Code Compliance Research Report
CCRR-1086

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DIVISION: 08 00 00 – OPENINGS
Section: 08 11 00 – Metal Doors and Frames
Section: 08 30 00 – Specialty Doors and Frames
Section: 08 35 13.23 – Accordion Folding Fire Doors

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REPORT SUBJECT:
McKeon Vertical Rolling Steel Doors With or Without Integral Proprietary Swing Doors;
McKeon Side Acting and Side Coiling Steel Fire Doors With or Without Integral Proprietary Swing Doors;
McKeon Horizontal Sliding Accordion Door Assemblies; and
McKeon Horizontal Rolling Steel Fire and Smoke Shutters

1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:

- 2015, 2012, and 2009 *International Building Code®* (IBC)
- 2015, 2012, and 2009 *International Fire Code®* (IFC)
- 2013 Abu Dhabi International Building code (ADIBC)

NOTE: This report references 2015 Code sections with [2012] and [2009] Code sections shown in brackets where they differ.

1.2 The McKeon fire doors, rolling steel doors, and accordion doors, recognized in this report have been evaluated for the following properties (see Table 1):

- Fire resistance
- Smoke and draft control

1.3 The McKeon fire doors, rolling steel doors, and accordion doors, recognized in this report have been evaluated for the following uses (see Table 1):

- As fire door assemblies for protection of vertical and horizontal openings as required in IBC Section 716 [2009 - 715].
- As fire door assemblies for use as opening protectives in openings through fire walls per IBC Section 706.8, fire barriers per IBC Section 707.6, fire partitions per IBC Section 708.6, smoke barrier walls per IBC Section 709.5 [2009 - 710.5], and smoke partition walls per IBC Section 710.5 [2009 - 711.5].
- As fire door assemblies used as smoke and draft control assemblies as required in IBC Section 716.5.3.1, as indicated in Section 4.2 of this report.
- As egress fire doors in accordance with IBC Section 1010 [2009 – 1008], as described in Section 6.3 of this report.
- Fire door assemblies with side-swinging egress doors as described in Section 3.5 of this report are recognized for use as means of egress in compliance with IBC Section 1010 [1008].
- The Horizontal sliding accordion assembly, model AC8800, may be used as a means of egress component complying with IBC Section 1010.1.4.3 [1008.1.4.3].
- Horizontal fire and smoke shutters are recognized for compliance with UL 10B, with limitations as described in Sections 3.4, 4.4, and 5.4.

2.0 STATEMENT OF COMPLIANCE

The McKeon fire doors, rolling steel doors, and accordion doors recognized in this report comply with the Codes listed in Section 1.1, for the properties stated in Section 1.2, and uses stated in Section 1.3, when installed as described in this report including the Conditions of Use stated in Section 6.

3.0 DESCRIPTION

3.1 Vertical Rolling Steel Doors:

3.1.1 General: Vertical-coiling fire door assemblies contain major components that include slats, insulated slats with back panel, wall guides, bottom bars, barrel assembly, counterbalance mechanism, and release devices.

3.1.2 McKeon Vertical Rolling Steel Doors, Models – CFS, FSFD, FSFD-IS, FSFD-TR, Dynamic 110F, and SafeSpace 500F: Doors include insulated and non-insulated assemblies. Model CFS is non-insulated and uses an F1 1-1/4 inch x 3/8 inch profile slat; Model FSFD uses an F3 3 inch x 7/8 inch profile slat; FSFD-IS is with slats that are mineral wool insulated of sizes IS 2-5/8 inch x 7/8 inch, IH 3 inch x 1 inch, and ID 3-1/4 inch x 1-1/2 inch profile slats; FSFD-TR uses a specified Portland cement-based cementitious fireproofing, insulated IS 2-5/8 inch x 7/8 inch, and IH 3 inch x 1 inch profile slats; Dynamic 110F uses McKeon F3-D slat profile that is 3 inch x 1-3/8 inch in size; SafeSpace 500F uses the ID slat profile, 3 inch x 1-1/2 inch. Slats are 22 gauge [0.030], 20 gauge [0.036], 18 gauge [0.048], 16 gauge [0.058] thick G60 galvanized, or Series 300 stainless steel. Applications with IS, IH, and ID slats are with back panels of 22, 20, or 18 gauge, and front panels of 16, 18, 20, or 22 gauge.

3.1.3 McKeon Series T2000/T5000/TU5000 Vertical Rolling Steel Fire Door with Integral Proprietary Swing Doors: Doors include non-insulated and insulated vertical rolling steel fire door assemblies with integral swinging egress doors. The non-insulated T2000 series uses the F3 flat profile slats 3 inch x 7/8 inch. The insulated doors use steel slats that are insulated with mineral wool insulation. The insulated profile types are IS, IH, or ID. Models T2000-TR and T5000-TR models are insulated fire rated doors with temperature rise rating.

3.2 Side-Acting and Side-Coiling Fire Door Assemblies:

3.2.1 General: Side-acting and side-coiling doors with steel slats in a vertical orientation. Doors open from the side with or without a barrel assembly with automatic release.

3.2.1.1 McKeon Series S4000, S9000, and S7000 Side-Coiling and Side-Acting Steel Fire Door With or Without Integral Proprietary Swing Doors: Models S4000, S9000, and S7000 are non-insulated side-acting steel fire doors. Models S4000-IS, S9000-IS, and S7000-IS are insulated fire doors. Models S4000-TR, S9000-TR, and S7000-TR are insulated fire rated doors with temperature rise rating. These side-coiling doors may coil one way or be bi-parting with a center meeting edge.

The side-coiling fire doors have slats that are 20 gauge [0.036] minimum. For temperature rise applications slat is filled with specified Portland cement-based fire resistive material.

3.3 Horizontal HH Sliding Accordion Fire Door Assemblies:

3.3.1 General: Vertical horizontal sliding accordion fire doors with top mounted horizontal tracks that may contain integral proprietary swing doors. The door stores into a side pocket when in open position. Doors are available as manually operated or motorized.

3.3.1.1 McKeon Series AC8000 Accordion Fire Door Systems With or Without Integral Proprietary Swing Doors: Accordion-type sliding doors comprised of a series of interlocking panels, which are suspended by an overhead track assembly. Every other panel employs a roller bearing detail that is interlocked within a formed steel guide and a roller guide retaining block.

Available in a bi-parting door configuration and as bi-parting with one side consisting of side-acting or side-coiling doors of series S4000, S9000, and S7000.

3.4 Horizontal Rolling Steel Fire and Smoke Shutters: The McKeon H200 horizontal rolling steel fire and smoke shutter is recognized for installation in masonry or concrete openings, or attached to fireproofed or encased steel beams.

The H200 units consist of an interlocking slat curtain designed to travel in a horizontal plane. Slats are F3, F3-D, ID, or IH 18 gauge [0.048] galvanized or stainless steel. Insulated slats are with mineral wool.

3.5 Side-Swinging Egress Doors: Side-swinging egress doors shall be fire rated, listed, and labeled as evidence of compliance with UL 10C and the applicable Code, are constructed within qualifying McKeon vertical rolling, side-acting, side-coiling, or accordion-type as integral parts of the fire door assembly.

3.5.1 Egress Door Assembly: To qualify as egress doors the side-swinging fire door assemblies shall be installed with approved hardware in accordance with door listing requirements and door operation requirements in IBC Section 1010 [1008]. All components of the fire door assembly must be compatible fire door assembly components per NFPA 80, including but not limited to:

door, frame, gasketing, latching hardware, and hinges. The egress door assemblies constructed within rolling door curtains are per the details of the rolling door listing procedures.

3.5.2 Egress Door Frame: Swinging door egress frames are of structural steel tube with minimum requirements per the rolling door listing.

3.5.3 Fire Door Opening Devices: For each egress exit door, listed fire exit hardware and listed panic hardware are required to be provided on one face, with lever or pull handle on the opposite door face.

3.5.4 Closers: Listed and labeled surface or recess mounted closers may be used.

3.5.5 Electromagnetic Door Holders: Listed and labeled surface mounted electromagnetic door holders may be used.

3.6 Fire Door Motor Operators: Fire door motor operators shall be listed and labeled for the intended use.

3.7 Battery Backup System: Battery backup systems shall be listed for the intended use.

4.0 PERFORMANCE CHARACTERISTICS

4.1 Fire Resistance Rating: The fire door assemblies, horizontal rolling steel fire doors, and smoke shutters recognized in this report have fire resistance ratings reported in Table 2 of this report when tested in accordance with UL 10B.

4.2 Smoke and Draft Control Assemblies: The fire door assemblies noted in Table 2 of this report have qualified as smoke and draft control assemblies in accordance with the Codes and Code sections as outlined in Table 1, have air leakage rates of less than 3.0 cubic feet per minute per square foot at 0.10 inch water pressure differential when tested in accordance with UL 1784.

4.3 Temperature Rise: The fire door assemblies identified in Table 2 of this report, as having a maximum temperature rise rating of "not more than 450° F" above ambient at the end of a 30 minute fire test exposure, are in compliance with 2015 IBC and 2012 IBC Section 715.5.5, for doors in interior exit stairways and ramps and exit passageways.

4.4 Horizontal Rolling Steel Fire and Smoke Shutter: The McKeon horizontal rolling steel fire and smoke shutter is not intended for use as a fire door assembly or as a floor fire door horizontal assembly and is included in this report as an alternative method of construction per IBC Section 104.11. The shutter has been tested and meets the requirements of UL 10B.

5.0 INSTALLATION

5.1 General: The McKeon fire doors, rolling steel doors, and accordion doors recognized in this report must be installed in accordance with the McKeon published installation instructions, the applicable Code, and this Research Report. A copy of the manufacturer's instructions must be available on the jobsite during installation.

5.2 Oversized Fire Door Assemblies: When a fire resistance rating is required for an opening exceeding the allowed size as described in Table 2 of this report, doors may be installed when use is approved by the Code Official having jurisdiction, provided that the oversized fire door assembly complies with oversized door labeling and certification requirements in accordance with IBC Section 716.5.7.2 [2009 - 715.4.6.2].

5.3 Smoke and Draft-control Fire Door Assemblies: The door assemblies described in Table 2 of this report, when labeled with an "S" rating, must include the manufacturer's supplied perimeter brush-type gaskets, or neoprene or fabric seals in accordance with the door manufacturer's installation instructions, and as per the assembly listing approval. Installation of smoke control doors must be in accordance with NFPA 105.

5.4 McKeon Horizontal Rolling Fire and Smoke Shutter: The horizontal shutter is intended for use as a protection device to compartmentalize vertical open spaces of two stories or less in accordance with IBC Section 712.1.12 and Section 404.5, and having no requirement for Smoke Control Systems as defined in IBC Section 909. The shutter is not intended to comply with IBC Section 711 as a Horizontal Assembly. The shutter is not intended to be a means of egress and is intended for applications that, when

closed, does not block means of egress. Approval for use is at the discretion of the building official.

6.0 CONDITIONS OF USE

6.1 Installation must comply with this Research Report; the manufacturer's published installation instructions, and the applicable Code. In the event of a conflict, this report governs.

6.2 Approved releasing devices, closing devices, door operators, fire exit hardware, and panic hardware must be installed as is required by the applicable Code.

6.3 Where applicable, side-swinging egress doors within the assembly must swing in the direction of egress travel, provide clear opening widths, and comply with opening forces as required by the applicable Code. Side-swinging egress doors must be listed and labeled fire doors in compliance with UL 10C with equivalent fire resistance rating to the parent assembly.

6.4 Opening sizes must not be greater than the size limitations specified in the applicable Code sections referenced in this report or Table 2 of this report, whichever is less.

6.5 Assemblies used to protect openings as fire resistance rated door assemblies and/or smoke and draft control assemblies must be maintained in accordance with Sections 107 and 703 of the IFC and Chapter 5 of NFPA 80. Annual inspections must be in accordance with Section 5.2 of NFPA 80.

6.6 The McKeon door products recognized in this report are manufactured at 44 Sawgrass Drive, Bellport, New York, under a quality control program with inspections by Intertek Testing Services NA, Inc. (AA-647).

7.0 SUPPORTING EVIDENCE

7.1 Reports of tests in accordance with Standards: NFPA 252 (2012), UL 10B (2015), UL 10C (2016), CAN/ULC S104 (2015), and UL 1784 (2015).

7.2 Reports of tests in accordance with the means of egress door test requirements of IBC Section 1010.1.4.3 [1008.1.4.3].

7.3 Quality Control Manuals and manufacturer's published installation instructions.

7.4 Intertek Listing Reports found on the Intertek Directory of Building Products.

- McKeon Series AC8000 Accordion Fire Door Systems With or Without Integral Proprietary Swing Doors
- McKeon Series S4000, S9000, and S7000 Side Coiling and Side Acting Steel Fire Door (Slats) with or without Integral Proprietary Swing Doors
- McKeon Series T2000/T5000/TU5000 Vertical Rolling Steel Fire Door with Integral Proprietary Swing Doors
- McKeon Vertical Rolling Steel Doors, Models - CFS, FSFD, FSFD-IS, FSFD-TR, Dynamic 110F, and SafeSpace 500F
- McKeon Horizontal Rolling Steel Fire and Smoke Shutter

8.0 IDENTIFICATION

The McKeon door products recognized in this report are identified with the manufacturer's name (McKeon Door Company), address and telephone number, the product name, the Intertek Mark as shown below, and the Code Compliance Research Report number (CCRR-1086).



In addition to the above identification requirements, McKeon listed fire door products referenced in Section 7.4 of this report are also required to have a permanent label with the Warnock Hersey Certification Mark with "US" and "C" country identifiers, the applicable test standards (UL 10B, NFPA 252, or CAN/ULC S104), the serial number, the words "DO NOT COVER OR REMOVE THIS LABEL", and the words "SEE INSTALLATION INSTRUCTIONS".

Labels for smoke and draft control assemblies contain the letter "S" with the statement "Also Meets Smoke & Draft Control".

Optional label information: Temperature transmission rate at 30 minutes as applicable.

9.0 FLORIDA BUILDING CODE

9.1 Scope of Evaluation: The McKeon fire doors, rolling steel doors, and accordion doors recognized in this report were evaluated for compliance with the 2014 *Florida Building Code – Building, Florida Building Code – Residential,* and *Florida Building Code – Energy Conservation.*

9.2 Conclusion: The McKeon fire doors, rolling steel doors, and accordion doors recognized in this report and described in Sections 2.0 through 8.0 of this Research Report, comply with the 2014 *Florida Building Code – Building* and *Florida Building Code – Residential* subject to the following conditions:

- The McKeon door products have not been evaluated for compliance with the High-Velocity Hurricane Zone provisions of the 2014 *Florida Building Code – Building* and *Florida Building Code – Residential*, and this use is outside the scope of this Research Report.
- Intertek is a quality assurance entity approved by the Florida Building Commission.

10.0 CODE COMPLIANCE RESEARCH REPORT USE

10.1 Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

10.2 Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Intertek.

10.3 Reference to the https://bpdirectory.intertek.com is recommended to ascertain the current version and status of this report.

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TABLE 1a – PROPERTIES EVALUATED

VERTICAL ROLLING STEEL DOORS, SIDE COILING FIRE DOORS, and ACCORDION DOORS			
PROPERTY	**2015 IBC SECTION[1]**	**2015 IFC SECTION[1]**	**2015 FBC SECTION[1]**
Fire resistance	716	701.1	Based on IBC (2012) 715
Smoke and draft control	710.5.2.2 and 716.5.3.1	701.1	Based on IBC (2012) 710.5.2.2 and 716.5.3.1
Means of egress	1010	1010	Based on IBC (2012) 1008

[1] Section numbers may be different for earlier versions of the International and Florida codes.

TABLE 1b – PROPERTIES EVALUATED

HORIZONTAL ROLLING SHUTTER			
PROPERTY	**2015 IBC SECTION[1]**	**2015 IFC SECTION[1]**	**2015 FBC SECTION[1]**
Alternative Material, Designs and Methods of Construction[2]	104.11	104.9	Based on IBC (2012) 104.11

[1] Section numbers may be different for earlier versions of the International and Florida Codes

TABLE 2 – FIRE DOOR RATINGS AND SIZE LIMITATIONS[3]

Door Type	Model	Fire Door Rating (Hours)	Temperature Rise Rating	Maximum Opening Sizes		
				Area (sq. ft.)	Width	Height
Vertical Rolling Steel Doors	CFS	3	-	156	13’-0”	12’-0”
	FSFD	4	-	156	13’-0”	12’-0”
	FSFD-IS	4	-	156	13’-0”	12’-0”
	FSFD-TR (2 layer)[1]	4	Not more than 450° F	156	13’-0”	12’-0”
	FSFD-TR (1 layer)[2]	1-1/2	Not more than 650° F	156	13’-0”	12’-0”
	Dynamic 110F	4	-	156	13’-0”	12’-0”
	SafeSpace 500F	4	-	156	13’-0”	12’-0”
	T2000	3	-	156	13’-0”	12’-0”
	T5000	3	-	156	13’-0”	12’-0”
	T2000-IS	3	-	156	13’-0”	12’-0”
	T5000-IS	3	-	156	13’-0”	12’-0”
	T2000-TR (1 layer)[2]	1-1/2	Not more than 650° F	156	13’-0”	12’-0”
	T5000-TR (1 layer)[2]	1-1/2	Not more than 650° F	156	13’-0”	12’-0”
	TU5000	3	-	156	13’-0”	12’-0”
Side-Coiling Fire Doors	S4000	3	-	135	13’-6”	10’-0”
	S9000	3	-	135	13’-6”	10’-0”
	S7000 Series	3	-	135	13’-6”	10’-0”
	S4000-IS	3	-	135	13’-6”	10’-0”
	S9000-IS	3	-	135	13’-6”	10’-0”
	S7000-IS Series	3	-	135	13’-6”	10’-0”
	S4000-TR (2 layer)[1]	3	Not more than 450° F	135	13’-6”	10’-0”
	S4000-TR (1 layer)[2]	1-1/2	Not more than 650° F	135	13’-6”	10’-0”
	S9000-TR (1 layer)[2]	1-1/2	Not more than 650° F	135	13’-6”	10’-0”
	S7000-TR (2 layer)[1]	3	Not more than 450° F	135	13’-6”	10’-0”
	S7000-TR (1 layer)[2]	1-1/2	Not more than 650° F	135	13’-6”	10’-0”
Accordion Doors	AC8000 Series	3	-	130	13’-0”	10’-0”
Horizontal Rolling Shutter	H200, H200-IS	2	-	200	12’-0”	16’-8”

[1] Temperature rise model when used as back-to-back pairs - Rise in temperature not more than 450° F (250°C) above ambient after first 30 minutes of fire exposure.

[2] Temperature rise model when used as single unit - Rise in temperature not more than 650° F (340°C) above ambient after first 30 minutes of fire exposure. When used in assembly, swinging egress doors must also be listed and labeled temperature rise doors.

[3] These products are smoke and draft-control fire door assemblies with an "S" rating when installed in accordance with NFPA 105, the applicable Code, and when installed with manufacture’s supplied perimeter sealing brushes/gaskets per the published installation instructions.