

EVALUATION REPORT

Title: Evaluation of Light Commercial Doors for Wind load and Impact Rating

Report #: S05-012

Manufacturer: Ingersoll-Rand Company
Security & Safety Americas
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I. Introduction/ Scope

Based on wind load test results from Dade County approvals, the following evaluation will estimate the performance for light gauge single panel commercial door.

II. Reference Material

The following items were used to prepare the evaluation report:

- A. Dade County NOA # 03-1107.03, February 19, 2004
ExpiDoor Single Outswing Steel Commercial Door- Impact
- B. Dade County NOA # 03-0206.04, November 28, 2003
Schlage/Broadway/Dexter Passage locks w/ Deadbolts Hardware
- C. Dade County NOA # 01-0129.10, May 24, 2001
Series L, SL, CE & B 20 ga Outswing Commercial Steel Door- Impact
- D. Dade County NOA # 04-0203.03, October 21, 2004
Series H16-4 8080 Flush Double/Single Steel Commercial Outswing Door
- E. Intertek Test Report #3067867, April 18, 2005
Impact & Cyclic Load Tests of Outswing Single Steel Door
- F. Underwriter's Laboratory Report, File R3993, Dated September 16, 2004
Door Assemblies with Frames and Hardware Tested to ASTM E330-02
- G. IR Dwg# S05-012, L/B/T/CE Series Single Door, 5 sheets, Dated 5/25/05
- H. ANSI A250.13-2003, Test and Rating of Severe Windstorm Resistant Components
for Swinging Door Assemblies

III. Evaluation

A. Wind Load Design

A door swings inward for an inswing application and outward away from the building for an outswing application. An inswing application relies on the hinges and lock to retain the opening while an outswing application also has the door frame for support.

A positive pressure wind load is directed towards the interior of the opening. Conversely, a negative wind load is directed away from the opening. For a positive outswing wind load application, the wind load applied to the door panel would be distributed around the frame equally. For a negative outswing wind load application, the wind load applied to the door panel will be focused around the hinges and lock/ dead bolt. The opposite applies for an inswing application.

B. Product Comparison

1. The following table shows the door frames that have already been tested and approved. This will be the basis for the comparative analysis. The Steelcraft door types are as follows: 1.) L –honeycomb, polystyrene, or polyurethane core options; 2.) B – steel stiffened; 3.) T – Temperature rise core; 4.) SL – square edge door construction; 5.) CE – embossed panel door with polystyrene core.

TABLE 1

	ITS Report	NOA 03-1107.03	NOA 01-0129.10
Door Configuration	Single, Outswing	Single, Outswing	Single, Outswing
Door Type(s)	L Series	L Series	L, SL, CE & B
Frame Type(s)		PU	MU, F
Max Width	3' -4"	3' - 0"	3' - 4"
Max Height	7' -2"	7' - 0"	7' - 2"
Design Pressure (psf)	+/- 70	+/- 70	+80/-53
Steel Thk (ga)	18	18	20
Lock Type(s)	Mortise w/ dead bolt Schlage, L95453P	Cylindrical Schlage D/ND Series Mortise Schlage L9400 Mortise Panic Device Monarch 18-M Series	Cylindrical Yale, 5407 Mortise Yale, 8747
Impact	Yes	Yes	Yes

TABLE 1 (Cont.)

	NOA 03-0206.04	NOA 04-0203.03	UL File R3993
Door Configuration	Single, Outswing/ Inswing	Single, Outswing/	Single. Outswing
Door Type(s)	B,L	H	L
Frame Type(s)		MU, F	F
Max Width	3' - 0"	4' - 0"	8' - 0"
Max Height	8' - 0"	8' - 0"	8' - 0'
Design Pressure (psf)	+/-67	+/- 55 +/- 65	+/50 psf, Note 1
Steel Thk (ga)	24	16	18
Lock Type(s)	Cylindrical, Schlage F10 series, Deadbolt Broadway, U10 Series Deadbolt Broadway, B1060 Series U10 passage lock Dexter, J10 Series D60 Deadbolt Dexter, Cylindrical D60 Series, J10 lock Schlage, 210 Series Deadbolt & latch	Cylindrical, Schlage ND Series (55 psf) AL Series (65 psf) Cylindrical, Falcon T Series Cylindrical, Locknetics CM5100 Series	Cylindrical, Schlage ND/AL Series Cylindrical, Falcon T, B, Z, X, S, H Lock Mortise, Schlage L9000, L9400 Mortise, Falcon M Series Mortise, Locknetics CM5500
Impact	Yes	Yes	Yes

Note 1:

Since the door tested in the UL report is larger than the door under evaluation, the loads will be converted. A 4 ft x 8 ft door under a 50 psf windload exerts a 800 lb on the lock. This equates to a 76.1 psf windload for a 3 ft x 7 ft door size. Consequently the locks tested in the UL report can be used for applications using a 3 ft wide x 7 ft high door under a 75 psf or lower wind load.

2. The following table shows the door under evaluation.

TABLE 2

		Qualifying Report(s)
Door Configuration	Single, Outswing Single, Inswing	Various NOA 03-0206.04
Door Type(s)	L, B, T, SL, CE	NOA 01-0129.10
Max Width	3' -0"	NOA 03-1107.03
Max Height	7' -0"	
Design Pressure (psf)	+/- 70	NOA 03-1107.03
Steel Thk (ga)	18	NOA 03-1107.03
Lock Type(s)	Mortise, Schlage L9000, L9400 Series	UL File R3993, NOA 03-1107.03
	Mortise, Falcon M Series	UL File R3993
	Cylindrical, Schlage AL, ND, A Series	UL File R3993, NOA 04-0203.03
	Cylindrical, Falcon T, B, X, Z, S, H Series	UL File R3993, NOA 04-0203.03
	Mortise Exit Device Monarch, 18M Series	NOA 03-1107.03
	Cylindrical, w/ Deadlock Schlage, F Series Schlage, S200 Series Dexter, J Series Broadway, U Series	NOA 03-0206.04
Impact	Yes	Various

IV Limitation of Use

The following information summarizes the limitation of use for the doors/ frames under evaluation:

1. Elevation

Maximum Frame Width:	3 ft - 0 in
Maximum Frame Height:	7 ft - 0 in
Maximum Wind Pressure:	+/-70 psf (Class 2 locks) +/- 67 psf (Light duty locks)
Door Panel Construction:	Refer to IR Dwg # S05-012, 5 Sheets, Dated 5/25/05
Weatherstrip Construction:	Refer to IR Dwg # S05-012, 5 Sheets, Dated 5/25/05
Frame Anchor Type, Size & Spacing:	Refer to IR Dwg # S05-012, 5 Sheets, Dated 5/25/05

Certification of Independence of Evaluation Entity

I hereby certify that (1) I have no financial interest in Ingersoll-Rand Company; (2) I am an independent licensed Professional Engineer in the State of Florida and; (3) I comply with the criteria of independence as stated in 9B-72.110 (3), F.A.C. and 9B-72.110(4), F.A.C.