



Technical Evaluation Report

TO ASSIST WITH CODE COMPLIANCE

Evaluation of Curries Door Assemblies for Wind Pressure Resistance and Building Code Compliance

TER No. 1107-01

ASSA ABLOY AB

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Division 08 00 00 – Openings

Section 08 01 00 – Operation and Maintenance of Openings
Section 08 10 00 – Doors and Frames
Section 08 30 00 – Specialty Doors and Frames
Section 08 70 00 – Hardware

1. Products Evaluated:

- 1.1. Curries metal door assemblies consisting of single or double leaves
 - 1.1.1. Steel door leaf
 - 1.1.1.1. Series 707 – Polystyrene core
 - 1.1.1.1.1. Optional Polyurethane (Polyisocyanurate) core
 - 1.1.1.1.2. Optional Honeycomb core
 - 1.1.1.2. Series 727 – Mineral core
 - 1.1.1.3. Series 747 – Rib-stiffened door
 - 1.1.2. Door frame
 - 1.1.2.1. 16 ga. or 14 ga. steel, cold-rolled or galvanized
 - 1.1.2.2. Mechanically fastened or welded corners
 - 1.1.3. Hardware series
 - 1.1.3.1. Active leaf locksets
 - 1.1.3.1.1. ML2000 by Corbin-Russwin Mortise (lock with latch and deadbolt)
 - 1.1.3.1.2. 8200 by Sargent – Mortise (lock with latch and deadbolt)
 - 1.1.3.1.3. 8800 by Yale – Mortise (lock with latch and deadbolt)
 - 1.1.3.2. Inactive leaf surface bolts
 - 1.1.3.2.1. 988CR – by Corbin-Russwin
 - 1.1.3.2.2. 988Y – by Yale
 - 1.1.3.2.3. 988 – by Sargent
 - 1.1.3.3. Hinges
 - 1.1.3.3.1. McKinney TA2714 (4.5" x 4.5")
 - 1.1.3.3.1.1. Minimum thickness, 0.134"
 - 1.1.3.3.1.2. 4 per leaf for doors greater than 7' 6" in height
 - 1.1.3.3.1.3. 3 per leaf for doors 7' 6" or less in height

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1.1.3.3.2. Continuous hinges

1.1.3.3.2.1. McKinney MCK-12-HD, MCK-14HD, MCK-25-HD, MCK HG 305, MCK-FM300, MCK-FM3500 and MCK-FM3700

1.1.3.3.2.2. MarKar FM100, FM200, FM300, FM3500, FM1111 and HG 300

1.1.3.3.2.3. Pemko SPBFM and SPBFMHD

1.1.3.4. Door frame anchors

1.1.3.4.1. Masonry T

1.1.3.4.2. Masonry wire

1.1.3.4.3. Pipe sleeve anchor

1.1.3.4.3.1. $\frac{3}{8}$ " Powers Power-Bolt

1.1.3.4.3.2. $\frac{3}{8}$ " Hilti Kwik-Bolt III

1.1.3.4.3.3. $\frac{3}{8}$ " Lag screw into Southern Pine lumber

1.1.3.4.3.4. $\frac{3}{8}$ " HILTI Drop-In

1.1.3.4.4. Steel channel anchor

1.1.3.4.4.1. #14 Grade 5 screws

1.1.3.4.5. Welded multi-purpose anchor

1.1.3.4.5.1. #8 Grade 5 screws

1.1.3.4.6. Welded wood stud anchor

1.1.3.4.6.1. #8 Grade 5 screws

1.1.3.5. Louvers

1.1.3.5.1. WLV60 by Markar

1.1.3.5.2. LV-WS by Pemko

1.1.3.6. Vision light kits

1.1.3.6.1. Type I-Polycarbonate glazing

1.1.3.6.1.1. Contains $\frac{5}{8}$ " pocket depth.

1.1.3.6.1.2. $\frac{1}{4}$ " Polycarbonate glazing

1.1.3.6.2. Type II – Glasslam glazing

1.1.3.6.2.1. Contains $\frac{5}{8}$ " pocket depth

1.1.3.6.2.2. Requires surround channel with PET flap and DOW CORNING 995 silicone

2. Applicable Codes:

2.1. Curries metal door assemblies were evaluated for compliance with the following building codes and standards:

2.1.1. 2003, 2006, 2009 and 2012 International Building Code (IBC)

2.1.2. Minimum Design Loads for Buildings and Other Structures (ASCE 7-05 and ASCE 7-10)

2.1.3. ASTM E1886, E330 and E1996

2.1.4. Florida, High Velocity Hurricane Zone (HVHZ) Test Protocols TAS 201, TAS 202 and TAS 203

2.1.5. 2007 and 2010 Florida Building Code (FBC)

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3. Performance Evaluation:

- 3.1. The Curries door assemblies were evaluated, using their tested allowable design values, as a means of resisting wind pressures as required by the *IBC* and *ASCE 7*.
 - 3.1.1. Tested assemblies used the hardware listed in [Section 1](#). Assemblies were evaluated to determine their ability to resist the wind pressures required by *IBC* Section 1609, Wind Loads, and Section 1715.5, Exterior Window and Door Assemblies; the *Florida Building Code* Section 1620, High-Velocity Hurricane Zones – Wind Loads, and Section 1625, High-Velocity Hurricane Zones – Load Tests; and *ASCE 7-05* Chapter 6.
 - 3.1.2. Load calculations for each of the assemblies' components were assessed and compared to the test data to determine the ability of each individual component to withstand the required wind pressure as defined by the *IBC* and *ASCE 7* for the application.
 - 3.1.3. Shear strength of each of the assemblies' connections was evaluated for their ability to withstand the required wind pressure as defined by the *IBC* and *ASCE 7* for the application.

4. Product Description and Materials:

- 4.1. The assemblies assessed herein are comprised of:
 - 4.1.1. Single or double steel leaves
 - 4.1.2. Minimum 16 ga. steel door frames
 - 4.1.3. One door threshold
 - 4.1.4. Connection hardware to secure the frames to the building
 - 4.1.5. Hardware for securing the door leaves in the closed position
 - 4.1.6. Weather stripping
 - 4.1.7. One Curries (Type I or II) light kit (optional)
- 4.2. The assembly size evaluated is a standard 8080 pair of doors. Smaller doors using the same connection hardware are permitted. Single leaves shall be permitted, provided the same connection hardware is used and the single door leaf size does not exceed 47- $\frac{3}{4}$ " x 97- $\frac{1}{2}$ ".
- 4.3. Actual frame size is 100" x 98" and 100" x 100" with 4" face head.
 - 4.3.1. Jamb depth: 5- $\frac{3}{4}$ " minimum, 14" maximum
 - 4.3.2. Face dimensions: Jambs 2"; Head 2" minimum, 4" maximum
- 4.4. Actual door leaf size is 47- $\frac{13}{16}$ " x 95- $\frac{1}{2}$ " x 1- $\frac{3}{4}$ ".
- 4.5. Curries steel door assemblies are comprised of various combinations of the following components:
 - 4.5.1. Series 707 door leaves are comprised of:
 - 4.5.1.1. 16 ga. steel skins spot welded to rail and stile frames
 - 4.5.1.2. Hinge side stiles are 14 ga. steel channels ($\frac{3}{4}$ " leg x $\frac{3}{4}$ " leg x 1.656" wide x full height) and lock side stiles are 12 ga. steel channels (1.375" leg x 0.5" leg x 1.656" wide x full height).
 - 4.5.1.3. Top and bottom rails are 12 ga. steel channels (0.75" leg x 0.75" leg x 1.656" wide x full width).
 - 4.5.1.4. Spot welds are 16" o.c. at stiles and 6" o.c. at rails.
 - 4.5.1.5. Skins are surface glued to cores made of expanded polystyrene (EPS).
 - 4.5.1.5.1. EPS core shall conform to ASTM C578, Type I.
 - 4.5.1.5.2. Alternately, cores may be Polyisocyanurate or Honeycomb construction.
 - 4.5.1.5.2.1. Polyisocyanurate (ISO) core shall conform to ASTM C591 for Type I ISO having a density of 2 lbs/ft³.
 - 4.5.1.5.2.2. Honeycomb core is a Kraft Honeycomb cell consisting of 31-35# paper and a 42# paper facing.

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- 4.5.2.** Series 727 door leafs are the same as the Series 707 doors except:
- 4.5.2.1.** EPS core is replaced with a cementitious mineral core having a 15-lb density.
- 4.5.3.** Series 747 door leafs are comprised of the same construction as the Series 707 door leafs except:
- 4.5.3.1.** Instead of an EPS core, the steel skins are supported by five (5) steel 20 ga. ribs, spot welded at 5" o.c. and have a core of fiberglass conforming to ASTM C553, Type II with a density of 0.75 lbs/ft³. For narrower doors up to 3' 6" in width, four (4) ribs are used.
 - 4.5.3.2.** Hinge side stiles are 12 ga.
 - 4.5.3.3.** Stiles are spot welded at 16" o.c.
 - 4.5.3.4.** Rails are spot welded at 6" o.c.
- 4.5.4.** Door frames are three sided, 16 ga. or 14 ga. cold-rolled steel (may be galvanized) with mitered corners, which are mechanically fastened with a metal tab and two (2) #6 X 0.25" screws at each corner or face welded.
- 4.5.4.1.** Frames are reinforced at a double door head for the surface bolt with an 18"-long, 12 ga. full sleeve.
- 4.5.5.** Threshold is Pemko 2005, 181, or 177 fastened with # 10 x 1.5" screws (wood framing). Alternatively, Tapcon screws having at least an equivalent performance in shear may be used where fastening into concrete is required. Screws are 6" from the end of the threshold and 12" o.c. maximum.
- 4.5.6.** Door frame connections to the building
- 4.5.6.1.** Wood stud framing – welded wood stud anchors located 12" from the bottom of the frame and 24" o.c. maximum. Fastened to the stud with four (4) #8 x 1" Grade 5 screws per anchor.
 - 4.5.6.2.** Wood stud framing – welded pipe spacer or welded existing wall anchors located 12" from the bottom of the frame and 24" o.c. maximum. Fastened to the wood stud with ³/₈" x 5" minimum lag bolts. Minimum embedment 3", 1.75" minimum edge distance.
 - 4.5.6.3.** Metal stud framing – welded multi-purpose anchors located 12" from the bottom of the frame and 24" o.c. maximum. Fastened to the 18 ga. minimum metal stud with four (4) # 8 x 1" Grade 5 screws per anchor.
 - 4.5.6.4.** Steel building structure – three (3) welds, one (1) each, at 6" from the top and bottom and one centered in the jambs. ³/₁₆" x 1" long minimum welds on each side of the frame.
 - 4.5.6.5.** Masonry buck – welded pipe spacer or welded existing wall anchors located 12" from the bottom of the frame and 24" o.c. maximum. Fastened to the buck with ³/₈" x 6" minimum flat head sleeve anchors. Minimum embedment 2.5"; 4" minimum edge distance.
 - 4.5.6.6.** Masonry buck – welded pipe spacer or welded existing wall anchors located 12" from the bottom of the frame and 24" o.c. maximum. Fastened to the buck with ³/₈" Hilti Drop-In anchors. 3" minimum edge distance.
 - 4.5.6.7.** Grouted masonry – Masonry Wire or Masonry T anchors located 18" to 24" o.c. maximum in grouted joints. May not be more than 12" from the corner of the frame.
- 4.5.7.** Connections of the door leaf to the door frames
- 4.5.7.1.** Four (4) hinges (4.5" x 4.5") at each door leaf having a height greater than 7'6"
 - 4.5.7.2.** Three (3) hinges (4.5" x 4.5") at each door leaf having a height 7'6" or less
 - 4.5.7.3.** Pemko – SPBFM and SPBFMHD continuous hinge
 - 4.5.7.4.** McKinney – MCK-12-HD, MCK-14HD, MCK-25-HD, MCK HG 305, MCK-FM300, MCK-FM3500 and MCK-FM3700 continuous hinge
 - 4.5.7.5.** Markar – FM100, FM200, FM300, FM3500, FM1111 and HG 300 continuous hinge

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- 4.5.8. Hardware for securing the door leaves in the closed position
 - 4.5.8.1. Active leaf – latch bolts and deadbolts
 - 4.5.8.1.1. ML2000 by Corbin – Russwin Mortise (lock with latch bolt and deadbolt)
 - 4.5.8.1.2. 8200 by Sargent – Mortise (lock with latch bolt and deadbolt)
 - 4.5.8.1.3. 8800 by Yale – Mortise (lock with latch bolt and deadbolt)
 - 4.5.8.2. Inactive leaf – surface bolts
 - 4.5.8.2.1. 988CR – by Corbin-Russwin
 - 4.5.8.2.2. 988Y – by Yale
 - 4.5.8.2.3. 988 – by Sargent
- 4.5.9. Weather stripping – Pemko S88 adhesive weather-strip at each frame member. Pemko 303AS mechanically fastened to the meeting edge of each door for pairs of doors
- 4.5.10. Vision light kit (optional) – Curries Type I or II
 - 4.5.10.1. Surround channel – 14 ga. (0.625" leg x 1.656" x 1.5" leg") connected with 8" o.c. spot welds
 - 4.5.10.2. Frame – Two piece, 18 ga. connected with #6 x 0.125" oval head TEC screws into surround channel 3" from each end and 8" o.c. maximum
 - 4.5.10.3. Size
 - 4.5.10.3.1. Visible light – 32" x 42"
 - 4.5.10.3.1.1. Maximum area of glazing – 1344 sq in. Multiple lights allowed.
 - 4.5.10.3.1.2. Minimum 6" stile and rail
 - 4.5.10.3.2. Actual light – 34.5" x 44.5"
 - 4.5.10.3.3. Alternately, Curries Type II light kits with a maximum dimension of 24" x 66" with Nebula Glass Glasslam Safety Plus 2 may be used where the application is limited to wind pressures of 60 psf or less. Multiple lights allowed.
 - 4.5.10.4. Glazing
 - 4.5.10.4.1. SABIC plastics – Lexan ¼" Polycarbonate (Dade County NOA #08-0305.02)
 - 4.5.10.4.2. Nebula glass – Glasslam Safety Plus 2 (Dade County NOA #08-0709.04)
 - 4.5.10.4.3. All glazing requires 0.125" x 0.5" double faced, closed cell foam tape.
 - 4.5.10.4.4. Glazing bedding – Nebula glass Glasslam requires DOW CORNING 995 Silicone.
- 4.5.11. Louvers
 - 4.5.11.1. Surround channel 20 ga.
 - 4.5.11.2. Surround channel 20 ga. (0.625" leg x 1.656" x 1.5" leg) connected with 8" o.c. spot welds.
 - 4.5.11.3. Frame – Two-piece, 18 ga. connected with #8 x 1-½" machine screw into 1-½" feral 2" from each end and 12" o.c. max.
 - 4.5.11.4. Grill – 12 ga.
 - 4.5.11.5. Size
 - 4.5.11.5.1. Maximum louver size is 34" x 78", 2652 sq in. Multiple louvers allowed.
 - 4.5.11.5.2. Minimum 6" stile and rail

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5. Applications:

- 5.1.** The Curries door assemblies described in this Technical Evaluation Report (TER) are used in commercial applications falling under the *IBC* Section 1609, Wind Loads, and Section 1715.5, Exterior Window and Door Assemblies; and the *FBC* Section 1620, High-Velocity Hurricane Zones – Wind Loads, and Section 1625, High-Velocity Hurricane Zones – Load Tests.
- 5.2.** The Curries door assemblies evaluated are designed to withstand a minimum design positive and negative wind pressure of 70 psf (105 psf ultimate load). These loads are adequate to withstand a design wind speed exceeding 165 mph (3 second gust) as shown in *IBC* Table 1609.6.2(1)¹ ([Table 1](#)).
- 5.2.1.** Exception: Door assemblies with light kits as described in [Section 4.5.10.3.3](#) are limited to application where the design wind pressures are 60 psf or less. These loads are adequate to withstand a design wind speed exceeding 150 mph.

TABLE 1609.6.2(1)
WIND VELOCITY PRESSURE (q_s) AT STANDARD HEIGHT OF 33 FEET^a

BASIC WIND SPEED (mph)	85	90	100	105	110	120	125	130	140	150	160	170
PRESSURE, q_s (psf)	18.5	20.7	25.6	28.2	31.0	36.9	40.0	43.3	50.2	57.6	65.5	74.0

For SI: 1 foot = 304.8 mm, 1 mph = 0.44 m/s, 1 psf = 47.88 Pa.

a. For basic wind speeds not shown, use $q_s = 0.00256 V^2$.

Table 1: *IBC* Table 1609.6.2(1), Wind Velocity Pressure at Standard Height of 33 Feet

- 5.3.** The following Curries door assemblies consisting of the component parts defined in [Section 4.5](#) have been designed to withstand a maximum design positive and negative wind pressure of 70 psf (105 psf ultimate load). See [Section 5.2.1](#) for limitation on wind pressure when using visible glass size of 24" x 66".

¹ Based on 2009 *IBC* and *ASCE-7-05*.

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Allowable Components for Use with Curries Single or Double Door Assemblies Meeting a Design Wind Pressure of 70 psf			
Components	Series 707	Series 727	Series 747
Core Options	Expanded Polystyrene Poylisocyanurate Honeycomb	Mineral	Rib stiffened w/fiberglass
Door Frame Options	Cold-formed steel (14 ga.) Cold-formed steel (16 ga.) Galvanized steel (14 ga.) Galvanized steel (16 ga.)	Cold-formed steel (14 ga.) Cold-formed steel (16 ga.) Galvanized steel (14 ga.) Galvanized steel (16 ga.)	Cold-formed steel (14 ga.) Cold-formed steel (16 ga.) Galvanized steel (14 ga.) Galvanized steel (16 ga.)
Door Frame Anchors	Masonry T Masonry wire Pipe sleeve w/ 3/8" Powers Power-bolt Pipe sleeve w/ 3/8" Hilti Kwik-Bolt III Pipe sleeve w/ 3/8" lag screw into Southern Pine framing #8 sheet metal screws into wood or steel studs HILTI Drop-In 3/8" Expansion shell anchor	Masonry T Masonry wire Pipe sleeve w/ 3/8" Powers Power-bolt Pipe sleeve w/ 3/8" Hilti Kwik-Bolt III Pipe sleeve w/ 3/8" lag screw into Southern Pine framing #8 sheet metal screws into wood or steel studs HILTI Drop-In 3/8" Expansion shell anchor	Masonry T Masonry wire Pipe sleeve w/ 3/8" Powers Power-bolt Pipe sleeve w/ 3/8" Hilti Kwik-Bolt III Pipe sleeve w/ 3/8" lag screw into Southern Pine framing #8 sheet metal screws into wood or steel studs HILTI Drop-In 3/8" Expansion shell anchor
Hinges	McKinney TA2714 McKinney MCK-12-HD, MCK-14HD, MCK-25-HD, MCK HG 305, MCK-FM300, MCK-FM3500 and MCK-FM3700 MARKAR FM100, FM200, FM300, FM3500, FM1111 and HG 300 Pemko SPBFM and SPBFMHD	McKinney TA2714 McKinney MCK-12-HD, MCK-14HD, MCK-25-HD, MCK HG 305, MCK-FM300, MCK-FM3500 and MCK-FM3700 MARKAR FM100, FM200, FM300, FM3500, FM1111 and HG 300 Pemko SPBFM and SPBFMHD	McKinney TA2714 McKinney MCK-12-HD, MCK-14HD, MCK-25-HD, MCK HG 305, MCK-FM300, MCK-FM3500 and MCK-FM3700 MARKAR FM100, FM200, FM300, FM3500, FM1111 and HG 300 Pemko SPBFM and SPBFMHD
Inactive Leaf Surface Bolts	Corbin Russwin – 988CR Sargent – 988 Yale – 988Y	Corbin Russwin – 988CR Sargent – 988 Yale – 988Y	Corbin Russwin – 988CR Sargent – 988 Yale – 988Y
Active Leaf Locksets	Corbin Russwin – ML2000 series Sargent – 8200 series Yale – 8800 series	Corbin Russwin – ML2000 series Sargent – 8200 series Yale – 8800 series	Corbin Russwin – ML2000 series Sargent – 8200 series Yale – 8800 series
Threshold	Pemko 2005 with (8) #10 x 1.5" screws	Pemko 2005 with (8) #10 x 1.5" screws	Pemko 2005 with (8) #10 x 1.5" screws
Weather Stripping	Pemko 303AS	Pemko 303AS	Pemko 303AS
Light Kits (optional)	Curries Type I Curries Type II	Curries Type I Curries Type II	Curries Type I Curries Type II
Louvers (optional)	WLV60 by Markar LV-WS by Pemko	WLV60 by Markar LV-WS by Pemko	WLV60 by Markar LV-WS by Pemko

Table 2: Allowable Components for Use with Curries Single or Double Door Assemblies Meeting a Design Wind Pressure of 70 psf

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6. Test and Engineering Substantiating Data:

- 6.1. *National Design Specification for Wood Construction* – 2005 Edition, American Forest & Paper Association (NDS).
- 6.2. *Design Loads for Buildings and Other Structures*, American Society of Civil Engineers, ASCE 7-05.
- 6.3. *Design Loads for Buildings and Other Structures*, American Society of Civil Engineers, ASCE 7-10.
- 6.4. Testing conducted for Curries by Intertek, Report #3037990.
- 6.5. Testing conducted for Curries by ATI, Report #676011.01-201-18.
- 6.6. Testing conducted for Curries by ATI, Report #58626.01-201-18.
- 6.7. Engineering calculations by Frank Bennardo, P.E., Project #07-CUI-0010.
- 6.8. Engineering calculations by Frank Bennardo, P.E., Project #07-CUI-0009.

7. Findings:

- 7.1. When used in accordance with this TER and the manufacturer's installation instructions (www.curries.com), the Curries door assemblies listed herein meet the wind pressure requirements of the 2003, 2006, 2009 and 2012 editions of the *IBC* for both positive and negative design wind pressures up to and including 70 psf.
- 7.2. Exception: When light kits in accordance with [Section 5.2.1](#) are used, door assemblies are limited to design wind pressures of up to 60 psf.

8. Conditions of Use:

- 8.1. Curries door assemblies covered by this report shall be installed in accordance with the manufacturer's installation instructions.
- 8.2. Manufacturer's installation instructions shall be followed as provided at curries.com/en/site/curries/Products/Metal-Doors.
- 8.3. Curries door assemblies falling under this TER shall not exceed the standard size 8080 nominal dimensions.
- 8.4. Curries door assemblies may be comprised of any of the combinations of components listed in [Table 2](#) to achieve to a code compliant 70 psf design wind pressure, except as noted in [Section 5.2.1](#).
- 8.5. For conditions not covered in this TER, connections shall be designed in accordance with generally accepted engineering practice.
- 8.6. Curries doors are produced by the Curries Division of AADG, Inc.
- 8.7. Curries doors are produced under a quality control program subject to periodic inspections in accordance with *IBC* Section 1703.5.2.

9. Identification:

- 9.1. The Curries doors described in this TER are identified by the designation "Curries" on the packaging. The manufacture's name, city and state will be on the packaging. The door model and sizes will be on a label on the door packaging and/or the door. A label with the mark of the third party inspection agency will be on the door and frame.

10. Review Schedule:

- 10.1. This TER is subject to periodic review and revision.
- 10.2. For information on the current status of this report, contact [SBCRI](#).



Responsibility Statement

The information contained herein is a product, engineering or building code evaluation performed in accordance with the referenced building code, testing and/or analysis using generally accepted engineering practices. Product, design and code compliance quality control is the responsibility of the referenced company. Consult the referenced company for the proper detailing and application for the intended purpose. Consult your local jurisdiction or design professional to assure compliance with the local building code. Qualtim, Inc. (www.qualtim.com) and SBC Research Institute (www.sbcricri.info) do not make any warranty, express or implied, or assume any legal liability or responsibility for the use, application of, and/or reference to opinions, findings, conclusions, or recommendations included in this report.