

SCHLAGE



STEELCRAFT



VON DUPRIN



ALLEGION

Windstorm solutions

**For the harshest
environmental conditions**

When safety is as important as security™

Severe weather takes a tremendous toll in the United States. From 2018-2020, there were over 3,700 tornadoes resulting in 128 deaths in the US¹. Between 2016-2018, 72 hurricanes or tropical storms resulted in 4,285 deaths and over \$97 billion in damages².

This brochure is intended as an introduction to severe weather codes and guidelines in the United States, and as an overview of Allegion severe weather solutions. Requirements and details vary state to state so please contact your local Allegion representative to discuss the appropriate solution for your needs or call 877-671-7011 to get connected with someone in your area.

References

1. <http://www.spc.noaa.gov/climo/online/monthly/newwm.html>
2. <https://www.wunderground.com/hurricane>

Information and customer care



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Due to the technical nature of these applications, Allegion recommends contacting one of our specification writers for help. Submit a request here: <https://us.allegion.com/en/home/support/contact-spec-writer.html>.

Types of severe weather

Tornado

Tornado resistant openings are designed to protect occupants during short periods of high-velocity winds. The strongest tornadoes produce wind speeds up to 250 mph and dangerous projectile debris. Tornado devices are specially designed and tested to withstand these conditions. Most tornadoes in the United States occur in the Midwest, Central and Southeastern states. The primary guidelines and standards concerning tornado applications are FEMA P-361, FEMA P-320 and ICC 500.

Hurricane

Hurricane resistant openings are designed to withstand storm conditions for long periods of time while maintaining the structural and functional integrity of the opening. The primary purpose is to not only prevent debris and wind from penetrating the assembly but also to maintain functionality after the storm. Florida was the first state to develop hurricane codes. As a result, the requirements in the Florida Building Code may be adopted by jurisdictions in other states where hurricane protection is a necessity.

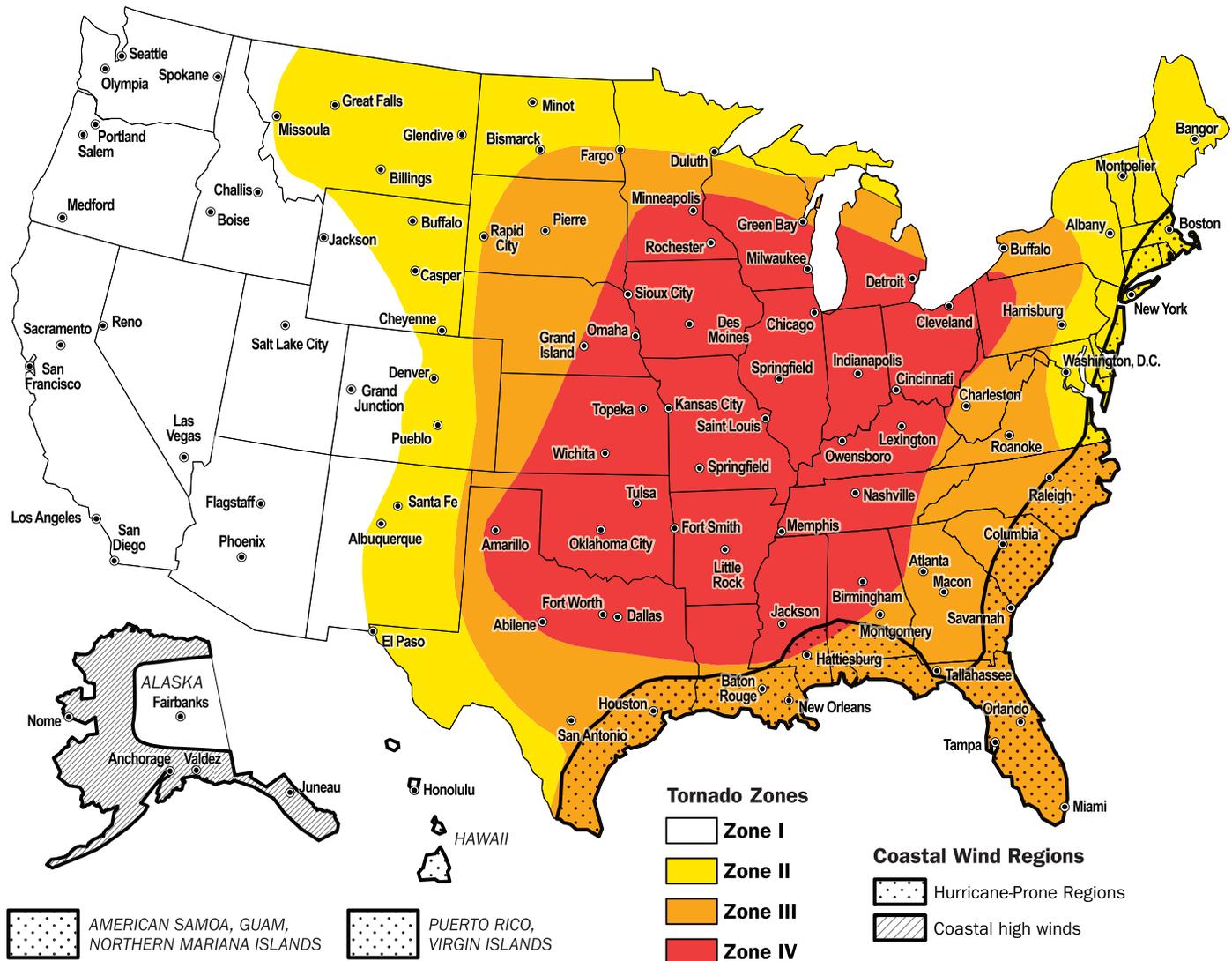


Figure 2-8: Wind hazards in the United States

Note: Always reference local codes for specific jurisdiction requirements.

Map reference: https://www.fema.gov/sites/default/files/documents/fema_taking-shelter-from-the-storm_p-320.pdf

Codes and requirements

Tornado guidelines and standards

The tornado guidelines used in the United States were established by the Federal Emergency Management Agency (FEMA) after a series of devastating tornadoes in the 1990s. Today, the FEMA P-320/P-361 guidelines and ICC 500 test standards are the principle governing documents for tornado protection. All Allegion tornado products are assembly listed with Intertek as certified to these guidelines and test standards.

FEMA P-320, FEMA P-361 (guidelines):

Both FEMA P-320 and FEMA P-361 provide guidelines for tornado resistant structures. FEMA P-320 pertains to residential safe rooms (occupancy <16 people) whereas FEMA P-361 is for community storm shelters (occupancy ≥ 16 people) and a single action is required to exit (multi-point or panic exit hardware). All products in this catalog identified as FEMA compliant are held to the more stringent FEMA P-361 standard and can be used in both residential and community applications. For more information, visit www.FEMA.gov.

ICC 500 (testing standard):

ICC 500 is the most up-to-date testing standard for community and residential storm shelters that provide a safe refuge from storms that produce high winds, hurricanes, and tornadoes. While the design guidelines are contained within FEMA 320/FEMA 361, the testing standards are contained within ICC 500. All tornado assemblies listed within this document are tested at the highest level of ICC 500, and have passed all tests deemed necessary to withstand windspeeds up to 250 mph, design pressures of +/-252 PSF, and multiple 15 lb projectile impacts at 100 mph, the equivalent of an EF5 tornado. For more information, visit www.iccsafe.org.

All ICC 500 approved hardware and accessories are publically listed with Intertek and are shown in [Steelcraft Technical Data Manual](#). Click on “Tornado resistant openings” then “Approvals” to jump to the page.



Hurricane codes

Miami-Dade County in Florida was the first to certify products for Hurricane resistant structures. Subsequently the Florida Building Code enacted all the requirements for Hurricane resistance and now has standards equivalent to the Miami-Dade County requirements. Because of their leadership in hurricane codes, many states reference the requirements set forth in the Florida Building Code, whereas some states have developed their own requirements. Texas, for example, developed their standard in cooperation with the Texas Department of Insurance. The intent of this brochure is to provide a general guideline for severe weather – always work with your local Allegion sales representative for the specific requirements in your state.

Florida Building Code (FBC) TAS 201, 202, 203 [wind and impact zone (HVHZ)], ASTM E1886, ASTM E1996, ASTM E330:

Exterior door assemblies certified for installation within the Florida High Velocity Hurricane Zone (coastal region of the state) are subject to specific tests for both wind speed and flying debris called out in the TAS or ASTM test protocols of the Florida Building Code. Impact, structural, and cyclic tests must be conducted on full assemblies (i.e. lock or exit device and door) as part of the standard.

ANSI-ASTM E330 [Wind-Only (non-impact zone)]:

Exterior door assemblies certified for installation in non-impact regions (typically inland regions) are tested for structural integrity in accordance with ASTM E330 for Wind-Only applications. These doors are subject to a structural test load equal to 1.5 times their actual design pressure rating, and must remain operable with no breakage of glazing panels.

Full building support

with wind and impact-resistant locks, multi-point locks, exit devices, and doors

Tornado solutions

Allegion's tornado shelter door offerings meet FEMA P-320/P-361 guidelines and are tested to ICC 500 standards for the most powerful EF5 tornadoes, providing protection from windspeeds up to 250 mph and 15 lb projectile impacts at 100 mph. Because of the extreme requirements, all tornado solutions are tested as complete assemblies (e.g., lock or exit device along with a Steelcraft Paladin™ door and frame). Two different locking solutions are available.

Multi-point locks: Multi-point locks are three-point locking systems that secure the door at three points – top, bottom, and traditional center latch location. Operating just like traditional locks, multi-point locks are ideally suited for classrooms, storerooms, community rooms, or dedicated storm shelters. Multi-point locks can also be used as “storm shutters” to secure window openings from the inside, protecting occupants from glass and flying debris.

Windstorm exit devices: Tornado exit devices are operationally and aesthetically similar to a standard exit device, but are specially designed to the same wind and impact standards as the multi-point lock and can withstand the most powerful tornadoes.



Hurricane solutions

The appropriate hurricane solution depends on the specific requirements for the application zone. There are two different hurricane zones:*

Hurricane wind and impact (HVHZ*): Coastal regions take the brunt of hurricanes, with threats from both wind and flying debris. Hurricane wind and impact devices are tested to meet or exceed all windstorm risk categories. Furthermore, the Schlage LM9300 multi-point locks and Von Duprin WS98/9927 exit devices meet the additional Florida Building Code Enhanced Hurricane Protection Area (EHPA) requirements, providing additional protection against projectile impacts.

Hurricane wind-only: Inland regions have lower hurricane requirements, with only high wind pressure posing a threat. Most Von Duprin exit devices and Schlage locks, when paired with select Steelcraft doors, are approved for wind-only applications.

* Please note that the terminology used in this brochure - wind and impact, wind-only - is general terminology and the exact verbiage used in a specific state may differ.

Schlage, Von Duprin and Steelcraft have combined to offer a complete solution

specifically designed for severe weather

Locks, multi-point locks, exit devices and doors offer safety and security from tornadoes and/or hurricanes, complying with the most stringent testing standards. Tornado shelter solutions meet the most stringent FEMA P-361/FEMA P-320/ICC 500 requirements, withstanding 250 mph windspeeds and 15 lb projectile impacts at 100 mph. Hurricane shelter solutions are likewise tested to meet wind-only or wind and impact requirements for inland or coastal regions.

	Schlage multi-point locks	Von Duprin exit devices	Schlage locks	Steelcraft doors
Door swing	Inswing (single and pairs) Outswing (single and pairs)	Outswing only	Outswing only (L9400 Series approved inswing/outswing)	
Application	Single or pair doors, storm shutters	Single or pair doors	Single or pair doors	
Tornado	LM9300 Series	Von Duprin WS98/9927 (pair doors), WS98/9957 (single doors)	Not applicable for tornado applications	Paladin (PW) Paladin Light (PN, PNF, PV, PVF)
Hurricane wind and impact	LM9300 Series (Compatible with H Series door only)	Many configurations within these series: 33A/35A, 88, 98/99, WS98/99, XP98/99, 2670 (see Von Duprin Hurricane Reference sheet for details)	ALX and ND Series cylindrical locks, L Series mortise locks, B600/700/800 Series deadbolts, AD/CO Series electronic locks, Control, LE and NDE wireless electronic locks	Hurricane (H) Hurricane Embossed (HE)
Hurricane wind-only (non-impact)	Not required for hurricane wind-only applications	Most Von Duprin exit devices (see Von Duprin Hurricane Reference sheet for details)	A, ALX and ND Series cylindrical locks, L Series mortise locks, B600/700/800 Series deadbolts, AD/CO Series electronic locks, Control, LE and NDE wireless electronic locks	Steel reinforced (B) Embossed (CE) Honeycomb core (L) Mineral board core (T)

Multi-point locks



Storm shelter applications

Schlage LM9300 multi-point locks secure the door at three points – top, bottom, and the traditional center latch location – resulting in an assembly that is exceptionally strong and can withstand tremendous abuse. When the Schlage LM9300 multi-point lock is paired with a Steelcraft Paladin tornado door it can withstand the most severe EF5 class tornadoes, with windspeeds up to 250 mph and 15 lb projectile impacts at 100 mph.

The LM9300 multi-point lock utilizes a unique mortise lock that interfaces with top and bottom latches contained within the door. Rotating the handle retracts all three latches; closing the door automatically engages all three latches and immediately secures the door. From a user perspective, operation is identical to a standard door.

The Schlage multi-point lock offers the following advantages:

- Multiple available functions for applications in schools, assisted living/healthcare, government, or corporate campuses
- A full range of Schlage levers, trim and finish options
- Vertical rods pre-assembled and factory aligned in the door for ease of installation

Storm shutter applications

In the event of a tornado, all openings to a shelter must be secured – including the windows. For that reason, the multi-point lock is available in a shutter configuration. The storm shutter utilizes a 4-sided frame that mounts against a window from the inside of the shelter to protect the occupants from flying glass and debris.

Hurricane protection

The Schlage multi-point lock, when paired with a Steelcraft H hurricane door, meets the FBC EHPA standard to Level E missile impact at 80 f/s and 50.5 MPH for risk category IV.

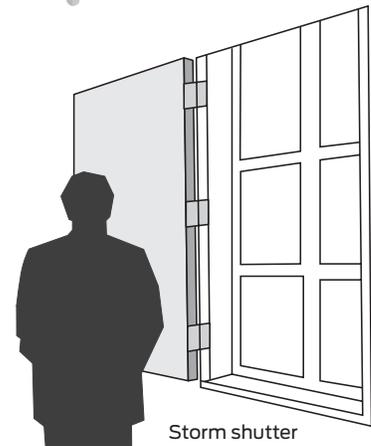
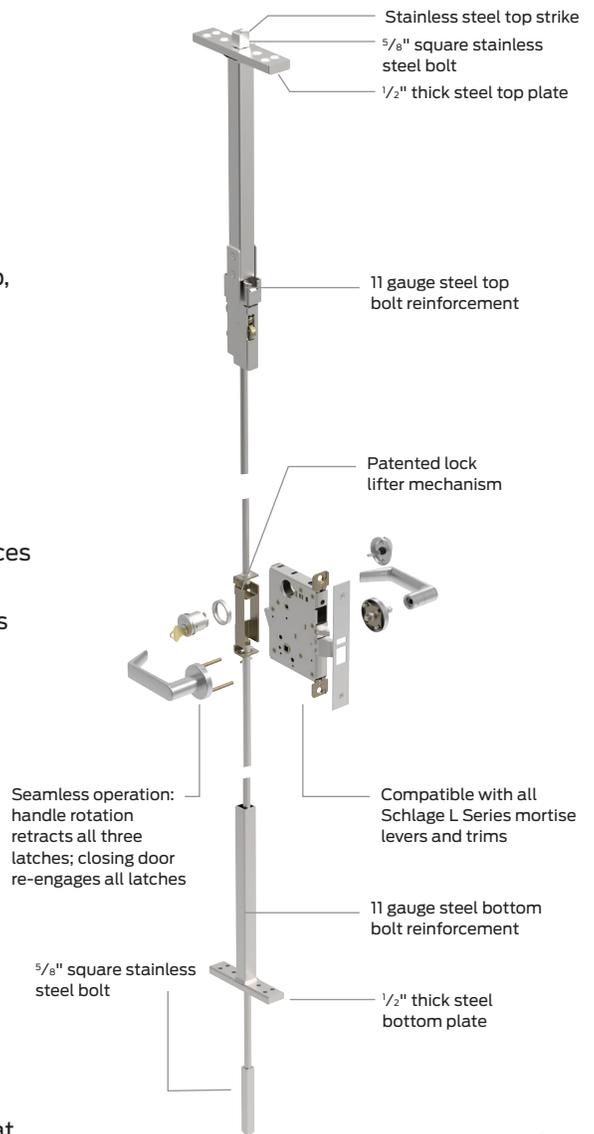
Available functions

Passage	Exit	Office/entry	Classroom	Classroom security	Storeroom
LM9310	LM9325	LM9350 LMV9350†	LM9370 LMV9370†	LM9371 LMV9371†	LM9380 LMV9380†

	Schlage Multi-point lock	Steelcraft door/shutter*	Fire rating
Tornado	Any LM/LMV 9300 Series†	Paladin (PW, PW with PV or PN Lights 3-sided only)	UL 10C and CAN/ULC-S104 3-hour
Hurricane wind and impact	Any LM/LMV 9300 Series†	Hurricane (H)	UL 10C and CAN/ULC-S104 3-hour

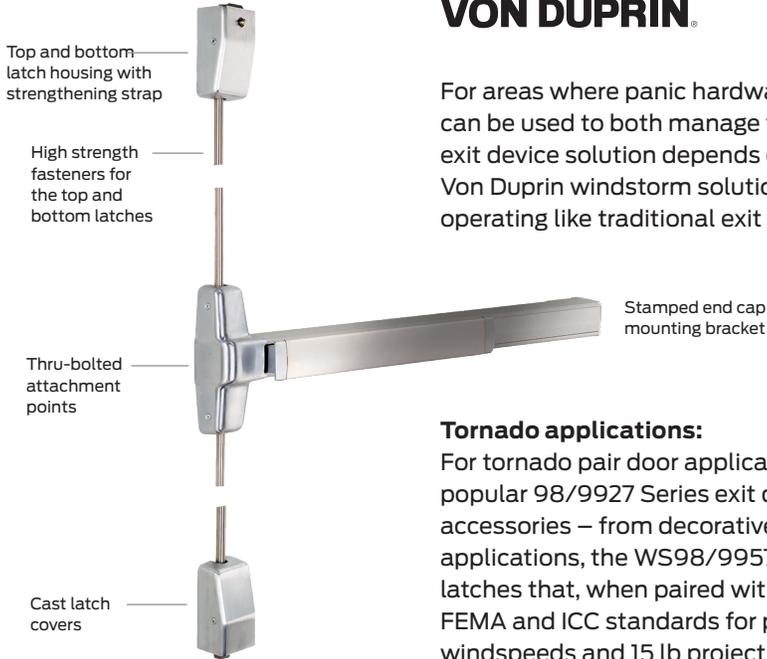
* Door includes vertical rod system; see data sheet for ordering information.

† LMV denotes VandlGard® option that allows the exterior lever to rotate fully down when locked, preventing damage to internal lock components caused by excessive force in trying to gain access.



Exit devices

VON DUPRIN®



For areas where panic hardware is required by code for expedited egress, exit devices can be used to both manage the area and provide safety during storms. The exact exit device solution depends on the requirements of that particular application. All Von Duprin windstorm solutions provide the necessary storm protection while operating like traditional exit devices.

Tornado applications:

For tornado pair door applications, the WS98/9927 exit device is based on the popular 98/9927 Series exit device, with the full complement of features and accessories – from decorative levers to electrified functions. For single tornado door applications, the WS98/9957 is used. Both devices utilize reinforced rods and latches that, when paired with the Steelcraft Paladin door, meet the most stringent FEMA and ICC standards for protection during tornadoes – withstanding 250 mph windspeeds and 15 lb projectile impacts at 100 mph. Extended latch guards for WS98/9927 and WS98/9957 are available. These are intended to cover the bottom 10” of doors with gradual ramp to comply with required accessibility standards per ADA or A117.1.

Note: The WS98/9927 Series exit device when paired with a Steelcraft H or HE Series door, meets the Florida standard for risk category IV and Level E missile 80 f/s and 50.5 MPH impact.

Note: To order extended latch guards, specify WS-LGO-3 for 3’ door openings and WS-LGO-4 for over 3’ to 4’ door openings.

Hurricane wind and impact applications:

For coastal regions requiring protection from both debris and high winds resulting from hurricanes, multiple Von Duprin exit devices can be utilized when paired with a Steelcraft Hurricane H or HE Series embossed door. Some configurations within these device series meet the wind and impact requirements set forth in the Florida Building Code (see [Von Duprin Hurricane Reference sheet](#) for details):

33A/35A Series	Narrow stile pushbar exit device
88 Series	Crossbar exit device
98/99 Series	Wide stile pushbar exit device
WS98/9927	Windstorm-rated 98/9927
XP98/99 Rim	Heavy-duty 98/99 Series rim device
2670	Guard-X® exit alarm lock

Note: Specify HH when ordering Von Duprin wind and impact rated exit devices.

Hurricane wind-only applications:

For inland regions where risk of damage due to debris impact is not as severe, most Von Duprin exit devices can be utilized with select Steelcraft doors for wind-only applications (see [Von Duprin Hurricane Reference sheet](#) for details). Details of the relevant Steelcraft door models can be found on page 11 of this brochure.

Note: Specify HW when ordering Von Duprin wind-only rated exit devices.

	Von Duprin exit device	Steelcraft door	Fire rating*
Tornado	WS98/9927	Paladin (PW, PW with PV or PN Lights)	Available (pair doors only)
	WS98/9957	Paladin (PW, PW with PV or PN Lights)	Available (single-door only)
Hurricane wind and impact	Some configurations within these series: 33A/35A, 88, 98/99, WS98/99, XP98/99, 2670	Hurricane (H) Hurricane Embossed (HE)	Available (except 2670)
Hurricane wind-only	Most Von Duprin exit devices	L, SL, B, T, CE	Available (most models)

* Available fire rating varies by exit device model, features, and door type; please review specific details for your particular model.

Locks



Locks for hurricane applications

Most Schlage commercial locksets can be utilized in either wind-only or wind and impact applications when paired with the appropriate Steelcraft rated door.

Approved Schlage locksets

Type	Description
Mortise	L Series (Grade 1 levers/knobs)
Cylindrical	ND Series (Grade 1 levers)
	ALX Series (Grade 2 levers)
	A Series (Grade 2 knobs)
Deadbolts	B600/700/800 Series (Grade 1)
Electronic	AD Series (networked and standalone)
	CO Series (standalone)
	NDE wireless cylindrical
	LE wireless mortise
	Schlage Control™ smart locks

Note: Wind and impact applications may require a specific door frame strike available through Allegion. As with any windstorm and code related items, please discuss with your local SSC representative.



	Schlage lockset ¹	Steelcraft door	Fire rating ²
Hurricane wind and impact	AD, ALX, B600/700/800, CO, ND, L, LE, NDE, Control	B, CE, H, HE, L, SL, SZ, T	Available
Hurricane wind-only	A, AD, ALX, B600/700/800, CO, ND, L, LE, NDE, Control	L, SL, B, T, CE	Available

1. May require a specific latch or strike for wind and impact rating. Please discuss with your local sales consultant.
 2. Available rating varies by lock model, features, and door type; please review specific details for your particular model.

Doors

Republic ■ STEELCRAFT

Steelcraft offering and nomenclature shown below. Contact technical support for additional details.

Whether you're in a coastal area subject to hurricane-force storms, or in one of the many areas across the country at risk for tornadoes, Steelcraft has a tough, dependable door system that can take whatever nature dishes out. Our tornado- and hurricane-rated doors are built to exact standards that ensure tough protection when it's needed most.

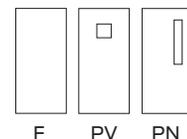
Tornado

Paladin (PW):

Specifically designed for tornadoes, Paladin doors have a specially designed steel-stiffened core. When paired with the Schlage LM9300 multi-point lock, Von Duprin WS98/9927 or WS98/9957 exit device, the assembly withstands 250 mph windspeeds and multiple 15 lb projectile impacts at 100 mph.

Paladin doors are available with rated or non-rated glass lights fully installed from the factory. See Steelcraft Technical Data or Intertek online for a full list of approved Allegion hardware and accessory items available with Paladin.

Available elevations



Doors

Republic ■ STEELCRAFT

Steelcraft offering and nomenclature shown below. Contact technical support for additional details.

Tornado

Paladin (PW) continued:



Hurricane wind and impact

Hurricane flush (H):

Specifically designed for Wind and Impact hurricane zones, Hurricane doors are specially designed to withstand the high winds and flying debris associated with hurricanes. Multiple core options are available for improved thermal performance or for additional steel reinforcements. The multi-point lock is only compatible with F elevations.

Hurricane Embossed (HE):

Embossed version of the H Series door. Not compatible with the Schlage multi-point lock.

Hurricane wind-only

CE Series embossed door:

Designed to meet the architectural requirements for embossed doors, the CE Series combines the features and benefits of polystyrene core laminated construction with the strength and structural stability of steel.

L Series door:

Steelcraft's most popular door, the L Series comes standard with an environmentally friendly, formaldehyde-free honeycomb core for increased structural integrity while reducing overall weight. Available with a polystyrene core for enhanced thermal performance or polyurethane core for extreme thermal performance.

B Series door:

With steel reinforcement, the B Series flush door provides a more secure entry.

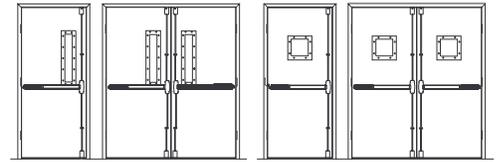
T Series door:

With a mineral board core, T Series doors are designed for stairwells and other areas where specifications require temperature rise rated doors.

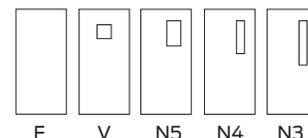
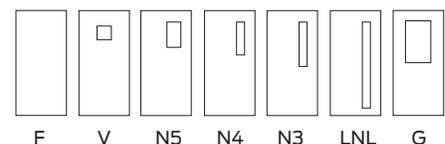
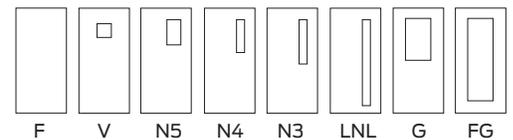
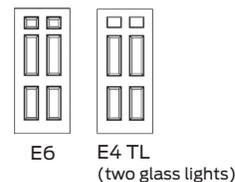
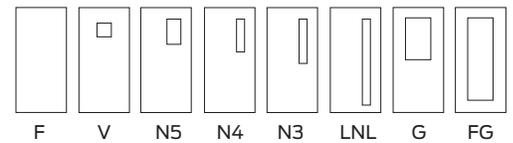
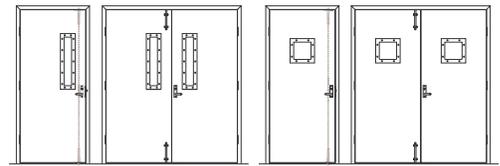
SL Series door:

Square edge version of Steelcraft's L door, chosen when the quality of an L door is desired but with a square edge.

ADA Compliant PN(F) Narrow and PN(F) Vision Lights – WS98/9927, WS98/9957



PN(F) Narrow and PV(F) Vision Lights – LM 9300



About Allegion

Allegion (NYSE: ALLE) is a global pioneer in seamless access, with leading brands like CISA®, Interflex®, LCN®, Schlage®, SimonsVoss® and Von Duprin®. Focusing on security around the door and adjacent areas, Allegion secures people and assets with a range of solutions for homes, businesses, schools and institutions. Allegion had \$2.7 billion in revenue in 2020, and its security products are sold around the world.

For more, visit www.allegion.com

KRYPTONITE ■ LCN ■  ■ STEELCRAFT ■ VON DUPRIN