

8350 PARKLINE BLVD ORLANDO, FL 32809 (407) 240-1356

3310 HILL AVE EVERETT, WA 98201 (425) 259-6799

SIMULATION TEST REPORT

NCTL-610-23419-1_{E0A0}

REPORT To: ClimateGuard Manufacturing 2500 North Pulaski Chicago, IL 60639

SIMULATION DATE: 08/26/20

PRODUCT: 2500 Double Hung

PRODUCT CPD DESIGNATION: RSC-A-7

This report is for recertification of an existing product line.

NGTL SI

NATIONAL CERTIFIED TESTING LABORATORIES

5 LEIGH DRIVE YORK, PA 17406 (717) 846-1200 8350 PARKLINE BLVD ORLANDO, FL 32809 (407) 240-1356 3310 HILL AVE EVERETT, WA 98201 (425) 259-6799

SIMULATION TEST REPORT

Simulation Standards

ANSI/NFRC 100-2017 "Procedure for Determining Fenestration Product U-

factors"

ANSI/NFRC 200-2017 "Procedure for Determining Fenestration Product Solar Heat Gain Coefficients and Visible Transmittance at Normal

Incidence"

NFRC 500-2017 "Procedure for Determining Fenestration Product

Condensation Resistance Values"

THERM 7 / WINDOW 7 NFRC Simulation Manual (July 2017) NFRC 2010 Technical Interpretations Manual (November 2017)

Approved Simulation

Center of Glass

Window 7.4

Software

2-D Heat Transfer

THERM 7.4

Total Product Calculations

Window 7.4

Note: All dimensions are in the order (Width x Height) unless otherwise noted.

Report Number

NCTL-610-23419-1_{E0A0}

Model/ Series

2500 Double Hung

Operator Type

Vertical Slider Double Hung (VSDH)

Simulation Size

1200 mm x 1500 mm (47" x 59")

Frame Type

Vinyl (VY)

Vinyl with Foam Filling (VF)

Nail Fin

Not applicable

Sash/Vent/Panel Type

Vinyl (VY)

Vinyl with Foam Filling (VF)

Frame/Sash Material & Finish Rigid vinyl (PVC)

Reinforcement

Not applicable

Thermal Break(s)

Not applicable

Weather Seal(s)

Head

(4) Strips mohair

Upper Jamb
(3) Strips mohair

Meeting Rail
(3) Strips mohair

Lower Jamb
(3) Strips mohair

Sill

(3) Strips mohair, (1) flexible vinyl bulb seal

Foam Fill

Head

(2) Largest cavities in frame and exterior most cavities in sash as represented in assembly

Upper Jamb

(2) Largest cavities in frame and exterior most cavities in sash as represented in assembly

Meeting Rail

(1) Exterior most cavities in rails

Lower Jamb

(2) Largest cavities in frame and exterior most cavities in sash as represented in assembly

Sil

(2) Largest cavities in frame and exterior most cavities in sash as represented in assembly

Foam Type

Polystyrene expanded (EPS) with a conductivity of 0.0240 W/m-K

Edge of Glass

Interior glazed with flexible vinyl fin back bedding on glazing leg, and snap-in dual durometer rigid vinyl glazing bead with dual leaf.

Spacer System(s)

Coated steel U-shaped spacer system - dual sealed (CU-D)

Gas Fillings

Argon 90% single probe per the client (ARG)

Divider(s)

Grid 1

.1875" x .610" painted aluminum rectangle

Divider Notes

Where the space between lite and divider is greater than 3 mm, dividers are not modeled. Solar Heat Gain Coefficient (SHGC) and Visible Light Transmittance (VT) are calculated using default dividers of less than 1" and greater than/ equal to 1".

For U-factor, SHGC, and VT calculations the standard default grid pattern of 12" is used, as established by the Window 7 program.

Notes, Additional Information, Comments, and Assumptions

All simulations use the emissivity from the approved ANSI/NFRC spectral data files with the International Glazing Database (IGDB).

For Solar Heat Gain and Visible Light Transmittance; all frame, divider and glass options are grouped using the best case center of glass/ worst-case frame values from the "U" Factor calculations as required by ANSI/NFRC 200-2017.

A default frame absorptance of 0.30 is assumed for all products except glazing window walls, glazing curtain walls, and slopped glazing wall - all of which will have a frame absorptance of 0.50

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Supporting information including THERM 7 and WINDOW 7 files are being submitted as part of this report. The simulation matrix is being submitted electronically.

Detailed assembly drawings, horizontal and vertical cross-sectional drawings, profile drawings, parts drawings, and a bill of materials as supplied by the client were used as the basis for performing the simulations. Copies are attached to this report. The results were secured by using the designated methods and NFRC approved simulation programs as required by, and in full compliance with, NFRC procedures.

This report does not constitute certification of this product. The results in this report apply only to the sample as shown in the attached drawings, using the components and construction methods described herein. NCTL does not warrant the accuracy of the computer programs used to obtain the results. Client request for work performed by NCTL and its associated documentation constitute approval by client for Inspection Agency (IA) submission.

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 options identified on a valid Certificate of Authorization (CA) by an NFRC accredited Inspection Agency (IA) are to be used for labeling purposes.

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.

Units and rounding is in accordance with NFRC 601, Units and Measurement Policy except that all units may be reported in IP as the primary units after conversion and any matrix is reported in IP units only unless requested otherwise by the client.

The manufacturer is capable of producing, in its normal manufacturing process, products in sizes identical to the model sizes listed in the ANSI/NFRC 100 Table 4-3 and have a least deviation of 0 within the tolerances of ANSI/NFRC 100. All simulations are performed in the sizes and configurations listed in ANSI/NFRC 100 Table 4-3 except that a non-standard size may be simulated and identified in the matrix to match the manufacturer's physical test sample. Glass and glazing types, Low-E placement, finishes and other required information is included in the NFRC U-Factor Simulation Summary Report and/ or the NFRC SHGC/ VT Simulation Summary Report included in this document. Additional supporting information and modeling assumptions are included in the individual reports obtained from the approved simulation programs and in the notes following the required summary reports.

National Certified Testing Laboratories

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Performed by:

BRYCE PETERS

NFRC Certified Simulator

Reviewed by:

MARK BENNETT

NFRC Certified Simulator

Simulator-In-Responsible-Charge

DIGITAL SIGNATURE

Attachments

Glazing Matrix

Appendix A - Revision Summary

Appendix B - Product Drawings

VT GRID >=1"	I			I		I	П	П	10	4	1	H	T	0	48	П	П		7.	7.	53		-	41	33		12	88	22
	0.57	0.57	Ц	1	0.56	0.55			0.45	0.44	-	Н		5 0.49	0		\prod	8	3 0.47	3 0.47	C	-	0.51	0.4	0.33	4	0.45	0.38	.64 0.57
VT NO GRID	0.64	0.63	0	0.59	0.63	0.62	200	0.58	0.50	0.50	0.46		0.37	0.55	0.54	0		0.43	0.53	0.53	1	Н	1	Н	+	Н	+	1	9.0
SHGC GRID>=1"	I	L	Ц			1	\prod			0		Н	+	9	9	1	Н	-	9	12	20		45	18	1	+	54	.22	0.55
	0.55	0.54		1	0.49	97.0			0.19	0.19		Ц		9 0.26	9 0.26		Н	10	8 0.26	8 0.25	c	Š	0.0	o.	0 17	j	0.24	0	
SHGC NO GRID	0.61	0.60	1	0.56	0.55	0.54	6.0	0.50	0.21	0.21	000	7	0.19	0.29	0.29	100	N.Y	0.25	0.28	0.28	1	\sqcup	1	Н	+	\perp	_	1	0.61
	\perp	L	П						10	1	H.	H	10	4	54	Н,	\mathbb{H}	65	43	45	5	\parallel	25	61	S.F.		61	65	43
ondensation Resistance	6 43	46 43	-	37 52	4 45		-	34 55	29 55	29 54	10		23 65	0.29 54	0.29 5		0.27	.23 6	0.25 4	0.25 4	7000		0.34 5	0.27	0 03		0.27	0.24	0.45
U-factor	5 0.46	0		0.3	5 0.44	1	기	0	5 0.29	5 0.29		5	0				9	0	0.75 0.	0.75 0		0.75	0.75 0	0.75 0		0.70	0.75 0	0.75	0.75 0
Grid Size	0.75	0.75		1	3 0.75		0.75	+	3 0.75	3 0.75		+	-	G 0.75	2 0 75		+				-	5 5	0	9	_	5	G 0.	0	O, N, O
Grid Type	N,G	C Z		z	N,G	1	4	Z	N,G	N.G		z	z	Z	2		z	Z	D,'G	D'N G							100		Z Q
Spacer	CU-D	0-1-0		CO-D	CU-D	1	G-05	CU-D	CU-D	CU-D		C-0-D	CU-D	G-N-D	2		CO-D	G-NO	CN-D	CO-D		0.00	G-D	CU-D	_	7	G-NO-	CO-D	d-no
Tint	리	ī		리	CL		CL	CL	디	Ü		5	CL	디	c	3	히	디	C	2	H	3	김	C	1	3	ر ا	리	J
Emissivity Surface 6	Н	+	Н	1	-	H	+	H	H	+	Н	+	0	H	+	H	+	32	Н	+	Н	+	H	+	1	020	H	0.035	+
Emissivity Surface 5									Ц		Ш		0.020	Ц	1	Ц	1	0.035		-	Н	+	\sqcup	+	H	8.	H	0.0	+
Emissivity Surface 4									Ц		\prod		Ц	\prod	1		1		0.149	0.149		+	H		H	+		\mathbb{H}	+
Emissivity Surface 3	H	+	+	H	+	H	-	+	020	100	1	20	20	35	-	9	35	35	0.035	0.035	H	+	$\dagger\dagger$	020	H	0.020	0.035	0.035	++
Emissivity Surface 2				Ц		Ц			0.0	000		0.020	0.020	0.035	- 6	0.035	0.035	0.035	0.0	0		+	6	0.0	H	0.0	0.0	0.0	+
Emissivity Surface 1					0.149		0.149	0.149													Ш		0.149		Ц		\coprod	Ш	\perp
% of Gap Fill 2	H	1	1		Ť			2				2	2				2	2		1		-	2	2	-	2	5	5	+
% of Gap Fill 1				П	7.	,	2	2	5	4	0	3	c)	5	Н	2	9	G G	5	4	1	~	5	100		9		ARG 5	+
Gap Fill 2				AIR				ARG	Ц			ARG	ARG		Ц	(0)	S ARG	3 ARG	(0	Н,		AIR	3 ARG	ARG		3 ARG	G ARG		1
Gap Fill 1	AIR		AIR	0 AIR	000	DYK.	ARG	0 ARG	ARG		ARG	0 ARG	00 ARG	ARG	Н	ARG	30 ARG	30 ARG	ARG	100	DYK.	90 AIR	90 ARG	ON ARG		90 ARG	0.290 ARG	0.290 ARG	AR
Gap 2				0.290				0.290		Ц	1	0.290	0.290	1	Ц		0.290	0.290	-	Ц		0.290	0.290	0000	7.0	0 0.290	0 0.2		8
Gap 1	0.678		0.639	0.290	1	0.0/8	0.639	0.290	0.678		0.639	7 0.290	7 0.290	0.678	Ц	0.639	7 0.290	7 0.290	0.678		U.b38	37 0.290	37 0.290	7000		37 0.290	37 0.290	87 0.290	0.678
Pane Thickness #3				0.087				0.087		Ц		0.087	0.087		Ц		0.087	780.0		Ц	1	7 0.087	7 0.087	70007		7 0.087	7 0.087	7 0.087	
Pane Thickness #2	0.087		0.118	0.087		0.087	0.118	780.0	7 0.087		3 0.118	7 0.087	7 0.087	7 0 087		8 0.118	7 0.087	7 0.087	7 0 087		8 0.117	7 0.087	780.0 21	1	7 0.08/	37 0.087	37 0.087	37 0.087	37 0.087
Pane Thickness #1	0.087		0.118	0.087		0.087	0.117	0.087	0.087		0.118	0.087	6 0.087	0.087	3	0.118	0.087	0.087		3	0.118	0.087	0.087	П	0.087	36 0.087	r 0.087	270 0.087	
Pane ID #3				2 mm Clear				2 mm Clear				2 mm Clear	2 mm LoE 366				2 mm Clear	2 mm LoE 270				r 2 mm Clear	r 2 mm Clear	Ц	r 2 mm Clear	r 2 mm LoE 366	ır 2 mm Clear	30 L mm C	
Pane ID #2	Cool Cook	Z IIIIII Cleal	3 mm Clear	Jan Clone	Z mm clear	2 mm Clear	3 mm Clear	2 mm Clear	J mm Close		3 mm Clear	2 mm Clear	2 mm Clear		z mm clear	3 mm Clear	2 mm Clear	2 mm Clea	2		3 mm i89	2 mm Clear	2 mm Clear		2 mm Clear	3 2 mm Clear	2 mm Clear	na c	2 mm Clear
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Product Number	+	+	2	1	6	4	5	9	-	1	80	6	-		=	12	13			15	16	17	0,	0	19	20	21	1 8	23
PRODUCT		Grids/ No Grids	Grids/ No Grids		No Grids	Grids/ No Grids	Grids/ No Grids	No Grids		Grids/ No Grids	Grids/ No Grids	No Grids	-5:00	No Grids	Grids/ No Grids	Grids/ No Grids	No Grids	-	No Grids	Grids/ No Grids	Grids/ No Grids	0.1875" x 0.610" Rectangle Grid		0.18/5" x 0.510" Rectargle Grid	0.1875" x 0.610" Rectargle Grid	0.1875" x 0.610" Rectangle Grid	0.4075 U. 0.640 Display	0.16/3 × 0.010 Reciallyla Gild	0.1875" x 0.510" Rectangle Gnd Filled Grids No Grids

VT GRID >=1"		4	+	(0)	1,	Н	+	2	4	+	+	Н	0	m	+	Н	+			m	-	Н	_		10		Н-
VT GRID<1"	0.57			0.56	0.55			0.45	0.44	Ш		Ц	0.49	0.48				0.47	0.47	0.53	0.51		0.41	0.33	0.45	0.38	
VT NO GRID	0.63	1	0.59	0.63	0.62	2	0.58	0.50	0.50	0.46	0.37	Ц	0.55	0.54	0.50	9	0.43	0.53	0.53	\sqcup				Ц		_	0.43
SHGC GRID>=1"	4	+	+	6	ΔA	H	+	0	6	+	+	Н	9	36	+	Н	+	9	2	20	.45	Н	00	7	.24	7	Н
SHGC GRID<1"	0.54	1	1	0.49				0.19	0.19	11	_		0.26		1	Ц		0.26	0.25	0.5	0.4		0.18	0.17	0.2	0.22	Ц.
SHGC NO GRID	0.60	1	0.56	0.55	0.54	5	0.50	0.21	0.21	0.20	0.19		0.29	0.29	0.27	100	0.25	0.28	0.28	Ш			1		11	1	0.25
	43	+	25	45	45		22	22	54	62	65	Н	24	54	61	1	69	43	45	52	55	Н	62	65	61	65	65
ondensation Resistance			36.5				0.33 5		0.28 5	26 6	0.22 6		0.29 5	0.29 5	26 6		22 6	0.24 4	0.24	0.36	0.33 5		0.26	0.22 6	26 6	0.23	23 6
U-factor	5 0.45	+	0	5 0.43	75 0 43		0	75 0.28		0	0	H	0.75 0.3	0.75 0.3	0		0	0.75 0.3	0.75 0.3	0.75 0.3	0.75 0.3		0.75 0.3		0.75 0.3	0.75 0.3	Ö
Grid Size	3 0.75	4	+	3 0.75	0.75			3 0.75	3 0.75	$^{++}$	+				+	Н	+	G 0.7		$\overline{}$				0.75	+		Н
Grid Type	N,G		z	D'N C	2		Z	N,G	N,G	Z	Z	Н	D, G	D'N Q	Z		z	z	D, N	9	0		0	9 Q	9	0	Z
Spacer	CU-D		G-D	CU-D	-	_	G-D	G-D	CU-D	CU-D	CU-D		G-NO	CN-D	CU-D		G-D2	CN-D	CN-D	CU-D	CO-D		CN-D	CN-D	G-NO	CU-D	CO-D
Tint	C		딩	디	ī	3	CL	디	CL	CL	ū		CL	J	r Z	i	J	ö	C	겅	J		딩	C	리	CL	ij
Emissivity Surface 6	Ц	4	1	Н	1			Н	\sqcup	44	1	Н	4	Н	+	Ц.		1	Н	H	\perp	Ц			+	10	100
Emissivity Surface 5								Ш		Ц	0.020			Ш			0.035			Ш				0.020	Ц	0.035	0.035
Emissivity Surface 4																		0.149	0.149								
Emissivity Surface 3	П			П	T			I					10		1	П	10	Lic	lic.	11					10	10	1
Emissivity Surface 2								0.020	0.020	0.020	0 00 0	0.02	0.035	0.035	0.035		0.035	0.035	0.035				0.020	0.020	0.035	0.035	0.035
Emissivity Surface 1				0.149	0,440	0. 148	0.149	П	П												0.149						
% of Gap Fill 2	Т		1	T			2	\sqcap		2	r	,		П	2		2	П		П	r2		ည	2	2	r.	
% of Gap Fill 1				2	-	n	2	2	2	5	u		2	2	5	\perp	2	2	2	П	5	_	2	c)	5	r.	
Gap Fill 2	П		AIR				ARG			ARG	000	2		П	ARG		ARG			AIR	ARG		ARG	ARG	ARG	ARG	ABG
Gap Fill 1	AIR		AIR	ARG	0	AKG	ARG	ARG	ARG	ARG	Cav		ARG	ARG	ARG		ARG	ARG	ARG	AIR	ARG		ARG	ARG	ARG	ARG	0
Gap 2	T		0.290		П		0.290	П	П	0.290	0000	0.230			0 290		0.290			0.290	0.290		0.290	0.290	0.290	0 200	0000
Gap 1	0.639		0.290	0.678	П	0.639	0.290	0.678	0.639	0.290	000	0.230	0.678	0.639	0 200		0.290	0.678	0.639	0.290	0.290		0.290	0.290	0.290	0 200	0000 0000 0000 ABG
Pane Thickness #3	Ť		0.087		П		0.087	Ħ		0.087	100	780.0	П		0.087	000	0.087	П		0.087	0.087		0.087	0.087	0.087	7800	000
Pane Thickness #2	0.118		0.087	0.087	П	0.118	0.087	0.087	0.118	0.087	100	0.087	0.087	0.118	790.0		0.087	0.087	0.117	0.087	0.087		0.087	0.087	0.087	7000	100
Pane Thickness #1	0.118		0.087 0	087 0		0.117 0	0.087	0.087	0.118	0.087	100	0.08/ 0	0.087	0.118	7000	700.	0.087	0 280.	0.118	0.087	0.087		0.087	0.087	0.087		
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	200	ā	ear	g	9	33	စ္တ	366	366	366	3	366	270	270		2/0	270	270	270	ear	0	200	366	366	270		77
Pane ID #1	2 mm Close	5	2 mm Clear	ogi mm c		3 mm i89	2 mm i89	Loe	2	1 10			Loe	J. C.			Loe	LoE	Loe	2 mm Clear	1	Z mm 189	100	n Loe	90		
	6	0	2 m	0	4	3.	2	2 mm LoE 366	3 mm LoE 366	2 mm 1 oF 366		2 mm LoE 366	2 mm LoE 270	3 mm l oF 270		2 mm LoE 2/0	2 mm LoE 270	2 mm LoE 270	3 mm LoE 270	2 m	1	7	2 mm LoE 366	2 mm LoE 366	2 mm l oF 270		2 mm LoE 2/0 2 mm Clear
Product Number	70	#	25	36	2	27	28	29	30		\rightarrow	32	33	34		32	38	37	38	39	1	40	14	42			44
		T				I														rid		prid	in in	irid	ric	2	E
	de la	Sprids	rids	Cride	Spilds	oGrids .	rids	oGrids	OGrids	pio	S	rids	oGrids	Gride		uds	rids	oGrids	o Grids	Rectangle G		Rectangle C	Rectangle G	Rectangle G	Poortangle G	o Binon	Rectangle C
PRODUCT	JA Jakin Chail	Foam Filled, Grids/ Nourids	Foam Filled, No Grids	Spiral Order Notice	lled, Grids/ IV	Foam Filled, Grids/ NoGrids	Foam Filled, No Grids	Foam Filled, Grids/ NoGrids	Foam Filled. Grids/ No Grids	Coom Filled No Gride	I Lilled, NO.	Foam Filled, No Grds	Foam Filled, Grids/ No Grids	Foom Filled Gride/ No Gride	and being	Foam Filled, No Grds	Foam Filled, No Grids	Foam Filled, Grids/ No Grids	Foam Filled, Grids/ No Grids	Foam Filled 0 1875" x 0 610" Rectangle Grid		Foam Filled, 0.1875" x 0.610" Rectangle Grid	Foam Filled, 0.1875" x 0.610" Rectangle Grid	Foam Filled, 0.1875" x 0.610" Rectangle Grid	Foam Filled 0.1875" v 0.840" Pentanole Grid	2000	Foam Filled, 0.1875" x 0.610" Rectangle Grid
		roam ri	Foar	Loom Ci	LOBILI L	Foam Fi	Foan	Foam Fi	Foam Fi	2003	L Ca	Foan	Foam Fi	Foom Ei		Foan	Foan	Foam Fi	Foam Fi	Filled 0.18		Filled, 0.1	Filled, 0.18	Filled, 0.18	Eillod 0 48	0,0	Filled, 0.1

Appendix A

Revision Summary

Identification

<u>Date</u>

Revision

Original Issue

08/26/20

Report to ClimateGuard Manufacturing and Inspection Agency