SUZHOU TRYBA BUILDING MATERIALS TECHNOLOGY CO.,LTD

COMPUTER SIMULATION REPORT

SCOPE OF WORK
TILT AND TURN WINDOW - NFRC 100/200/500

REPORT NUMBER
P8762.01-116-45 R2

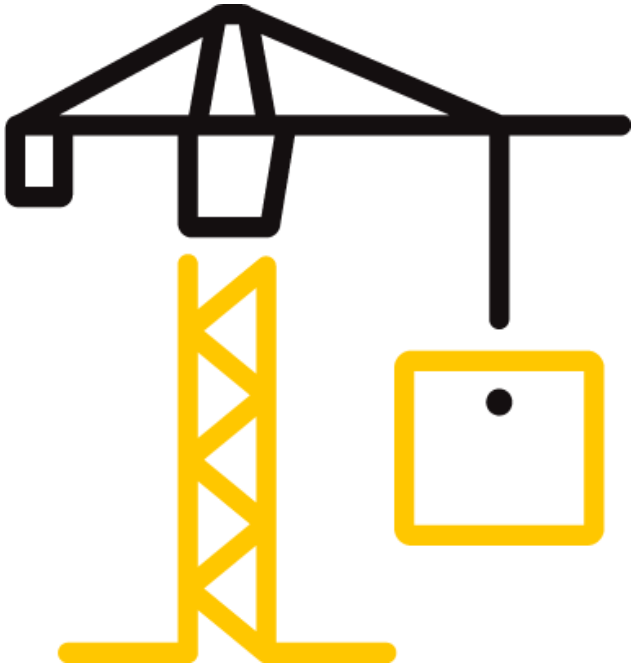
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TEST REPORT FOR SUZHOU TRYBA BUILDING MATERIALS TECHNOLOGY CO., LTD
Report No: P8762.01-116-45 R2
Date: 05/17/23

REPORT ISSUED TO

SUZHOU TRYBA BUILDING MATERIALS TECHNOLOGY CO., LTD
Room 3600-3606, 3608, Building 1
Golden River Building, No. 35
Shishan Road, Suzhou, China

SECTION 1

SUMMARY

SERIES/MODEL: Tilt and Turn Window

Architectural Testing, Inc. (an Intertek company) dba Intertek Building & Construction (B&C) was contracted to perform U-Factor, Solar Heat Gain Coefficient, Visible Transmittance and Condensation Resistance simulations in accordance with the National Fenestration Rating Council (NFRC).

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. Intertek B&C will service this report for the entire test record retention period. The test record retention period ends five years after the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained for the entire test record retention period.

FOR INTERTEK B&C:

COMPLETED BY:	Dale C. White	**REVIEWED BY:**	Eric S. Leitner
TITLE:	Simulation Technician, NFRC Certified Simulator	**TITLE:**	Manager - Simulations and Thermal Testing, SIRC
SIGNATURE:	Digitally Signed by: Dale C. White	**SIGNATURE:**	Digitally Signed by: Eric S. Leitner
DATE:	05/17/23	**DATE:**	05/17/23

DCW:dcw

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SECTION 2
TEST METHODS

The products were evaluated in accordance with the following:

ANSI/NFRC 100-2020, *Procedure for Determining Fenestration Product U-Factors*

ANSI/NFRC 200-2020, *Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence*

NFRC 500-2017, *Procedure for Determining Fenestration Product Condensation Resistance Values*

**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 Certificate of Authorization (CA) by an NFRC accredited Inspection Agency (IA) are to be used for labeling purposes. The ratings values were rounded in accordance with NFRC 601, NFRC Unit and Measurement Policy.

Intertek B&C is an NFRC accredited simulation laboratory and all simulations were conducted in full compliance with NFRC approved procedures and specifications. The values included in this report are not considered in compliance with ANSI/NFRC 100, ANSI/NFRC 200, and/or NFRC 500 unless the associated validation test requirements have been satisfied, as applicable.

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SECTION 3
TEST PROCEDURE

The total product, including specific frame, spacer, and glass details, was modeled using NFRC approved software.

FRAME AND EDGE MODELING	THERM 7.4.4
CENTER-OF-GLASS MODELING	WINDOW 7.4.14
TOTAL PRODUCT CALCULATIONS	WINDOW 7.4.14
SPECTRAL DATA LIBRARY	IGDB 91.0

Modeling Assumptions / Technical Interpretations

Any modeling assumptions and technical interpretations required to model this product are listed below.

1) To prevent air infiltration, tape was applied to all interior sash crack locations.
2) Grids did not require modeling per the NFRC 3mm rule.

SECTION 4
SIMULATION SPECIMEN DESCRIPTION

SERIES/MODEL	Tilt and Turn Window
PRODUCT TYPE	Dual Action (Tilt Turn)
FRAME MATERIAL	VR - Vinyl w/ Reinforcement
SASH MATERIAL	VR - Vinyl w/ Reinforcement
STANDARD SIZE	1200mm x 1500mm

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SECTION 4 (Continued)
SIMULATION SPECIMEN DESCRIPTION

SPACER OPTIONS			
TYPE	***PRIMARY SEAL***	***SECONDARY SEAL***	***CODE***
Aluminum Spacer	Butyl Rubber	Silicone	A1-D
Technoform TGI-M Spacer	PIB	Silicone	TS-D

GRID OPTIONS		
GRID SIZE	***GRID TYPE***	***GRID PATTERN***
11mm x 18mm	Aluminum Rectangular Grid (Painted)	NFRC Standard

REINFORCEMENT OPTIONS	
LOCATION	***MATERIAL***
All frame and sash members	Galv. Steel

GAS FILLING TECHNIQUE	
FILL TYPE	***METHOD***
90% Argon	Single or dual probe

EDGE-OF-GLASS CONSTRUCTION	
INTERIOR CONDITION	PVC glazing bead with EPDM fins
EXTERIOR CONDITION	PVC leg with EPDM gasket

WEATHERSTRIPPING		
TYPE	***QUANTITY***	***LOCATION***
EPDM Gasket	2	Frame Exterior/Center Perimeter
EPDM Gasket	1	Sash Interior Perimeter

FRAME/SASH MATERIALS FINISH	
INTERIOR	Vinyl (Renolit Film)
EXTERIOR	Vinyl (Renolit Film)

VALIDATION MATRIX*	
PRODUCT LINE	***REPORT NUMBER***
None	-

**These products are part of a validation matrix. Only one is required for validation testing.*

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SECTION 5
SPECIALTY PRODUCTS TABLE

The specialty products method allows 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 7.4.14. The method calculates overall product SHGC and VT indexed on center of glass properties. All values used in the calculations are truncated to six decimal place precision.

	No Dividers	Dividers < 1	Dividers > 1
SHGC0	0.004992	0.007522	0.009894
SHGC1	0.664942	0.589974	0.519686
VT0	0.000000	0.000000	0.000000
VT1	0.659951	0.582452	0.509792

$$SHGC = SHGC0 + SHGCc\ (SHGC1 - SHGC0)$$

$$VT = VT0 + VTc\ (VT1 - VT0)$$

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SECTION 6
SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (Tilt and Turn Window)

Option Number	Pane Thickness 1 (in)	Gap Width 1 (in)	Pane Thickness 2 (in)	Gap Width 2 (in)	Pane Thickness 3 (in)	Gap Width 3 (in)	Pane Thickness 4 (in)	Gap Fill	Low-e (Surface #)	Tint	Spacer	Grid Type
	U-Factor (Btu/Hr-Ft2-F)			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)					Visible Transmittance (VT) Grids (None / <1 / >=1)		Condensation Resistance (CR)	
1	Clear/Air/Clear/Air/Clear (5mm/5mm/5mm) 1.77" IG											
	0.191	0.594	0.191	0.594	0.191			AIR		CL	A1-D	N,G
	U-Factor		**0.29**	**SHGC(N/<1)**			**0.46 / 0.41**		**VT(N/<1)**	**0.49 / 0.43**	**CR**	**58**
2	Clear/Air/Clear/Air/Light Gray (5mm/5mm/5mm) 1.77" IG											
	0.191	0.594	0.191	0.594	0.191			AIR		GY	A1-D	N
	U-Factor		**0.29**	**SHGC(N)**			**0.44**		**VT(N)**	**0.37**	**CR**	**58**
3	CEV11-55T/Air/Clear/Air/Clear (5mm/5mm/5mm) 1.77" IG											
	0.195	0.594	0.191	0.594	0.191			AIR	0.050(#2)	CL	A1-D	N
	U-Factor		**0.24**	**SHGC(N)**			**0.18**		**VT(N)**	**0.28**	**CR**	**63**
4	CEV11-55T/Arg90/Clear/Arg90/Clear (5mm/5mm/5mm) 1.77" IG											
	0.195	0.594	0.191	0.594	0.191			ARG90	0.050(#2)	CL	A1-D	N
	U-Factor		**0.22**	**SHGC(N)**			**0.17**		**VT(N)**	**0.28**	**CR**	**65**
5	CEV11-55T/Arg90/Clear/Arg90/Clear (5mm/5mm/5mm) 1.77" IG											
	0.195	0.594	0.191	0.594	0.191			ARG90	0.050(#2)	CL	TS-D	N
	U-Factor		**0.21**	**SHGC(N)**			**0.17**		**VT(N)**	**0.28**	**CR**	**71**
6	CEF13-69/Arg90/CEF13-69/Arg90/Clear (6mm/6mm/6mm) 1.65" IG											
	0.235	0.472	0.235	0.472	0.231			ARG90	0.084(#2) / 0.084(#4)	CL	TS-D	N
	U-Factor		**0.18**	**SHGC(N)**			**0.21**		**VT(N)**	**0.29**	**CR**	**74**
7	CEF13-69/Arg90/Clear/Arg90/Gray (6mm/6mm/6mm) 1.65" IG											
	0.235	0.472	0.235	0.472	0.233			ARG90	0.084(#2) / 0.084(#4)	GY	TS-D	N
	U-Factor		**0.18**	**SHGC(N)**			**0.21**		**VT(N)**	**0.14**	**CR**	**74**
8	CEF13-69/Air/Clear/Air/Gray (6mm/6mm/6mm) 1.65" IG											
	0.235	0.472	0.231	0.472	0.233			AIR	0.084(#2)	GY	A1-D	N
	U-Factor		**0.24**	**SHGC(N)**			**0.26**		**VT(N)**	**0.18**	**CR**	**62**
9	CES11-80T/Air/Low Iron Clear/Air/Low Iron Clear (6mm/6mm/6mm) 1.65" IG											
	0.230	0.472	0.239	0.472	0.239			AIR	0.125(#2)	CL	A1-D	N
	U-Factor		**0.25**	**SHGC(N)**			**0.37**		**VT(N)**	**0.46**	**CR**	**61**
10	Clear/Air/Clear/Air/Clear (6mm/6mm/6mm) 1.65" IG											
	0.231	0.472	0.231	0.472	0.231			AIR		CL	A1-D	N
	U-Factor		**0.30**	**SHGC(N)**			**0.45**		**VT(N)**	**0.49**	**CR**	**56**

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SECTION 6 (Continued)
SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (Tilt and Turn Window)

Option Number	Pane Thickness 1 (in)	Gap Width 1 (in)	Pane Thickness 2 (in)	Gap Width 2 (in)	Pane Thickness 3 (in)	Gap Width 3 (in)	Pane Thickness 4 (in)	Gap Fill	Low-e (Surface #)	Tint	Spacer	Grid Type
	U-Factor (Btu/Hr-Ft2-F)			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)					Visible Transmittance (VT) Grids (None / <1 / >=1)		Condensation Resistance (CR)	
11	CEF13-69/Air/Clear/Air/Clear (6mm/6mm/6mm) 1.65" IG											
	0.235	0.472	0.231	0.472	0.231			AIR	0.084(#2)	CL	A1-D	N
	U-Factor		**0.24**	**SHGC(N)**			**0.27**		**VT(N)**	**0.37**	**CR**	**62**
12	CEF13-69/Arg90/Clear/Arg90/Clear (6mm/6mm/6mm) 1.65" IG											
	0.235	0.472	0.231	0.472	0.231			ARG90	0.084(#2)	CL	A1-D	N
	U-Factor		**0.22**	**SHGC(N)**			**0.27**		**VT(N)**	**0.37**	**CR**	**64**
13	CEF13-69/Arg90/Clear/Arg90/Clear (6mm/6mm/6mm) 1.65" IG											
	0.235	0.472	0.231	0.472	0.231			ARG90	0.084(#2)	CL	TS-D	N
	U-Factor		**0.21**	**SHGC(N)**			**0.27**		**VT(N)**	**0.37**	**CR**	**68**
14	CEN12-40/Air/Clear/Air/Clear (6mm/6mm/6mm) 1.65" IG											
	0.236	0.472	0.231	0.472	0.231			AIR	0.063(#2)	CL	A1-D	N
	U-Factor		**0.24**	**SHGC(N)**			**0.17**		**VT(N)**	**0.25**	**CR**	**62**
15	Clear/Air/Clear/Air/Clear (8mm/8mm/8mm) 1.89" IG											
	0.311	0.472	0.311	0.472	0.311			AIR		CL	A1-D	N
	U-Factor		**0.29**	**SHGC(N)**			**0.42**		**VT(N)**	**0.47**	**CR**	**56**
16	SJ65S-1/Arg90/SJ65S-1/Arg90/Clear (8mm/8mm/8mm) 1.89" IG											
	0.310	0.472	0.310	0.472	0.311			ARG90	0.026(#2) / 0.026(#4)	CL	TS-D	N
	U-Factor		**0.17**	**SHGC(N)**			**0.14**		**VT(N)**	**0.27**	**CR**	**75**
17	Clear Lami/Air/Clear Lami (6mm|114PVB|6mm/6mm|114PVB|6mm) 1.63" IG											
	0.506	0.594	0.506					AIR		CL	A1-D	N
	U-Factor		**0.38**	**SHGC(N)**			**0.43**		**VT(N)**	**0.51**	**CR**	**46**
18	CEF13-69 Lami/Air/Clear Lami (6mm|114PVB|6mm/6mm|114PVB|6mm) 1.63" IG											
	0.511	0.594	0.506					AIR	0.084(#2)	CL	A1-D	N
	U-Factor		**0.29**	**SHGC(N)**			**0.27**		**VT(N)**	**0.39**	**CR**	**54**
19	Clear Lami/Air/Clear Lami (6mm|114PVB|6mm/10mm) 1.63" IG											
	0.506	0.594	0.390					AIR		CL	A1-D	N
	U-Factor		**0.39**	**SHGC(N)**			**0.43**		**VT(N)**	**0.51**	**CR**	**45**

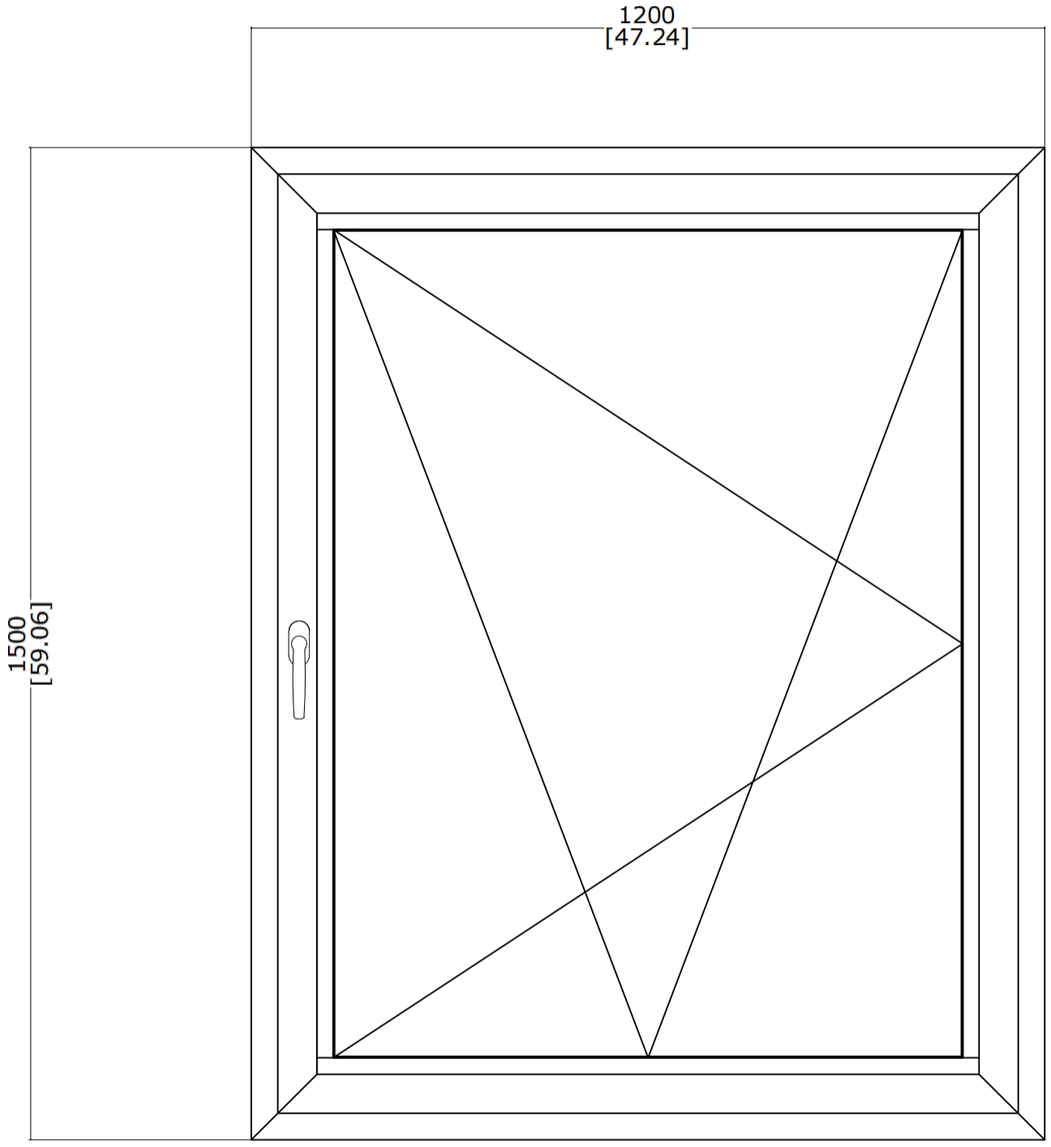
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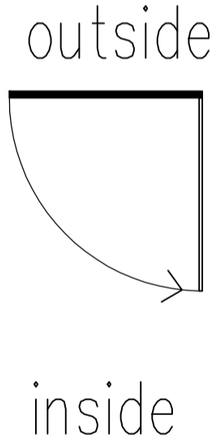
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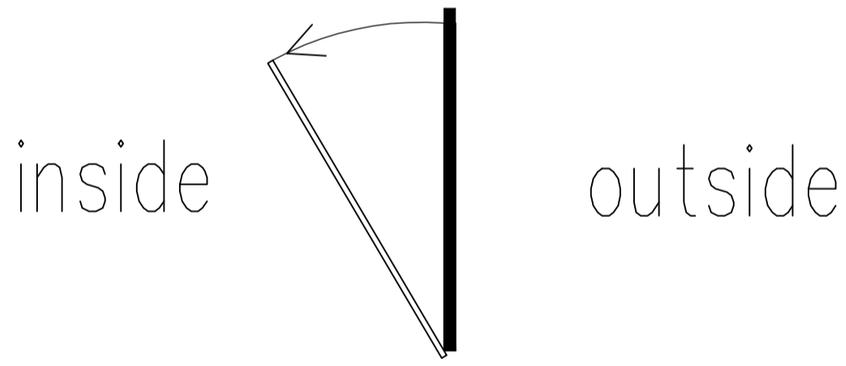
SECTION 7
DRAWINGS / BILL OF MATERIALS

The drawings which follow have been reviewed by Intertek B&C and are representative of the simulation results reported herein. Any deviations are documented herein or on the drawings.

Product Name: Tilt and turn window







Report #:	P8762-116-45
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SECTION 8
REVISION LOG

REVISION #	DATE	PAGES	REVISION
.01 R0	05/17/23	N/A	Original report issue.
.01 R1	05/20/23	N/A	Revised to correct series/model, company name, amd drawings callouts.
.01 R2	05/31/23	N/A	Revised to correct drawing package.
.02 R0	02/07/25	N/A	Updated Company Name and Address