

Certified Testing Laboratories

Architectural Division _ 1924 Premier Row _ Orlando, FL 32809

(407) 438-2019 _ Toll Free (800) 381-7744 _ Fax (407) 438-4064

Website: www.certifiedtestinglaboratories.com



Report Number: CTLA 3006WD

CTL Certification #: 14-0102.08

DC Not. #: 12009

Report Date: October 17, 2014

Test Dates: January 27, 2014

Through: June 13, 2014

STRUCTURAL PERFORMANCE TEST REPORT

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

Product Type and Series: Series 623.620 PD/With Impact Brackets – High Pressure Vinyl Equal Leg Frame Impact Sliding Glass Door

Test Specifications

Tests Conducted: TAS 201 (Large Missile), TAS 202, and TAS 203

Design Pressure: + 65.0 - 65.0

Overall Size: 4876 mm x 2438 mm (192" wide x 96" high)

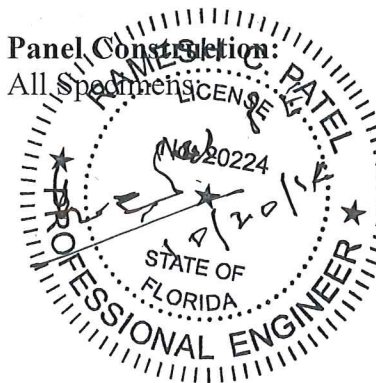
Configuration: O/X/X/O Two (2) operable panels / Two (2) fixed panels

Frame and Sash Material: Extruded vinyl

Frame Construction: The extruded vinyl main equal leg frame measured 4876 mm wide x 2438 mm high (192" wide x .96") high. The frame corners utilized coped and butted corner construction, secured with three (3) # 8 x 76mm (2.5") Phillips PH fasteners. Head and jamb extrusions measured 127.2 mm (5.008") wide x 51mm (2.007") high (*refer to drawing # 10001100_SH*). The frame sill extrusion measured 127 mm (5.088") wide x 51mm(2.007") high (*refer to drawing #10001101_SH*). The frame sill had vinyl sill insert running full length of fixed panel that measured 46mm (1.800") wide x 26mm (1.020") high and secured to frame utilizing four #8 x 32mm (1.250") Phillips CS self-drilling SMS (*refer to drawing # 10001105_SH*). The frame sill incorporated a friction fit Waterdam sill extender that measured (.226") wide x (.701") high (*refer to drawing # 200008052*). An extruded vinyl frame adapter was utilized at the interior perimeter of the main frame and measured 54mm x 26mm (2.128" wide x 1.051" high).

Panel Construction:

All Specimens: The operable panels measured 1245 mm (49.187") wide x 2369mm (93.500") high overall. The fixed panels measured 1238mm (49.187") wide x 2369mm (93.500") high overall. The panels utilized mitered and welded corner construction. The vinyl sash stiles, rails and interlock measured 45mm (1.755") wide x 102 mm (4.000") high (*refer to drawing # 10001102_SH*). The operable and fixed panel interlock stiles had an interlocking vinyl sash adapter measuring 51 mm (2.002") wide x 58 mm (2.279") high (*refer to drawing # 10001117_SH Sash Adapter*) secured through the stile with nine (9) #8 x 16mm (0.625") Phillips PH self-drilling SMS located 102 mm (4") from top and bottom of panel and a maximum of 305 mm (12") on center thereafter.



Panel Construction:Cont.

The fixed panels were secured to frame head/sill with an aluminum HD/Impact (L) shaped bracket measuring 46 mm (1.500") wide x 77 mm (3.000") high overall (*refer to drawing # 623620PD*) and was secured to fixed panel interlock stile with two (2) #8 x 25mm (1.00") Phillips CS self-drilling SMS and to frame head/sill utilizing two (2) #8 x 19mm(0.750") Phillips CS self-drilling SMS and two (2) #8 x 64mm(2.500") Phillips CS fasteners per bracket

The fixed panels each had three (3) aluminum snubbers each measuring 45mm (1.780") wide x 32mm (1.242") high x 762 mm (30") long. Two (2) were secured equal distance on the frame jamb at each fixed panel location with nine (9) #8 x 32 mm (1.250") Phillips F.H. self-tapping S.M.S. The third aluminum snubber was centered at the frame head fixed panel. This frame head fixed panel snubber utilized no fasteners and was inserted between the frame head pocket and fixed panel sash top rail (*refer to drawing # 10300148*).

Two (2) aluminum T-Brackets were located at frame head of the operable panel track pocket c/l of the operable panel. The tracks/guides measured 47mm (1.845") wide x 29mm (1.145") high x 305mm (12.00") long. Each track/guide was secured to the frame head with eight (8) #8 x 64mm (2.500") Phillips F.H self-tapping S.M.S. (*refer to drawing # 10300213SH*).

The four (4) lite 6061-T65 vertical aluminum astragal bar measured 58mm (4.00") wide x 60mm (.500") thick x full length. A vinyl astragal adapter was utilized on the interior and exterior of the vertical aluminum astragal, and measured 1.772" wide x 1.915" high (*refer to drawing # 10001183/ EMS 10-61-500*). The four (4) lite aluminum astragal was secured to the operable panel keeper stile with eight (8) #8 x 52mm (2.00") Phillips P.H.S.M.S. The fasteners were located at 127mm (5.00") from the each end of the vertical astragal and 305mm (12.000") on center thereafter.

Day lite opening:
All Specimens:

Daylight opening for the fixed and operable panels measured 1038 mm (40.750") wide x 2162 mm (85.00") high.

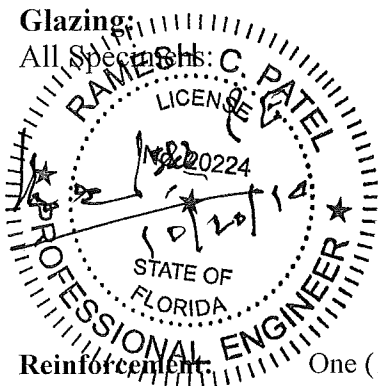
Glazing:
All Specimens:

1.000" overall insulated glass consisting of the following as viewed from exterior to interior: One (1) exterior piece of .1875" tempered glass / one (1) .375" Duraseal / Quanex spacer system / one (1) piece of .125" annealed glass / 0.090" SGP interlayer by (Dupont) as stated by mfg.) / one (1) piece of .125" annealed glass. Setting block was Tremco dense rubber extrusion. Exterior glazed with silicone back bedding compound (Sikaflex 552 as stated by Mfg.), .625" glass bite (*refer to drawing # PA-007*) The glazing utilized an extruded vinyl snap-in glazing bead measuring (.283" wide x .977" high) overall with (*refer to drawing # 1001111_SH Glazing Bead*)

Reinforcement:
All Specimens:

One (1) H shaped aluminum reinforcement measuring 50mm (1.971") wide x 39mm (1.555") high x full length was located in each fixed panel interlock stile, passive panel interlock stile and operable panel astragal stile (*refer to drawing # 10300151*).

The fixed panel interlock reinforcement and the operable interlock reinforcement were secured through the interlock into stile with nine (9) #8 x 16mm (0.625") Phillips PH self-drilling SMS located 102 mm (4") from top and bottom of panel and a maximum of 305 mm (12") on center thereafter.



Reinforcement: Cont.

The operable panel astragal reinforcement was secured to the panel thru the astragal with eight (8) #8 x 52mm (2.00") Phillips P.H.S.M.S. The fasteners were located at 127mm (5.00") from the each end of the vertical astragal and 305mm (12.000") on center thereafter.

One (1) aluminum square tube reinforcement was inserted into each H shaped aluminum reinforcement at each operable panel vertical interlock rail and measured (1.00" wide x 1.00" high x .125" thick x full length). The tubular reinforcement was free floating (No fasteners were utilized) (refer to drawing # 10300151-A & EMS 19-61-140).

One (1) free floating aluminum reinforcement measuring 50 mm (1.965") wide x 39 mm (1.555") high x full length was located in each fixed panel jamb stile and active panel lockstile (refer to drawing # 10300150).

One (1) aluminum rail insert reinforcement in each operable panel bottom rail measured 1.555" wide x 1.971" high. Each rail insert was secured to the bottom rails with two (2) #8 x .750" TEK screws (refer to drawing # 10300152)

One (1) 1.500" x 1.500" x 8' x .125" aluminum "L" angle was located at frame sill interior, center mid-span. Secured to rough opening butted against interior frame sill attached to rough opening with eight (8) #12 x 1.500" Phillips SMS, 3" from each end and 12" OC thereafter. (refer to drawing # EMS 11-63-275).

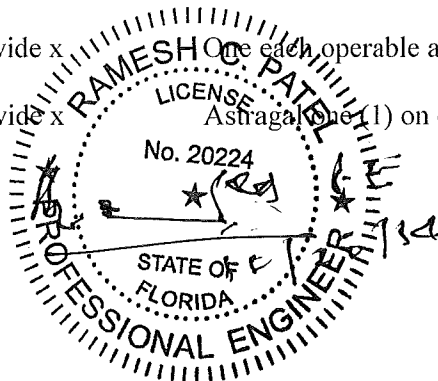
Four (4) Nylon Impact Brackets, One (1) each located at the operable panels interlock stiles, top/bottom rail interface. Secured with three (3) #8 x 2.5" PFH TEK SMS three (3) per bracket (refer to drawing # 011H055-D)

Weep System:
 All Specimens:

Four (4) weep notches that measured 25 mm (1.00") wide x 6 mm (.250") high were located as follows. One (1) at each corner of the exterior face of the frame sill and one (1) at each corner of the interior track leg of the frame sill. Each weep notch measured 76 mm (3.00") c/l from the frame jamb/sill corner connection.

Weather-stripping: All Specimens:

<u>Quantity</u>	<u>Description</u>	<u>Location</u>
Two (2) strips	Fin seal 9mm (.270") wide x 6 mm (.250") high	One (1) operable panel track and one (1) fixed panel track frame head
One (1) strip	Fin seal 9mm (.270") wide x 6 mm (.250") high	One (1) operable panel track frame sill
Two (2) strips	Fin seal 9mm (.270") wide x 6 mm (.250") high	One (1) each frame jamb.
Four (4) strip	Fin seal 9mm (.270") wide x 6mm (.250") high	One each operable and fixed panel interlock
Two (2) strips	Fin seal 9mm (.270") wide x 6mm (.250") high	Astragal One (1) on exterior and one (1) on interior



Hardware: All Specimens:

<u>Quantity</u>	<u>Description</u>	<u>Location</u>
Four (4)	Steel front adjustable tandem roller, 42mm (1.66") OD wheels, each secured with two (2) # 8 x 25mm(1.00") Phillips PH SMS (Amesbury Group) Ref. dwg.# 1988-8000-REV-SS	Each operable panel bottom rail corner
Two (2)	Inside/Outside Pull Handle	Located at lock stile of the operable panels
One (1)	Gemini II Lock with 2450 Trimplate, secured with four (4) # 10 x 32mm (1.250") Phillips flat head screws.	Lock stile of the operable panels located 972mm (38.250") c/l measuring from bottom of panel.
One (1)	Steel keeper (Gemini 1") secured with four (4) #8 x 76mm (3.00") Phillips P.H. screws.	Latch stile of the operable panels located 972mm (38.250") c/l measuring from bottom of panel.

Installation: The specimen was secured to the 50 mm x 305 mm double stacked (2" x 12") wood test buck utilizing #8 x 38 mm (1.500") Phillips PH SMS. Eight (8) in each frame jamb located at 152mm (6.00") from each end and a max. of 12" on center thereafter. Sixteen (16) in the frame head and frame sill located at 152 mm (6.00") from each end and a max. of 12" on center thereafter. (refer to drawing # 623620PD-007 OXXO).

Sealant: Silicone caulking as needed to seal the test units to the wood bucks.

Screen: Roll formed aluminum screen with fiberglass mesh, and vinyl spline

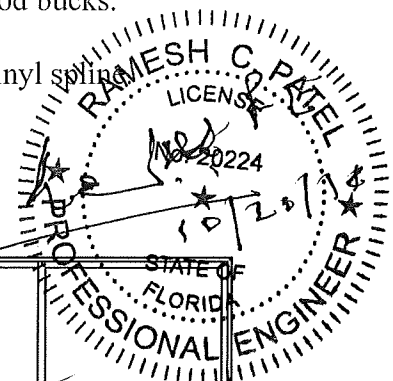
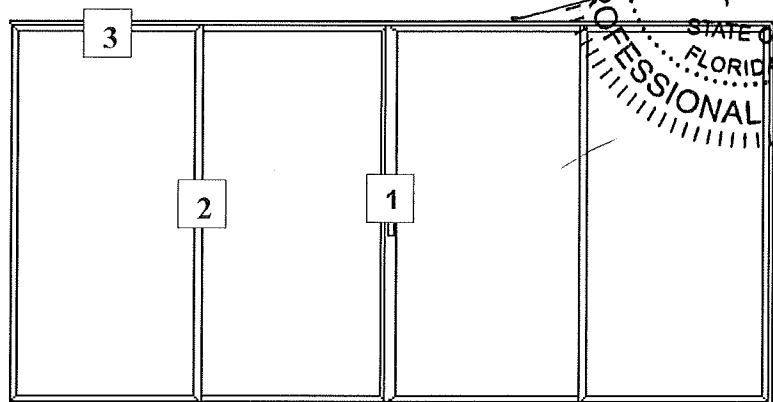
Surface Finish: White vinyl

Performance Test Results

Specimen 1

Test Sequence TAS 202-94

1. Air Infiltration
2. ½ Test Pressure Positive
3. ½ Test Pressure Negative
4. Design Pressure Positive
5. Design Pressure Negative
6. Water Infiltration
7. Full Test pressure Positive
8. Full Test Pressure Negative
9. Forced Entry Resistance



Location (1) - Center mid-span vertical astragal

Location (2) - Center mid-span of the interlock

Location (3) – Longest span between installation anchors, frame head

Deflection / Permanent Set were measured with three (3) dial indicators Mitutoyo control #'s A068, A067 & A070. Measurements were taken at #1 center mid-span of astragal, #2 center mid-span of interlock & #3 longest span between installation fasteners at frame head

Performance Test Results: Cont.

Air Infiltration Test: Specimen 1

Air Infiltration Tests were conducted in accordance with **DCBCCD TAS 202-94**

	<u>Actual</u>	<u>Allowable</u>
@ 1.57psf / 75 Pa	0.28 cfm/ft ²	0.34 cfm/ft ²

Water Infiltration Test: Specimen 1

Water Infiltration Test was conducted in accordance with **DCBCCD TAS 202-94**

WTP=9.75 psf / 467Pa

No water penetration was observed 15 min. duration Result: Passed

The specimen was tested with and without an insect screen installed.

Forced Entry Resistance Test: Specimen 1

Forced Entry Resistance Test was conducted in accordance with **DCBCCD TAS 202-94**

Forced Entry Resistance **ASTM F842** Passed No Entry

Type "C" Window Assembly T1= 5 min

L1/300 lbs-Passed, L2/175 lbs-Passed, L3/30lbs-Passed, L4/50lbs-Passed

Tools used: a spatula (10.1.1.1) and a piece of stiff wire (10.1.1.2)

The test specimen meets the performance Grade 10.

Uniform Structural Load Test

Static Tests were conducted in accordance with **DCBCCD TAS 202-94**

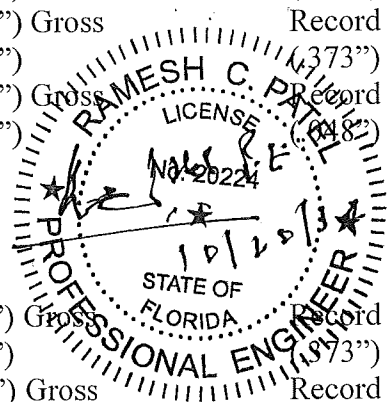
Specimen 1

Design Pressure of +65.0psf

<u>Range of test</u>	<u>Time</u>	<u>Actual Load</u>	<u>Deflection</u>	<u>Perm. Set</u>	<u>Allowable</u>
Positive loads	(seconds)	psf			
½ Test load	30	48.75			
Design Load	30	65.0	Loc. 1 (1.501") Gross		Record only
Test load	30	97.5	Loc. 1 (0.147")		(.373")
Design Load	30	65.0	Loc. 2 (1.129") Gross		Record only
Test load	30	97.5	Loc. 2 (0.082")		(.373")
Design Load	30	65.0	Loc. 3 (0.021") Gross		Record only
Test load	30	97.5	Loc. 3 (0.004")		(.048")

Design Pressure of -65.0psf

Negative loads	(seconds)	psf			
½ Test load	30	48.75			
Design Load	30	65.0	Loc. 1 (1.660") Gross		Record only
Test load	30	97.5	Loc. 1 (0.075")		(.373")
Design Load	30	65.0	Loc. 2 (1.320") Gross		Record only
Test load	30	97.5	Loc. 2 (0.130")		(.373")
Design Load	30	65.0	Loc. 3 (0.013") Gross		Record only
Test load	30	97.5	Loc. 3 (0.008")		(.048")



Location (1) -Center mid-span astragal .004% of 93.250" span = .373" allowable permanent set
 Location (2) -Center mid-span of the interlock .004% of 93.250" span = .373" allowable permanent set
 Location (3) -Longest span between installation anchors, frame head .004% of 12" span = .048" allowable permanent set

Impact Test: Large Missile

Specimens: 2, 3 & 4

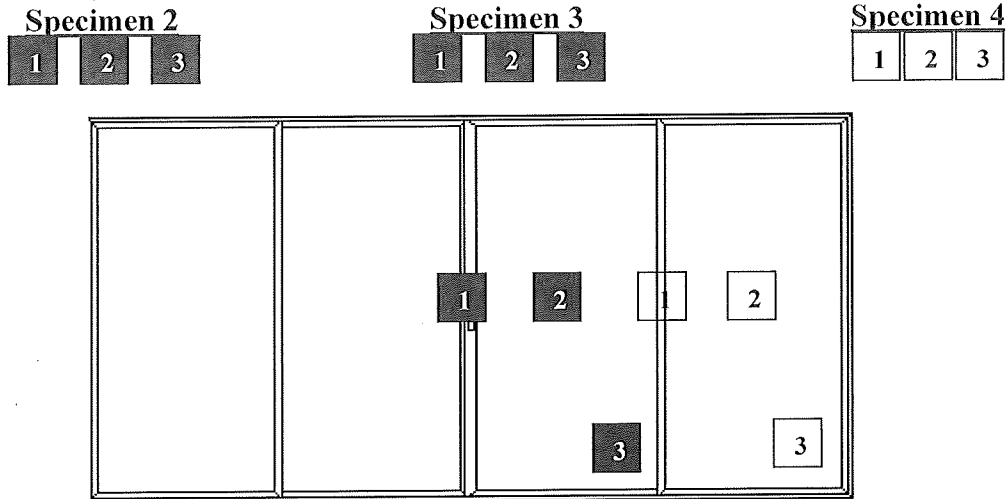
Impact tests were conducted in accordance with **DCBCCD TAS 201-94**

Each specimen was impacted with an 8 ft., 9 lb. Southern yellow pine (2" x 4") at the following locations:

X measurement from left edge of specimen.

Y measurement from top edge of test specimen

Type and weight of missile: #2 Southern yellow pine 2 x 4, length approx. 96" & 9 lb.

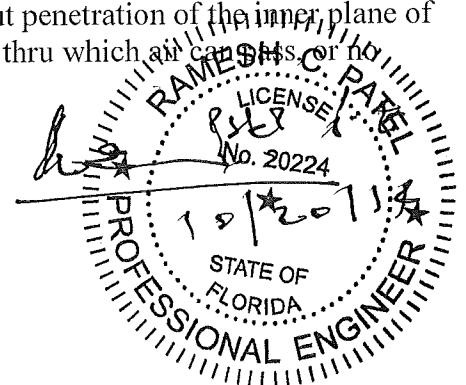


Specimen	Impact Loc.	Speed Ft/Sec	X Meas.	Y Meas.
No. 2	Loc: 1.	49.9	98.25"	47.50"
	Loc: 2.	50.1	122.00"	47.50"
	Loc: 3.	50.1	137.00"	87.00"

Specimen	Impact Loc.	Speed Ft/Sec	X Meas.	Y Meas.
No. 3	Loc: 1.	50.1	98.00"	47.50"
	Loc: 2.	50.2	123.00"	47.00"
	Loc: 3.	50.1	137.25"	88.50"

Specimen	Impact Loc.	Speed Ft/Sec	X Meas.	Y Meas.
No. 4	Loc: 1.	50.0	147.00"	47.00"
	Loc: 2.	50.2	171.50"	47.50"
	Loc: 3.	50.1	187.00"	87.00"

Results: All specimens tested resisted the large missile impact, without penetration of the inner plane of the glazing. With no tear forming longer than 5" and wider than 1/16" thru which an 8" diameter solid sphere could pass, or no opening through which a 3" diameter solid sphere could freely pass.



Fatigue Loading Test TAS 203

Specimens 2, 3, and 4:

Cycle tests were conducted in accordance with DCBCCD TAS 203-94

Specimen 2

Design Load + 65.0 psf, -65.0 psf

+ Positive loads

<u>Range of test</u>	<u>Actual load PSF</u>		<u># of cycles</u>	<u>Cycles/min</u>
+ .2 - .5	13.0	32.5	3500	55
+ .0 - .6	0.00	39.0	300	55
+ .5 - .8	32.5	52.0	600	55
+ .3 - 1.0	19.5	65.0	100	55

Deflection taken at center mid-span

Deflection/ Set
 1.750" 0.250"

-Negative Loads

<u>Range of test</u>	<u>Actual load PSF</u>		<u># of cycles</u>	<u>Cycles/min</u>
+ .3 - 1.0	19.5	65.0	50	55
+ .5 - .8	32.5	52.0	1050	55
+ .0 - .6	0.00	39.0	50	55
+ .2 - .5	13.0	32.5	3350	55

Deflection taken at center mid-span

Deflection/ Set
 2.250" 0.375"

9000 cycles completed

Specimen showed no resultant failure after cycle test.

Specimen 3

Design Load + 65.0 psf, -65.0 psf

+ Positive loads

<u>Range of test</u>	<u>Actual load PSF</u>		<u># of cycles</u>	<u>Cycles/min</u>
+ .2 - .5	13.0	32.5	3500	55
+ .0 - .6	0.00	39.0	300	55
+ .5 - .8	32.5	52.0	600	55
+ .3 - 1.0	19.5	65.0	100	55

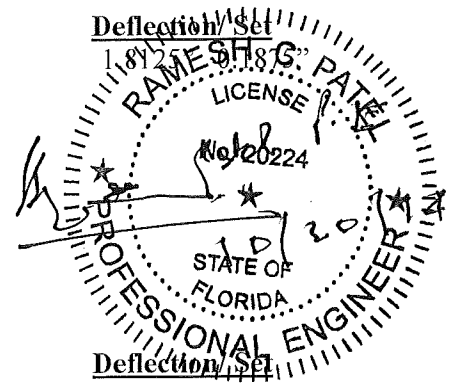
Deflection taken at center mid-span

-Negative Loads

<u>Range of test</u>	<u>Actual load PSF</u>		<u># of cycles</u>	<u>Cycles/min</u>
+ .3 - 1.0	19.5	65.0	50	55
+ .5 - .8	32.5	52.0	1050	55
+ .0 - .6	0.00	39.0	50	55
+ .2 - .5	13.0	32.5	3350	55

Deflection taken at center mid-span

Deflection/ Set
 1.875" 0.250"



Deflection/ Set
 2.250" 0.250"

9000 cycles completed

Specimen showed no resultant failure after cycle test.

Specimen 4

Design Load + 65.0 psf, -65.0 psf
+ Positive loads

<u>Range of test</u>	<u>Actual load PSF</u>		<u># of cycles</u>	<u>Cycles/min</u>
+ .2 - .5	13.0	32.5	3500	55
+ .0 - .6	0.00	39.0	300	55
+ .5 - .8	32.5	52.0	600	55
+ .3 - 1.0	19.5	65.0	100	55

Deflection taken at center mid-span

Deflection/ Set
 1.750" 0.250"

-Negative Loads

<u>Range of test</u>	<u>Actual load PSF</u>		<u># of cycles</u>	<u>Cycles/min</u>
+ .3 - 1.0	19.5	65.0	50	55
+ .5 - .8	32.5	52.0	1050	55
+ .0 - .6	0.00	39.0	50	55
+ .2 - .5	13.0	32.5	3350	55

Specimen showed no resultant failure after cycle test.

Deflection/ Set
 2.1875" 0.4375"

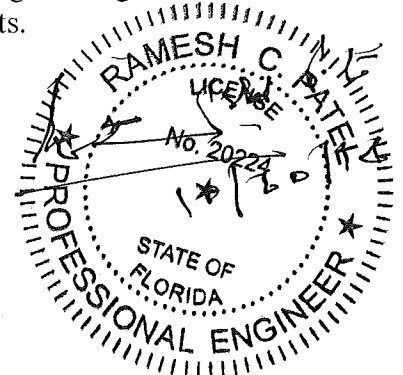
9000 cycles completed

Specimen showed no resultant failure after cycle test.

Note: The doors were operable at the end of cycle test.

Results: All specimens tested resisted the Fatigue Loading test. With no tear forming longer than 5" long x 1/16" wide thru which air could pass.

Comment: Nominal 2-mil polyethylene film was used to seal against air leakage during structural loads. The film was used in a manner that did not influence the test results.



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 Certified Testing Laboratories for a period of ten (10) years. The results obtained apply only to the specimen tested.

This test report does not constitute certification of this product, but only 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. This report shall not be reproduced, except in full, without the written approval of the laboratory.

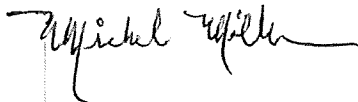
Certified Testing Laboratories

Testing Performed/Witnessed By:

Mike Miller Certified Testing Laboratories
Washington Romero Certified Testing Laboratories
Ramesh Patel P.E.

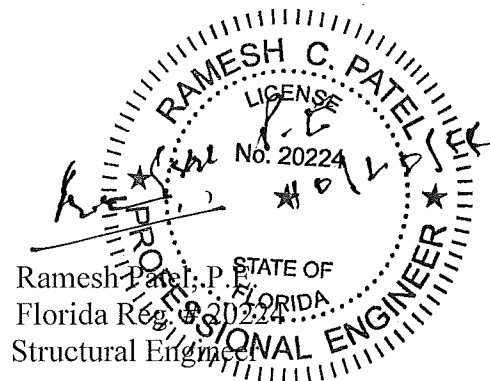
Client Present:

Dennis Cox Deceuninck NA



Michael Miller
Documentation Manager
Certified Testing Laboratories

cc: Deceuninck NA (2)
 Dade Co. (1)
 Ramesh Patel P.E. (1)
 File (1)



Ramesh Patel, P.E.
Florida Reg. # 20224
Structural Engineer