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FENESTRATION SIMULATION ENGINEERING

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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 Horizontal Slider**
Report#:	SIM13H-043-4
Series#:	**Venetian S-3900 HS**
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 original simulation report# SIM13H-043, prepared on 01/19/2014 by FSE. Revised to add “SB90 low-e glass”. No other changes were made per client. For baseline product detail, refer to original sim report# SIM13H-043. No additional validation test required.

Baseline Simulation Date:	01/19/2014
Expiration Date:	Five years from the date of the oldest physical test conducted for the latest certification ratings
Revision Date:	08/14/2017
Product Type:	Horizontal Slider
Simulator:	Anis Jan
Simulator-in-Charge:	Anis Jan
Simulation Method:	Approved NFRC software THERM7 and WINDOW7 and NFRC WINDOW/THERM simulation manual

Model/Type:	HSOX
Size:	{1500 mm x 1200 mm} / [59 in x 47 in]
Frame Type and Finish:	Vinyl- rigid PVC
Sash Type and Finish:	Not Applicable (pvc glazing bead)
IG Glass Parameters:	Glass from PPG. Solarban 90/e=0.023 applied on srf# 2. (stated per client)
Glazing Method:	Glass is wet glazed onto silicone sealant from exterior, 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 exterior/ 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
Grouping:	
Center-of-Glazing:	Yes, NFRC Rules for grouping (see summary tables)
Frame:	Yes, see original sim report# SIM14H-043 for detail
Spacer:	No
Divider:	No
Miscellaneous:	
SHGC and VT:	Default Frame Absorptivity 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
5	SB90 / AIR / CLEAR - (SS-SS)	L1	0.291	0.697	5443	AIR	5008		
6	SB90 / AIR / CLEAR - (DS-DS)	1	0.29	0.736	5444	AIR	5009		
9	SB90 / AIR / SB90 / AIR / CLEAR - (SS-SS-SS)	L2	0.197	1.045	5443	AIR	5443	AIR	5008
10	SB90 / AIR / SB90 / AIR / CLEAR - (DS-DS-DS)	2	0.196	1.104	5444	AIR	5444	AIR	5009
16	SB90 / ARG / CLEAR - (SS-SS)	L3	0.243	0.697	5443	ARG(90)	5008		
17	SB90 / ARG / CLEAR - (DS-DS)	3	0.243	0.736	5444	ARG(90)	5009		
20	SB90 / ARG / SB90 / ARG / CLEAR - (SS-SS-SS)	L4	0.154	1.045	5443	ARG(90)	5443	ARG(90)	5008
21	SB90 / ARG / SB90 / ARG / CLEAR - (DS-DS-DS)	4	0.154	1.104	5444	ARG(90)	5444	ARG(90)	5009
50	SB70 / ARG / SB70 / ARG / CLEAR - (SS-SS-SS)	L50	0.153	1.045	5431	ARG(90)	5431	ARG(90)	5008

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	0.004308	0.007015	0.009564
SHGC1	0.758555	0.678154	0.602434
VT0	0	0	0
VT1	0.754247	0.671139	0.592869

SHGC & VT "0 and 1" values were used from original simulation report# SIM14H-043, per TI-2010-001.

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-3900 HS
Product: Vinyl Horizontal Slider

U-Factor, SHGC and VT Summary

Report#: SIM13H-043-4
Report Date: 8/14/2017

						Sim Lab Code:	SFSE
		Operator Type:	HSOX	***2014 Model Size:***	1500 mm x 1200 mm	***Sim Report#:***	SIM13H-043-4
Mfr Name:	GREEN WORLD WINDOWS	***Frame Type:***	VY	***Residential Size:***		***Sim Rpt date:***	1/19/2014
Series/Model#:	Venetian S-3900 HS	***Sash Type:***	VI	***Non Res Size:***		***Sim Rpt revision date:***	8/14 /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 - (SS-SS)	001	0.098	0.098		0.500			0.023					A8-D	N		0.29	0.230377	0.531174	**0.32**	0.18	0.40	57
SB90 / AIR / CLEAR - (SS-SS) – rectangular grid	001-0001	0.098	0.098		0.500			0.023					A8-D	G	0.75	0.29	0.230377	0.531174		0.16	0.36	
SB90 / AIR / CLEAR - (DS-DS)	001-0002	0.118	0.118		0.500			0.023					A8-D	N		0.29	0.231486	0.524806		0.18	0.40	
SB90 / AIR / CLEAR - (DS-DS) – rectangular grid	001-0003	0.118	0.118		0.500			0.023					A8-D	G	0.75	0.29	0.231486	0.524806		0.16	0.35	
SB90 / AIR / CLEAR - (SS-SS) -- contour grid	002	0.098	0.098		0.500			0.023					A8-D	G	0.75	0.29	0.230377	0.531174	**0.33**	0.16	0.36	57
SB90 / AIR / CLEAR - (DS-DS) -- contour grid	002-0001	0.118	0.118		0.500			0.023					A8-D	G	0.75	0.29	0.231486	0.524806		0.16	0.35	
SB90 / AIR / SB90 / AIR / CLEAR - (SS-SS-SS)	003	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	N		0.20	0.175372	0.314613	**0.24**	0.14	0.24	67
SB90 / AIR / SB90 / AIR / CLEAR - (SS-SS-SS) – rectangular grid	003-0001	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.20	0.175372	0.314613		0.12	0.21	
SB90 / AIR / SB90 / AIR / CLEAR - (DS-DS-DS)	003-0002	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	N		0.20	0.176338	0.308952		0.14	0.23	
SB90 / AIR / SB90 / AIR / CLEAR - (DS-DS-DS) – rectangular grid	003-0003	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.20	0.176338	0.308952		0.13	0.21	
SB90 / AIR / SB90 / AIR / CLEAR - (SS-SS-SS) -- contour grid	004	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.20	0.175372	0.314613	**0.25**	0.12	0.21	67
SB90 / AIR / SB90 / AIR / CLEAR - (DS-DS-DS) -- contour grid	004-0001	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.20	0.176338	0.308952		0.13	0.21	
SB90 / ARG / CLEAR - (SS-SS)	005	0.098	0.098		0.500			0.023					A8-D	N		0.24	0.225516	0.531174	**0.28**	0.17	0.40	61
SB90 / ARG / CLEAR - (SS-SS) – rectangular grid	005-0001	0.098	0.098		0.500			0.023					A8-D	G	0.75	0.24	0.225516	0.531174		0.16	0.36	
SB90 / ARG / CLEAR - (DS-DS)	005-0002	0.118	0.118		0.500			0.023					A8-D	N		0.24	0.226010	0.524806		0.17	0.40	
SB90 / ARG / CLEAR - (DS-DS) – rectangular grid	005-0003	0.118	0.118		0.500			0.023					A8-D	G	0.75	0.24	0.226010	0.524806		0.16	0.35	
SB90 / ARG / CLEAR - (SS-SS) -- contour grid	006	0.098	0.098		0.500			0.023					A8-D	G	0.75	0.24	0.225516	0.531174	**0.30**	0.16	0.36	61
SB90 / ARG / CLEAR - (DS-DS) -- contour grid	006-0001	0.118	0.118		0.500			0.023					A8-D	G	0.75	0.24	0.226010	0.524806		0.16	0.35	
SB90 / ARG / SB90 / ARG / CLEAR - (SS-SS-SS)	007	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	N		0.15	0.172448	0.314613	**0.21**	0.13	0.24	69
SB90 / ARG / SB90 / ARG / CLEAR - (SS-SS-SS) – 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		0.12	0.21	
SB90 / ARG / SB90 / ARG / CLEAR - (DS-DS-DS)	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		0.13	0.23	
SB90 / ARG / SB90 / ARG / CLEAR - (DS-DS-DS) – 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		0.12	0.21	
SB90 / ARG / SB90 / ARG / CLEAR - (SS-SS-SS) -- 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	**0.22**	0.12	0.21	69
SB90 / ARG / SB90 / ARG / CLEAR - (DS-DS-DS) -- 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		0.12	0.21	
SB90 / AIR / CLEAR - (SS-SS)	009	0.098	0.098		0.500			0.023					A8-D	N		0.29	0.230377	0.531174	**0.30**	0.18	0.40	61
SB90 / AIR / CLEAR - (SS-SS) – rectangular grid	009-0001	0.098	0.098		0.500			0.023					A8-D	G	0.75	0.29	0.230377	0.531174		0.16	0.36	
SB90 / AIR / CLEAR - (DS-DS)	009-0002	0.118	0.118		0.500			0.023					A8-D	N		0.29	0.231486	0.524806		0.18	0.40	
SB90 / AIR / CLEAR - (DS-DS) – rectangular grid	009-0003	0.118	0.118		0.500			0.023					A8-D	G	0.75	0.29	0.231486	0.524806		0.16	0.35	
SB90 / AIR / CLEAR - (SS-SS) -- contour grid	010	0.098	0.098		0.500			0.023					A8-D	G	0.75	0.29	0.230377	0.531174	**0.32**	0.16	0.36	61
SB90 / AIR / CLEAR - (DS-DS) -- contour grid	010-0001	0.118	0.118		0.500			0.023					A8-D	G	0.75	0.29	0.231486	0.524806		0.16	0.35	

Series: Venetian S-3900 HS
Product: Vinyl Horizontal Slider

U-Factor, SHGC and VT Summary

Report#: SIM13H-043-4
Report Date: 8/14/2017

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 / SB90 / AIR / CLEAR - (SS-SS-SS)	011	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	N		0.20	0.175372	0.314613	**0.23**	0.14	0.24	71
SB90 / AIR / SB90 / AIR / CLEAR - (SS-SS-SS) – rectangular grid	011-0001	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.20	0.175372	0.314613		0.12	0.21	
SB90 / AIR / SB90 / AIR / CLEAR - (DS-DS-DS)	011-0002	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	N		0.20	0.176338	0.308952		0.14	0.23	
SB90 / AIR / SB90 / AIR / CLEAR - (DS-DS-DS) – rectangular grid	011-0003	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.20	0.176338	0.308952		0.13	0.21	
SB90 / AIR / SB90 / AIR / CLEAR - (SS-SS-SS) -- contour grid	012	0.098	0.098	0.098	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.20	0.175372	0.314613	**0.23**	0.12	0.21	71
SB90 / AIR / SB90 / AIR / CLEAR - (DS-DS-DS) -- contour grid	012-0001	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	G	0.75	0.20	0.176338	0.308952		0.13	0.21	
SB90 / ARG / CLEAR - (SS-SS)	013	0.098	0.098		0.500			0.023					A8-D	N		0.24	0.225516	0.531174	**0.27**	0.17	0.40	65
SB90 / ARG / CLEAR - (SS-SS) – rectangular grid	013-0001	0.098	0.098		0.500			0.023					A8-D	G	0.75	0.24	0.225516	0.531174		0.16	0.36	
SB90 / ARG / CLEAR - (DS-DS)	013-0002	0.118	0.118		0.500			0.023					A8-D	N		0.24	0.226010	0.524806		0.17	0.40	
SB90 / ARG / CLEAR - (DS-DS) – rectangular grid	013-0003	0.118	0.118		0.500			0.023					A8-D	G	0.75	0.24	0.226010	0.524806		0.16	0.35	
SB90 / ARG / CLEAR - (SS-SS) -- contour grid	014	0.098	0.098		0.500			0.023					A8-D	G	0.75	0.24	0.225516	0.531174	**0.28**	0.16	0.36	65
SB90 / ARG / CLEAR - (DS-DS) -- contour grid	014-0001	0.118	0.118		0.500			0.023					A8-D	G	0.75	0.24	0.226010	0.524806		0.16	0.35	
SB90 / ARG / SB90 / ARG / CLEAR - (SS-SS-SS)	015	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**	0.13	0.24	72
SB90 / ARG / SB90 / ARG / CLEAR - (SS-SS-SS) – rectangular grid	015-0001	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		0.12	0.21	
SB90 / ARG / SB90 / ARG / CLEAR - (DS-DS-DS)	015-0002	0.118	0.118	0.118	0.500	0.250		0.023		0.023			A8-D	N		0.15	0.172886	0.308952		0.13	0.23	
SB90 / ARG / SB90 / ARG / CLEAR - (DS-DS-DS) – rectangular grid	015-0003	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		0.12	0.21	
SB90 / ARG / SB90 / ARG / CLEAR - (SS-SS-SS) -- contour grid	016	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**	0.12	0.21	72
SB90 / ARG / SB90 / ARG / CLEAR - (DS-DS-DS) -- contour grid	016-0001	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		0.12	0.21	

A8-D = supersure seal spacer, dual sealed with hot melt butyl

Product# 001 to 008 with supersure seal spacer regular (see page 2 for more detail)
Product# 009 to 016 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 & 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.

It is the policy of this laboratory to prepare a report and submit it to the manufacturer for his approval. Upon notification in writing from the manufacturer that he approves of the report, (in approving report, manufacturer takes responsibility of all information provided to this laboratory) the report is sent to the certification agency. The data shall be kept for a period of five years after which they may be destroyed.

Fenestration Simulation Engineering will not be responsible for inaccuracies in the information it has been provided.

A. Simulations were conducted in full compliance with NFRC requirements.
B. This report shall not be reproduced, except in full, without the approval of this laboratory.
C. This report relates only to the fenestration products simulated.
D. Rounding is per NFRC 601, NFRC Unit and Measurement Policy.
E. 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.
F. Name and signature of the individual performing the simulations and accepting the responsibility for the technical accuracy of this simulation report.
The data shall be kept for a period of four years after which they may be destroyed.

Anis Jan

Anis Jan
Simulator-in-responsible-charge