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Fenestration Structural Test Report

Rendered To
Comfort Line Inc.
5500 Enterprise Blvd.
Toledo, OH 43612

Series / Model

8020 Series Fiberglass Horizontal Sliding Window

Summary Description:

The tested product was a fiberglass horizontal sliding window. The test specimen was configured as a type C, (XX). The IG units used had a nominal thickness of 22.0 mm (7/8 inch) with two lites of 3.0 mm (1/8 inch) annealed glass. Two specimens were tested; the overall frame size of specimen 1 was 1828.8 mm (72 inches) wide by 1828.8 mm (72 inches) high. Specimen 2 measured 1828.8 mm (72 inches) wide by 1524 mm (60 inches) high both with a depth of 82.6 mm (3-1/4 inches).

Specification:

The test specimen(s) was evaluated in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-05 "Standard/Specification for Windows, Doors, and Unit Skylights." in addition to NSI/AAMA/WDMA 101/I.S.2/NAFS-02, AAMA/WDMA 101/I.S.2/A440-08 and AAMA/NWDMA 101/I.S.2-97.

Summary of Results

	<u>Specimen 1</u>	<u>Specimen 2</u>
Overall Design Pressure, Pa (psf)	960 (20.00)	1440 (30.00)
Breakaway Force, N (lbf)	76 (17)	*
Maximum Operating Force, N (lbf)	85 (19)	*
Air Leakage Rate, L/sec/m ² (scfm/ft ²)	0.20 (0.04)	*
Maximum Water Pressure Achieved, Pa (psf)	290 (6.00)	290 (6.00)
Maximum Structural Pressure Achieved, Pa (psf)	1440 (30.00)	2160 (45.00)
Forced Entry Resistance, ASTM F588	Pass	*
Specimen 1 - 101/I.S.2/A440-05 - Product Designation:	HS-R 20 1829 x 1829 (72 x 72)	
Specimen 1 - 101/I.S.2/NAFS-02 - Product Designation:	HS-R 20 1829 x 1829 (72 x 72)	
Specimen 1 - 101/I.S.2/A440-08 - Product Designation:	R-PG 20 1829 x 1829 (72 x 72) - HS	
Specimen 1 - 101/I.S.2-97 - Product Designation:	HS-R20 72 x 72	
Specimen 2 - 101/I.S.2/A440-05 - Product Designation:	HS-R 30 1829 x 1524 (72 x 60)	
Specimen 2 - 101/I.S.2/NAFS-02 - Product Designation:	HS-RC 30 1829 x 1524 (72 x 60)	
Specimen 2 - 101/I.S.2/A440-08 - Product Designation:	R-PG 30 1829 x 1524 (72 x 60) - HS	
Specimen 2 - 101/I.S.2-97 - Product Designation:	HS-R 30 72 x 60	

* Note: Data obtained from referencing specimen 1, per requirements of AAMA 101/I.S./A440-05 Section 4.4.2.6.2, "Optional Performance Grades"

Gateway Performance Test Results

<i>Specification Paragraph</i>	<i>Title of Test</i>	<i>Results</i>	<i>Allowed</i>
5.3.1	<u>Operating Force – ASTM E2068</u> Specimen 1 & 2 Right vent Force to initiate motion - Maximum Force to keep in motion - Maximum Left vent Force to initiate motion - Maximum Force to keep in motion - Maximum Specimen 2 data obtained from referencing specimen 1 (Larger unit of identical construction)	44.5 N (10.0 lbf) 40.0 N (9.0 lbf) 44.5 N (10.0 lbf) 35.6 N (8.0 lbf)	Report Only 90 N (20 lbf) Report Only 90 N (20 lbf)
5.3.1.1.3	Specimen 1 & 2 Latching Devices - Maximum Specimen 2 data obtained from referencing specimen 1 (Larger unit of identical construction)	22.2 N (5.0 lbf)	100 N (22.5 lbf)
5.3.2	<u>Air Leakage Resistance – ASTM E 283</u> Test Pressure - 75 Pa (1.60 psf) The tested specimens meet (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440-05 for air leakage resistance. Specimen 2 data obtained from referencing specimen 1 (Larger unit of identical construction)	0.20 L/sec/m ² (0.04 scfm/ft ²)	1.50 L/sec/m ² (0.30 scfm/ft ²)
5.3.3	<u>Water Penetration Resistance – ASTM E 547</u> Note: Testing started at pressures higher than gateway		
5.3.4.2	<u>Uniform Load Deflection - ASTM E 330</u> Note: Testing started at pressures higher than gateway		
5.3.4.3	<u>Uniform Structural Load - ASTM E 330</u> Note: Testing started at pressures higher than gateway		
Specimen 1 & 2			
5.3.5	<u>Forced Entry Resistance – ASTM F 588</u> Grade: 10 Disassembly Test Tests A1 through A7 Hardware Manipulation Test Sash Manipulation Test Specimen 2 data obtained from referencing specimen 1 (Larger unit of identical construction)	Pass Pass Pass Pass	No Entry No Entry No Entry No Entry

Auxiliary (Durability) Test Results

<i>Specification Paragraph</i>	<i>Title of Test</i>	<i>Results</i>	<i>Allowed</i>
	Specimen 1 & 2		
5.3.6.3	<u>Deglazing Test – ASTM E 987</u>		
	Right vent:		
	Top Rail 230 N (50 lbs)	2 %	<90 %
	Bottom Rail 230 N (50 lbs)	3 %	<90 %
	Left Stile 320 N (70 lbs)	4 %	<90 %
	Right Stile 320 N (70 lbs)	6 %	<90 %
	Left vent:		
	Top Rail 230 N (50 lbs)	2 %	<90 %
	Bottom Rail 230 N (50 lbs)	2 %	<90 %
	Left Stile 320 N (70 lbs)	8 %	<90 %
	Right Stile 320 N (70 lbs)	7 %	<90 %
	Specimen 2 data obtained from referencing specimen 1 (Larger unit of identical construction)		

Optional Performance Test Results

Specification

<i>Paragraph</i>	<i>Title of Test</i>	<i>Results</i>	<i>Allowed</i>
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The product specified herein has successfully achieved all the required criteria in section 5 of the referenced specification for the Gateway size of the achieved Performance Rating and has been further successfully tested the product to higher performance levels as indicated below.

Specimen 1

4.4.2.6

Water Resistance - ASTM E 547

204 L/hr/m² (5 gal/hr-ft²) - 4 Test cycles - 24 Minutes

Design Pressure - 1920 Pa (40.00 psf)

Test Pressure - 290 Pa (6.00 psf)	Pass	No Leakage
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Specimen was tested with and without screen.

Specimen 2

Water Resistance - ASTM E 547

204 L/hr/m² (5 gal/hr-ft²) - 4 Test cycles - 24 Minutes

Design Pressure - 1920 Pa (40.00 psf)

Test Pressure - 290 Pa (6.00 psf)	Pass	No Leakage
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Specimen was tested with and without screen.

Specimen 1

Uniform Load Deflection - ASTM E 330

Design Pressure - 960 Pa (20.00 psf)

Test Pressure		
Positive Load - 960 Pa (20.00 psf)	19.28 mm (0.759 in.)	N/A
Negative Load - 960 Pa (20.00 psf)	19.15 mm (0.754 in.)	N/A

Note: Measurements per AAMA Guidelines: Keeper stile

Uniform Structural Load - ASTM E 330

Design Pressure - 960 Pa (20.00 psf)

Test Pressure		
Positive Load - 1440 Pa (30.00 psf)	0.03 mm (0.020 in.)	6.99 mm (0.275 in.)
Negative Load - 1440 Pa (30.00 psf)	0.48 mm (0.001 in.)	6.99 mm (0.275 in.)

Note: Measurements per AAMA Guidelines: Keeper stile

0.4% allowable limit

Specimen 2

Uniform Load Deflection - ASTM E 330

Design Pressure - 1440 Pa (30.00 psf)

Test Pressure		
Positive Load - 1440 Pa (30.00 psf)	10.95 mm (0.431 in.)	N/A
Negative Load - 1440 Pa (30.00 psf)	10.57 mm (0.416 in.)	N/A

Note: Measurements per AAMA Guidelines: Keeper stile

Optional Performance Test Results (con't)***Specification***

<i>Paragraph</i>	<i>Title of Test</i>	<i>Results</i>	<i>Allowed</i>
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4.4.2.6

Specimen 2Uniform Structural Load - ASTM E 330**Design Pressure - 1440 Pa (30.00 psf)**

Test Pressure

Positive Load – 2160 Pa (45.00 psf) 0.05 mm (0.002 in.) 5.77 mm (0.227 in.)

Negative Load – 2160 Pa (45.00 psf) 0.05 mm (0.002 in.) 5.77 mm (0.227 in.)

Note: Measurements per AAMA Guidelines: Keeper stile

0.4% allowable limit

Product Description of Test Specimen**Specimen Item****Laboratory Verification**

Note: All descriptions are inclusive of specimens 1 & 2 unless otherwise noted

Frame:

Series/Model Name	8020 Series Horizontal Slider
Size	
Specimen 1	72 in. W. x 72 in. H. x 3-1/4 in. D.
Specimen 2	72 in. W. x 60 in. H. x 3-1/4 in. D.
Material	Fiberglass
Corner construction	Cope and butt construction,
Corner fastening	Composite material blocks (aert blocks) are inserted into ends of sill, jambs and head extrusions and secured in place with 3/16 in. W. x 1/2 in. L. staples and silicone. [3] #10 x 2 in. L. screws are driven horizontally. [1] #8 x 3/4 in. L. screw driven vertically at each screen track corner.
Corner sealing	Corners have a foam gasket and silicone
Other	Vinyl frame support (part #832) 4 in. lengths are centered on all four frame legs to the exterior edge, snapped into position and fastened with [1] staple. Vinyl interlock pop riveted to exterior face of lock stile

Vents:

Size	
Specimen 1	
Each vent:	35-1/2 in. W. x 68-3/4 in. H. x 1-7/16 in. D.
Specimen 2	
Each vent:	35-1/2 in. W. x 56-3/4 in. H. x 1-7/16 in. D.
Material	Fiberglass
Corner construction	Cope and butt
Corner fastening	Pivot corner assemblies join corners by being press fit into ends of stiles and sealed with silicone, [2] #10 x 3/8 in. L. screws are driven horizontally before vents are glazed, securing corner assemblies. Ends are then press fit into rails and are fastened with [2] # 10 x 3/4 in. L. screws driven vertically from the exterior of each rail corner.

Reinforcement:

Frame	None
Vent	None

Drainage:

Frame	Slot, 1 in. W. x 3/16 in. H. through base of parting stop 2-3/4 and 27 in from either jamb with weep covers in the exterior track pocket
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Product Description of Test Specimen**Specimen Item****Laboratory Verification****Drainage:**

Frame

Oval slot, 3/4 in. W. x 1/4 in. D. located 2-3/4 and 27 in. from either jamb in the base of the exterior track pocket, weeping to exterior

Hole, 3/16 in. diameter located 1-1/2 and 25-3/4 in. from either jamb through base of screen track

Three legs of sill track cover notched out 1-1/4 in. W. x 3/16 in. H. at 1-3/4 and 26 in. on center from either end

The ends of the sill track fillers have a 1/2 in. W. x 5/16 in. D. notch cut out from the exterior edge

The co-extruded top edge of the sill track fillers have 3/4 in. W x 1/16 in. D. notches cut out on the their interior and exterior edges. Notches are located 3-1/2 and 26 in. from either end.

Vent

Stiles drain to rails, mitered corners have slight separation which facilitate drainage

Weather-stripping:**Frame**

[2] rows of center fin pile 0.187 in. W. x 0.220 in. H. T- slot backer on jambs head and sill.

Closed cell foam, 2-5/8 in. W. x 1-1/2 in. D. x 7/8 in. H. in interior and exterior head track pockets (head closures)

Keeper vent

Top rail

[1] row center fin pile 0.187 in. W. x 0.270 in. H. T- slot backer on exterior face

Jamb stile

[1] row dual fin pile 0.187 in. W. x 0.220 in. H. T- slot backer on exterior face

Keeper stile

Vinyl interlock closure, 2 in. H. x 1-5/8 in. D. fastened to top edge of keeper stile with [1] #8 x 3/4 in. L. screw with 0.187 in. W. x 0.340 in. H. wool pile with T-slot backer

Bottom rail

[1] row center fin pile 0.187 in. W. x 0.270 in. H. T- slot backer on exterior face

Product Description of Test Specimen**Specimen Item****Laboratory Verification****Weather-stripping:****Lock vent**

Top rail

[1] row center fin pile 0.187 in. W. x 0.270 in. H. T- slot backer on exterior face

Lock stile

[1] row center soft fin pile 0.187 in. W. x 0.320 in. H. T- slot backer on exterior face

Jamb stile

[1] row center fin pile 0.187 in. W. x 0.210 in. H. T- slot backer on exterior face

Bottom rail

[1] row center fin pile 0.187 in. W. x 0.270 in. H. T- slot backer on exterior face

Glazing:

Overall IG thickness

7/8 in.

Thickness of glass

1/8 in.

Heat treatment

Annealed

Number of lights

2

Spacer ID

Aluminum box [A1-D]

Glazing Method

Laid in from exterior, wet glazed with silicone and vinyl dual durometer snap in glazing beads

Bite Depth

1/2 in.

Setting Blocks

1/8 in. rubber, [2] on each edge of each IG unit

Hardware:

Locks

Die cast cam lock centered 12 in. from ends and surface mounted with [2] #8 x 5/8 in. L. screws into threaded inserts

Keepers

Die cast keepers, surface mounted with [2] #6 x 1 in. L. screws into threaded inserts

Rollers

Single 5/8 in. diameter wheel in vinyl housing, press fit into routed openings in bottom edges of rails, 3-1/2 in. on center from corners

Handles

PVC pull handles centered on interior face of jamb stiles and fastened with [2] #8 x 5/8 in. L. screws into threaded inserts

Screen:**Specimen 1**

68-5/8 in. W. x 68-5/8 in. H. x 7/16 in. D.

Specimen 2

68-5/8 in. W. x 56-5/8 in. H. x 7/16 in. D.

Product Description of Test Specimen

Specimen Item

Laboratory Verification

Screen:

Construction

Aluminum frame and fiberglass cloth with rubber spline, cut square at ends with external plastic corner key and vertical cross brace

Test Buck:

Mounting Gap

3/16 in. at the head, jambs and 0 in. at the sill

Sealant

Silicone

Shims

Yes

Stops

None

Material

2 x 8 wrapped around a 2 x 6, SPF, #2

Anchorage of Frame to Test Buck:

Type

Truss head wood screw

Size

#8 x 3 in. L.

Quantity

[3] ea. in head and jambs [9] total

Location

Head: 7-1/2 in. from corners with [1] centered between
Jambs: 3 in. from corners with [1] centered between, all through frame

Review of Bill of Materials – 8020 Horizontal Slider

Review of Assembly and Detail Drawings – Assembly page, Exploded frame view 2-pages, Exploded inner sash view 2-pages, Exploded outer sash view 3-pages, Exploded screen view, Anchoring 2-pages , 8020, 821, 8002, 8003, 8004, 8005, 816, 825, 829, 832, A037011, A025510, A028519.

Components changed or altered during testing to achieve stated results – None

This report, in its original form contains product drawings and a Bill of Materials.

Conditions, Terms, and General Notes Regarding These Tests

The product tested **Has Been** compared to the detailed drawings, bill of materials and fabrication information supplied by the client so named herein. Our analysis, which includes dimensional and component description comparisons, indicate the tested product and engineering information supplied by the client "**Are Equivalent**". The report and representative samples will be retained for four years from the date of initial test.

These test results were obtained by employing all requirements of the designated test methods with no deviations. The test results and specimen supplied for testing are in compliance with the referenced specifications. The test results are specific to the product tested by this laboratory and of the sample supplied by the client named herein, and they relate to no other product either manufactured by the client, a Fabricator of the client or of installed field performance.

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No conclusions of any kind regarding the adequacy of the glass in the test specimen may be drawn from the test. Procedure "A" in ASTM E330-02 was used for this test.

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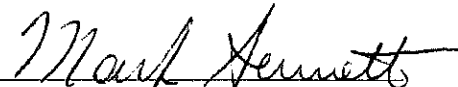
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Revision History

<u>Date</u>	<u>Rev. #</u>	<u>Pages Affected</u>	<u>Revisions</u>
02/11/09	.0	N/A	Original report issue
05/15/09	.1	1,2,5	Page 1 *note changed to cover optional performance grade Changed Performance class & requirements of specimen #2 to "R" class

For ETC Laboratories

Josh Reindl Testing Technician



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