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TESTED FOR

ALL WEATHER

777 Aldridge Road
Vacaville, CA 95688

1.0 PURPOSE

The purpose of this report is to present the testing methods employed and the test results obtained during the performance testing of one (1) **Thermally Broken Aluminum Hopper Combination Window** described in paragraph 4.0 of this report.

2.0 TEST REFERENCES

- 2.1 Standard/Specification for Windows, Doors, and Skylights AAMA/WDMA/CSA 101/ I.S.2/A440-05
AP – HC75 1524 x 2438 (60 x 96)
- 2.2 CAWM 301 - 90 Forced Entry Resistance Tests for Windows.
- 2.3 ASTM F 588-07 Standard Test Method for Measuring the Forced Entry Resistance of Windows

3.0 SUMMARY

The test results in paragraphs 5.0 and 6.0 indicate that the test sample described in paragraph 4.0 of this report complied with the performance requirements of the above referenced specifications.

4.0 SAMPLE SUBMITTED

SERIES: 5000T Hopper Combination Window

CONFIGURATION: Fixed / Hopper / Fixed

FRAME SIZE: 1524 mm x 2438 mm (60.00" x 95.98")

VENT SIZE: 1473 mm x 775 mm (57.99" x 30.51")

FIXED SIZES: 1454 mm x 746 mm (57.24" x 29.37") Daylight Opening

GLASS: Each fixed portion of the frame and the vent panel were each glazed with a 1" overall insulated glass consisting of 1/8" clear annealed glass on both sides and a 3/4" air space.

INSULATED

GLASS SPACER: The spacer was aluminum box type 3/4" wide and single sealed.

GLAZING:

The glass lites each rested on 1" x 3" x 1/4" high setting blocks set at quarter points of their respective spans and were glazed from the exterior onto a double-sided adhesive foam tape. The lites were also adhered to the frame or vent with seam sealer applied 2" in each direction at each corner under the glazing tape.

From the exterior, the glass lites were each retained full perimeter with aluminum snap-in glazing stops containing a full length pull-in flat vinyl gasket.

WEEPAGE: The exterior face of the vent bottom rail, frame sill and each horizontal mullion contained a 7/16" x 1/8" weep slot at each 1.5" from each end.

The snap-in stop at the sill, at the bottom rail of the vent and at the upper horizontal mullion was notched around each weep allowing water to drain from the glazing pockets.

WEATHERING: The vent contained a strip of hollow bulb weather strip full perimeter facing out and the frame vent opening contained a strip full perimeter facing in.
The glass stops each contained a full length pull-in flat vinyl gasket.

HARDWARE: The vent panel was supported in frame with an AMC S2000 J 24" four-bar friction hinge in each jamb stile. The hinges were each fastened to the frame with four (4) #10 x 3/4" square drive pan head screws and to the vent with five (5) #10 x 3/4" square drive pan head screws.

The vent lock rail contained a metal cam latch lock 14" from each end and one at midspan for a total of three. Each lock was fastened with a pair of #10 x 5/8" PFH screws. When closed and locked, the locks each engaged their respective metal strike fastened to the integral mullions with a pair of #10 x 5/16" PFH screws.

CONSTRUCTION: All frame and vent corners were mitered and welded. The horizontal mullions were slot-fitted into the jambs and staked.
The thermal break was poured-in and debridged. The debridged width was 0.17".

CAULKING: The following were sealed with sealer:

- 1) Frame corners full profile.
- 2) Intermediate horizontals to frame full profile.
- 3) Vent panel corners full profile.
- 4) Glass corners to frame and vent panel, 2" in each direction.
- 5) The back of all screws penetrating the frame.
- 6) All lock and strike screws
- 7) The strike plate to the horizontal mullion.

ANCHORING: The frame was mounted over a 2" x 6" wood rough opening and fastened through the nail fin with #6 x 1 5/8" screws every 12" on center. Wood furring was applied over the nail fins and screwed to the wooden buck.

5.0 **TEST PROCEDURES AND RESULTS**

5.1 All testing procedures were performed in accordance with the performance requirements of the test specifications referenced in paragraph 2.0 of this report.

5.2 **TEST RESULTS**

<u>PARAGRAPH</u>	<u>TEST DESCRIPTION</u>	<u>MEASURED</u>	<u>ALLOWED</u>
5.3.1.1.1	Operating Force (ASTM E 2068) Breakaway Force Operating Force	29.0 N (6.52 lbf) 20.0 N (4.49 lbf)	Report Only 135N (30 lbf)
5.3.1.1.3	Latching Device Open and Close Latch Device	27 N (6.00 lbf)	100 N (22.5 lbf)
5.3.2.1	Air Infiltration (ASTM E 283) 300 Pa (6.2 PSF)	0.0 L/s*m ² 0.00 CFM/ft ²	1.5 L/s*m ² 0.3 CFM/ft ²

The tested specimen exceeds the performance requirements specified in AAMA/WDMA/CSA 101 / LS.2 / A440 for air leakage resistance.

5.2 TEST RESULTS (Continued)

<u>PARAGRAPH</u>	<u>TEST DESCRIPTION</u>	<u>MEASURED</u>	<u>ALLOWED</u>
5.3.3.2	Water Penetration (ASTM E 547 & 331) 290 Pa (6.0 PSF) Interior screen	No Leakage	No Leakage
5.3.4.2	Uniform Load Deflection (ASTM E 330) (Integral mullion)(Three locks) 1920 Pa (40.0 PSF) POS 1920 Pa (40.0 PSF) NEG	4.00 mm (0.16") 3.75 mm (0.15")	8.50 mm (0.33") 8.50 mm (0.33")
5.3.4.3	Uniform Load Structural (ASTM E 330) 2880 Pa (60.0 PSF) POS 2880 Pa (60.0 PSF) NEG	0.00 mm (0.00") 0.00 mm (0.00")	4.25 mm (0.17") Set 4.25 mm (0.17") Set
5.3.6.4.2	Sash/Leaf Torsion Test 70 N (15 lbf)	25.25 mm (0.99")	37.25 mm (1.47")
5.3.6.4.4	Sash/Leaf Concentrated Load Test on Latch Rail Vertical 135 N (30 lbf) Horizontal 135 N (30 lbf)	1.5 mm (0.06") 1.0 mm (0.04")	1.5 mm (0.06") 1.5 mm (0.06")
5.3.6.5	Vertical Concentrated Load Test on Intermediate Frame Rails 135 N (30 lbf)	1.25 mm (0.05")	1.5 mm (0.06")
5.3.6.6.7	Hardware Load Test 140 N (30 lbf)	3.25 mm (0.13")	43.75 mm (1.72")

5.3 OPTIONAL PERFORMANCE GRADES

TEST RESULTS

<u>PARAGRAPH</u>	<u>TEST DESCRIPTION</u>	<u>MEASURED</u>	<u>ALLOWED</u>
5.3.3.2	Water Penetration (ASTM E 547 & 331) 720 Pa (15.00 PSF)	No Leakage	No Leakage
5.3.4.2	Uniform Load Deflection (ASTM E 330) (Integral mullion)(Three locks) 3600 Pa (75.0 PSF) POS 3600 Pa (75.0 PSF) NEG	6.25 mm (0.25") 6.50 mm (0.26")	8.50 mm (0.33") 8.50 mm (0.33")
5.3.4.3	Uniform Load Structural (ASTM E 330)(Three locks) 5400 Pa (112.5 PSF) POS 5400 Pa (112.5 PSF) NEG	0.00 mm (0.00") 0.00 mm (0.00")	5.00 mm (0.20") 5.00 mm (0.20")

6.0 5.3.5 ASTM F 588 Forced Entry Resistance Test Results For Windows

1.2.2 Type "B" Window
Table A1.1 Grade 20

<u>TEST</u>	<u>RESULTS</u>	<u>ALLOWED</u>
A2.1		Disassembly Test
A2.5.2	Passed	No Entry
A2.5.3	Passed	No Entry
A2.5.4	Passed	No Entry
A2.2	Passed	No Entry
A2.3	Passed	No Entry

6.1 5.3.5 CAWM 301 - 90 FORCED ENTRY RESISTANCE TEST RESULTS

2.4.2 Type "II" Window

	<u>TEST</u>	<u>RESULTS</u>	<u>ALLOWED</u>
	5.2.1	Passed	Disassembly Test
	5.2.2	A Passed	No Entry
	5.2.3	B Passed	No Entry
	5.2.4	C Passed	No Entry
	5.2.5	E Passed	Hand and Tool Manipulation Test.

For a complete description of the tested sample refer to the attached cross section drawings.

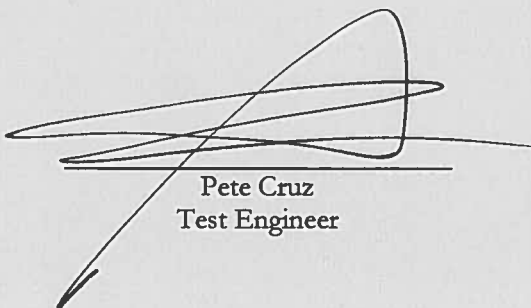
Assembly and die drawings of frame members are on file and have been compared to the sample submitted. Test sample sections, drawings and a copy of this report will be retained at the test laboratory for four years.

This test report may not be modified in any way without the written consent of Fenestration Testing Laboratory.

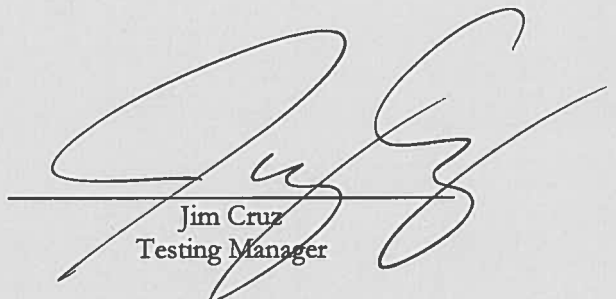
The above test results were obtained by using the applicable ASTM and CAWM Test Methods. This report does not constitute Certification of this product. Certification can only be granted by an approved Administrator and/or Validator.

Testing Completed: April 23, 2009

Report Completed: May 11, 2009



Pete Cruz
Test Engineer



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Testing Manager