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Architectural Testing

5 March 2002

Mr. David Garcia
Cuprum, S.A. de C.V.
Planta San Pedro, Calle Zinc 97
Col. Fomerrey 22, C.P. 66200
Garza Garcia, N.L., Mexico

LEGENDS WINDOWS

RE: Mullion Anlyses

Dear Mr. Garcia:

At your request, I have performed a mullion analyses for use with your series/model 2000 residential aluminum single hung and picture windows. A 3' 0" wide by 2' 0" high picture window mulled over a 3' 0" wide by 6' 0" high single hung window has a +/-40.0 psf design wind load capacity using your "Horizontal Saddle Mullion", part number CW-2137. The reaction at each end of the mullion would require one #6 drywall screw, at least 1-3/8" long, through either the frame in shear, or the nailing fin in tension.

Single hung windows 3' 0" wide by 6' 0" high can be mulled side by side to form twins and triples. These combinations will have a +/-40.0 psf design wind load capacity using your "180 Mull – STD", part number CW-2064 B. These vertical mullions must have two steel plates, each 0.1644" (8 gage) thick by 1-3/4" wide, attached to the web of the mullion the entire length to obtain this design pressure. The reaction at each end of these mullions would require three #6 drywall screws, at least 1-3/8" long, through either the frame in shear, or the nailing fin in tension.

I trust that this analyses is sufficient for your needs. If there are any questions about the analyses, or if anything additional is required, please advise me.

Sincerely yours,

ARCHITECTURAL TESTING, INC.

Allen N. Reeves

Allen N. Reeves, P.E.
Director – Engineering Services
5 MARCH 2002

ALLEN N. REEVES CERTIFICATE NO. 1556 STATE OF FLORIDA PROFESSIONAL ENGINEER

ANR:anr
cc: 01-41011.02

130 Derry Court
York, PA 17402-9405
phone: 717.764.7700
fax: 717.764.4129
www.archtest.com

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ARCHITECTURAL TESTING INC.

2524 East Jensen Avenue • Fresno, California 93706
web www.testati.com • Facsimile 559-233-8360 • Telephone 559-233-8705

LEGENDS WINDOWS

STRUCTURAL TEST REPORT

Rendered to:

Cuprum S.A. de C.V.
Planta San Pedro, Calle Zinc 97
Fomerrey 22 APDO, 308 C.P. 66200
San P.G. Garcia, MX

Report No:	03-30408.02
Test Date:	06-02-99
Report Date:	07-14-99
Expiration Date:	06-02-03

Series/Model: "2000"

Type: Aluminum Single Hung Window

Project Summary: Architectural Testing, Inc. (ATI) was contracted to perform test on a Series "2000" Aluminum Single Hung Window by Cuprum. The specimen tested met all the performance criteria for H-R40 (44" x 72") rating in accordance with AAMA/NWWDA 101/I.S. 2-97. The following report includes a detailed test specimen description, test data and results.

Test Procedures: The test specimen was evaluated in accordance with the following:

AAMA/NWWDA 101/I.S. 2-97 *"Voluntary Specifications for Aluminum Vinyl (PVC) and Wood Windows and Glass Doors"*.

Test Specimen Description:

Overall Size: 44:13" wide by 72.13" high

Active Sash Size: 42.68" wide by 36.50" high

Fixed D.L.O. Size: 40.68" wide by 33.88" high

Screen Size: 41.00" wide by 35.68" high

Finish: All aluminum was painted white

Glazing: Both the sash and fixed lite were interior glazed with 0.115" thick annealed glass onto Acryl-R backbedding sealant and held-in-place with aluminum glazing bead with a vinyl gasket. Sheet metal screws hold glazing bead in place. The glazing bead was held-in-place with # 10 x 1" sheet metal screws located 12" apart.

Weatherstripping:

Description	Quantity	Location
0.190" polypile with fin	1 Row	Each active sash stile
0.190" polypile with fin	1 Row	The fixed interlock
0.300" Vinyl bulb	1 Row	The active sash bottom rail exterior leg
0.200" Vinyl bulb	1 Row	The active sash bottom rail interior leg

Frame Construction: Coped and butted corner construction was used. Each corner was sealed with a double sided adhesive foam gasket and was mechanically fastened with two screws per corner. The fixed meeting rail was sealed and fastened with two screws per end

Sash Construction: Coped and butted corner construction was used. Each corner was mechanically fastened with one screw.

Screen Construction: Fiberglass mesh cloth was held-in-place wit a vinyl hollow spline. The aluminum frame utilized vinyl corner key construction.

Hardware:

Description	Quantity	Location
Nylon stops	1 per jamb	34-/4" from head in operable sash track
Metal cam locks	2	8-3/4" from each end located on operable sash meeting rail
Spiral balances	2	One per jamb
0.050" Nylon guides	4	At each corner of both stiles of operable sash interior side
0.050" Nylon guides	2	Top of each operable sash on the jamb side
Nylon pivot bar	2	Bottom of each operable sash stile

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Drainage:

Description	Quantity	Location
0.500" x 0.145" weep hole	2	6-1/4" from each end of the bottom rail of the operable sash
0.525" weep notch	2	At each end of screen track

Installation: The window was installed into a 2" x 8" Douglas Fir wood test buck. The window fir was sealed to the test buck, and attached with #6 by 1-3/8" drywall screws located 8" O.C. A 1" x 2" white pine wood stop was attached over the fin and was attached to the test buck using #6 by 1-3/8" drywall screws located 12" O.C.

Test Results:

The results are tabulated as follows:

Paragraph	Title of Test	Results	Allowed
2.2.1.6. 1	Operating Force	27 lbf	30 lbf max.
2.1.2 ASTM E283	Air Infiltration @ 1.56 psf (25 mph)	0.18 cfm/ft^2	0.3 cfm/ft^2 max.

Note #1: The tested specimen meets (or exceeds) the performance levels specified in AAMA/NWWDA 101/I.S. 2-97 for air infiltration.

2.1.3	Water Resistance per ASTM E331 and E547 (with or without) WTP = 2.86 psf @ 5.00 gph/ft^2	No Entry	No Entry
2.1.4.2 ASTM E330	Uniform Load Structural		
	@ 22.5 psf (exterior)	0.020"	0.177" max.
	@ 22.5 psf (interior)	0.010"	0.177" max.

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Test Results: (Continued)

Paragraph	Title of Test	Results	Allowed
2.2.1.6.2 ASTM E987	Deglazing Test In operating direction at 70 lbf		
	Meeting Rail	0.020" / 4%	<0.500" / 100%
	Bottom Rail	0.010" / 2%	<0.500" / 100%
	In operating direction at 50 lbf		
	L.H. Stile	0.035" / 7%	<0.500" / 100%
	R.H. Stile	0.035" / 7%	<0.500" / 100%
2.1.8	Forced Entry Resistance per AAMA 1302.5		
	Disassembly	No Entry	No Entry
	Test A	No Entry	No Entry
	Test B	No Entry	No Entry
	Test C	No Entry	No Entry
	Hand and tool manipulation	No Entry	No Entry

Optional Performance

4.3 ASTM E547	Water Resistance (with and without screen) WTP = 6.00 psf @ 5.00 gph/ft^2	No Entry	No Entry
4.4.2 ASTM E330	Uniform Load Structural		
	@ 60.0 psf (exterior)	0.035"	0.177"
	@ 60.0 psf (interior)	0.010"	0.177"

Detailed drawings, representative samples of the test specimen, and a copy of this report will be retained by ATI for a period of four years. The above results were secured by using the designated test methods and they indicate compliance with the performance requirements of the above referenced specification. This report does not constitute certification of this product which may only be granted by the certification program administrator.

For ARCHITECTURAL TESTING, INC.

Leaton Kirk (LK)
Leaton Kirk
Regional Manager

Anthony Avalos (AA)
Anthony Avalos
Technician

LK:lg

03-30408.02