Tornado resistant openings

General information

The Paladin**™** Series door systems are specifically designed and tested to conform to the Federal Emergency Management Agency (FEMA) 320 and 361 guidelines and ANSI ICC500 standards providing security and safety for tornado shelters and severe storm areas of refuge.

The PW14 Paladin**™** Series doors include unique internal steel stiffeners which are welded to the face sheets. The full height mechanically interlocked edge seams and rigid end closures are welded and provide attractive and very durable doors.

The FP14 Paladin**™** Series frames are designed for installation in either interior or exterior locations as a part of the wall framing process. Three sided steel frames are furnished in three pieces (two jambs and a head) which are anchored to the wall systems.

Approvals

For up to date online Approvals and instructions to access, go to http://us.allegion.com/en/home/products/categories/doors-and-frames/steelcraft-pw.html, then click Approvals.

The *Authority Having Jurisdiction* is the final authority in issues related to the installation and use of any building products.

Paladin™ Systems offer a range of hardware applications based on ongoing testing for door, frame and hardware configurations. Applications are limited to the configurations tested.

How are frames supplied

The connecting corners of the 3-piece frame include precision factory die miters and interlocking tabs and corner clips. The corner miters are specially designed to insure a tight closed corner connection when installed properly. There are two methods of furnishing 3-sided frames to the jobsite:

- **Knock Down (KD):** Frames are supplied in 3 pieces for assembly prior to installation at the jobsite by the installing contractor.

- **Set-Up and Welded (SUA):** Prior to arriving at the jobsite, the 3-sided frame (with factory miters) is assembled (at the distributor's fabrication location, or by Steelcraft). The miters are welded (in accordance with ANSI A250.8-2017 [SDI 100]), finished and supplied to the jobsite ready for installation. SUA frames are shipped to the jobsite with temporary shipping bars attached.

Sizes and performance

All doors and frames are manufactured and supplied to meet the dimensional standards and performance levels as published in ANSI A250.8-2017 (SDI 100).

Special size products are available to meet the unique construction, performance and aesthetic requirements of the architectural community. Contact Steelcraft for those requirements.

Usage and application

To help simplify the use, selection and specification of Steelcraft Storm Resistance door and frame products, the following guidelines for base material selection can be used:

Material Gauge: the following base material thickness values were taken from the Underwriters Laboratories, Inc. publication for gauge number and equivalent thickness and describe the sheet steel products available from Steelcraft:

- **14 Gauge [0.067" (1.7 mm)]** for Extra Heavy Commercial and Institutional applications with extremely high use.

Material Selection: in addition to the thickness of base material, the following base material types of metal are available from Steelcraft:

- **Galvannealed Steel:** conforming to ASTM A924 and ASTM A653 recommended for exterior opening or interior openings with high humidity.

Installation

Proper installation is very important in providing reliable doors and frames for life-safety.

1. Installers of Paladin products should be experienced and capable. See available installation instructions as needed. Standards and ICC500-2014 must be followed in this life safety product.

2. The following industry standards should be referenced and followed:

   Installation of all Steelcraft frames and doors shall conform to the published Steelcraft installation instructions, ANSI A250.11-2012 (formerly SDI 105) Recommended Erection Instructions for Steel Frames and HMMA 840.

   Installation of Paladin™ Systems must conform to corresponding Intertek opening requirements, in compliance with FEMA 361 and ANSI ICC500-2014.

   All Fire Rated doors must be installed in accordance with the National Fire Protection Association Pamphlet 80 (NFPA 80), and/or the local Authority Having Jurisdiction.

3. Follow general instructions and videos in collaborative efforts from Steelcraft and SDI (for all Steel door and frame applications, not specific to Paladin).

   Frames:

   PDF of steps with images: "Steel Door Frame Installation in Masonry" www.steeldoor.org/pdf/steeldoorinstallationinmasonryconstruction.pdf

   Installaton video: www.steeldoor.org/videos.php#videos. Select "How to Install Frames in Masonry Construction"

   Doors:

   Door installation videos: www.steeldoor.org/videos.php#videos. Select "How to Install a Steel Door"

   - Note in addition to checking for fire labels as stated in this video, check also for ICC500-2014 / FEMA 361/320 labels on doors and frames.

   Troubleshooting:

   Troubleshooting videos: www.steeldoor.org/videos.php#videos. See Troubleshooting Videos section

4. For installation of hardware and accessories, follow applicable installation instructions from the manufacturer.

   for online resource links to the most current approvals.

PW Series flush doors

About the product

The Paladin™ PW14 Series Flush doors and FP14 Frame have been specifically designed, tested and approved to withstand extreme wind-load and flying missile impact. Unique engineered designs combined with the durability of superior corrosive resistant steel make Steelcraft PW14 Paladin™ Series Flush doors an excellent solution for added building protection from severe weather.

Specifiable options to meet application, specification and performance requirements include mechanical and electrical hardware preparations for exit hardware.

The PW14 Paladin™ Door and FP14 Frame System has been designed and tested to address the requirements of FEMA 361/320 guidelines and ANSI ICC500-2014 standards to protect the general public from the extreme effects of tornados. For compliance with the standards, the PW14 Paladin™ Door and FP14 Frame must be supplied as a system.

System features and benefits

DOOR: PW14 Paladin™ Series Flush Door:

1. **Steel Stiffened core construction** with stiffeners welded to one face sheet and attached with epoxy to the opposite face sheet.

2. **Full Height, Epoxy Filled Mechanical Interlock Edges** at lock and hinge edges with edge seams welded, filled and dressed smooth provide structural support and stability the full height of the door.

3. **Full Height Lock Side Reinforcement Channel** ensures structural stability under extreme pressure conditions.

4. **Universal Hinge Preparations** (patented) allow for easy field conversion from standard weight .134" (3.3 mm) hinges to heavy weight .180" (54.7 mm) hinges.

5. **14 Gauge (0.067") Inverted Top and Bottom Channels** with additional 12 Gauge (0.105") flush channel top cap.

6. **Custom Undercuts. ¾" maximum allowable undercut** to finished floor is provided standard to allow for a ½" saddle threshold. Specify your undercut needs based on latching hardware, finished floor, threshold and whether your strike sits flush.

    Hardware installation instructions must be followed. Use the instructions that came with the product or search

online at www.steelcraft.com. Required distance from bottom of door to top of strike (for rabetted, or bumper, thresholds on WS, bottom of latch housing to top of strike):

- Schlage LM9300: ⅛" min, ¼" max
- Von Duprin WS98/9927 & WS98/9957: ⅛"

The manufacturer's strike must be used, cannot be unduly modified, and must be anchored/grouted into the slab.

- For finished floors, strikes should sit on the finished floor and be anchored (LM) and/or grouted (WS) into the concrete slab securely.

- For thresholds, cut a hole for the strike plate (LM) to sit flush with top of threshold (ADA), or cup strike lip (WS) to sit on or flush (ADA) with top of threshold. Cut slab 1" min below and ¾" around the strike perimeter, then with threshold in place, grout full in the strike area, and embed the cup strike (WS) into the grout in the hole cut in the threshold, or anchor the strike plate (LM) after set. Note in using rabbetted, or bumper, thresholds with the WS, the bottom latch housing is mounted higher on door.

- Hardware and concrete guidance above are Steelcraft recommendations only. Hardware and industry specific building standards must be followed and should take precedence, although any differences in recommendations should be investigated and understood.

7. **Beveled Hinge and Lock Edges** allow for tighter installation tolerances, ensure easier operation and eliminate binding and sticking.

8. **Factory Applied Baked-On Rust Inhibiting Primer** paint in accordance with ANSI A250.10-2011.

9. **Standard A-60 Galvannealed Steel** face sheets for superior corrosion resistance on exterior openings

Specification compliance

1. Door construction for Steelcraft PW14 Paladin™ Series Flush doors meets the requirements of ANSI A250.8-2017 (SDI 100).

2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115.

ICC500-2014 / FEMA COMPLIANCE LABEL

Factory Label from Intertek (ITS/WHI) is applied to all PW14 Paladin™ Series Flush doors and FP14 Frame System.
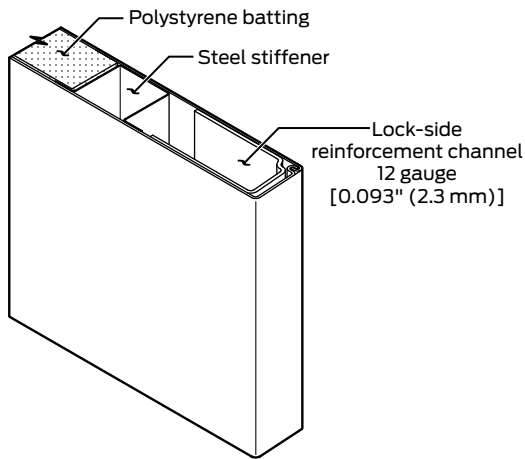
Fire ratings

Steelcraft PW14 Paladin™ Series Flush doors meet the broadest fire rating requirements. They are listed and labeled by Intertek (ITS/WHI). Installations requiring compliance to both neutral pressure testing UL-10B and positive pressure standard UL-10C.

Paladin Flush doors and frames can be fire rated up to and including 3 hours.

Paladin Glass Light doors and frames can be fire rated up to and including 1 ½ hours.

Standard construction

- Polystyrene batting
- Steel stiffener
- Lock-side reinforcement channel 12 gauge [0.093" (2.3 mm)]

Standard 12 gauge [0.093" (2.3 mm)]
Galvannealed Top Channel

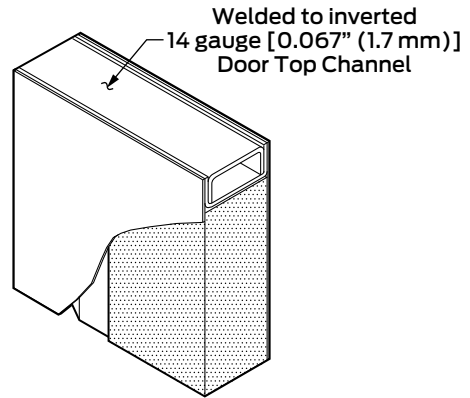Welded to inverted 14 gauge [0.067" (1.7 mm)] Door Top Channel

Standard PW14 Paladin™ series core
- Galvannealed Steel Stiffeners welded to one face sheet and attached with epoxy adhesive to the opposite face sheet
- 1 pound density insulation inserted between the steel stiffeners
- 12 Gauge (0.105") reinforcement channel at the lock edge

Standard Premium Edge Construction
- Beveled hinge and lock edges
- Full height mechanical interlock with epoxy adhesive
- Mechanical edge seam is welded and dressed smooth prior to applying the factory primer. No options
- Lock edge with 12 Gauge (0.105") channel

Standard Rigid End Channel Construction
- 14 gauge inverted galvannealed top and bottom channels
- Top channel includes an additional 12 Gauge (0.105") top channel.

Door Application and Usage			
Series	**Steel Thickness**	**Opening**	**Usage Frequency**
PW14	14 Ga (1.7 mm)	Interior - Galvannealed Steel Exterior - Galvannealed Steel	Maximum Duty	Tornado resistance in accordance with FEMA 361 and ANSI ICC500-2014 standards

Standard hardware preparations (ICC500-2014 and FEMA 361/320 compliant)

Universal mortise hinge prep

Patented Universal hinge preparations allow for easy field conversion from standard 4 ½" (114 mm) x 0.134" (3.3 mm) standard weight hinges to 4 ½" (114 mm) x 0.180" (4.7 mm) heavy weight hinges.
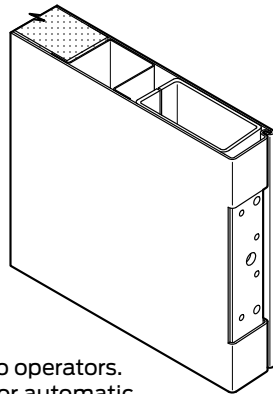
- Optional preps for 5" (127 mm) x 0.146" (3.7 mm) standard weight hinges or for 5" (127 mm) x 0.190" (4.8 mm) heavy weight hinges.

- High frequency hinge prep is also available and is required with auto operators. For reinforcement requirements for automatic operators, see "High frequency hinge reinforcement F and FE Series" on page 79.

- The 12 gauge lock side reinforcement shown beside the center hinge prep supports the panic bar on a WS device.

WS98/9927/9957

Prep for Von Duprin Windstorm devices:

- 2-point WS98/9927(F)

- 3-point WS98/9957(F)
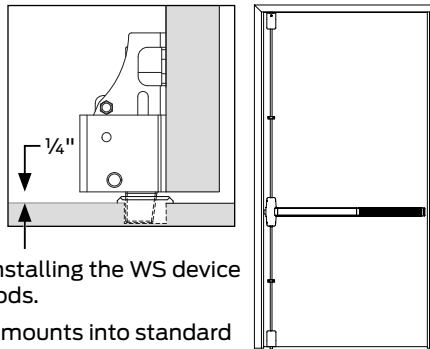
The 12 gauge lock side reinforcement provides support for installing the WS device with surface vertical rods.

Bottom latch housing mounts into standard 12 ga lock side channel reinforcement.

See Figure 11.1: PW-Series hardware preparations for reinforcement locations.

Note: Housing will be mounted higher on door for rabbetted threshold. See page 211, #6.

LM9300

Prep for LM9300 MultiPoint (3-pt).

- CVR (concealed vertical rod) assembly is installed at the factory

- Center latch is shown with 8" high cutout for astragal prep. Typical prep is 4 ⅞" ASA prep. See "Hardware preparations" on page 235.

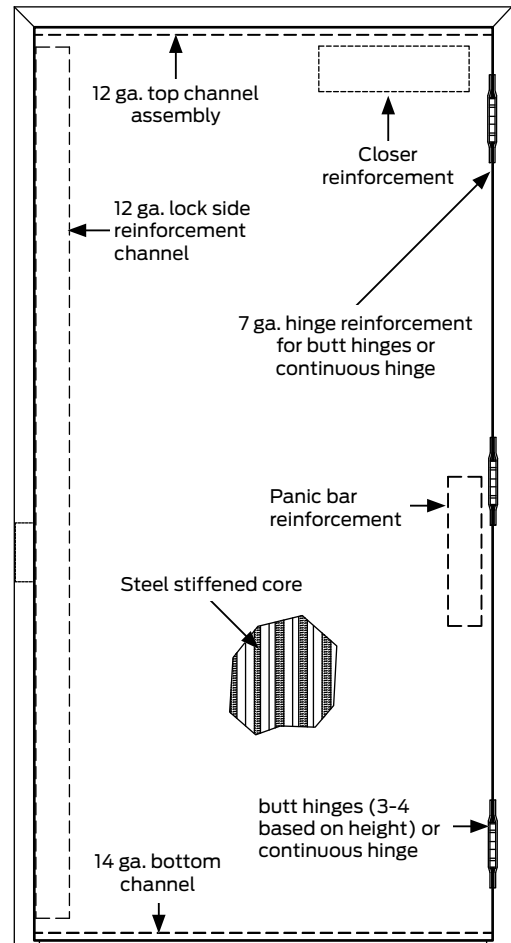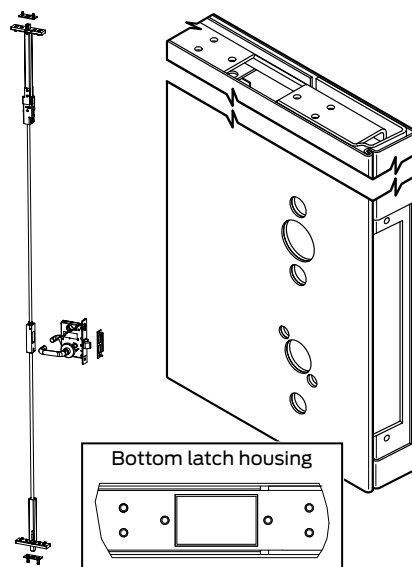- See Figure 11.1: PW-Series hardware preparations for reinforcement locations.

Bottom latch housing

12 ga. top channel assembly

Closer reinforcement

12 ga. lock side reinforcement channel

7 ga. hinge reinforcement for butt hinges or continuous hinge

Panic bar reinforcement

Steel stiffened core

butt hinges (3-4 based on height) or continuous hinge

14 ga. bottom channel

Figure 11.1: *PW-Series hardware preparations*

Inactive leaf ASA strike prep with astragal attached

Mounting tabs for the ASA 4 ⅞" (124 mm) mortise strikes are attached to the door edge for direct mounting
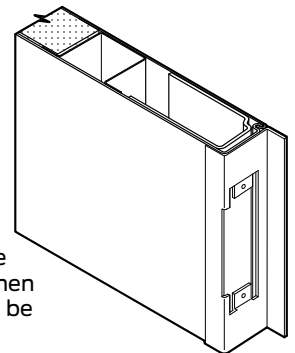
- Astragals, cut-out only for the flush mounting of the strike to the door. There are no tabs attached to the astragal. Note astragals can be used with LM9300 pairs but should not be used with panic exit devices. When not using astragals, the gap can be filled with Zero gasketing

Surface bolt reinforcement is provided for inactive leaves

Standard 14 gauge [0.067" (1.7 mm)] with optional full width reinforcement

20" closer reinforcements are provided.

- Full width surface closer
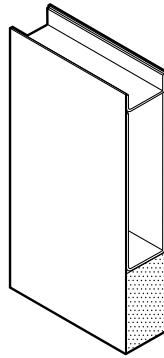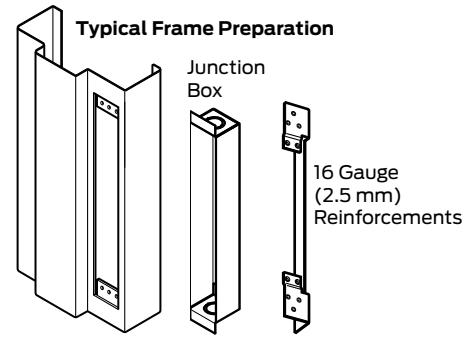- Surface overhead holder/stop
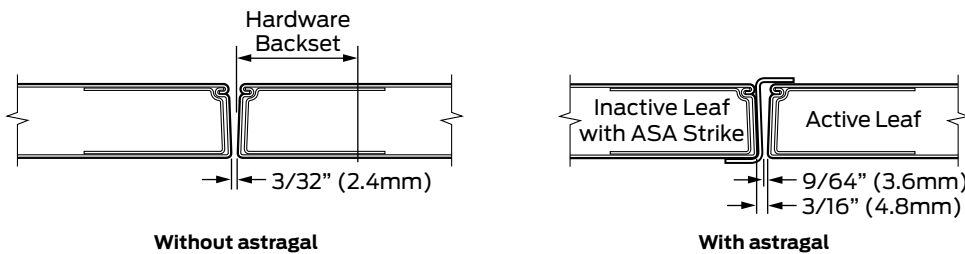- Surface Floor & Wall stops/holders

Electrical Preps

Options will be reviewed by engineering at the time of order and will not be available in OEW. The following options are available:

Typical Frame Preparation

Junction Box

16 Gauge (2.5 mm) Reinforcements

- Power transfer units (EPT2, EPT10)
- Electric hinge
- Electric door closer utilizes the same preps shown in "closers"
- Magnetic hold opens utilize the same preps shown in "closers." Must be outswing and must be located away from hardware/rod locations to avoid interference.
- Door position switch (round) must be mortised into edge or top of door
- Magnetic switch (rectangle) must be mounted to exterior or storm side only
- Auto operator allowed on exterior, or storm side, only and must use high frequency hinge reinforcement and 5" heavyweight hinges.

Meeting edge details for pairs of doors

Hardware Backset

3/32" (2.4mm)

Without astragal

Inactive Leaf with ASA Strike | Active Leaf

9/64" (3.6mm)
3/16" (4.8mm)

With astragal

Door Sizes and ANSI A250.8 Conversions							
			Minimum and Maximum Sizes				
Series	**ANSI A250.8 - SDI 100**	**Edge Construction**	**Single**		**Pair**		**Recommended Gauge of Frame**
			Min	**Max**	**Min**	**Max**	
PW 3-sided flush	Not Applicable	Welded	3' 0" x 6' 8" 914 x 2032 mm	4' 0" x 8' 0" 1219 x 2438 mm	6' 0" x 6' 8" 1829 x 2032 mm	8' 0" x 8' 0" 2438 x 2438 mm	14 Gauge [0.067" (1.7 mm)]
PW 3-sided PV/PVF							
PW 3-sided PN-PNF							
PW 4-sided flush (shutters)			2' 8" x 4' 3" 813 x 1295 mm	4' 0" x 8' 0" 1219 x 2438 mm	5' 4" x 4' 3" 1629 x 1295 mm	8' 0" x 8' 0" 2438 x 2438 mm	

NOTE: Review for approved hardware, notes and restrictions.

Glass light options

Fully installed from the factory Glass lights with trim included in PV and PN label Light designs without modification. Lights can be added to any Paladin door available in a 3-sided frame. Lights are not available in variable sizes or locations. Fire rated versions (PVF and PNF) are available up to 90 minutes. Narrow light is ADA compliant.

See "Paladin glass lights" on page 164 for further details and options, including care and instructions concerning your glass lights before and after installation.

- Standard 1" Thick Glass. Fire rated glass is slightly, but not noticeably, thicker.

Narrow light with Schlage LM9300 concealed rods lock and latch*
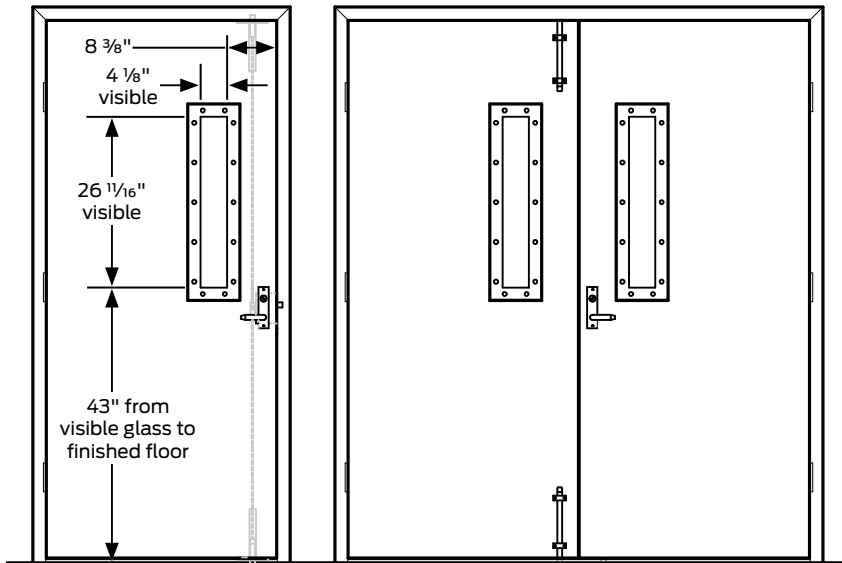
Vision light with Schlage LM9300 concealed rods lock and latch*
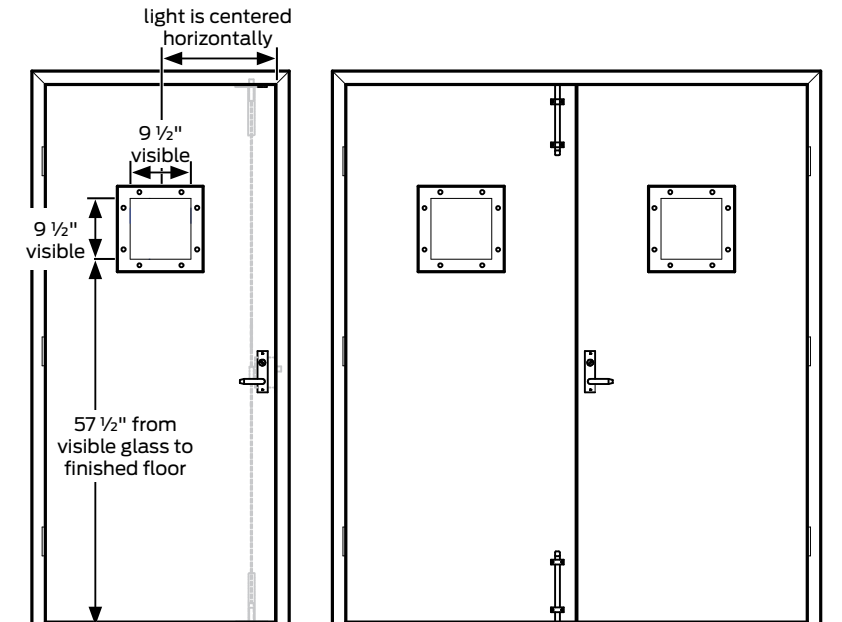
* Also available with WS98/9927 2-pt Panic Exit and WS98/9957 3-pt Panic Exit (same size and location glass)

Paladin handing

Correctly understanding handing in ordering and installing tornado products is critical to life safety. In referencing "Handing procedures diagrams" on page 11, use the following IMPORTANT rules when considering Tornado openings.

- The Exterior, or Outside, is always the Storm side (the side of the door that faces a storm). Typically this is the Key Side, but not always (e.g. not typical, but if the shelter is the hallway and a connected classroom is outside of the shelter, the outside of your door would face the classroom since that is the side facing the outside, or storm side, of the shelter).
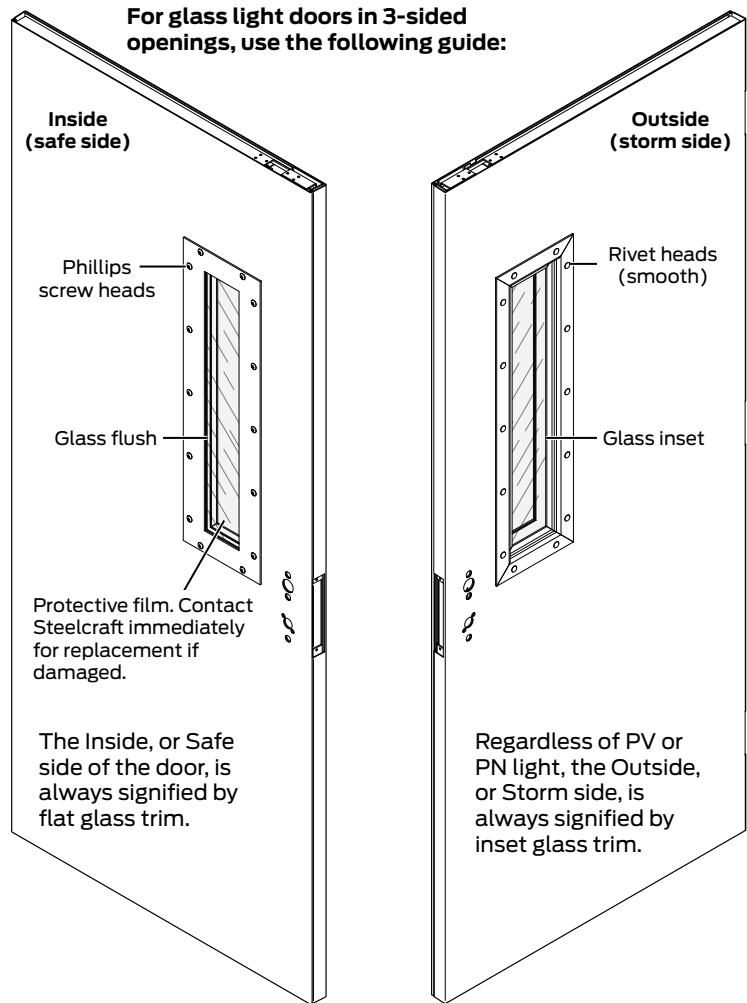
- The Interior, or Inside, is always the Safe side (the side on the inside of your shelter or safe room). Typically this is the non-Key Side, but not always (e.g. not typical, but if the shelter is the hallway and a connected classroom is outside of the shelter, the inside of your door would face the hall since that is the side facing the inside, or safe side, of the shelter).

- Note that PW doors may be inswing or outswing when using lever trim. But PW doors with panic exit hardware will always be outswing with the panic bar on the safe side and the door opening out towards the Outside, or Storm side.

For glass light doors in 3-sided openings, use the following guide:

Inside (safe side)

Phillips screw heads

Glass flush

Protective film. Contact Steelcraft immediately for replacement if damaged.

The Inside, or Safe side of the door, is always signified by flat glass trim.

Outside (storm side)

Rivet heads (smooth)

Glass inset

Regardless of PV or PN light, the Outside, or Storm side, is always signified by inset glass trim.

Shutter handing

Most shutter applications should be ordered as straight handed.

- Straight handed shutters (Figure 11.2: Straight handed shutters): Shutters with glass in a 4-sided frame are always straight handed. If the shutter opening does not have glass, but is still installed into the rabbet nearest to the inside/shelter/safe side of the opening, then the shutter is still straight handed.

- Reverse handed shutters (Figure 11.3: Reverse handed shutters): Shutters without glass that are installed into the rabbet nearest to the storm side of the opening is reverse handed. This option would not have glass.
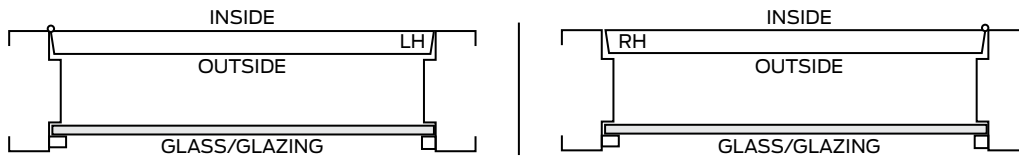
INSIDE LH
OUTSIDE
GLASS/GLAZING

INSIDE RH
OUTSIDE
GLASS/GLAZING

Figure 11.2: *Straight handed shutters*

RHR INSIDE
OUTSIDE
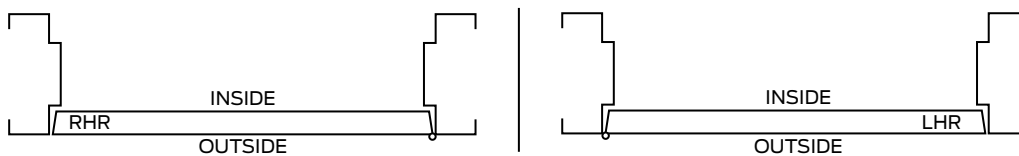
INSIDE LHR
OUTSIDE

Figure 11.3: *Reverse handed shutters*
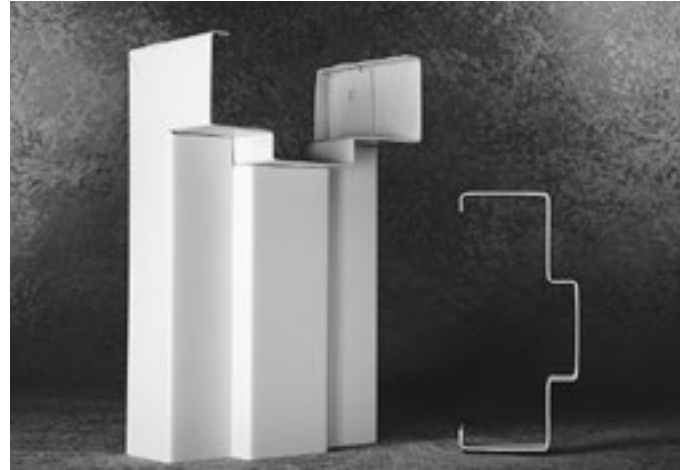
FP14 Series flush frames

About the product

The FP14 Paladin™ Series 3 Sided flush frames are designed to meet requirements of ICC500-2014 code, FEMA 361/320 guidelines, and ANSI compliance to protect the general public from the extreme effects of tornados. These frames are available in 14 gauge [0.067" (1.7 mm)] only. They are installed in both interior and exterior locations, and in virtually all types of buildings and wall constructions. These frames are to be installed as part of the wall framing sequence. They can be specified and supplied as KD (knock-down) for field assembly prior to installation or SUA (set-up and welded) for installation as a pre-welded unit. All FP14 Paladin™ Series frames include the ICC500-2014 / FEMA 361/320 Label.

Features and benefits

Steelcraft FP14 Paladin Series flush frames offer the following unique features which enhance long term functionality and durability:

1. **14 Gauge A60 galvannealed steel** f**or superior corrosion resistance** on exterior openings.

2. **Die-mitered corner connections** at the head and jamb. Standard corners insure attractive, tight and closed miters.

3. **Patented universal hinge preparations** allow for easy field conversion from standard weight .134" (3.3 mm) thick hinges to heavy weight .180" (4.7 mm) hinges.

4. **Adjustable base anchors** allow for installation adjustment when the floor is not level.

5. **Factory applied baked on rust inhibiting**

Specification compliance

1. Overall frame construction for the Steelcraft FP14 Paladin™ Series flush frames meets the requirements of ANSI A250.8-2017 (SDI 100).

2. Hardware preparations and reinforcements are in accordance with ANSI A250.6-2003 (R2009). Locations are in accordance with ANSI/DHI A115.

ICC500-2014 / FEMA COMPLIANCE LABEL

The FP14 Paladin Series flush frames meet fire rating requirements. They are listed by Intertek (ITS/WHI) installations requiring compliance to both neutral pressure testing UL 10B and positive pressure standard UL 10C. Refer to the Fire Rated Section of this manual for particular listings.

Hardware and concrete recommendations from Steelcraft are only guidelines. Hardware and industry specific building standards must be followed and should take precedence, although any differences in recommendations should be investigated and understood.

Fire ratings

Steelcraft FP14 Paladin Series Flush doors meet the broadest fire rating requirements. They are listed and labeled by Intertek (ITS/WHI). Installations requiring compliance to both neutral pressure testing UL-10B and positive pressure standard UL-10C.

Paladin Flush doors and frames can be fire rated up to and including 3 hours.

Paladin Glass Light doors and frames can be fire rated up to and including 1 ½ hours.

Applications

FP14 Paladin Series flush frames are typically installed in wall construction types as defined in the chart below:

Frame Applications			
Profile	Steel Thickness	Wall Construction	Typical Wall Anchors
FP14	14 Gauge [0.067" (1.7 mm)]	New Masonry - CMU Block	Masonry T
		Existing Masonry* ▪ Concrete (e.g. tilt-up or prefab) ▪ CMU Block	Bolted through Soffit and Tube and Strap anchor

*Note: Frames in existing masonry wall constructions are not required to be grouted, except for 4" face heads, which must be grouted.

Elevation

2" (50 mm) 2" (50 mm) Finished Opening Width 2" (50 mm)

9 ¾" (248 mm)

Standard 14 gauge [0.067" (1.7 mm)] closer reinforcement

14 gauge RIM Strike reinforcement

alt 12 gauge RIM strike reinforcement

Ȼ HINGE

Equal

Finished Opening Height

Ȼ HINGE

STRIKE Ȼ

Equal

Ȼ HINGE

10 ⅜" (264 mm)

3' 4 5/16" (1024 mm)

Standard Double Rabbet Frame

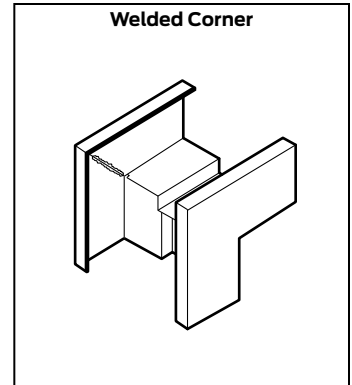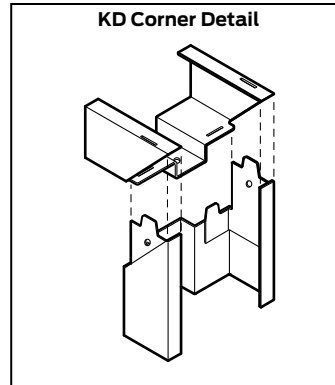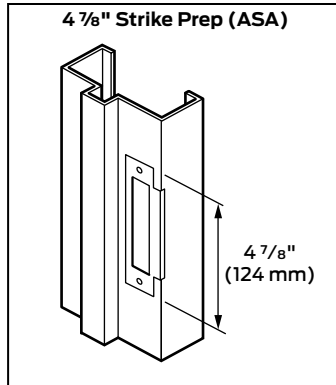*½" (13 mm)

1 9/16" (40 mm)

Throat Opening

Varies

Jamb Depth

1 15/16" (49 mm)

*½" (13 mm)

5/8" (16 mm)

2" (50 mm)

Opening Width

Note: FP14 Paladin™ Series Frame are available as double rabbet only.

Frame Sizing Options

Series	Minimum and Maximum Size				Jamb Depth Availability (Profile)			Standard Profile Dimensions (Variations Available)			Corners
	Single		Pair		Single Rabbet	Double Rabbet		Face	Stop	Returns	Standard
	Min	Max	Min	Max		Min	Max				
FP14 3-sided	3' 0" x 6' 8" 914 x 2032 mm	4' 0" x 8' 0" 1219 x 2438 mm	6' 0" x 6' 8" 1829 x 2032 mm	8' 0" x 8' 0" 2438 x 2438 mm	N/A	5 ¾" 146 mm	10 ¾ 273 mm	2" 51 mm	⅝" 16 mm	½" * 13 mm	DIE MITERED with four (4) concealed tabs interlocking head and jambs
FP 4-sided (shutters)	2' 8" x 4' 3" 813 x 1295 mm	4' 0" x 8' 0" 1219 x 2438 mm	5' 4" x 4' 3" 1629 x 1295 mm	8' 0" x 8' 0" 2438 x 2438 mm							

n/a = not available

* except 5 ¾" (146 mm) depth, which is 7/16" (11 mm)

Universal Mortise Hinge Prep	4 ⅞" Strike Prep (ASA)	KD Corner Detail	Welded Corner
4 ½" Standard (114 mm) 5" Optional (127 mm) 7 Gauge Hinge Reinforcement	4 ⁷/₈" (124 mm)		
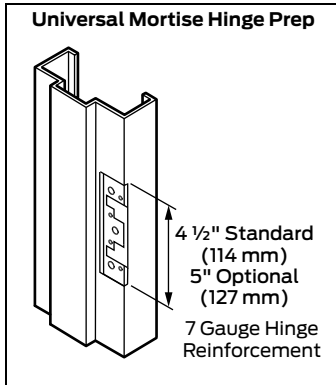
General notes

1. Variations in jamb depths available in ⅛" (3 mm) increments.

2. All FP Paladin™ Series Frames are supplied standard with Masonry T anchors for new masonry. For existing masonry, Tube and strap anchors welded in from the factory with punch and dimpled frames including approved anchor bolt. Anchors and bolts are designed and selected for maximum wall/frame engagement for Tornado applications. Additional information is available upon request.

3. FP Paladin™ Series Frames are to be installed as part of the framing sequence.

4. All frames are supplied with a factory applied baked-on primer for ultimate field paint adhesion.

5. Steelcraft provides Galvannealed steel for both interior and exterior applications.

6. Frames do not have silencer holes from factory; recommend self-adhesive type to be applied in the field.

Optional 4" (102 mm) Face Head Detail
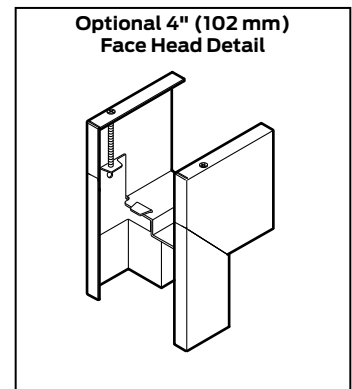
Door Sizes and ANSI A250.8 conversions

Series	Frame Profile		Corner Connections				4" (182 mm) Heads
	Single Rabbet	Double Rabbet	KD (Knock-Down)		SUA (Up and Welded) (Set)		
			Single Rabbet	Double Rabbet	Single Rabbet	Double Rabbet	
FP14	N/A	Typically for walls 4 ¾" (121 mm) thick or greater	N/A	4 tabs per factory die-miter	N/A	Available when specified, and in accordance with ANSI A250.8-2017 (SDI 100).	Die-mitered for use with 2" (51 mm) face double rabbet jambs. Available when specified for KD or SUA applications.

Anchoring systems

All anchors are included with your order. Installation instructions will accompany your shipment. If you have questions, please contact technical support for Steelcraft.

See "Anchoring systems" on page 84 for drawings and general information on the FP anchors below:

New Masonry (CMU Block Walls)

- Masonry T anchors and adjustable base anchors are provided standard with your order when specifying new masonry shelter walls

Existing Masonry (Concrete or CMU Block Walls)

- Tube and Strap anchors provided standard with punch and dimple frame prep and approved bolts from the factory when specifying existing masonry walls. You must specify shelter wall type when ordering to ensure the correct number of preps for your openings:

  - Concrete (tilt-up/pre-fab) walls (TSCONC)
  - Concrete-filled CMU block walls (TSBLOCK)

- When specifying a 4" face head, you will have a different bolt set than 2" face jambs and heads

- Refer to installation instructions on your distributor customer portal under doors and frames.

Framing applications

Series	Steel Type	Building Type	Opening	KD Corner	SUA Corner	Applications
FP14	Non-Galvanneal Galvannealed	Institutional and Commercial	Mainly Interior Exterior if Specified	X	X	Tornado Shelters in accordance with ICC500-2014 and FEMA 361

Approvals

Openings with Von Duprin® and Schlage® hardware
The **Paladin™ Series** door system (PW14 Series doors and FP14 Series frames) are available in compliance with FEMA 361 and ANSI ICC500-2014 with factory attached ITS/WHI Intertek listed or approved opening labels in the configurations shown below.

For complete Assembly Approvals, see "ICC 500-2014 and FEMA Approved Paladin Tornado Hardware Offering" on page 222, or go online to Steelcraft PW Series and click on "Approvals" for a link to ITS/WHI Intertek website approvals.

The Authority Having Jurisdiction is the final authority in issues related to the installation and use of any building products.

Steelcraft's Paladin™ Series door system is tested as a complete door frame and hardware system. Door, frame and anchors must be ordered from Steelcraft.

When specified, ITS/WHI fire door labels are factory attached stating listings in accordance with UL10C Fire Resistance Ratings in the configurations shown below.

Model	Latching hardware			Single-Outswg		Single-Inswg		Pair-Outswg		Pair-Inswg		Figure	
	Exit	Rod	Latches	Tornado	Fire	Tornado	Fire	Tornado	Fire	Tornado	Fire	Single	Pair
Schlage LM9300	Lever	CVR	3-point	320/361	3 hr	320/361	3 hr	320/361	3 hr	Yes	3 hr	11.4	11.6
Securitech 52xx-V	Lever	CVR	2-point	320/361	n/a	n/a	n/a	320/361	90 m	n/a	n/a		
Securitech 53xx	Lever	CVR	3-point	320/361	3 hr	n/a	n/a	320/361	3 hr	n/a	n/a		
Securitech 7L, 83L	Lever	CVR	3-point	320/361	3 hr	n/a	n/a	320/361	3 hr	n/a	n/a		
ATAR RB-100	Lever	CVR	3-point	320 only	3 hr	320 only	3 hr	320 only	3 hr	n/a	n/a		
Medeco 3-deadbolt with Schlage ND or Falcon NT	Lever	n/a	3-point	320 only	3 hr	320 only	3 hr	320 only	3 hr	n/a	n/a		
Von Duprin WS98/9927	Panic bar	SVR	2-point	320/361	none	n/a	n/a	320/361	90 m	n/a	n/a	11.5	11.7
Von Duprin WS98/9957	Panic bar	SVR	3-point	320/361	3 hr	n/a	n/a	n/a	n/a	n/a	n/a	11.5*	n/a
Securitech 7T	Panic bar	CVR	3-point	320/361	3 hr	n/a	n/a	320/361	n/a	n/a	n/a		
Securitech 83T	Panic bar	SVR	3-point	320/361	3 hr	n/a	n/a	320/361	n/a	n/a	n/a		

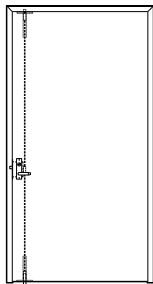Any levers shown can be used as pair (2-point latch only) with Ives SB360 surface bolt for inactive leaf

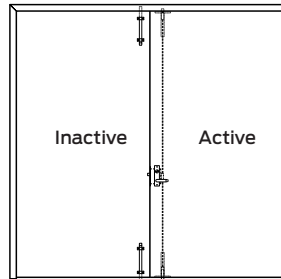

Figure 11.4: *LM9300 3-point latch (shown)*

Inactive   Active
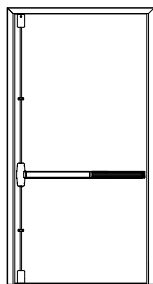
Figure 11.6: *LM9300 3-point latch (shown)*

Figure 11.5: *WS98/9927 2-point latch (shown)*

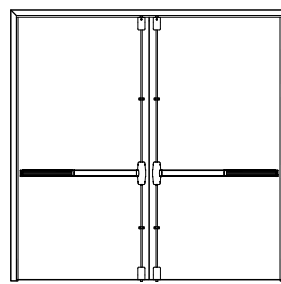WS98/9957 (not shown) is similar but is a 3-point latch, adding a center latch point.

Figure 11.7: *WS98/9927 2-point latch (shown)*

Notes:
1. See page 211, note 6 for information regarding undercuts and installation.
2. LM 9300 Inactive leaf must use IVES SB360 surface bolts. See LM9300 data sheets and installation instructions in the online library at us.allegion.com/en/home/document-library.html for more information.
3. WS devices available with EO (exit only). NL (night latch) not available. Electrical options include LX, RX, RX-2, ALK, SS, QEL, E996L E-Trim. See WS98/9927 data sheets and installation instructions in the online library at us.allegion.com/en/home/document-library.html for more information.
4. See "ICC 500-2014 and FEMA Approved Paladin Tornado Hardware Offering" on page 222.
5. Available glass light options may be added to any PW flush door in a 3-sided frame.

ICC 500-2014 and FEMA Approved Paladin Tornado Hardware Offering
Intertek tornado listing

Type	Brand	Models		Description/Notes		UL Fire listings
Latches - Panic Exit hardware Outswing only	Von Duprin	WS98/9927	with or without (F)	2-point, Panic bar, surface vertical rods (no primary), electrified options		R4504
	Von Duprin	WS98/9957		3-point, Panic bar, surface vertical rods, electrified options		SA163
	Von Duprin	LGO-3, LGO-4		ADA Latch guards. Verify availability prior to order.		
	Ives	SB360		Top and bottom surface bolts for inactive leaf, any 2-point lever		R4942
	Securitech	7T Series		3-point, concealed vertical rods, elect options		R27798
	Securitech	83T Series, 84T Series		3-point, surface vertical rods, elect options		R27798
Latches - Multi-point Lever hardware Outswing & inswing	Schlage	LM/LMV9300 Series		3-point lock		R27031
	Von Duprin			concealed vertical rods		R21149
Latches - Multi-point Lever hardware Outswing only	Securitech	5200 Series-V		2-point, concealed vertical rods (no primary)		R27798
	Securitech	5300 Series, 5400 Series		3 or 4-point, concealed vertical rods		R27798
	Securitech	7L, 83L, 84L Series		concealed vertical rods, HVL, electrified options		R27798
Latches - Latching hardware for FEMA 320 only Outswing & inswing multi-action release for small business and residential applications <16 occupancy	Securitech	ATAR System RB-100 Series		multi-latch system with HVL (bottom lock jamb bolt), in conjunction with cylindrical locks shown below		
	Medeco	Maxum		3 manual deadbolts in conjuction with cylindrical locks shown below		R18248
	Schlage	ND Series		Cylindrical locks used with Medeco Maxum or Securitech ATAR System		R3515
	Falcon	NT Series				GWVW
Butt hinges	Ives	3CB1, 3CB1HW, 3CB1NRP, 3CB1HWNRP, 3CB1SH, 3CB1HWSH, 5BB1, 5BB1HW, 5BB1WT, 5BB1NRP, 5BB1HWNRP, 5BB1SH, 5BB1HWSH, 5BB1HW WT		Ives butt hinges - 4.5 High (0.134 Min) or 5 high (0.146 Min)		R16697
	Ives	TW4, TW8		Ives electric hinge options		BP9752
Continuous hinges	Ives	112HD, 112XY, 224HD, 224XY		Ives aluminum geared continuous hinge - nominal leaf thickness 0.110		R16697
	Ives	600, 700, 700Cs, 705		Ives steel pin & barrel continuous hinge - nominal leaf thickness 14 gage		R16697
	Ives	TW8, TWP		Ives electric continuous hinge options		BP9752
Electric power transfer	Von Duprin	EPT-2, EPT-10				SA163
Surface mounted closers	LCN	4000T, 4010, 4010T, 4020, 4020T, 4030, 4030T, 4040XP, 4040XPT, 4050, 4110, 4110T		All surface mounted closers must be attached to door with through bolts per manufacturer's installation instructions. Covers must be attached with steel screws. 4010, 4040XPT, 4000T & 4050 do not open to 180 degrees, so application should be confirmed.		R1943
	Falcon	FALCON SC70 (heavy duty), SC80A, SC60A				R1943
Overhead holder/stop	Glynn Johnson	70S, 79S, 81S, 90S		surface mount overhead holder/stop	79 Series does not open to 180 degrees, so application should be confirmed.	R18895
Electronic door closer	LCN	4040SE, 4310ME		LCN-Sentronic electronic door closer	4310ME May be mounted on interior or exterior side of storm shelter or safe room. 4040SE exterior side only.	R1943
Auto-door operator	LCN	9542, 9553		To be mounted only to the exterior side of storm shelter or safe room.		R7303
Magnetic holder	LCN	SEM 7800		Extenders not permitted on inswing applications		R8327
Door position switch	Schlage	679-05 (round), 7764 (rectangular)		Must be mortised into the edge or top of the door, and into the door rabbet of the jamb or head of the frame.		
	Sentrol	1076, 1078 (round), 2757 (rectangular)				R13778
Kick plates	Ives	8400 (Metal or plastic), 8402 (metal)		Must be secured with steel screws. 48 Max height bottom of door only.		R22142
Thresholds & gasketing	Zero	multiple		Must not impede or affect the function of the opening or latching hardware.		R18465
Floor & wall stops/ holders	Ives	multiple		Attached to exterior with steel screws per manufacturer's instructions. Interior application must be Ives FS495 through bolted to the door, at the bottom only, minimum 6 from lock or strike side of door.		

Notes:

1. Glass lights approved with Schlage and Von Duprin latching hardware only. See "Glass light options" on page 215

2. For ½" ADA thresholds, the bottom strike should be mounted flush with the top of the threshold.