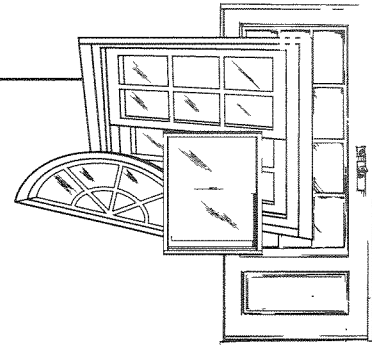


CERTIFIED TESTING LABORATORIES

Architectural Division • 7252 Narcoossee Rd. • Orlando, FL 32822
(407) 384-7744 • Fax (407) 384-7751
Web Site: www.ctlarch.com
E-mail: ctlarch.com

Report Number: CTLA-809W-3
Report Date: January 30, 2002



STRUCTURAL PERFORMANCE TEST REPORT

Client: NORANDEX
4504 - 30th STREET WEST
BRADENTON, FLORIDA 34207

Product Type and Series: Series 435 Aluminum Flange Single Hung Window
H-LC45 (53" x 77")

Test Specification: AAMA 101/I.S.2-97 "Voluntary Specification for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors".

Test Specimen

- Frame:** Extruded aluminum flange frame was 53.125" x 76.75" overall. Coped and butted corner construction. The header jamb corners used one (1) # 6 x 1" P.H. S.M.S. fastener. The sill jamb corner employed two (2) #6 x 1" P.H. S.M.S. fasteners. The fixed meeting rail employed a single # 6 x 1" P.H. S.M.S. fastener into each jamb.
- Ventilators:** The active sash measured 50.5" x 39". A fixed light glazed at the top with a clear opening of 48.5" x 35". The active sash corners were fastened with one (1) # 6 x 1" P.H. S.M.S. fastener.
- Weatherstripping:** A single strip of center fin pile weatherstrip .220" high was used in the fixed rail, left and right stiles. .320 o.d. bulb vinyl was used in the sash bottom rail.
- Hardware & Location:** A block and tackle balance system was employed. One take out clip on the interior of each jamb track 5" from frame header. A rigid vinyl sash stop was located at the top of each interior jamb track. An injection molded plastic sash guide was used at the top of each sash stile. One (1) metallic cam lock, was fastened to the sash meeting rail mid-span, locking into a metallic keeper fastened to the fixed rail.
- Glazing:** 3/16" annealed glass, exterior glazed using a silicone bedding compound and roll formed aluminum glazing bead.
- Sealant:** A narrow joint seam sealer was used on jamb sill corners. A foam rubber gasket was employed at all four main frame corners.

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1/3/02

Weepholes: Sill sash retaining leg and both screen retraining legs notched .500" x leg height at sill corner.

Muntins: None

Reinforcement: None

Additional Description: Unit tested had a sill height of 1.940" overall, drawing # XFLA-3C-X

Screen: Insect screen with plastic corner keys, vinyl pull tabs, fiberglass mesh, and vinyl spline. Two (2) retainer springs.

Installation: Thirteen (13) #10 x 1.75" P.P.H., S.M.S. fasteners were used to secure the specimen to the wooden 2" x 12" test buck with wooden 2" x 4" buck strip. Head, three (3) fasteners 4.5" from each corner and mid-span. Jamb, five (5) measuring from sill to head 4", 24.5", 40", 56", and 70". None in sill.

Surface Finish: Bronze

Performance Test Results

<u>Paragraph No.</u>	<u>Title of Test</u>	<u>Test Method</u>	<u>Measured</u>	<u>Allowed</u>
2.1.2	Air Infiltration @ 1.57 psf	ASTM E283-91	.19 cfm/ft ²	.3 cfm/ft ²
The tested specimen exceeds the performance requirements in AAMA/NWWDA 101/I.S.2-97. Results recorded in two (2) decimals at the clients request				
2.1.3/4.3	Water Resistance 5.0 gpf/ft ² WTP= 6.75 psf	ASTM E547-86 Four (4) five minute cycles ASTM E331-96 Fifteen (15) minute cycle	No Entry No Entry	No Entry No Entry
Tested with and without insect screen				
2.1.4.2/4.4.2	Uniform Load Structural Permanent Deformation Ten (10) second Loading @ 67.5 psf Exterior @ 67.5 psf Interior	ASTM E330-90	.064" .158"	.198" .198"
2.1.8	Forced Entry Resistance Test A Test B Test C Test D,E & F Test G	AAMA 1302.5-76	0" 0" 0" 0" 0"	1/2" 1/2" 1/2" 1/2" 1/2"
2.2.2.5.1	Operating force	ANSI/AMMA 101-93	11 lbs	35 lbs

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2.2.3.5.2	Deglazing	ASTM E987-88			
	Top Rail	(70 lbs)	.014	2.8 %	<100%
	Bottom Rail	(70 lbs)	.027	5.4 %	<100%
	Left Stile	(50 lbs)	.020	4.0 %	<100%
	Right Stile	(50 lbs)	.026	5.2 %	<100%

Test Date: December 19, 2001

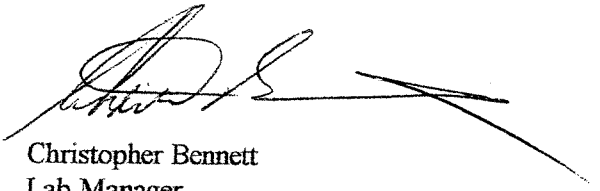
Test Completion Date: December 19, 2001

Remarks: Detail 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 CTL 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.

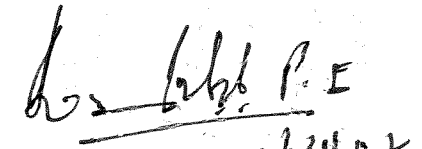
Certified Testing Laboratories assumes that all information provided by the client is accurate and that the physical and chemical properties of the components are as stated by the manufacturer.

Certified Testing Laboratories, Inc.



Christopher Bennett
Lab Manager
Architectural Division

cc: NORANDEX (2)
 A.L.I. (2)
 Ramesh Patel, P.E. (1)
 File (1)



Ramesh Patel, P.E.
Florida Reg. #20224 1/31/02