Architectural Testing

NFRC U-FACTOR, SHGC / VT, CONDENSATION RESISTANCE COMPUTER SIMULATION REPORT

Rendered to:
UNITED STATES ALUMINUM

SERIES/MODEL: 7200-Series Project-Out Bottom

Report No.: 85597.01-116-45
Report Date: 08/26/08
Expiration Date: 08/26/12

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NFRC U-FACTOR, SHGC / VT, CONDENSATION RESISTANCE
COMPUTER SIMULATION REPORT

Rendered to:
UNITED STATES ALUMINUM
200 Singleton Drive
Waxahachie, Texas 75165

Report No.:	85597.01-116-45
Simulation Date:	08/26/08
Report Date:	08/26/08
Expiration Date:	08/26/12

Project Summary: Architectural Testing, Inc. was contracted to perform U-Factor, Solar Heat Gain Coefficient, Visible Transmittance, and Condensation Resistance* computer simulations in accordance with the National Fenestration Rating Council (NFRC). The products were evaluated in full compliance with NFRC requirements to the standards listed below.

**NFRC's Condensation Resistance rating is NOT equivalent to a Condensation Resistance Factor (CRF) determined in accordance with AAMA 1503.*

Standards:

NFRC 100-2004:	*Procedure for Determining Fenestration Product U-Factors*
NFRC 200-2004:	*Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence*
NFRC 500-2004:	*Procedure for Determining Fenestration Product Condensation Resistance Values*

Software:

Frame and Edge Modeling:	THERM 5.2.14
Center-of-Glass Modeling:	WINDOW 5.2.17
Total Product Calculations:	WINDOW 5.2.17
Spectral Data Library:	16.1

Simulation Specimen Description:

Series/Model:	7200-Series Project-Out Bottom
Type:	Projected , Awning
Frame Material:	Aluminum w/ Thermal Breaks - All Members
Sash Material:	Aluminum w/ Thermal Breaks - All Members
Standard Size:	1500mm x 600mm

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Technical Interpretations:

None

Modeling Assumptions:

1) To prevent air infiltration, tape was applied to all interior sash crack locations.

Specialty Products Table:

The specialty products method allow the manufacturer to determine the overall product SHGC and VT for any glazing option. The center of glass SHGC and/or VT must be determined using WINDOW 5.2. The method gives overall product SHGC and VT indexed on center of glass properties.

	No Dividers	Dividers < 1	Dividers > 1
SHGC0	0.01856	0.02065	0.02265
SHGC1	0.67614	0.61414	0.55525
VT0	0	0	0
VT1	0.65759	0.59348	0.53261

SHGC = SHGC0 + SHGCc (SHGC1 - SHGC0)

VT = VT0 + VTc (VT1 - VT0)

Validation Matrix:

The following products are part of a validation matrix. Only one is required for validation

Product Line	*Report Number*
None	-

Spacer Option Description

	Sealant		
Spacer Type	*Primary*	*Secondary*	*Desiccant*
X-L Edge Stainless Steel Spacer	Polyisobutylene	Silicone	Yes

Grid Option Description

Grid Size	*Grid Type*	*Grid Pattern*
None	-	-

Reinforcement Option Description

Location	*Material*
None	-

Gas Filling Technique Description

Fill Type	*Method*
90% Argon	Single-Probe Timed Filling

Edge-of-Glass Construction

Interior Condition	EPDM Gasket
Exterior Condition	Foam Weather Stripping

Weatherstripping

Type	*Quantity*	*Location*
EPDM Gasket	1 Row	Frame and Sash Perimeter

NFRC 100/200/500 Summary Sheet
United States Aluminum
7200-Series Project-Out Bottom

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e	Tint	Spacer	Grid Type
1	0.225	0.500	0.225					AIR		CL	SS-D	N
	U-Factor 0.59		**SHGC (N) 0.48**						**VT (N) 0.52**			**CR 37**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
2	0.225	0.500	0.225					ARG90		CL	SS-D	N
	U-Factor 0.58		**SHGC (N) 0.48**						**VT (N) 0.52**			**CR 37**
	6mm Clear / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
3	0.223	0.500	0.223					AIR	0.035(#2)	LE	SS-D	N
	U-Factor 0.48		**SHGC (N) 0.27**						**VT (N) 0.46**			**CR 38**
	6mm Solarban 60 (#2) / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					AIR	0.035(#3)	LE	SS-D	N
	U-Factor 0.48		**SHGC (N) 0.31**						**VT (N) 0.46**			**CR 38**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Solarban 60 (#3)											
4	0.223	0.500	0.223					ARG90	0.035(#2)	LE	SS-D	N
	U-Factor 0.45		**SHGC (N) 0.27**						**VT (N) 0.46**			**CR 38**
	6mm Solarban 60 (#2) / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					ARG90	0.035(#3)	LE	SS-D	N
	U-Factor 0.45		**SHGC (N) 0.31**						**VT (N) 0.46**			**CR 38**
	6mm Clear / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Solarban 60 (#3)											
5	0.223	0.500	0.223					AIR	0.035(#2)	GR	SS-D	N
	U-Factor 0.48		**SHGC (N) 0.20**						**VT (N) 0.35**			**CR 38**
	6mm Solarban 60 (#2) Atlantica / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					AIR	0.035(#3)	GR	SS-D	N
	U-Factor 0.48		**SHGC (N) 0.22**						**VT (N) 0.35**			**CR 38**
	6mm Atlantica / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Solarban 60 (#3)											
6	0.223	0.500	0.223					AIR	0.018(#2)	LE	SS-D	N
	U-Factor 0.47		**SHGC (N) 0.20**						**VT (N) 0.42**			**CR 38**
	6mm Solarban 70XL (#2) / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					AIR	0.018(#3)	LE	SS-D	N
	U-Factor 0.47		**SHGC (N) 0.26**						**VT (N) 0.42**			**CR 38**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Solarban 70XL (#3)											
7	0.223	0.500	0.223					ARG90	0.018(#2)	LE	SS-D	N
	U-Factor 0.44		**SHGC (N) 0.20**						**VT (N) 0.42**			**CR 39**
	6mm Solarban 70XL (#2) / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											

NFRC 100/200/500 Summary Sheet
United States Aluminum
7200-Series Project-Out Bottom

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e	Tint	Spacer	Grid Type
	0.223	0.500	0.223					ARG90	0.018(#3)	LE	SS-D	N
	U-Factor 0.44		**SHGC (N) 0.26**						**VT (N) 0.42**			**CR 39**
	6mm Clear / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Solarban 70XL (#3)											
8	0.223	0.500	0.223					AIR	0.088(#2)	LE	SS-D	N
	U-Factor 0.49		**SHGC (N) 0.38**						**VT (N) 0.50**			**CR 38**
	6mm Viracon VE185 (#2) / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					AIR	0.088(#3)	LE	SS-D	N
	U-Factor 0.49		**SHGC (N) 0.40**						**VT (N) 0.50**			**CR 38**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Viracon VE185 (#3)											
9	0.223	0.500	0.223					ARG90	0.088(#2)	LE	SS-D	N
	U-Factor 0.46		**SHGC (N) 0.37**						**VT (N) 0.50**			**CR 38**
	6mm Viracon VE185 (#2) / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					ARG90	0.088(#3)	LE	SS-D	N
	U-Factor 0.46		**SHGC (N) 0.40**						**VT (N) 0.50**			**CR 38**
	6mm Clear / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Viracon VE185 (#3)											
10	0.223	0.500	0.223					AIR	0.040(#2)	LE	SS-D	N
	U-Factor 0.48		**SHGC (N) 0.27**						**VT (N) 0.46**			**CR 38**
	6mm Viracon VE12M (#2) / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					AIR	0.040(#3)	LE	SS-D	N
	U-Factor 0.48		**SHGC (N) 0.32**						**VT (N) 0.46**			**CR 38**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Viracon VE12M (#3)											
11	0.223	0.500	0.223					ARG90	0.040(#2)	LE	SS-D	N
	U-Factor 0.45		**SHGC (N) 0.26**						**VT (N) 0.46**			**CR 38**
	6mm Viracon VE12M (#2) / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					ARG90	0.040(#3)	LE	SS-D	N
	U-Factor 0.45		**SHGC (N) 0.32**						**VT (N) 0.46**			**CR 38**
	6mm Clear / 1/2" Argon Filled Spacer with X-L Edge Stainless Steel Spacer / 6mm Viracon VE12M (#3)											
12	0.222	0.500	0.225					AIR	0.034(#2)	LE	SS-D	N
	U-Factor 0.48		**SHGC (N) 0.25**						**VT (N) 0.43**			**CR 38**
	6mm Comfort TiAC 36 (#2) / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.225	0.500	0.222					AIR	0.034(#3)	LE	SS-D	N
	U-Factor 0.48		**SHGC (N) 0.31**						**VT (N) 0.43**			**CR 38**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Comfort TiAC36 (#3)											

NFRC 100/200/500 Summary Sheet
United States Aluminum
7200-Series Project-Out Bottom

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e	Tint	Spacer	Grid Type
13	0.222	0.500	0.225					ARG90	0.034(#2)	LE	SS-D	N
	U-Factor 0.45			**SHGC (N) 0.25**					**VT (N) 0.43**			**CR 38**
	6mm Comfort TiAC 36 (#2) / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.225	0.500	0.222					ARG90	0.034(#3)	LE	SS-D	N
	U-Factor 0.45			**SHGC (N) 0.32**					**VT (N) 0.43**			**CR 38**
	6mm Clear / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Comfort TiAC36 (#3)											
14	0.228	0.500	0.225					AIR	0.041(#2)	LE	SS-D	N
	U-Factor 0.48			**SHGC (N) 0.17**					**VT (N) 0.25**			**CR 38**
	6mm Comfort TiAC23 (#2) / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.225	0.500	0.228					AIR	0.041(#3)	LE	SS-D	N
	U-Factor 0.48			**SHGC (N) 0.32**					**VT (N) 0.25**			**CR 38**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Comfort TiAC23 (#3)											
15	0.228	0.500	0.225					ARG90	0.041(#2)	LE	SS-D	N
	U-Factor 0.45			**SHGC (N) 0.17**					**VT (N) 0.25**			**CR 38**
	6mm Comfort TiAC23 (#2) / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.225	0.500	0.228					ARG90	0.041(#3)	LE	SS-D	N
	U-Factor 0.45			**SHGC (N) 0.33**					**VT (N) 0.25**			**CR 38**
	6mm Clear / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Comfort TiAC23 (#3)											
16	0.222	0.500	0.223					AIR	0.157(#2)	LE	SS-D	N
	U-Factor 0.50			**SHGC (N) 0.43**					**VT (N) 0.48**			**CR 38**
	6mm Pilkington Advantage (#2) / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.222					AIR	0.157(#3)	LE	SS-D	N
	U-Factor 0.50			**SHGC (N) 0.46**					**VT (N) 0.48**			**CR 38**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Pilkington Advantage (#3)											
17	0.222	0.500	0.223					ARG90	0.157(#2)	LE	SS-D	N
	U-Factor 0.48			**SHGC (N) 0.43**					**VT (N) 0.48**			**CR 38**
	6mm Pilkington Advantage (#2) / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.222					ARG90	0.157(#3)	LE	SS-D	N
	U-Factor 0.48			**SHGC (N) 0.46**					**VT (N) 0.48**			**CR 38**
	6mm Clear / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Pilkington Advantage (#3)											

NFRC 100/200/500 Summary Sheet
United States Aluminum
7200-Series Project-Out Bottom

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e	Tint	Spacer	Grid Type
18	0.223	0.500	0.223					AIR	0.096(#2)	LE	SS-D	N
	U-Factor 0.49			**SHGC (N) 0.36**					**VT (N) 0.48**			**CR 38**
	6mm Sungate 100 (#2) / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					AIR	0.096(#3)	LE	SS-D	N
	U-Factor 0.49			**SHGC (N) 0.40**					**VT (N) 0.48**			**CR 38**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Sungate 100 (#3)											
19	0.223	0.500	0.223					AIR	0.024(#2)	LE	SS-D	N
	U-Factor 0.48			**SHGC (N) 0.18**					**VT (N) 0.31**			**CR 38**
	6mm Sungate 80 (#2) / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					AIR	0.024(#3)	LE	SS-D	N
	U-Factor 0.48			**SHGC (N) 0.21**					**VT (N) 0.31**			**CR 38**
	6mm Clear / 1/2" Air Filled Space with X-L Edge Stainless Steel Spacer / 6mm Sungate 80 (#3)											
20	0.223	0.500	0.223					ARG90	0.024(#2)	LE	SS-D	N
	U-Factor 0.45			**SHGC (N) 0.17**					**VT (N) 0.31**			**CR 39**
	6mm Sungate 80 (#2) / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Clear											
	0.223	0.500	0.223					ARG90	0.024(#3)	LE	SS-D	N
	U-Factor 0.45			**SHGC (N) 0.21**					**VT (N) 0.31**			**CR 39**
	6mm Clear / 1/2" Argon Filled Space with X-L Edge Stainless Steel Spacer / 6mm Sungate 80 (#3)											

The Condensation Resistance results obtained from this procedure are for controlled laboratory conditions and do not include the effects of air movement through the specimen, solar radiation, and the thermal bridging that may occur due to the specific design and construction of the fenestration system opening.

Ratings values included in this report are for submittals to an NFRC-licensed IA and are not meant to be used directly for labeling purposes. Only those values identified on a valid Certification Authorization Report (CAR) by an NFRC accredited Inspection Agency (IA) are to be used for labeling purposes. The ratings values were rounded in accordance to the NFRC unit conversion and rounding policy.

Architectural Testing is an NFRC accredited simulation laboratory and all simulations were conducted in full compliance with NFRC approved procedures and specifications. The NFRC procedure requires that the computational results be verified through actual test results.

Detailed drawings, simulation data files, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire. Results obtained are simulated values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the product simulated. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

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JAM:JAM
85597.01-116-45

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Drawings and Bills of Material (3)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
.01 R0	8/26/2008	All	Original Report Issue