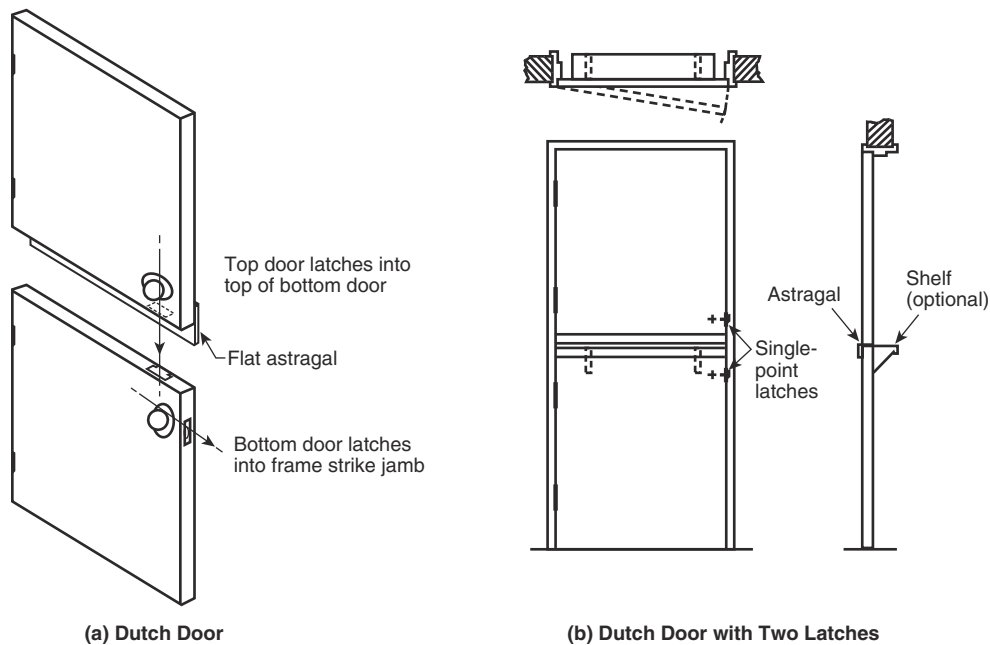
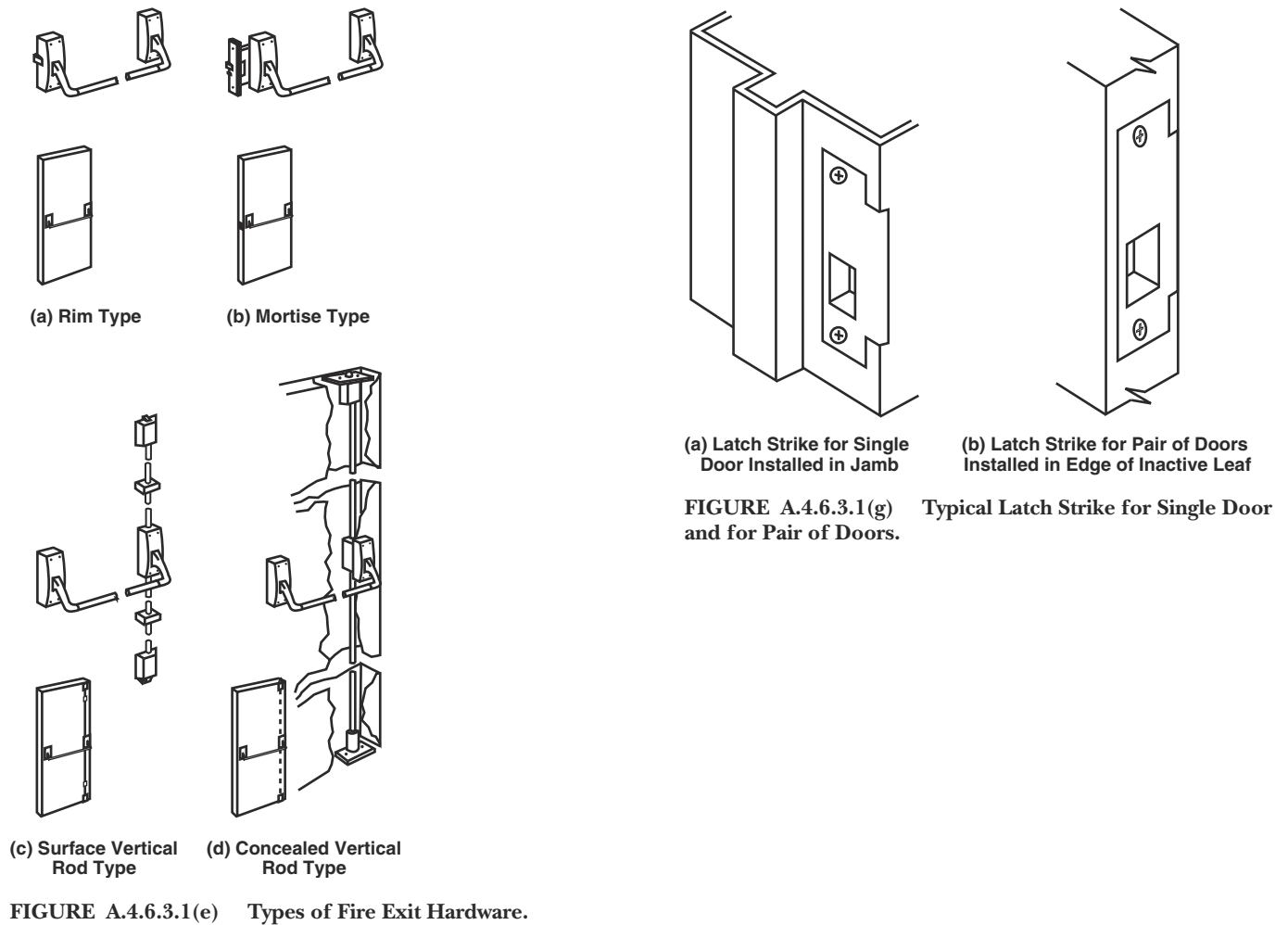


Note: The astragal can be permitted to be attached to the inside of the inactive leaf or the outside of the active leaf.

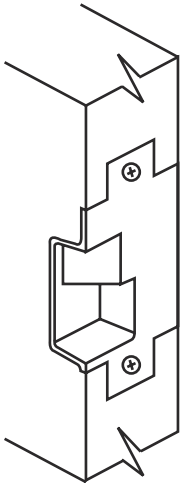
**FIGURE A.4.6.3.1(b) Builders Hardware for Doors Swinging in Pairs with Single-Point Latch — Flush Mounted.**



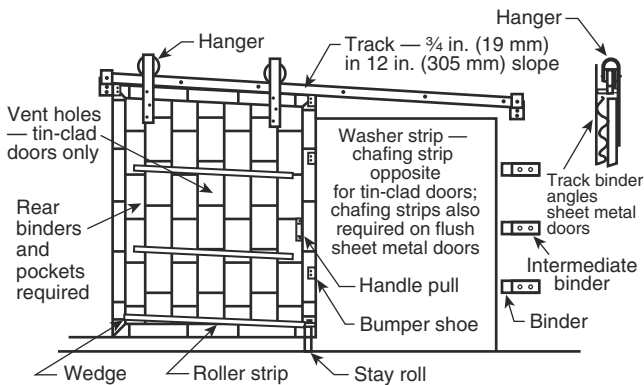
**FIGURE A.4.6.3.1(d) Builders Hardware for Doors Swinging in Pairs with Concealed Two- and Three-Point Latches — Flush Mounted.**



**FIGURE A.4.6.3.1(f) Dutch Door and Dutch Door with Two Latches.**



**FIGURE A.4.6.3.1(h) Typical “Open-Back” Latch Strike for Pair of Doors Installed in Edge of Inactive Leaf Where Permitted by Individual Published Listings.**



**FIGURE A.4.6.4(a) Single Sliding Door (Inclined Track).**

**A.4.7.4.3** Wall sleeves required for the installation of fire door fusible links on both sides of a wall are unlike many other wall penetrations for pipes, conduits, ducts, and the like. Such sleeves must remain open and unobstructed for free movement of the fusible link cable/chain upon fusing of the links. Fire-stopping, other sealants, or other materials should not be used on sleeves because they can encumber movement and prevent automatic closing of a fire door in a fire event.

It is important that cables, chains, or any components of the fusible link assembly do not hang up on eye bolts or pulleys, through-wall sleeve, any part of the building structure, or any component of the fire door assembly. It is also important that components not be coated or affixed with foreign material which could obstruct free operation of the release system. Examples of foreign material might include fireproofing, fire-stopping, paint, or spray texturing.

**A.4.8.1.4** See Figure A.4.8.1.4(a) through Figure A.4.8.1.4(c).

Figure A.4.8.1.4(a) illustrates typical reinforcement of a hollow concrete masonry wall opening to provide adequate anchorage of the door-mounting hardware. Brick reinforcement can be permitted to be omitted, provided all hollow cells within 16 in. (406 mm) of the opening are filled with concrete.

It is recommended where openings are subjected to heavy traffic that jambs be protected with steel frames extending the full thickness of the wall.

Figure A.4.8.1.4(b) illustrates typical brick reinforcement of a hollow concrete masonry wall opening to provide adequate anchorage of the door-mounting hardware. Brick reinforcement can be omitted, provided all hollow cells within 16 in. (406 mm) of the opening on each side and all cells where track is mounted are filled with concrete. It is recommended where openings are subjected to heavy traffic that jambs be protected with steel frames extending the full thickness of the wall.

Figure A.4.8.1.4(c) illustrates typical reinforcement for anchorage of door-mounting hardware by use of steel plates to bridge the cavities in the hollow concrete masonry units and to prevent their crushing.

**A.4.8.1.5** Figure A.4.8.1.5 illustrates typical reinforcement for anchorage of door-mounting hardware by use of steel plates to bridge cavities in the hollow concrete masonry units and to prevent their crushing. It is recommended where openings are subjected to heavy traffic that jambs be protected with steel frames extending the full thickness of the wall. See also Figure A.4.8.1.4(b) and Figure A.4.8.1.4(c).

**A.4.8.2.5** The jamb is the vertical component or member of an opening whether framed or not.

**A.4.8.2.6** See Figure A.4.8.2.6.

**A.4.8.2.8** See Figure A.4.8.2.8(a) through Figure A.4.8.2.8(c).

**A.4.8.2.9** See Figure A.4.8.2.8(a) through Figure A.4.8.2.8(c).

**A.4.8.2.13** See Figure A.4.8.2.6.

**Δ A.4.8.4.1** The maximum clearance of  $\frac{3}{4}$  in. (19 mm.) under fire doors as permitted by this standard is the accepted practice in the industry. NFPA 252, ANSI/UL 10B, *Standard for Safety Fire Tests of Door Assemblies*, and ANSI/UL 10C, *Standard for Positive Pressure Fire Tests of Door Assemblies*, are test standards, not installation standards, and prescribe clearances and tolerances for swinging doors in the test wall opening.

**■ A.4.8.4.2** See Figure A.4.8.4.2(a) and Figure A.4.8.4.2(b).

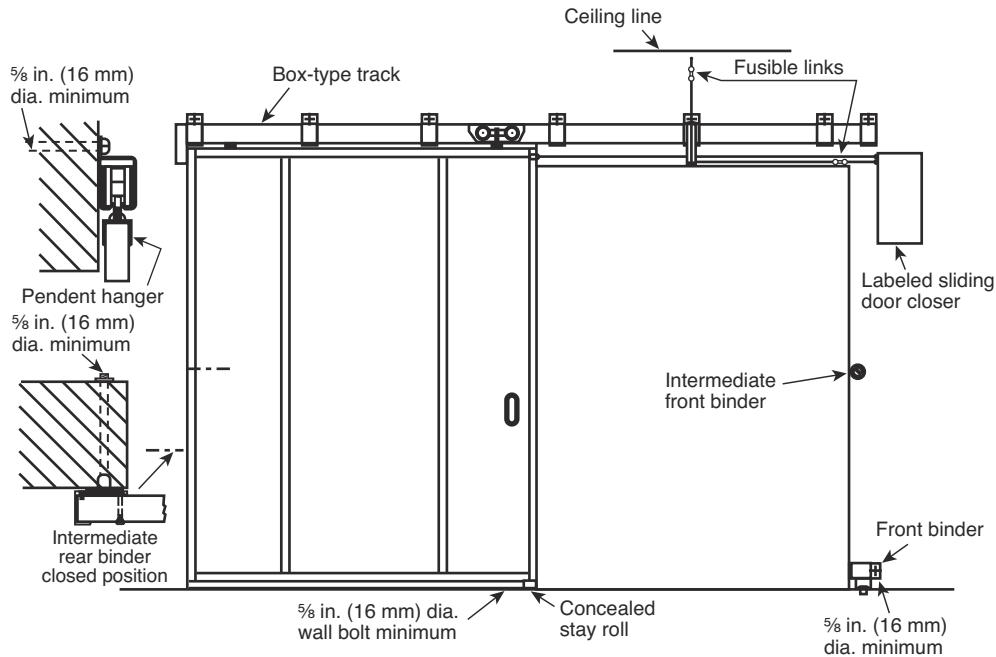
**A.4.8.4.3** Where clearance under the bottom of a fire door exceeds  $\frac{3}{4}$  in. (19 mm), door sweeps, door bottoms, or other devices specifically listed for use on fire doors and addressing the excess clearance could be a viable option. Utilization of such devices cannot prohibit the full engagement of the bottom latch bolt.

**A.4.8.6** See Figure A.4.8.6(a) and Figure A.4.8.6(b).

**A.5.1** Fire doors, fire shutters, and fire windows are designed to protect the opening under normal conditions of use, with clear spaces on both sides of the opening. Typically, fire doors, fire shutters, and fire windows will provide a lesser rating than the wall and generally allow heat transmission through the assembly. Combustible materials should not be piled against or near the door, window, or shutter.

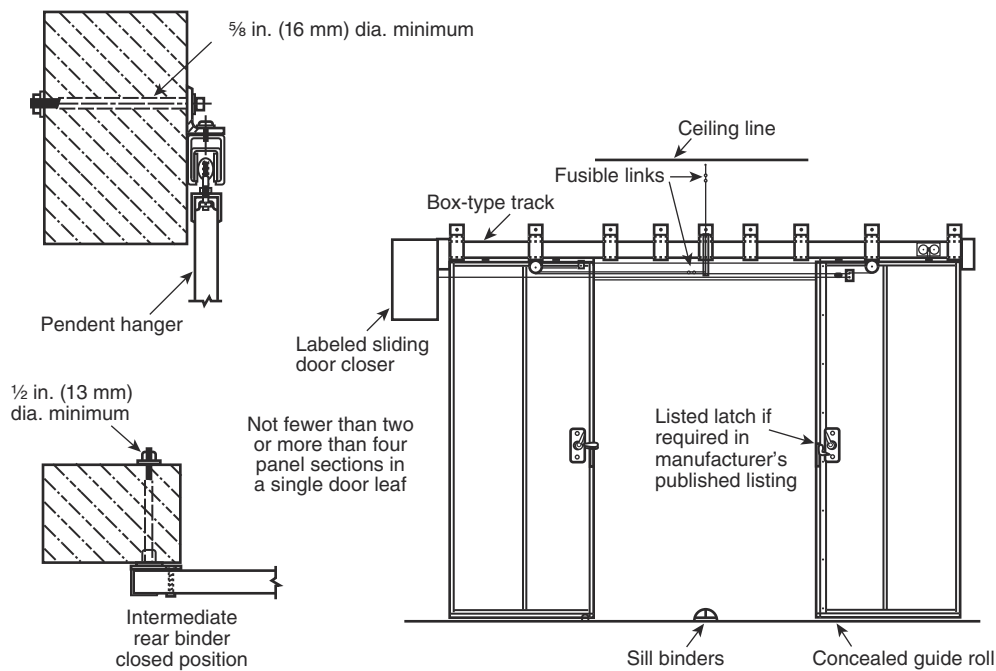
**A.5.1.1.1** See Chapter 19 for fire dampers and Chapter 20 for fabric fire safety curtains.

**A.5.1.2.1** Operability issues may include proper operation and function of latching hardware and closing devices. Latching hardware should not be modified to prevent positive latching.



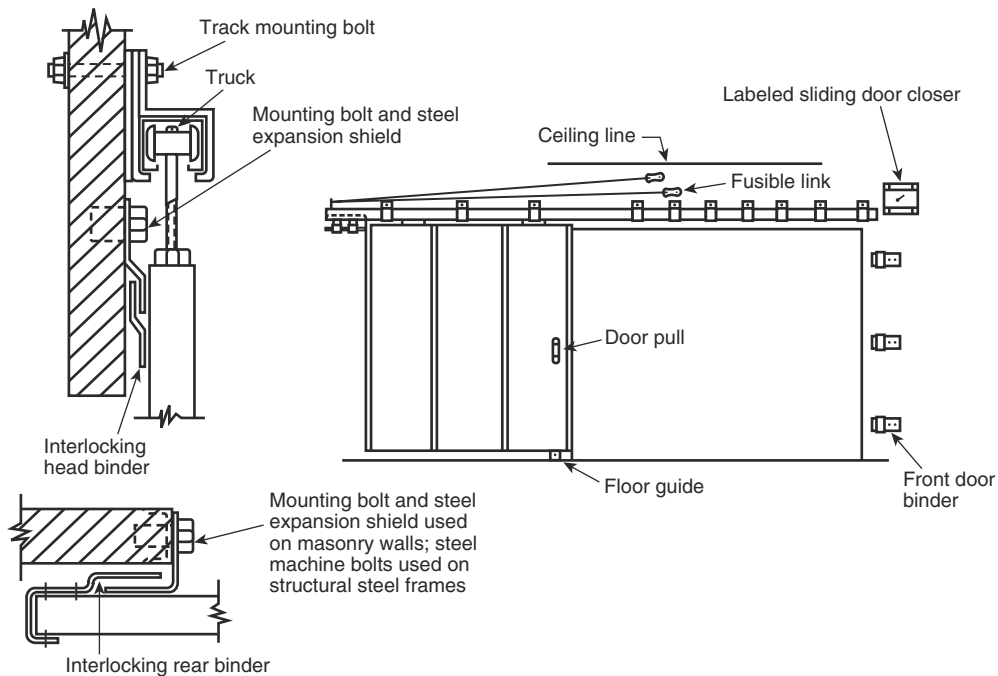
Note: Fusible links are needed on both sides of the wall.

**FIGURE A.4.6.4(b) Horizontally Sliding Composite Door.**



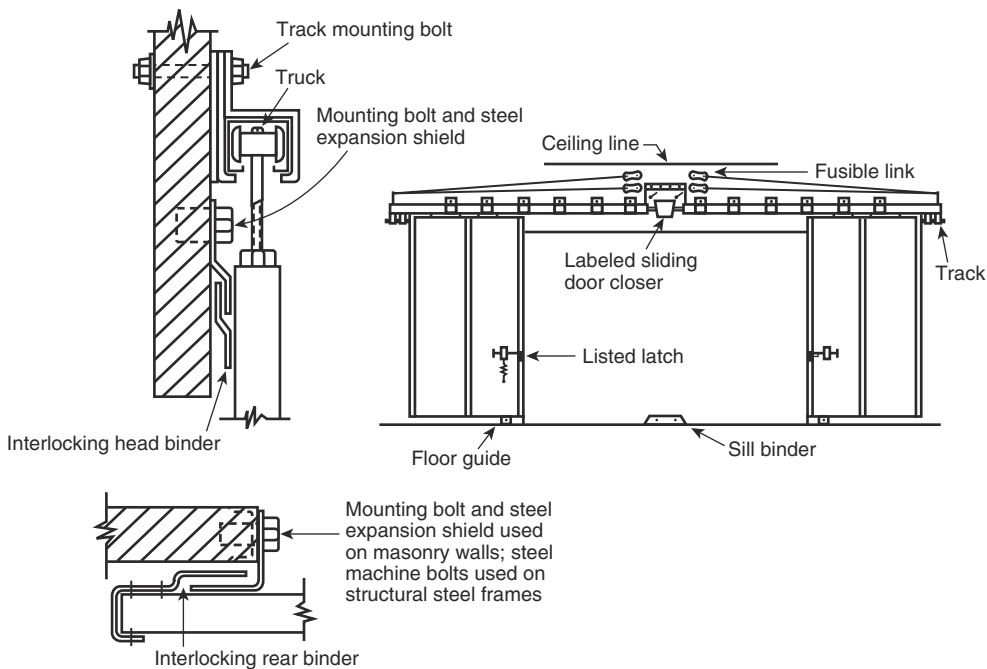
Note: Fusible links are needed on both sides of the wall.

**FIGURE A.4.6.4(c) Center-Parting, Horizontally Sliding Composite Door.**



Note: Fusible links are needed on both sides of the wall.

**FIGURE A.4.6.4(d) Horizontally Sliding Hollow Metal Door.**



Note: Fusible links are needed on both sides of the wall.

**FIGURE A.4.6.4(e) Center-Parting, Horizontally Sliding Hollow Metal Door.**

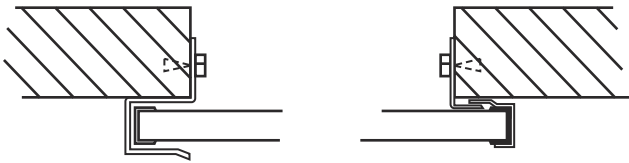


FIGURE A.4.6.4(f) Binder Arrangements.

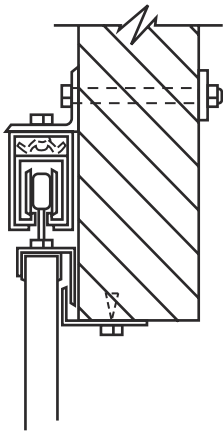
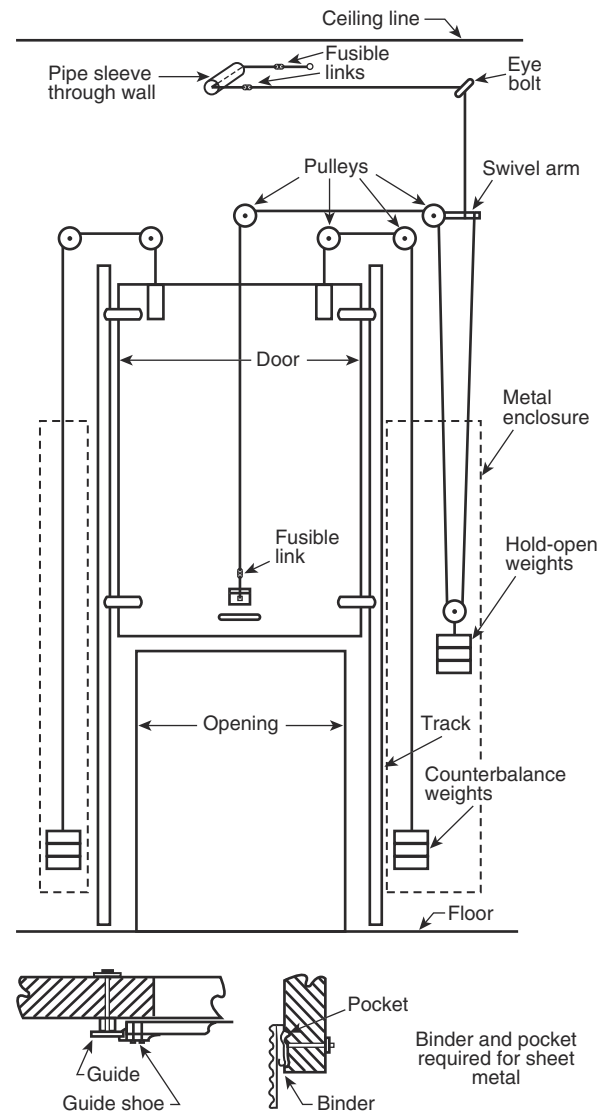


FIGURE A.4.6.4(g) Binder Arrangement on Pendant Hanger.

**A.5.1.5.1** Field modifications beyond the scope of the prescriptive allowances permitted by 4.1.3.2 through 4.1.3.2.5 typically result in voiding the fire rating of the assembly. Subsection 5.1.5 provides an alternative method whereby proposed modifications can be documented and presented to the labeling agency prior to work commencing. Where the proposed modification(s) are within the parameters of the manufacturer's procedures and will not degrade the fire resistance of the assembly, the labeling agency is permitted to authorize such modifications without a requirement for a subsequent field inspection.

Generally, the replacement of hardware components on swinging doors (hinges, pivots, door closers, etc.) is not considered to be a field modification, provided the replacement hardware does not require additional cutting, mortising, or boring into the doors and frames and the hardware meets the criteria specified elsewhere in the standard. Likewise, the installation of surface-mounted items like protection plates is not considered to be field modifications. Cutting doors for vision panels, enlarging existing cutouts for vision panels, and trimming doors in height or width are examples of field modifications. Similarly, installing hardware components that require additional cutting and mortising of the doors or frames are examples of field modifications.

**A.5.2** 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 is generally the responsibility of the building owner.



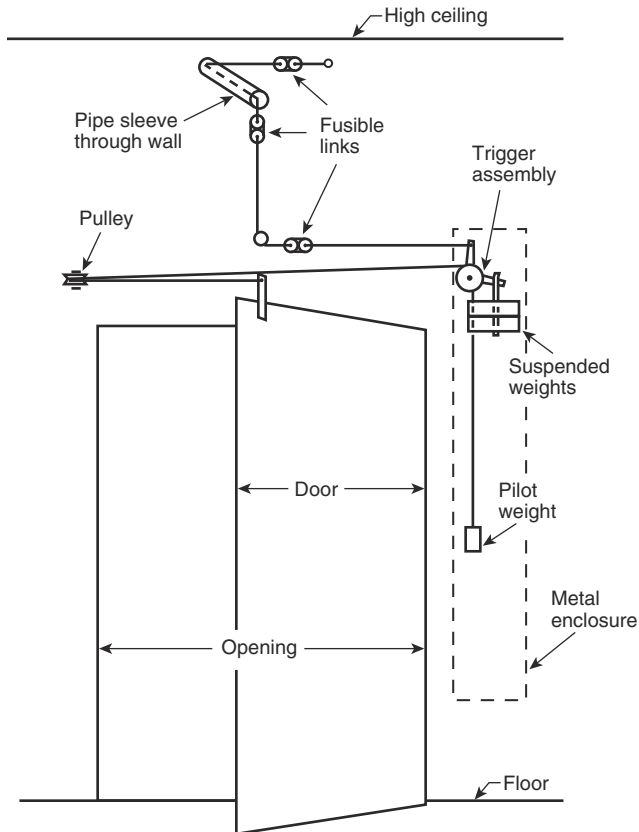
Note: Fusible links are needed on both sides of the wall.

FIGURE A.4.6.4(h) Vertically Sliding Door.

**A.5.2.1** Hinges, catches, closers, latches, and stay rollers are especially subject to wear.

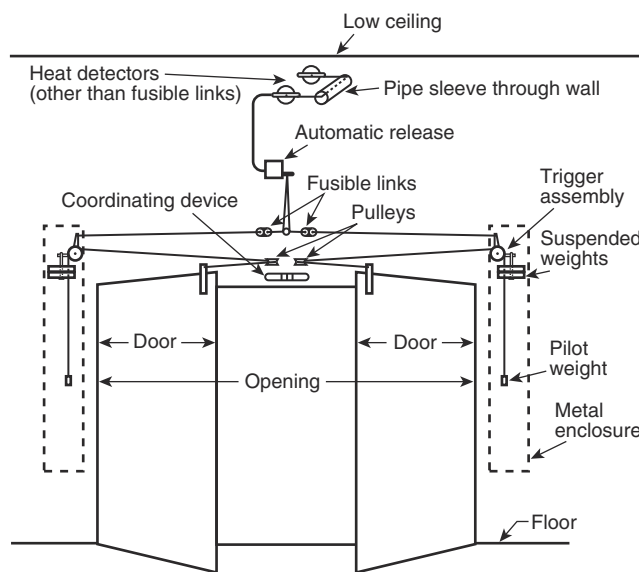
**A.5.2.2** Newer technology includes use of barcodes and other electronic devices. This section recognizes that completed and filed barcode reports should be considered signed by the inspector.

Some inspection organizations will utilize inspection markers or tags to identify completion of the inspections. These markers are intended to be different from any approved or listed field labeling service. The marker or tag is not to take the place of the inspection records as required by 5.2.2.



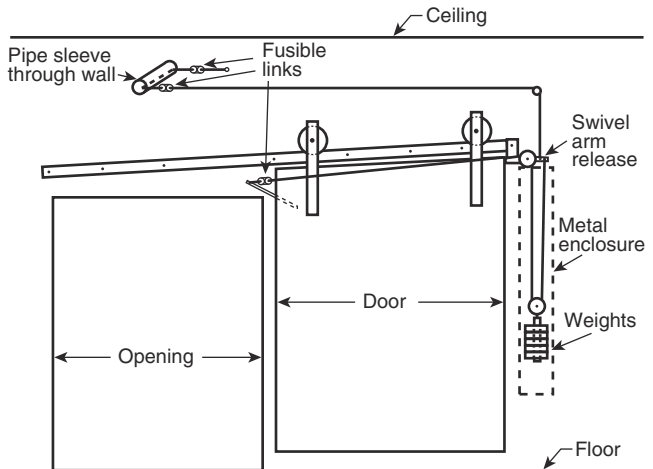
Note: Fusible links are needed on both sides of the wall.

**FIGURE A.4.7.4.2(a) Closing Devices for Single Swinging Door.**



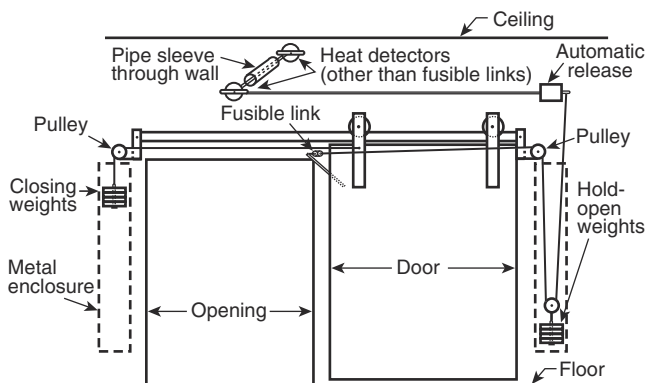
Note: See appropriate section for the required hardware for the normally stationary door.

**FIGURE A.4.7.4.2(b) Closing Devices for Doors Swinging in Pairs.**

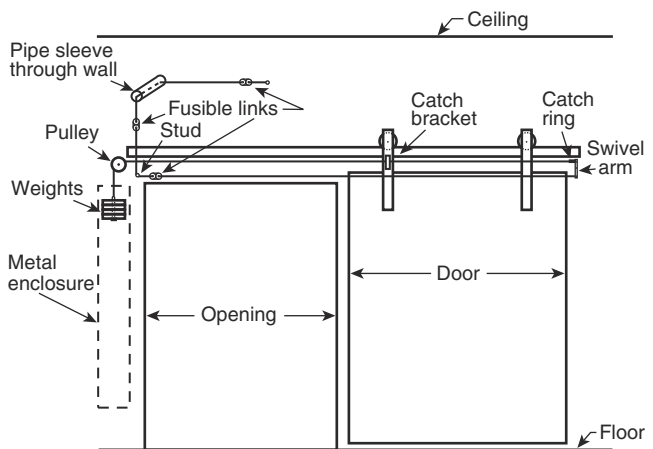


Note: Fusible links are needed on both sides of the wall.

**FIGURE A.4.7.4.2(c) Closing Devices for Single Sliding Door (Inclined Track).**

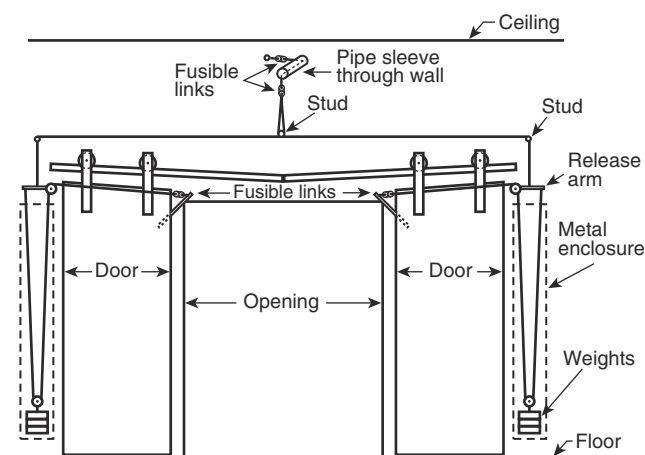


**FIGURE A.4.7.4.2(d) Closing Devices for Single Sliding Door, Example 1 (Level Track).**



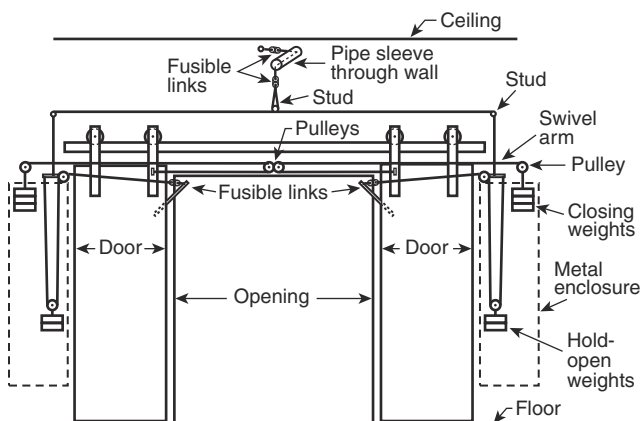
**FIGURE A.4.7.4.2(e) Closing Devices for Single Sliding Door, Example 2 (Level Track).**



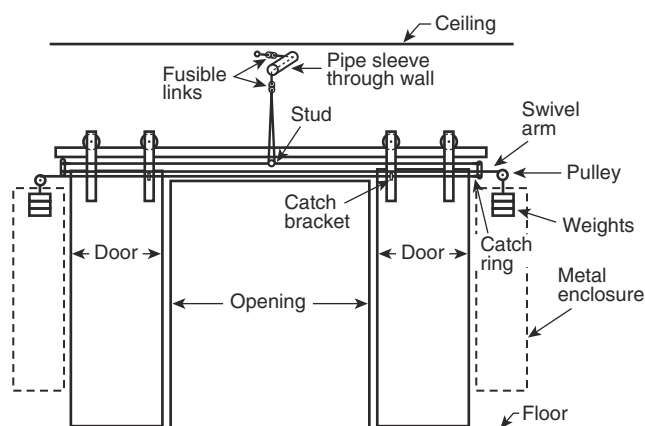


Note: Fusible links are needed on both sides of the wall.

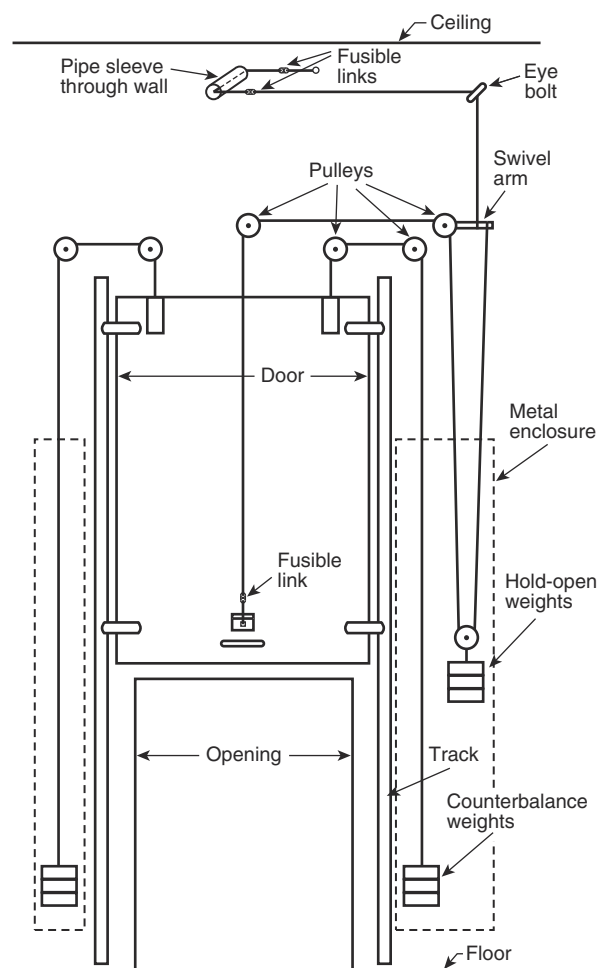
**FIGURE A.4.7.4.2(f) Closing Devices for Center-Parting, Horizontally Sliding Doors (Inclined Track).**



**FIGURE A.4.7.4.2(g) Closing Devices for Center-Parting, Horizontally Sliding Doors, Example 1 (Level Track).**



**FIGURE A.4.7.4.2(h) Closing Devices for Center-Parting, Horizontally Sliding Doors, Example 2 (Level Track).**

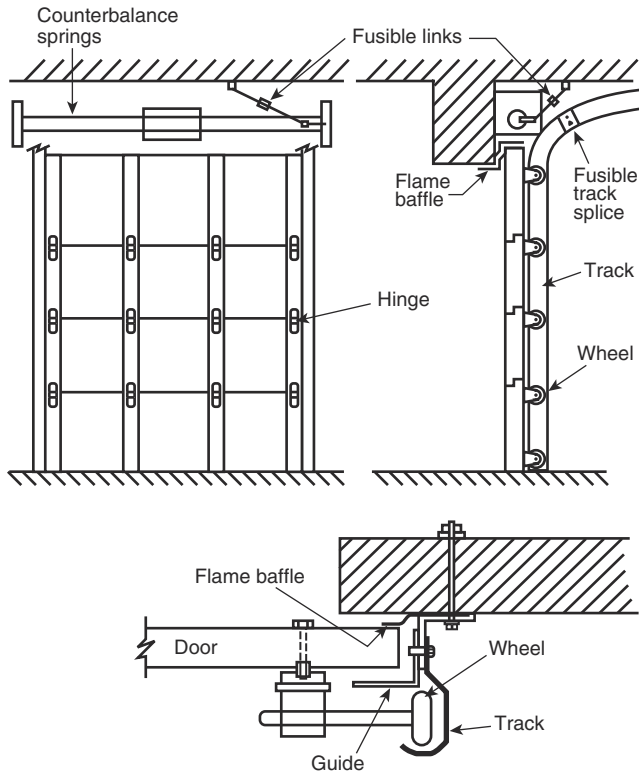


Note: Fusible links are needed on both sides of the wall.

**FIGURE A.4.7.4.2(i) Closing Devices for Vertically Sliding Door.**

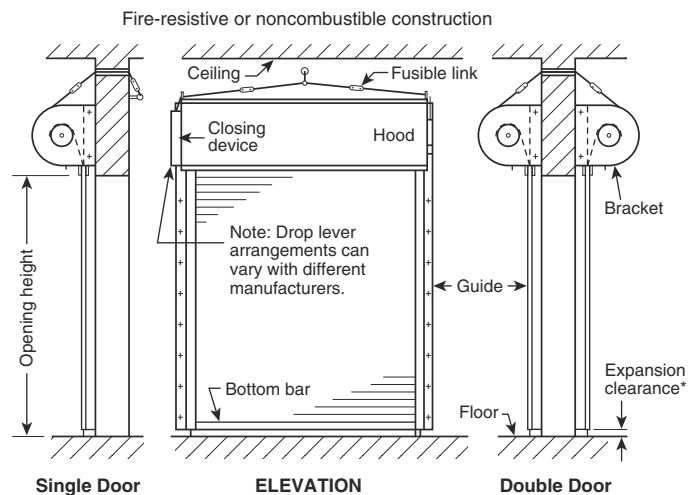
**A.5.2.2.2** In many cases, AHJs are not able to inspect each building in their jurisdiction each year. Inspection and testing records need to be retained during the intervening periods between the AHJ's formal visits to provide evidence that the inspections and testing were performed as required by this standard. Additionally, maintenance records documenting that the necessary corrective actions have been made in accordance with this standard should be stored with the inspection and testing records for the same period of time. Retaining the records for 7 years allows the AHJ the ability to look back over an extended period of time to verify that the fire door assemblies are being properly maintained.

**A.5.2.2.3** Installation of new fire door assemblies should be documented in the same manner and level of detail as the periodic inspections and testing of fire door assemblies required by 5.2.3 and 5.2.4. Records of new fire door assemblies should be retained with the periodic inspections and testing records for the facility.



Note: Fusible links are needed on both sides of the wall.

**FIGURE A.4.7.4.2(j) Vertically Sliding, Steel-Sectional Overhead Door.**



\* Expansion clearance per door listing. Doors with downward expansion are as shown. Doors with upward expansion require expansion clearance above the top of the door.

Note: Fusible links are needed on both sides of the wall — configuration could vary.

**FIGURE A.4.7.4.2(k) Rolling Steel Doors — Surface Mounted.**

**A.5.2.2.4(8)** Each fire door assembly inspected and tested should be assigned a unique identifier code (e.g., door number as assigned by the facility) that can be used to track the assembly's compliance and maintenance records throughout the life-time of its installation. Identifier codes could be a door assembly number, barcode, or other code that is unique to each fire door assembly.

**A.5.2.2.4(9)** To aid the AHJ during the review of the inspections and testing reports, the records should include a description of the type of fire door assembly as follows:

Type 6: Swinging door with builders hardware

Type 7: Swinging fire door with fire door hardware

Type 8: Horizontally sliding fire door

Type 9: Special purpose horizontally accordion or folding door

Type 10: Vertically sliding fire door

Type 11: Rolling steel door

Type 12: Fire shutter

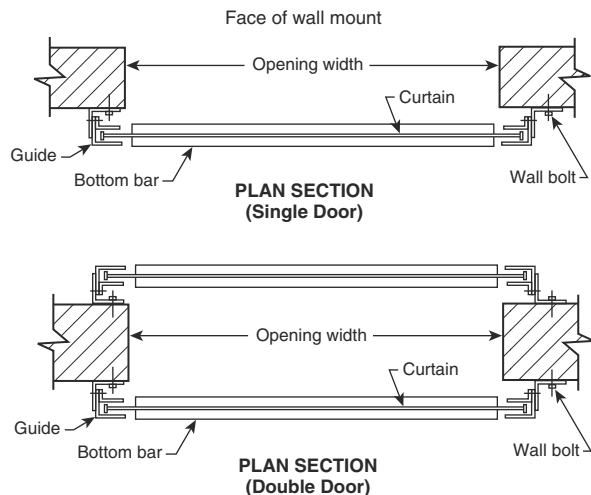
Type 13: Service counter fire door

Type 14: Hoistway doors for elevators and dumbwaiter

Type 15: Chute door

Type 16: Access door

Type 17: Fire window

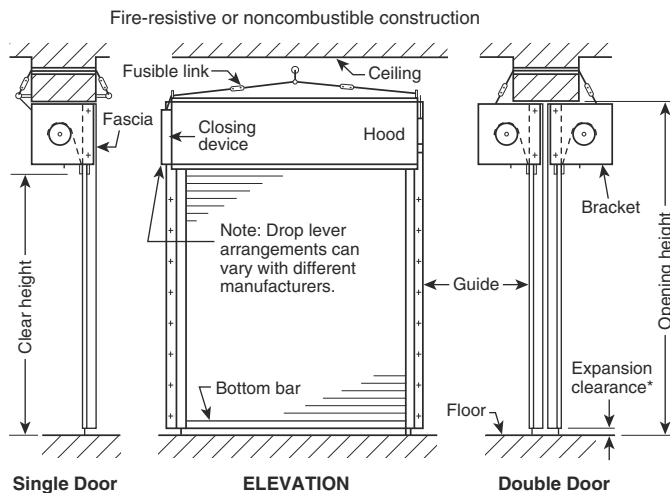


Wall bolt for masonry construction:

Through-bolt, or expansion anchor, as permitted by door listing.

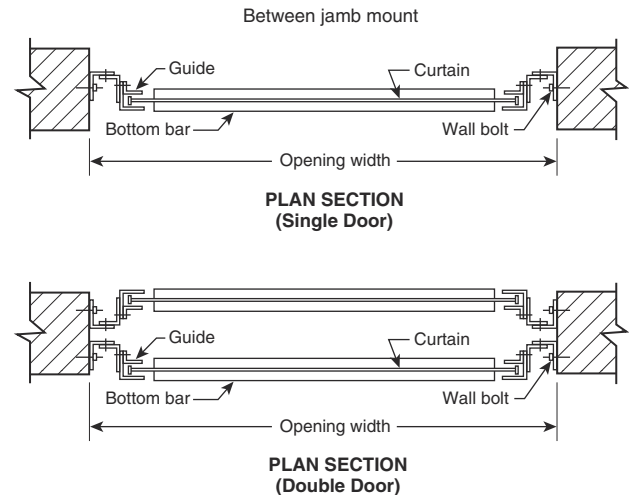
Wall bolt for nonmasonry wall construction:

Through-bolt, or machine screw into steel jamb, or lag screw into wood jamb, as permitted by door listing.



\* Expansion clearance per door listing. Doors with downward expansion are as shown. Doors with upward expansion require expansion clearance above the top of the door.

Note: Fusible links are needed on both sides of the wall — configuration could vary.



Wall bolt for masonry construction:  
Through-bolt, or expansion anchor, as permitted by door listing.

Wall bolt for nonmasonry wall construction:  
Through-bolt, or machine screw into steel jamb, or lag screw into wood jamb, as permitted by door listing.

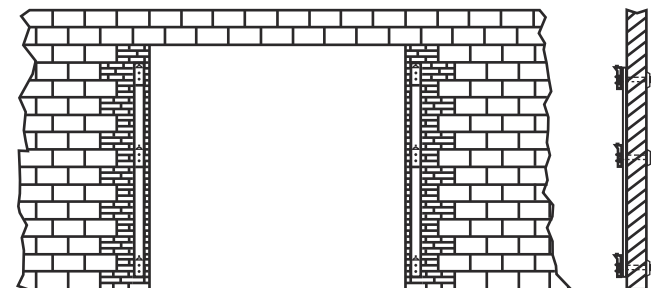
**FIGURE A.4.7.4.2(l) Rolling Steel Doors — Mounted Between Jambos.**

**A.5.2.2.4(10)** Functional operation of fire door assemblies should include testing of the closing device, complete closure of the fire door, and full engagement of latch(es) where required by door type. Functional testing of automatic-closing or power-operated fire door assemblies and electrically controlled latching hardware or release devices might need to be coordinated with the facility during other electrically controlled system tests.

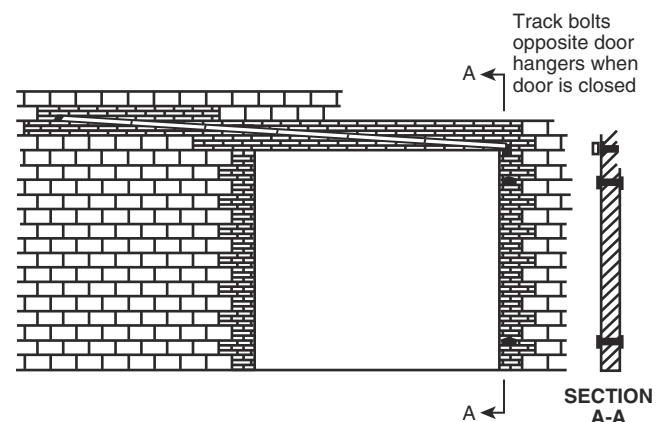
**A.5.2.3.1** Visual inspection and functional testing of fire door and fire window assemblies require the persons performing the inspections and testing to be thoroughly knowledgeable of the various components and systems that are used to create fire-rated assemblies. In the case of swinging doors with builders hardware, these assemblies are comprised of labeled and listed components from several manufacturers. Often, the listing of the door leaf determines which products are permitted to be installed on an assembly. Inspectors of swinging doors with builders hardware need be able to recognize which components can or cannot be used on specific assemblies, which requires training and experience on behalf of the persons performing the inspections. Additionally, AHJs need to be able to rely on the competency, expertise, experience, and knowledge of the fire door inspectors in their jurisdiction.

**A.5.2.3.2** Any fire door or fire window assembly or component that has a history of reoccurring failures should be evaluated for possible replacement or other corrective measures.

**A.5.2.3.5.2(11)** Aftermarket devices that are intended to alter the function and operation of door hardware could violate the listing and degrade the fire protection performance of the doorway. For example, magnetic strips that are marketed to apply over strike plates for quick school lockdowns directly defeat the purpose of the latching to hold the door in the closed position. Manufacturers and listing agencies should be consulted prior making any modifications or adding any devices to fire doors.



**FIGURE A.4.8.1.4(a) Hollow Concrete Masonry Wall Prepared for Doors Swinging in Pairs — Lap Mounted, Standard Method.**



**FIGURE A.4.8.1.4(b) Hollow Concrete Masonry Wall Prepared for Single Tin-Clad or Sheet Metal Sliding Door — Standard Method.**