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Report Number: ESP009160P-2
Report Date: April 23, 2012

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-004 Vinyl Fin Frame Impact Sliding Glass Door
3658mm x 2438mm (144.00" x 96.00")

Test Specifications: Test Specifications: AAMA/WDMA/CSA 101/I.S.2/A440-05
"Standard/Specification for Windows, Door and Unit Skylights".

Primary Product Designator: SD-C50 3658mm x 2438mm (144" x 96")
Positive Design Pressure = 2403 Pa. (50.0 psf.)
Negative Design Pressure = 2403 Pa. (50.0 psf.)
Water Penetration Resistance Test Pressure = 362 Pa. (7.5 psf.)

Test Specimens

Configuration: O/X/O One (1) operable panel / Two (2) fixed panels.

Frame Construction: The extruded vinyl main fin frame measured 3658mm wide x 2438mm high (144.00" wide x 96.00") high, with a 32mm (1.250") integral fin. The frame corners utilized coped and butted corner construction, secured with three (3) # 8 x 76mm (3.00") Phillips PH fasteners. The frame head and jamb extrusions measured 127mm (5.008") wide x 51mm (2.007") high (refer to drawing # 10001100_SH). The frame sill extrusion measured 127mm (5.088") wide x 51mm (2.007") high (refer to drawing # 10001101_SH). The frame sill had vinyl fixed panel riser running full length of each fixed panel that measured 46mm (1.800") wide x 26mm (1.020") high and secured to frame utilizing #8 x 32mm (1.250") Phillips CS self-drilling SMS (refer to drawing # 10001105_SH).

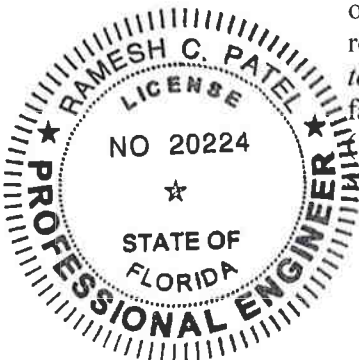


Panel Construction: The operable panel measured 1232mm (48.500") wide x 2369mm (93.250") high overall. The fixed panels measured 1232mm (48.500") wide x 2369mm (93.250") high overall. The panels utilized mitered and welded corner construction. The vinyl sash stiles and rails measured 45mm (1.755") wide x 102mm (4.000") high (*refer to drawing # 10001102_SH*). The operable and fixed panel interlock stiles had an interlocking vinyl sash adapter measuring 51mm (2.002") wide x 58mm (2.279") high (*refer to drawing # 10001117_SH*) secured through the stile with nine (9) #8 x 16mm (0.625") Phillips PH self-drilling SMS located 102mm (4") from top and bottom of panel and a maximum of 305mm (12") on center thereafter. The fixed panels were secured to frame head/sill with an aluminum "L" shaped bracket measuring 40mm (1.575") wide x 85mm (3.346") high overall (*refer to drawing # 011H027*) 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. The fixed panels each had three (3) aluminum snubbers each measuring 45mm (1.780") wide x 32mm (1.242") high x 762mm (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 32mm (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 45mm (1.755") wide x 254mm (10.00") high x 6mm (.250") thick located at top and bottom of interlock stile secured to the operable panel with three (3) #8 x 64mm (2.50") Phillips CS self-drilling SMS (*refer to drawing # 011H055*). One (1) aluminum track/guide was located at frame head of the operable panel track pocket c/l of the operable panel. The track/guide measured 47mm (1.856") wide x 29mm (1.160") high x 305mm (12.00") long. The track/guide was secured to the frame head with eight (8) #8 x 64mm (2.500") Phillips F.H. self-tapping S.M.S. The three (3) lite vinyl astragal measured 130mm (5.104") wide x 52mm (2.047") high (*refer to drawing # 10001115*). The astragal had an exterior mounted box tube shaped aluminum reinforcement that measured 25mm (1.000") wide x 52mm (2.000") high x (.063") thick (*refer to drawing # Aluminum*). The reinforcement was secured to the astragal with eight (8) #8 x 32mm (1.250") Phillips P.H.S.M.S. The fasteners were located at 127mm (5.00") from the each end of the vertical astragal and 254mm (10.00") on center thereafter.

Daylight opening: Daylight opening for the operable panel measured 1029mm (40.500") wide x 2165mm (85.250") high. The daylight opening for the fixed panels measured 1029mm (40.500") wide x 2165mm (85.250") high.

Glazing: 25mm (1.000") overall insulated laminated glass consisting of the following: One (1) exterior piece of 3mm (.156") tempered glass / one (1) 11mm (.441") spacer system / one (1) piece of 3mm (.156") annealed glass / 2mm (0.090") PVB interlayer (By Solutia as stated by mfg.) / one (1) piece of 3mm (.156") annealed glass. Exterior glazed with silicone back bedding compound. The glazing utilized an extruded vinyl snap-in glazing bead measuring 7mm (.283") wide x 25mm (.977") high overall with a 16mm (.625") glass bite (*refer to drawing # Glass/ 1" IG, .090 PVB, TEMPERED*).

Reinforcement: 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 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 25mm (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 50mm (1.965") wide x 39mm (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: Four (4) weep notches that measured 25mm (1.00”) wide x 6mm (.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 76mm (3.00”) c/l from the frame jamb/sill corner connection.

Weather-stripping:

| <u>Quantity</u> | <u>Description</u> | <u>Location</u> |
|------------------|--|--|
| Three (3) strips | Fin seal 9mm (.270”) wide x 6mm (.250”) high | Two (2) operable panel track and one (1) fixed panel track of frame head |
| Three (3) strips | Fin seal 9mm (.270”) wide x 6mm (.250”) high | Two (2) operable panel track and one (1) fixed panel track of frame sill |
| Four (4) strips | Fin seal 9mm (.270”) wide x 6mm (.250”) high | Interior panel tracks of frame jambs and frame head |
| One (1) strip | Fin seal 9mm (.270”) wide x 6mm (.250”) high | Operable and fixed panel interlock |

Hardware:

| <u>Quantity</u> | <u>Description</u> | <u>Location</u> |
|-----------------|--|--|
| Two (2) | Steel front adjustable tandem roller, 42mm (1.66”) OD wheels, each secured with two (2) # 8 x 19mm (.750”) Phillips PH SMS | Operable panel bottom rail corners |
| 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 32mm (1.250”) Phillips flat head screws. | Lock stile of the operable panel located 972mm (38.250”) c/l measuring from bottom of panel. |
| One (1) | Steel keeper (Gemini 1”) secured with four (4) #8 x 51mm (2.00”) Phillips P.H. screws. | Latch stile of fixed panel located 972mm (38.250”) c/l measuring from bottom of panel. |

Installation:

The specimen was secured to the 50mm x 305mm (2” x 12”) wood test buck utilizing thirty-eight (38) #8 x 38mm(1.500”) Phillips PH SMS. Seven (7) in each frame jamb located at 152mm (6.00”), 508mm(20.00”), 864mm(34.00”), 1219mm(48.00”), 1575mm(62.00”), 1930mm(76.00”) and 2134mm(84.00”) measuring from frame sill to frame head. Twelve (12) in the frame head and frame sill located at 152mm(6.00”), 457mm(18.00”), 762mm(30.00”), 1067mm(42.00”), 1372mm(54.00”), 1676mm(66.00”), 1981mm(78.00”), 2286mm(90.00”), 2591mm(102.00”), 2896mm(114.00”), 3200mm(126.00”) and 3505mm(138.00”) measuring from left frame jamb to right frame jamb.

Sealant:

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

Surface Finish:

White

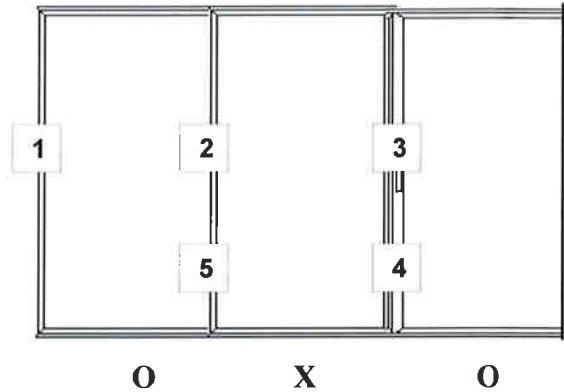


Performance Test Results

Uniform Structural Load **ASTM E330-02**
 Deflection / Permanent Set were measured with five (5) CDI Dial Indicators

Measurement Locations

- Location (1) -Center mid-span of frame jamb fasteners
- Location (2) -Center mid-span of fixed/operable panel interlock
- Location (3) -Center mid-span of the astragal/operable panel
- Location (4) -2" from bottom of the astragal/operable panel
- Location (5) -2" from bottom of the fixed/operable panel interlock



Performance Test Results

| <u>Paragraph</u> | <u>Title of Test</u> | <u>Method</u> | <u>Measured</u> | <u>Allowed</u> | <u>Result</u> |
|--|--|---|--|--------------------------|------------------|
| 5.3.1.1.1 | Operating Force | ASTM E2068 Max. Force to maintain motion Max. Force to initiate motion | 20 lbs 12 lbs | 40 lbs 25 lbs. | Passed Passed |
| 5.3.2 | Air Infiltration @ 75 Pa. (1.6 psf.) | ASTM E283-04 | 0.12 cfm/ft ² | 0.30 cfm/ft ² | Passed |
| *Note: Results recorded to two decimal precision at client's request. | | | | | |
| *The tested specimen meets the performance levels specified in AAMA/WDMA/CSA101/I.S.2/A440-05. | | | | | |
| 5.3.3.2 | Water Resistance 5.0 gph/ft ² WTP= 362 Pa. (7.5 psf.) *tested with and without insect screen | ASTM E547-00 Four (4) 5 min. cycles | No Entry | No Entry | Passed |
| 5.3.4.2 | Uniform Structural Load | ASTM E330-02 | Results recorded are net numbers. | | |
| 5.3.4.3 | Permanent Deformation Ten (10) second duration | | | | |

| <u>Positive</u> | | <u>Deflection @ Design</u> | <u>Set @ Test</u> | <u>Allowable Set</u> |
|--------------------------------------|--------|----------------------------|-------------------|----------------------|
| D/P @ 2403 Pa. (50.0 psf.) | Loc. 2 | 50mm (1.970") | 0.61mm (.024") | 9.8mm (0.384") |
| Test pressure @ 3545 Pa. (75.0 psf.) | Loc. 3 | 53mm (2.070") | 1.80mm (.070") | 9.8mm (0.384") |
| <u>Negative</u> | | | | |
| D/P @ 2403 Pa. (50.0 psf.) | Loc. 2 | 51mm (2.026") | 1.65mm (.065") | 9.8mm (0.384") |
| Test Pressure @ 3545 Pa. (75.0 psf.) | Loc. 3 | 52mm (2.125") | 2.41mm (.095") | 9.8mm (0.384") |

Location (2): Maximum allowable permanent set after test load at center mid-span of exterior left interlock stile:
 (0.4% of 2438mm (96") span) = 9.8mm (0.384")
 Location (3): Maximum allowable permanent set after test load at center mid-span of exterior right interlock stile:
 (0.4% of 2438mm (96") span) = 9.8mm (0.384")



Performance Test Results (Continued)

| <u>Paragraph</u> | <u>Title of Test</u> | <u>Method</u> | | | <u>Result</u> |
|-------------------------|--|--|------------------------|-----------------------|----------------------|
| 5.3.5 | Forced Entry Resistance Type "B" Sliding Door Assembly Tools used: A spatula (7.5.1) and a piece of stiff wire (7.5.2). The test specimen meets the performance Grade 10. | ASTM F 842-04 T ₁ = 10 minutes | | | Passed |
| 5.3.6.2 | Welded Corner Test Note: When loaded to failure, the break did not extend along the entire weld line. | ASTM D618-00 | | | Passed |
| 5.3.6.3 | Deglazing | ASTM E 987-94 | <u>Measured</u> | <u>Allowed</u> | <u>Result</u> |
| | Top Rail 70 lbs. | | 0.1mm (.012") = 1.3% | < 90% | Passed |
| | Bottom Rail 70 lbs. | | 0.1mm (.010") = 1.3% | < 90% | Passed |
| | Left Stile 50 lbs. | | 0.1mm (.007") = 1.1% | < 90% | Passed |
| | Right Stile 50 lbs. | | 0.1mm (.009") = 0.9% | < 90% | Passed |

Test Date: March 6th thru March 9th, 2012

Drawings to be submitted:

Submittal drawings numbered as listed and marked with the Element Materials Technology stamp are a part of this report submitted by our client (Deceuninck NA): 000620PD-007, 011H027, 011H055-D, GLASS/1" IG.090 PVB, TEMPERED, ALUMINUM, 10001100-SH, 10001101-SH, 10001104-SH, 10001105-SH, 1000111-SH, 10001115, 10001102-SH, 10001117-SH, P5870-A, 10300148, 10300150, 10300151, 10300152, 10300171, 623000PD-004, 623.620PD-003, 1988-8000-REV-SS, KEEPER GEMINI 1" TALL, GEMINI II LOCK W/2450 TRIMPLATE, 623.620PD-004.

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 Element Materials Technology 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.

Element Materials Technology 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.

Element Materials Technology



Testing Performed By:

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James Blakely

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