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Report Number: ETC-09-329-22961.0

Test Start Date: 08/31/2009

Test Finish Date: 09/10/2009

Report Date: 09/14/2009

Fenestration Structural Test Report

Rendered To

Croft, LLC
P.O. Box 826
McCombs, MS. 39649

Series / Model

Series 10 Single Hung Window

Summary Description:

The tested product was an aluminum single hung window configured as a type A (O/X.) The IG units used had a nominal thickness of 16.0 mm (5/8 inch) with two lites of double strength annealed glass. The overall frame size was 914.4 mm (36 inches) wide by 1828.8 mm (72 inches) high by 63.5 mm (2-1/2 inches) deep. The vent stiles of this series are captured to either side within the jamb pocket.

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 ANSI/AAMA/WDMA 101/I.S.2/NAFS-02.

Summary of Results

Overall Design Pressure, Pa (psf)	1920 (40.00)
Breakaway Force, N (lbf)	67 (15.00)
Maximum Operating Force, N (lbf)	80 (18.00)
Air Leakage Rate, L/sec/m ² (scfm/ft ²)	0.50 (0.10)
Maximum Water Pressure Achieved, Pa (psf)	290 (6.00)
Maximum Structural Pressure Achieved, Pa (psf)	2880 (60.00)
Forced Entry Resistance, ASTM F588	Pass

Product Designations:

H-R40 914 x 1829* (36 x 72*)

Gateway Performance Test Results*Specification*

<i>Paragraph</i>	<i>Title of Test</i>	<i>Results</i>	<i>Allowed</i>
Referenced Test Reports – ETC-09-329-22960.0			
<i>Note – The test data in any section below with an “RTR” comment have not been obtained from this specimen but from the Referenced Test Report with a specimen of the same or larger size and identical construction.</i>			
5.3.1	<u>Operating Force – ASTM E2068 “RTR”</u> Force to initiate motion - Maximum Force to keep in motion - Maximum	67 N (15 lbf) 80 N (18 lbf)	Report Only 135 N (30 lbf)
5.3.1.1.3	<u>Latching Devices –Maximum “RTR”</u>	9 N (2 lbf)	100 N (22.5 lbf)
5.3.2	<u>Air Leakage Resistance – ASTM E 283</u> Test Pressure - 75 Pa (1.60 psf)	0.50 L/sec/m ² (0.10 scfm/ft ²)	1.50 L/sec/m ² (0.30 scfm/ft ²)
The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440 for air leakage resistance.			
5.3.3.2	<u>Water Penetration Resistance – ASTM E 547</u> 204 L/hr/m ² (5 gal/hr-ft ²) - 4 Test cycles - 24 Minutes Design Pressure - 720 Pa (15.00 psf) testing was started at pressures higher than gateway.		
5.3.4.2	<u>Uniform Load Deflection - ASTM E 330</u> Design Pressure - 720 Pa (15.00 psf) Testing was started at pressures higher than gateway.		
5.3.4.3	<u>Uniform Structural Load - ASTM E 330</u> Design Pressure - 720 Pa (15.00 psf) Testing was started at pressures higher than gateway.		
5.3.5	<u>Forced Entry Resistance – ASTM F 588 “RTR”</u> Grade: 10 Disassembly Test Tests A1 through A5 and A7 Tool/Lock Manipulation Test Sash Manipulation Test	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>
5.3.6.3	<u>Deglazing Test – ASTM E 987 “RTR”</u>		
	Top Rail 320 N (70 lbs)	4 %	< 90 %
	Bottom Rail 320 N (70 lbs)	6 %	< 90 %
	Left Stile 230 N (50 lbs)	4 %	< 90 %
	Right Stile 230 N (50 lbs)	2 %	< 90 %

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.

4.4.2.6

Water Resistance - ASTM E 547204 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

Specimen was tested with and without screen

Uniform Load Deflection - ASTM E 330**Design Pressure - 1920 Pa (40.00 psf)**

Test Pressure

Positive Load - 1920 Pa (40.00 psf)

5.46 mm (0.215 in.)

N/A

Negative Load - 1920 Pa (40.00 psf)

6.50 mm (0.256 in.)

N/A

Note: Measurements per AAMA Guidelines: Fixed rail

Test Pressure

Positive Load - 1920 Pa (40.00 psf)

0.76 mm (0.030 in.)

N/A

Negative Load - 1920 Pa (40.00 psf)

5.20 mm (0.203 in.)

N/A

Note: Measurements per AAMA Guidelines: Bottom rail

Uniform Structural Load - ASTM E 330**Design Pressure - 1920 Pa (40.00 psf)**

Test Pressure

Positive Load - 2880 Pa (60.00 psf)

0.15 mm (0.006 in.)

2.39 mm (0.094 in.)

Negative Load - 2880 Pa (60.00 psf)

0.40 mm (0.014 in.)

2.39 mm (0.094 in.)

Note: Measurements per AAMA Guidelines: Fixed rail

Test Pressure

Positive Load - 2880 Pa (60.00 psf)

0.51 mm (0.020 in.)

2.59 mm (0.102 in.)

Negative Load - 2880 Pa (60.00 psf)

0.15 mm (0.006 in.)

2.59 mm (0.102 in.)

Note: Measurements per AAMA Guidelines: Bottom rail

Product Description of Test Specimen

<i>Specimen Item</i>	<i>Laboratory Verification</i>
<u>Frame:</u>	
Size	36 in. W. x 72 in. H. x 2-1/2 in. D.
Material	Aluminum
Corner construction	Coped and butted
Corner fastening	[2] #8 x 5/8 in. L. screws
Corner sealing	Acrylic seam sealer
DLO of direct set	31-7/16 in. W. x 33-1/16 in. H.
<u>Fixed Meeting Rail:</u>	
End construction	Coped and butted
End fastening	[1] #8 x 2-1/2 in. L. hex head screw secures ends of rail to jambs
End sealing	Acrylic seam sealer
<u>Sash:</u>	
Size	34-1/8 in. W. x in. 36-1/8 H. x 7/8 in. D.
Corner construction	Coped and butted
Corner fastening	[2] #8 x 5/8 in. L. screws at top rail and [1] #8 x 5/8 in. L. screw at bottom rail corners
Corner sealing	Acrylic seam sealer
<u>Reinforcement:</u>	
	None
<u>Weather-stripping:</u>	
Meeting rails	1 row of center-fin pile 0.187 in. W. x 0.270 in. H. on a T-slot backer
Stiles	1 row of center-fin pile 0.187 in. W. x 0.270 in. H. on a T-slot backer
Bottom rail	1 row of hollow bulb seal, 5/16 in. diameter
<u>Glazing:</u>	
Overall IG thickness	5/8 in. (0.580 in. actual)
Thickness of glass	1/8 in. (0.117 in. actual), annealed
Number of lights	2
Spacer ID	Intercept spacer (CU-D)
Glazing Method	Sash - marine glazing boot and press on members Direct set - interior laid in wet glazed with silicone and snap in vinyl glazing beads
Bite depth	1/2 in.
Setting blocks	None

Product Description of Test Specimen

<i>Specimen Item</i>	<i>Laboratory Verification</i>
<u>Drainage:</u>	
Frame	Sloped sill, 1-1/4 in. cut away from ends of sill track legs
Sash	None
<u>Hardware:</u>	
Sweep Locks	Surface mounted 7-7/8 in. o.c. from each end of top rail, [2] #8 x 5/8 in. L. screws per lock.
Keeper	Extruded pocket of fixed rail houses tongue of lock
Balance	Block and tackle, 39 E, BSI, located 38 in. from sill, clips into jambs
Vent slide	secured to top lateral edge of both stiles with same [2] #8 x 5/8 in. L. screws used in sash corner fastening
Vent guide	Interior leg of stiles has plastic covering running full height
<u>Screen:</u>	
Frame Material	Aluminum
Cloth Material	Fiberglass
Corner construction	cut square with external plastic corner key, spring clips used for retention
<u>Test Buck:</u>	
Mounting Gap	0 in. at head, jambs and sill
Sealant	Silicone
Lumber size	2 x 10 wrapped around 2 x 4
Material	Southern yellow pine, #2
<u>Anchorage of Frame to Test Buck:</u>	
Type	Pan head screws
Size	#8 x 1 in. L.
Location	Jambs - 4 in. from ends, then 8 in. on center average spacing through the nailing flange Head and sill - 2 in. from end, then 8 in. on center average spacing through the nailing flange Pine stops, 1-7/16 in. W. or H. x 1-5/16 in. D. was set over the nailing flange, full perimeter of the unit and was secured with #8 x 1-3/4 in. L. screws, 3 in. from ends of stops and then one additional screw in between on jambs

Review of Bill of Materials – As Supplied

Review of Assembly and Detail Drawings – BOM 2 pages, assembly drawing, 1201, 1202, 1203, 1204, 1207, 1208, 1205, 1206, 101101, 101102, 101103

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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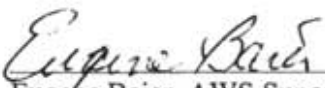
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Revision History

<u>Date</u>	<u>Rev. #</u>	<u>Pages Affected</u>	<u>Revisions</u>
09/14/2009	.0	N/A	Original report issue

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