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FENESTRATION SIMULATION ENGINEERING ***S***

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NFRC Accredited Computer Modeling & Simulation Laboratory

NFRC THERMAL SIMULATION REPORT

U-Factor (ANSI/NFRC 100-2017), CR (NFRC 500-2014)
SHGC and VT (ANSI/NFRC 200-2017)

Fenestration Product:	**Vinyl Casement Window**
Report#:	**SIM14C-081-1**
Series#:	Venetian S-4000/4080
Submitted To:	Rey Nea
Manufacturer:	**GREEN WORLD WINDOWS**
Address:	4195 Chino Hills Parkway, Ste. 508, Chino Hills, CA 91709
Phone#:	(909) 923-8618

Baseline Product:

This is a simple addendum report to SIM14C-081 prepared by FSE on 02/05/2015. Revised to add SB90 Low-e glass. For validation baseline product refer to original sim report# SIM14C-081.

Baseline Simulation Date:	02/05/2015
Expiration Date:	Four years from the date of the oldest physical test conducted for the latest certification ratings
Revision Date:	09/13/2017
Product Type:	Casement (single vent)
Simulator:	Anis Jan
Simulator-in-Charge:	Anis Jan
Simulation Method:	Approved NFRC software THERM7 and WINDOW7 and NFRC WINDOW/THERM simulation manual
Model/Type:	CSSV

Size:	[600 mm x 1500 mm] / {24 in x 59 in}
Frame Type and Finish:	Vinyl all members
Sash Type and Finish:	Vinyl all members
IG Glass Parameters:	2mm & 3mm glass. Low-e coating from PPG: Solarban 90/e=0.023 applied on surf# 2.
Glazing Method:	Panel is drop glazed onto double sided foam tape with PVC glazing bead applied full perimeter from exterior.
Gas Fill Method:	Argon 90% & Air 10% gas fill using Evacuated chamber fill technique.
Spacers:	A8-D = supersure seal spacer II, dual sealed with hot melt butyl (with rigid PVC strip for both strips, per client) and A8-D = supersure seal spacer regular, dual sealed with hot melt butyl (with rigid PVC on top strip and corrugated aluminum-mill finish for bottom strip, per client)
Dividers:	Aluminum painted outside / mill finish interior Rectangular grid: 0.188" x 0.625" x 0.02" (<1", 0.75" grid size), and Contour grid: 0.313" x 0.984" x 0.02" (<1", 0.75" grid size) Grid pattern: NFRC Standard 4 horizontal x 1 vertical strips
Grouping:	
Center-of-Glazing:	No
Frame:	No
Spacer:	No
Divider:	No
Miscellaneous:	
SHGC and VT:	Default Frame Absorptivity is 0.3, per ANSI/NFRC 200-2017 Sec. 4.5.D.

Glazing Matrix

Glz ID	Name	Group	UCOG	Thick.	ID1	Gap fill1	ID2	Gap fill2	ID3
1	SB90 / AIR / CLEAR_2mm	L1	0.308	0.947	5443	AIR	5008		
2	SB90 / AIR / CLEAR_3mm	1	0.307	0.986	5444	AIR	5009		
3	SB90 / ARG / CLEAR_2mm	L2	0.259	0.947	5443	ARG(90)	5008		
4	SB90 / ARG / CLEAR_3mm	2	0.258	0.986	5444	ARG(90)	5009		
5	SB90 / ARG / SB90 / ARG / CLEAR_2mm	L3	0.154	1.045	5443	ARG(90)	5443	ARG(90)	5008
6	SB90 / ARG / SB90 / ARG / CLEAR_3mm	3	0.154	1.104	5444	ARG(90)	5444	ARG(90)	5009
9	SB70 / CLR / SB70_ARG_2mm	L9	0.153	1.045	5431	ARG(90)	5008	ARG(90)	5431

Note: L denotes the group leader per ANSI/NFRC 100-2017.

SHGC 0 and 1 & VT 0 and 1

	No-divider	Divider < 25.4 mm	Divider >= 25.4 mm
SHGC0	0.006749	0.008861	0.010868
SHGC1	0.676600	0.613923	0.554366
VT0	0	0	0
VT1	0.669851	0.605062	0.543498

SHGC = SHGC0 + SHGCc * (SHGC1 - SHGC0)
VT = VT0 + VTc * (VT1 - VT0)

SHGCc = center of glass SHGC value only
VTc = center of glass VT value only

Series: Venetian S-4000/4080
Product: Vinyl Casement

U-Factor, SHGC & VT Values

Report#: SIM14C-081-1
Report Date: 9/13/2017

						Sim Lab Code:	SFSE
		Operator Type:	CSSV	***2014 Model Size:***	600 mm x 1500 mm	***Sim Report#:***	SIM14C-081-1
Mfr Name:	GREENWORLD WINDOWS	***Frame Type:***	VY	***Residential Size:***		***Sim Rpt date:***	2/5/2015
Series/Model#:	VENETIAN S-4000/4080	***Sash Type:***	VY	***Non Res Size:***		***Sim Rpt revision date:***	9/13/2017
		Thermal Break Type:	N			***Frame Absorptance:***	0.3
						Rating Procedure:	2014

Mfr Prod. Code	Product Num	Pane Thick. 1	Pane Thick. 2	Pane Thick. 3	Gap 1	Gap 2	Emiss 1	Emiss 2	Emiss 3	Emiss 4	Emiss 5	Emiss 6	Spacer Type	Grid	Grid Size	U factor cog	SHGC cog	VT cog	Total U-factor	Total SHGC	Total VT	Total CR
SB90 / AIR / CLEAR_2mm	001	0.098	0.098		0.750			0.023					A8-D	N		0.31	0.227669	0.531174	**0.32**	0.16	0.36	58
SB90 / AIR / CLEAR_2mm – rectangular & contour grid	001-0001	0.098	0.098		0.750			0.023					A8-D	G	0.75	0.31	0.227669	0.531174		0.15	0.32	
SB90 / AIR / CLEAR_3mm	001-0002	0.118	0.118		0.750			0.023					A8-D	N		0.31	0.228707	0.524806		0.16	0.35	
SB90 / AIR / CLEAR_3mm – rectangular & contour grid	001-0003	0.118	0.118		0.750			0.023					A8-D	G	0.75	0.31	0.228707	0.524806		0.15	0.32	
SB90 / ARG / CLEAR_2mm	002	0.098	0.098		0.750			0.023					A8-D	N		0.26	0.224585	0.531174	**0.29**	0.16	0.36	62
SB90 / ARG / CLEAR_2mm – rectangular & contour grid	002-0001	0.098	0.098		0.750			0.023					A8-D	G	0.75	0.26	0.224585	0.531174		0.14	0.32	
SB90 / ARG / CLEAR_3mm	002-0002	0.118	0.118		0.750			0.023					A8-D	N		0.26	0.225189	0.524806		0.16	0.35	
SB90 / ARG / CLEAR_3mm – rectangular & contour grid	002-0003	0.118	0.118		0.750			0.023					A8-D	G	0.75	0.26	0.225189	0.524806		0.15	0.32	
SB90 / AIR / CLEAR_2mm	003	0.098	0.098		0.750			0.023					A8-D	N		0.31	0.227669	0.531174	**0.30**	0.16	0.36	62
SB90 / AIR / CLEAR_2mm – rectangular & contour grid	003-0001	0.098	0.098		0.750			0.023					A8-D	G	0.75	0.31	0.227669	0.531174		0.15	0.32	
SB90 / AIR / CLEAR_3mm	003-0002	0.118	0.118		0.750			0.023					A8-D	N		0.31	0.228707	0.524806		0.16	0.35	
SB90 / AIR / CLEAR_3mm – rectangular & contour grid	003-0003	0.118	0.118		0.750			0.023					A8-D	G	0.75	0.31	0.228707	0.524806		0.15	0.32	
SB90 / ARG / CLEAR_2mm	004	0.098	0.098		0.750			0.023					A8-D	N		0.26	0.224585	0.531174	**0.27**	0.16	0.36	66
SB90 / ARG / CLEAR_2mm – rectangular & contour grid	004-0001	0.098	0.098		0.750			0.023					A8-D	G	0.75	0.26	0.224585	0.531174		0.14	0.32	
SB90 / ARG / CLEAR_3mm	004-0002	0.118	0.118		0.750			0.023					A8-D	N		0.26	0.225189	0.524806		0.16	0.35	
SB90 / ARG / CLEAR_3mm – rectangular & contour grid	004-0003	0.118	0.118		0.750			0.023					A8-D	G	0.75	0.26	0.225189	0.524806		0.15	0.32	
SB90 / ARG / SB90 / ARG / CLEAR_2mm	005	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	N		0.15	0.172448	0.314613	**0.21**	0.12	0.21	72
SB90 / ARG / SB90 / ARG / CLEAR_2mm – rectangular grid	005-0001	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.15	0.172448	0.314613		0.11	0.19	
SB90 / ARG / SB90 / ARG / CLEAR_3mm	005-0002	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	N		0.15	0.172886	0.308952		0.12	0.21	
SB90 / ARG / SB90 / ARG / CLEAR_3mm – rectangular grid	005-0003	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.15	0.172886	0.308952		0.11	0.19	
SB90 / ARG / SB90 / ARG / CLEAR_2mm – contour grid	006	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.15	0.172448	0.314613	**0.22**	0.11	0.19	72
SB90 / ARG / SB90 / ARG / CLEAR_3mm – contour grid	006-0001	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.15	0.172886	0.308952		0.11	0.19	
SB90 / ARG / SB90 / ARG / CLEAR_2mm	007	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	N		0.15	0.172448	0.314613	**0.20**	0.12	0.21	76
SB90 / ARG / SB90 / ARG / CLEAR_2mm – rectangular grid	007-0001	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.15	0.172448	0.314613		0.11	0.19	
SB90 / ARG / SB90 / ARG / CLEAR_3mm	007-0002	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	N		0.15	0.172886	0.308952		0.12	0.21	
SB90 / ARG / SB90 / ARG / CLEAR_3mm – rectangular grid	007-0003	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.15	0.172886	0.308952		0.11	0.19	
SB90 / ARG / SB90 / ARG / CLEAR_2mm – contour grid	008	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.15	0.172448	0.314613	**0.20**	0.11	0.19	76
SB90 / ARG / SB90 / ARG / CLEAR_3mm – contour grid	008-0001	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.15	0.172886	0.308952		0.11	0.19	

Note:
A8-D = supersure seal spacer, dual sealed with hot melt butyl
Product# 001 to 002 with supersure seal spacer regular (see page 2 for more detail)
Product# 003 to 004 with supersure seal spacer II (see page 2 for more detail)

WINDOW SIMULATION REPORT:

The fenestration products documented in this report were simulated in accordance with the ANSI/NFRC 100-2017: Procedure for Determining Fenestration Product Thermal Performance & ANSI/NFRC 500-2014. The fenestration products were simulated using computer programs Therm 7.4.4, Window 7.4.14 & Spectral Data # 55.0 as specified in ANSI/NFRC 100-2017 and ANSI/NFRC 200-2017 (SHGC/VT). The WINDOW program models the one-dimensional heat flow through the center-of-glass portion of the window. The Therm program models the two-dimensional heat flow through the frame, edge-of-glass, divider, and divider-edge portions of the fenestration product. The input data for both programs is based on manufacturer's specifications. Defaults for material thermal and optical properties are given in the computer programs. When values other than defaults were used, they are documented.

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It is the policy for this laboratory to verify as much information about the product being tested and simulated. However, not all information provided to the laboratory can be verified, such as physical properties of low-e coating, heat mirror, gas fills spacer, and others. Therefore, all information provided to the laboratory is the manufacturer's responsibility as to its accuracy.

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F. Name and signature of the individual performing the simulations and accepting the responsibility for the technical accuracy of this simulation report.
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