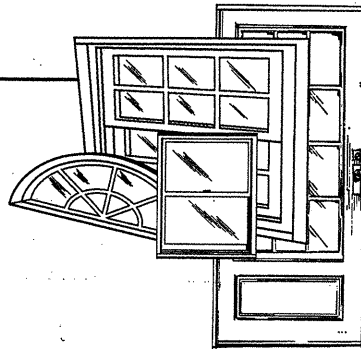


CERTIFIED TESTING LABORATORIES

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-294W-4
Report Date: August 11, 1998

STRUCTURAL PERFORMANCE TEST REPORT

Client: Energy Savings Products
PO Box 1507
537 North Blythe Street
Gallatin, TN 37066

Product Type and Series: 9901/9902 Aluminum Flange Frame Horizontal Slider XO HS-C 35 (73" x 52")

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

Frame: The aluminum flange frame measured 73" x 52" overall. Coped corner construction, with two (2) #8 x .750" P.H., fasteners in each corner. One (1) #8 x 2" P.H. fastener was used to secure the fixed meeting rail to the frame head and sill.

Configuration: XO fixed clear lite opening measured 36.5" x 49".

Ventilator: One (1) operable vent, measured 36.5" x 49" high. Each corner secured with one (1) #8 x .750" fastener.

Weatherstripping:

<u>Quality</u>	<u>Description</u>	<u>Location</u>
One (1) strip	Wool pile with integral plastic fin .230" high	Frame sill
One (1) strip	Wool pile with integral plastic fin .230" high	Fixed meeting stiles
Two (2) strips	Wool pile with integral plastic fin .230" high	Operable sash top and bottom rail
Two (2) strips	Wool pile with integral plastic fin .230" high	Frame jambs

Hardware & Location: One (1) snap lock, operable vent lead stile mid-span.

Glazing: 3/16" Annealed glass. Interior glazed with adhesive backbedding compound. Rigid vinyl glazing bead.

Sealant: Caulk was used on the frame perimeter exterior. Narrow joint sealant was used at each frame sill corner.

Weepsystem: Three (3) 1" x .125" high weep slots located in frame sill face.
One (1) 1" inside vertical meeting stile under fixed lite.
One (1) at each corner 1" from each jamb.

[Handwritten Signature]
8/11/98

Reinforcements: N/A

Additional Description: N/A

Screen: Roll formed aluminum screen with plastic corner keys, fiberglass mesh and vinyl spline.

Installation: Eighteen (18) #10 x 1.5" fasteners were used to secure specimen to wooden test buck. Six (6) in sill/head measuring from left jamb to right jamb 9", 21", 34.5", 38", 52", and 66". Three (3) in each jamb measuring from head to sill 9", 27", and 44".

Surface Finish: Bronze

Comment: Nominal 2 mil polyethylene film was used to seal against air leakage during structural loads. The film was used in a manner that did not influence the test results.

Performance Test Results

<u>Paragraph No.</u>	<u>Title of Test</u>	<u>Method</u>	<u>Measured</u>	<u>Allowed</u>
*2.1.2	Air Infiltration @ 1.57 psf	ASTM E 283-91	.14 cfm/ft ²	.34 cfm/ft ²
The tested specimen exceeds the performance levels specified in AAMA/NWWDA 101/I.S. 2-97. Results recorded in two decimals at the clients request.				
*2.1.3/4.3	Water Resistance 5.0 gph/ft ² WTP=5.25 psf	ASTM E547-93 Four (4) five minute cycles ASTM E331-93 Fifteen (15) minute duration	No Entry No Entry	No Entry No Entry
Unit tested with and without insect screen.				
2.1.4.2/4.4.2	Uniform Load Structural Permanent Deformation @52.5 psf Positive @52.5 psf Negative	ASTM E330-93 10 Second duration	.075" .055"	.240" .240"
*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 Left Sash Right Sash	AAMA/NWWDA 101/I.S. 2-97	9 lbs. 9 lbs.	25 lbs. 25 lbs.
*2.2.3.5.2	Deglazing Top Rail 50 lbs. Bottom Rail 50 lbs. Left Stile (lead) 70 lbs. Right Stile (interlock) 70 lbs.	ASTM E 987-88	.009= .007= .016= .013=	2.4 % < 100% 1.8 % < 100% 4.2 % < 100% 3.4 % < 100%

*See CTLA 294W August 10, 1998 for qualification testing.

Handwritten signature and date:
 [Signature]
 8/19/98

Test Date: June 25, 1998

Test Completion Date: July 20, 1998

Remarks: Detailed 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.

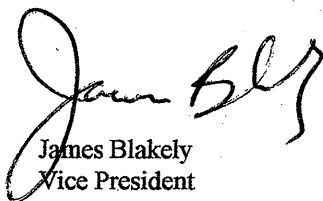
This test report does not constitute certification of this product, but only that the above test results were obtained using the designated test methods and they indicate compliance with the performance requirements (paragraphs as listed) of the above referenced specifications.

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.

All Tests Witnessed by:

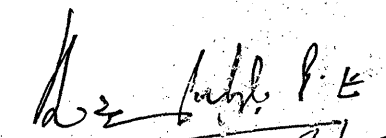
Nicky Dorris ESP
Chris Bennett CTL

Certified Testing Laboratories, Inc.



James Blakely
Vice President
Architectural Division

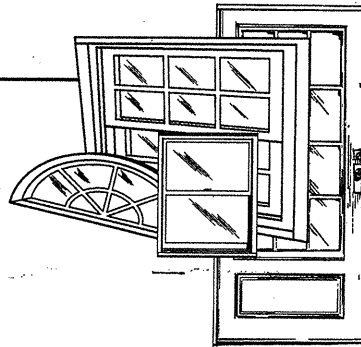
cc: Energy Savings Products (2)
NAMI (2)
Ramesh Patel, P.E. (1)
File (1)



Ramesh Patel, P.E.
Florida Reg. #20224
8/19/98

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Web Site: www.ctlarch.com
E-mail: ctlarch.com



Report Number: CTLA-294W-2
Report Date: August 11, 1998

STRUCTURAL PERFORMANCE TEST REPORT

Client: Energy Savings Products
PO Box 1507
537 North Blythe Street
Gallatin, TN 37066

Product Type and Series: 9901/9902 Aluminum Flange Frame Horizontal Slider XOX HS-C 35 (120" x 62")

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

Frame: The aluminum flange frame measured 120" wide x 62" overall. Coped corner construction, with two (2) #8 x .750" P.H., fasteners in each corner. One (1) #8 x 2" P.H. fastener was used to secure the fixed meeting rail to the frame head and sill.

Configuration: XOX fixed clear lite opening measured 48.25" x 60".

Ventilator: Two (2) operable vents, each measured 36.5" x 60" high. Each corner secured with one (1) #8 x .750" fastener.

Weatherstripping:

<u>Quality</u>	<u>Description</u>	<u>Location</u>
One (1) strip	Wool pile with integral plastic fin .230" high	Frame sill
One (1) strip	Wool pile with integral plastic fin .230" high	Fixed meeting stiles
Two (2) strips	Wool pile with integral plastic fin .230" high	Operable sash top and bottom rail
Two (2) strips	Wool pile with integral plastic fin .230" high	Frame jambs

Hardware & Location: One (1) snap lock, each operable vent lead stile mid-span.

Glazing: 3/16" Annealed glass. Interior glazed with adhesive backbedding compound. Rigid vinyl glazing bead.

Sealant: Caulk was used on the frame perimeter exterior. Narrow joint sealant was used at each frame sill corner.

Weepsystem: Four (4) 1" x .125" high weep slots located in frame sill face.
Two (2) 1" inside each vertical meeting stile under fixed lite.
One (1) at each corner 1" from each jamb.

W. H. P. E.
8/11/98

Reinforcements: N/A

Additional Description: N/A

Screen: Roll formed aluminum screen with plastic corner keys, fiberglass mesh and vinyl spline.

Installation: Twenty (20) #10 x 1.5" P.H. fasteners were used to secure specimen to wooden test buck. Seven (7) in frame head/sill measuring from left jamb to right jamb 9", 21", 34.5", 60", 86.5", 100", and 112". Three (3) in each jamb measuring from head to sill 10", 31.5", and 53".

Surface Finish: Bronze

Comment: Nominal 2 mil polyethylene film was used to seal against air leakage during structural loads. The film was used in a manner that did not influence the test results.

Performance Test Results

<u>Paragraph No.</u>	<u>Title of Test</u>	<u>Method</u>	<u>Measured</u>	<u>Allowed</u>
*2.1.2	Air Infiltration @ 1.57 psf	ASTM E 283-91	.14 cfm/ft ²	.34 cfm/ft ²

The tested specimen exceeds the performance levels specified in AAMA/NWWDA 101/I.S. 2-97.
 Results recorded in two decimals at the clients request.

*2.1.3/4.3	Water Resistance 5.0 gph/ft ² WTP=5.25 psf	ASTM E547-93 Four (4) five minute cycles ASTM E331-93 Fifteen (15) minute duration	No Entry No Entry	No Entry No Entry
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Unit tested with and without insect screen.

2.1.4.2/4.4.2	Uniform Load Structural Permanent Deformation @52.5 psf Positive @52.5 psf Negative	ASTM E330-93 10 Second duration	.095" .128"	.240" .240"
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*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"
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*2.2.2.5.1	Operating Force Left Sash Right Sash	AAMA/NWWDA 101/I.S. 2-97	9 lbs. 9 lbs.	25 lbs. 25 lbs.
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*2.2.3.5.2	Deglazing Top Rail 50 lbs. Bottom Rail 50 lbs. Left Stile (lead) 70 lbs. Right Stile (interlock) 70 lbs.	ASTM E 987-88	.009= .007= .016= .013=	2.4 % < 100% 1.8 % < 100% 4.2 % < 100% 3.4 % < 100%
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* See CTLA-294W August 10, 1998 for qualification testing.

Handwritten signature: [Signature]
 8/19/98

Test Date: June 25, 1998

Test Completion Date: July 20, 1998

Remarks: Detailed 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.

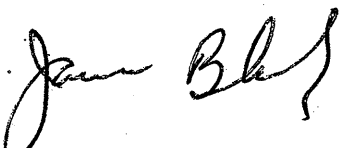
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All Tests Witnessed by:

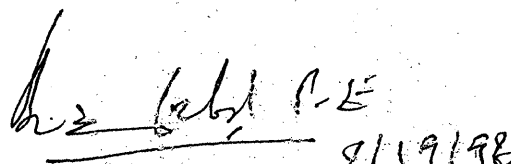
Nicky Dorris ESP
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Certified Testing Laboratories, Inc.



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cc: Energy Savings Products (2)
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File (1)



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