Certified Testing Laboratories

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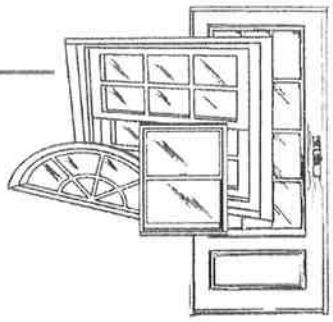


Report Number: CTLA 2054W
Report Date: May 25, 2010

STRUCTURAL PERFORMANCE TEST REPORT

Test Requested By: **Deceuninck North America, LLC**
351 North Garver Road
Monroe, Ohio 45050

Product Type and Series: **Series 623.620PD-005 Vinyl Fin Frame Impact Sliding Glass Door (192.00" x 96.00")**

Test Specifications: **ASTM E 1886-05** *"Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials."*
ASTM E 1996-05 *"Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes."*

Design Pressure: **+ 50.0 psf., - 50.0 psf.**

Test Specimen

Configuration: **O/X/X/O** Two (2) operable panels / Two (2) fixed panels.
All Specimens

Frame Construction:
All Specimens

The extruded vinyl main fin frame measured 192.00" wide x 96.00" high overall., with a 1.250" integral fin. The frame corners utilized coped and butted corner construction, secured with three (3) # 8 x 3.00" Phillips PH SMS fasteners. The frame head and jamb extrusions measured 5.008" wide x 2.007" high overall (*refer to drawing # 10001100_SH*). The frame sill extrusion measured 5.088" wide x 2.007" high overall (*refer to drawing #10001101_SH*). The frame sill had vinyl sill insert running full length of fixed panel track that measured 1.800" wide x 1.020" high and secured to frame utilizing #8 x 1.250" Phillips CS self-drilling SMS (*refer to drawing #10001105_SH*).

Panel Construction:

All Specimens

The operable panel measured 48.500" wide x 93.250" high overall. The fixed panels measured 48.750" wide x 93.250" high overall. The panels utilized mitered and welded corner construction. The vinyl sash stiles and rails measured 1.755" wide x 4.000" high (*refer to drawing # 10001102_SH*). The operable and fixed panel interlock stiles had an interlocking vinyl sash adapter measuring 2.002" wide x 2.279" high (*refer to drawing # 10001117_SH*) secured through the stile with nine (9) #8 x 0.625" Phillips PH self-drilling SMS located 4" from top and bottom of panel and a maximum of 12" on center thereafter. The fixed panel interlock was secured to frame head/sill with an aluminum (L) shaped bracket measuring 1.575" wide x 3.346" high overall (*refer to drawing # 011H027*) and was secured to fixed panel interlock stile with two (2) #8 x 1.00" Phillips CS self-drilling SMS and to frame head/sill utilizing two (2) #8 x 0.750" Phillips CS self-drilling SMS and two (2) #8 x 2.500" Phillips CS fasteners. The fixed panels each had three (3) aluminum snubbers each measuring 1.780" wide x 1.242" high x 30" long. Two (2) were secured to the top and bottom of the frame jamb at each fixed panel location with six (6) # 8 x 1.250" Phillips F.H. self-tapping S.M.S. The other one (1) aluminum snubber was located at the frame head at the corner of each fixed panel and interlock. This one (1) snubber utilized no fasteners and was inserted between the frame head pocket and fixed panel sash rail (*refer to drawing # 10300148*). Two (2) vinyl brackets measuring 1.755" wide x 10.00" high x .250" thick located at top and bottom of interlock stile secured to panel with three (3) #8 x 2.00" Phillips CS self-drilling SMS (*refer to drawing # 011H055*). Two (2) aluminum tracks/guides were located at frame head of the operable panel track pocket c/l of the operable panel. The tracks/guides measured 1.856" wide x 1.160" high x 12.00" long. Each track/guide was secured to the frame head with eight (8) #8 x 2.500" Phillips F.H self-tapping S.M.S. The four (4) lite vinyl astragal measured 2.275" wide x 2.354" high (*refer to drawing # 10001116*). The four (4) lite vinyl astragal was secured to the panel with eight (8) #8 x 2.00" Phillips P.H.S.M.S. The fasteners were located at 5.00" from the each end of the vertical astragal and 12.000" on center thereafter.

Daylight opening:

All Specimens

Daylight opening for the operable panels measured 40.750" wide x 85.000" high. The daylight opening for the fixed panels measured 40.750" wide x 85.000" high.

Glazing:

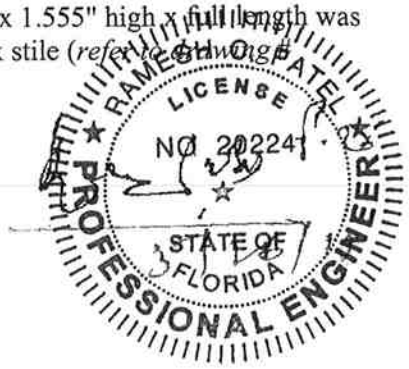
All Specimens

1.000" overall insulated laminated glass consisting of the following: One (1) exterior piece of .125" tempered glass / one (1) .375" thermal break butyl spacer system / one (1) piece of .125" annealed glass / 0.090" PVB interlayer (By Solutia as stated by mfg.) / one (1) piece of .125" annealed glass. Exterior glazed with silicone back bedding compound. The glazing utilized an extruded vinyl snap-in glazing bead measuring .283" wide x .977" high overall with a .625" glass bite (*refer to drawing # Glass/ 1" IG, .090 PVB,TEMPERED*).

Reinforcement:

All Specimens

One (1) H shaped aluminum reinforcement measuring 1.971" wide x 1.555" high x full length was located in each fixed panel astragal stile, fixed panel interlock stile and operable panel interlock stile. The fixed panel interlock reinforcement and the operable interlock reinforcement were secured with nine (9) #8 x 1.00" Phillips PH self-drilling SMS (*refer to drawing # 10300151*). The fixed panel astragal reinforcement was free floating with no fasteners. One (1) free floating aluminum reinforcement measuring 1.965" wide x 1.555" high x full length was located in each fixed panels jamb stile and operable panel lock stile (*refer to drawing # 10300150*).



Weep System:
All Specimens

Four (4) weep notches that measured 1.00" wide x .250" high were located as follows. One (1) at the corner of the exterior face of the frame sill and one (1) at the corner of the interior track leg of the frame sill. Each weep notch measured 3.00" c/l from the frame jamb/sill corner connection.

Weather-stripping:
All Specimens

Quantity	Description	Location
Three (3) strips	Fin seal .270" wide x .250" high	two (2) operable panel track and one (1) fixed panel track of frame head
Three (3) strips	Fin seal .270" wide x .250" high	two (2) operable panel track and one (1) fixed panel track of frame sill
Four (4) strips	Fin seal .270" wide x .250" high	Interior panel tracks of frame jambs and frame head
One (1) strip	Fin seal .270" wide x .250" high	Operable and fixed panel interlock

Hardware:
All Specimens

Quantity	Description	Location
Four (4)	Steel front adjustable tandem roller, 1.66" OD wheels, each secured with two (2) # 8 x 1.00" Phillips PH SMS	Each operable panel bottom rail corner
Two (2)	Inside/Outside Pull Handle	Located at lock stile of the operable panel
One (1)	Gemini II Lock with 2450 Trimplate, secured with two (2) # 10 x 1.250" Phillips flat head screws.	Lock stile of the operable panel located 38.250" c/l measuring from bottom of panel.
One (1)	Steel keeper (Gemini 1") secured with four (4) #8 x 3.00" Phillips P.H. screws.	Latch stile of the operable panel located 38.250" c/l measuring from bottom of panel.

Installation:
All Specimens

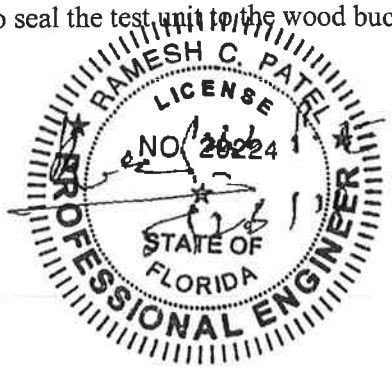
The specimen was secured to the 2" x 12" wood test buck utilizing forty-six (46) #8 x 1.500" Phillips PH SMS. Seven (7) in each frame jamb located at 6.00", 20.00", 34.00", 48.00", 62.00", 76.00" and 84.00" measuring from frame sill to frame head. Sixteen (16) in the frame head and frame sill located at 6.00", 18.00", 30.00", 42.00", 54.00" 66.00", 78.00", 90.00", 102.00", 114.00", 124.00", 136.00", 148.00", 160.00", 172.00", 184.00" and 196.00" measuring from left frame jamb to right frame jamb.

Sealant:
All Specimens

Silicone caulking on hairline joinery and as needed to seal the test unit to the wood buck.

Surface Finish:
All Specimens

White



Performance Test Results

Large Missile Impact

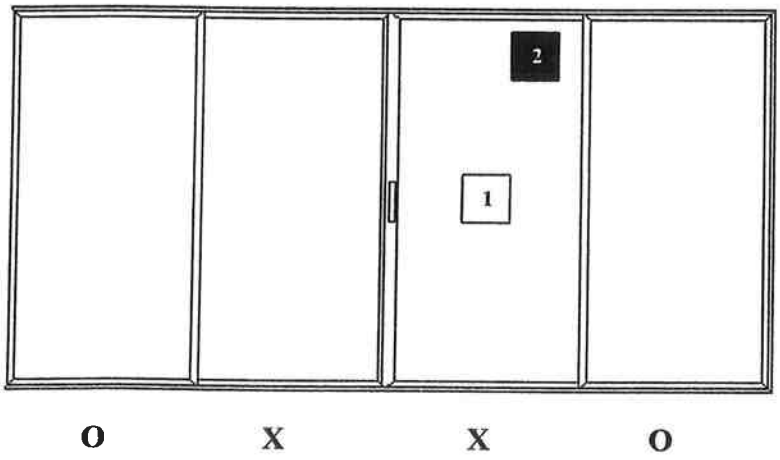
Specimen 1, 2, & 3: ASTM E-1996-05

Specimens were tested to **ASTM E 1996-05** with the required protocol of the test specifications. All specimens were tested to the Wind Zone 4 requirements stated in section 5 of **ASTM E-1996-05** Missile level D. The missile orientation was perpendicular to the glazing surface at impact. Each specimen was impacted with an 8 ft., 9 lb. Southern yellow pine 2" x 4" at the following locations:

Note:

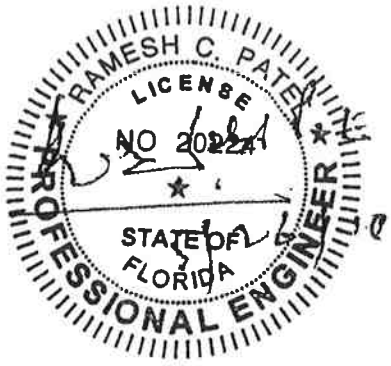
X- Measurement from left edge of test specimen.
Y- Measurement from top edge of test specimen.

Specimen 1



Specimen 1:

Impact No.	Speed ft/sec.	X Meas.	Y Meas.
1.	50.0	123.000"	48.500"
2.	49.9	134.500"	14.000"



Performance Test Results: Cont.

Large Missile Impact

Specimen 1, 2, & 3: ASTM E-1996-05

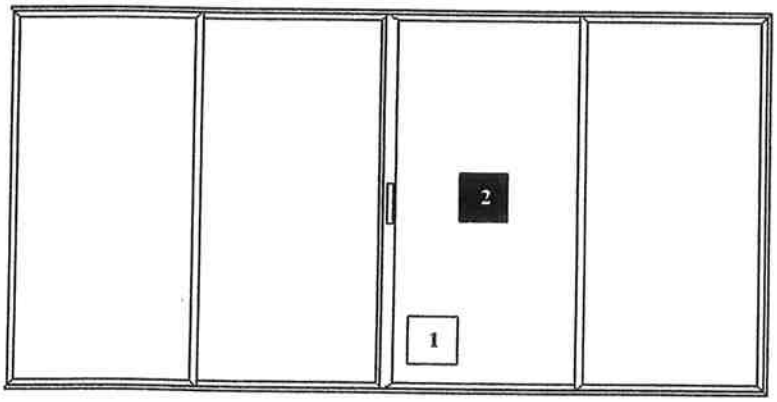
Specimens were tested to **ASTM E 1996-05** with the required protocol of the test specifications. All specimens were tested to the Wind Zone 4 requirements stated in section 5 of **ASTM E-1996-05** Missile level D. The missile orientation was perpendicular to the glazing surface at impact. Each specimen was impacted with an 8 ft., 9 lb. Southern yellow pine 2" x 4" at the following locations:

Note:

X- Measurement from left edge of test specimen.

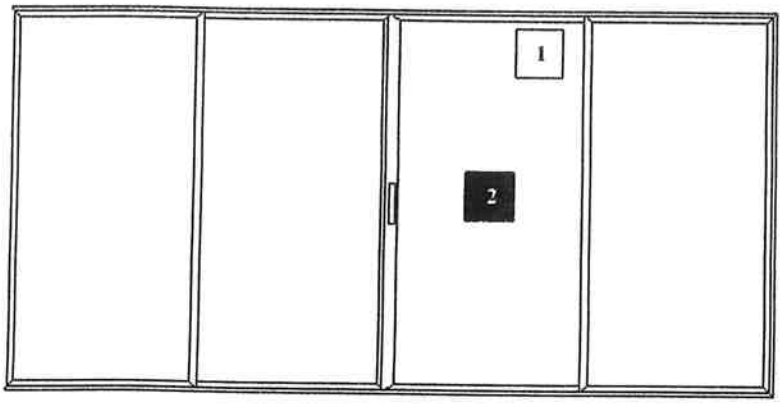
Y- Measurement from top edge of test specimen

Specimen 2



	O	X	X	O	
Specimen 2:	Impact No.	Speed ft/sec.	X Meas.	Y Meas.	
	1.	49.9	108.500"	83.000"	
	2.	50.1	122.000"	48.500"	

Specimen 3



	O	X	X	O	
Specimen 3:	Impact No.	Speed ft/sec.	X Meas.	Y Meas.	
	1.	49.7	134.000"	13.500"	
	2.	50.0	123.000"	47.500"	

Results:

When evaluated, upon completion of missile impacts the test specimens resisted the large missile impacts with no tear formed longer than (5 in.) by (1/16 in.) wide through which air can pass.

Performance Test Results (Continued)

Cyclic Static Air Pressure Loading Test

Specimen 1, 2, & 3: ASTM E 1886-05

Specimens were tested to **ASTM E 1886-05** test specifications. All specimens were tested to the requirements of section 5.4 table 1 in **ASTM E 1996-05.**

Specimen 1, 2 & 3: (Design Pressure) +50.0 psf., - 50.0 psf.

Positive loads

Range of Test	Actual Load (psf.)		# of Cycles	Cycles/min.
0.2 – 0.5	10.0	25.0	3500	55
0.0 – 0.6	0.0	30.0	300	55
0.5 – 0.8	25.0	40.0	600	55
0.3 – 1.0	15.0	50.0	100	55

4500 cycles

Deflection taken center mid-span

	Deflection	Set
Specimen 1	3.000"	0.500"
Specimen 2	3.250"	0.750"
Specimen 3	2.875"	0.750"

Negative loads

Range of Test	Actual Load (psf.)		# of Cycles	Cycles/min.
0.3 – 1.0	15.0	50.0	50	55
0.5 – 0.8	25.0	40.0	1050	55
0.0 – 0.6	0.0	30.0	50	55
0.2 – 0.5	10.0	25.0	3350	55

4500 cycles

Deflection taken center mid-span

	Deflection	Set
Specimen 1	2.500"	0.750"
Specimen 2	2.750"	0.750"
Specimen 3	2.625"	0.875"

9000 cycles completed

Specimen showed no resultant failure after cycle test.

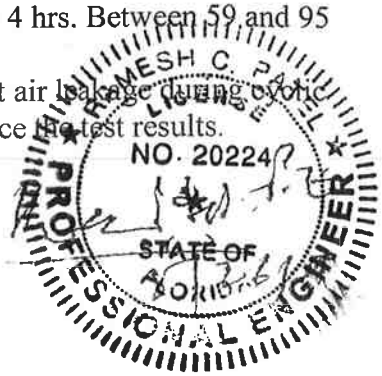
The results obtained and reported apply only to the specimens tested.

Results:

All test specimens tested resisted the large missile impact,s without penetration of the inner plane of the glazing assembly, and resisted the cycle cyclic pressure loading specified in Table 1; with no tear forming longer than 130mm (5" x 1/16" wide in.) and wider than 1mm (1/16 in.) through which air can pass (ASTM 1996-05, 7.2.1).

Comment:

1. At the conclusion of testing it was determined that the tested specimens passed the criteria of Wind Zone 4 set forth in ASTM E 1886-05 and ASTM E 1996-05.
2. The tested specimens were separated and conditioned for 4 hrs. Between 59 and 95 degrees Fahrenheit.
3. Nominal 2-mil polyethylene film was used to seal against air leakage during cyclic loads. The film was used in a manner that did not influence the test results.



Drawings to be submitted:
Submittal drawings numbered as listed and marked with the CTL stamp are a part of this report submitted by our client (Deceuninck NA): 000620PD-008, 011H027, 011H055-D, GLASS/ 1" IG, .090 PVB, TEMPERED, 10001100-SH, 10001101-SH, 10001102-SH, 10001104-SH, 10001105-SH, 10001111-SH, 10001116-SH, 10001117-SH, 10300148, 10300150, 10300152, 10300171, 623000PD-004, 623.620PD-003, 1988-8000-REV-SS, KEEPER GEMINI 1" TALL, GEMINI II LOCK W/2450 TRIMPLATE, 623.620PD-005.

Test Date: April 14th thru April 28th, 2010

Remarks: Detailed drawings were available for laboratory records and comparison to the test specimen at the time of this report. A copy of this report along with representative sections of the test specimen will be retained by CTL for a period of four (4) years. The results obtained apply only to the specimen tested.

This test report does not constitute certification of this product, but only that the above test results were obtained using the designated test methods and they indicate compliance with the performance requirements (paragraphs as listed) of the above referenced specifications.

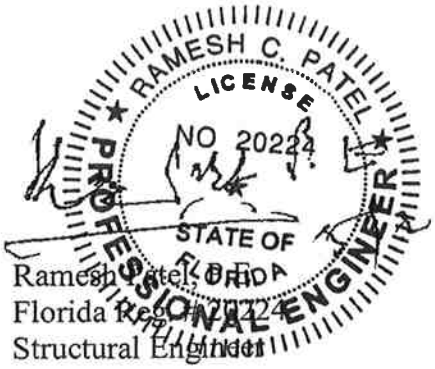
Certified Testing Laboratories assumes that all information provided by the client is accurate and that the physical and chemical properties of the components are as stated by the manufacturer.

Certified Testing Laboratories, Inc.

Testing Performed By:
Steve Gibbs CTL
Washington Romero CTL

Client Present:
Jonathan Morton Deceuninck NA

Michael Miller
Lab Technician
Architectural Division
Certified Testing Laboratories



Ramesh Patel, P.E.
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