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INOVUES, LLC
THERMAL PERFORMANCE TEST REPORT

SCOPE OF WORK
BASE UNIT

REPORT NUMBER
I6637.01-116-46 R0

TEST DATE
07/14/18

ISSUE DATE
07/26/18

RECORD RETENTION END DATE
07/14/23

PAGES
12

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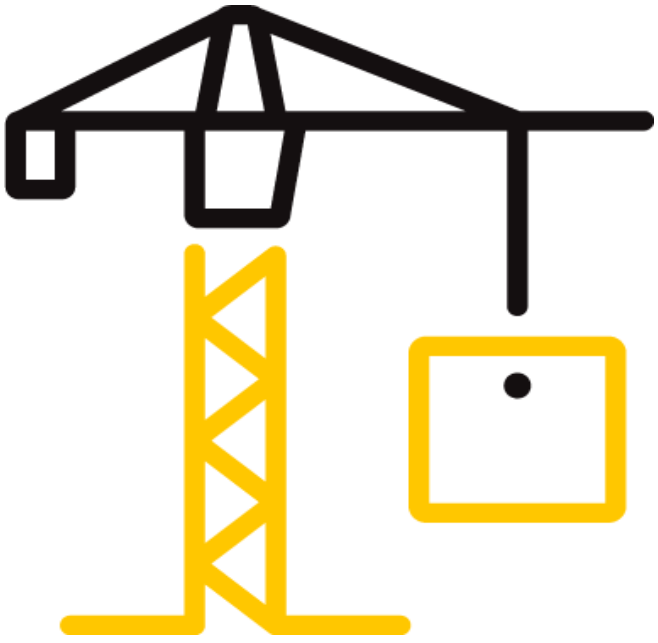

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TEST REPORT FOR INOVUES, LLC
Report No.: I6637.01-116-46 R0
Date: 07/26/18

REPORT ISSUED TO

INOVUES, LLC
2323 McCue Road
Houston, Texas 77056

SECTION 1

SCOPE

SERIES/MODEL: CW (Base Unit)
TYPE: Fixed

Intertek Building & Construction (Intertek B&C) was contracted by INOVUES, LLC to evaluate the thermal performance per AAMA 1503-09. The purpose of this testing was to evaluate the Condensation Resisance and Thermal Transmittance. Results obtained are tested values and were secured by using the designated test method. Testing was conducted at Intertek B&C test facility in York, Pennsylvania. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

SECTION 2

SUMMARY OF TEST RESULTS

Condensation Resistance Factor - Frame (CRFf):	75
Condensation Resistance Factor - Glass (CRFg):	26
Thermal Transmittance (U):	1.07 Btu/hr·ft^2·F

For INTERTEK B&C:

COMPLETED BY	Ryan P. Moser	**REVIEWED BY**	Shon W. Einsig
TITLE	Senior Technician	**TITLE**	Technician Team Leader, IIRC
SIGNATURE	Ryan P. Moser Digitally Signed by: Ryan P. Moser	**SIGNATURE**	Shon W. Einsig Digitally Signed by: Shon W. Einsig
DATE	07/26/18	**DATE**	07/26/18

RPM:pan

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SECTION 3
TEST SPECIMEN SUMMARY

SERIES/MODEL	CW (Base Unit)
TYPE	Fixed
OVERALL SIZE	53" x 77"
TEST SAMPLE SUBMITTED BY	Client

SECTION 4
TEST METHOD

The specimens were evaluated in accordance with the following:

> **AAMA 1503-09**, *Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections*

SECTION 5
MATERIAL SOURCE/INSTALLATION

The test specimen was provided by the client. Representative samples of the test specimen will be retained by Intertek B&C for a minimum of five years from the test completion date.

Test Chamber Installation

The test sample was installed in a vertical orientation, the exterior of the specimen was exposed to the cold side.

SECTION 6
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Joel T. Chronister	Intertek B&C
Ryan P. Moser	Intertek B&C
Shon W. Einsig	Intertek B&C

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SECTION 7
TEST SAMPLE DESCRIPTION

Frame

MATERIAL	AT (0.72"): Aluminum with Thermal Breaks - All Members		
SIZE	53" x 77"		
DAYLIGHT OPENING	48" x 72"	**GLAZING METHOD**	Exterior
EXTERIOR COLOR	Clear	**EXTERIOR FINISH**	Anodized
INTERIOR COLOR	Clear	**INTERIOR FINISH**	Anodized
CORNER JOINERY	Square Cut / Screws / Sealed		

Glazing Information

LAYER 1	1/4"	Tinted Glass
GAS FILL METHOD		N/A*
DESICCANT		No

**Stated per Client/Manufacturer*
N/A Non-Applicable

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SECTION 7 (CONTINUED)

TEST SAMPLE DESCRIPTION (CONTINUED)

Weatherstripping

DESCRIPTION	QUANTITY	LOCATION
EPDM gasket	1 row	Interior and exterior glazing perimeter
EPDM thermal isolator	1 row	Frame at pressure plate center

Hardware

DESCRIPTION	QUANTITY	LOCATION
Aluminum pressure plate	4	Exterior frame perimeter
Aluminum face cover	4	Exterior frame perimeter
Aluminum adaptor	1 row	Interior glazing perimeter

Drainage

DRAINAGE METHOD	SIZE	QUANTITY	LOCATION
Diameter weephole	0.31"	2	Exterior sill face cover

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SECTION 8
CONDENSATION RESISTANCE FACTOR

1.	Average Metering Room Air Temperature (th)	69.79	F
2.	Average Cold Side Air Temperature (tc)	-0.38	F
3.	Average of 14 Pre-Specified Frame Temperatures (FTp)	52.66	F
4.	Average of 4 Roving Thermocouples (FTr)	43.98	F
5.	Weighting Factor (W)	0.081	
6.	Weighted Frame Temperature (FT)	51.96	F
7.	Average Glass Temperature (GT)	17.95	F
8.	Condensation Resistance Factor – Frame (CRFf)	75	
9.	Condensation Resistance Factor – Glass (CRFg)	26	

The CRF number was determined to be 26 (on the size as reported). When reviewing this test data, it should be noted that the glass temperature (GT) was colder than the frame temperature (FT) therefore controlling the CRF number. Refer to the 'CRF Report' page and the 'Thermocouple Location Diagram' page of this report.

SECTION 9
THERMAL TRANSMITTANCE

1.	Average Metering Room Air Temperature (th)	69.79	F
2.	Average Cold Side Air Temperature (tc)	-0.38	F
3.	Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"	H_2O
4.	Test Specimen Projected Area (As)	28.34	ft^2
5.	Total Measured Input into Metering Box (Qtotal)	2303.92	Btu/hr
6.	Total Correction	181.90	Btu/hr
7.	Net Specimen Heat Loss (Qs)	2122.02	Btu/hr
8.	Thermal Transmittance (U)	1.07	$Btu/hr \cdot ft^2 \cdot F$

SECTION 10
TEST DURATION

1. The environmental systems were started at 13:59 hours, 07/13/18.
2. The test parameters were considered stable for two consecutive four hour test periods from 23:55 hours, 07/13/18 to 07:55 hours, 07/14/18.
3. The thermal performance test results were derived from 03:55 hours, 07/14/18 to 07:55 hours, 07/14/18.

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SECTION 11
TEMPERATURE AND CONDENSATION RESISTANCE CALCULATION

Time	05:55	06:25	06:55	07:25	07:55	**Average**
Pre-Specified Thermocouples - Frame						
1	46.70	46.66	46.70	46.67	46.72	46.69
2	47.08	47.05	47.04	47.05	47.04	47.05
3	47.84	47.81	47.83	47.86	47.85	47.84
4	57.21	57.21	57.20	57.23	57.26	57.22
5	55.79	55.80	55.81	55.82	55.79	55.80
6	54.99	55.01	55.00	55.00	55.02	55.00
7	58.17	58.14	58.17	58.16	58.20	58.17
8	55.79	55.81	55.79	55.80	55.81	55.80
9	55.48	55.46	55.45	55.45	55.49	55.47
10	54.10	54.09	54.12	54.13	54.11	54.11
11	52.73	52.72	52.71	52.72	52.72	52.72
12	52.38	52.38	52.39	52.40	52.38	52.39
13	49.47	49.45	49.45	49.47	49.48	49.47
14	49.49	49.50	49.51	49.51	49.48	49.50
FTp	52.66	52.65	52.65	52.66	52.67	52.66
Pre-Specified Thermocouples - Glass						
15	16.68	16.70	16.75	16.72	16.71	16.71
16	17.91	17.93	17.95	17.93	17.95	17.94
17	17.21	17.12	17.23	17.27	17.24	17.22
18	18.43	18.37	18.40	18.44	18.39	18.41
19	17.32	17.43	17.31	17.32	17.45	17.36
20	20.03	20.07	20.05	20.07	20.06	20.06
GT	17.93	17.94	17.95	17.96	17.96	17.95
Cold Point (Roving) Thermocouples						
21	43.40	43.40	43.40	43.40	43.40	43.40
22	43.80	43.80	43.80	43.80	43.80	43.80
23	44.10	44.10	44.10	44.10	44.10	44.10
24	44.60	44.60	44.60	44.60	44.60	44.60
FTr	43.98	43.98	43.98	43.98	43.98	43.98
W	0.081	0.081	0.081	0.081	0.081	0.081
FT	51.96	51.95	51.95	51.96	51.97	51.96
Warm Side - Room Ambient Air Temperature						
	69.78	69.77	69.81	69.80	69.81	69.79
Cold Side - Room Ambient Air Temperature						
	-0.46	-0.33	-0.35	-0.37	-0.36	-0.37
Condensation Resistance Factor						
CRFf	75	75	75	75	75	75
CRFg	26	26	26	26	26	26

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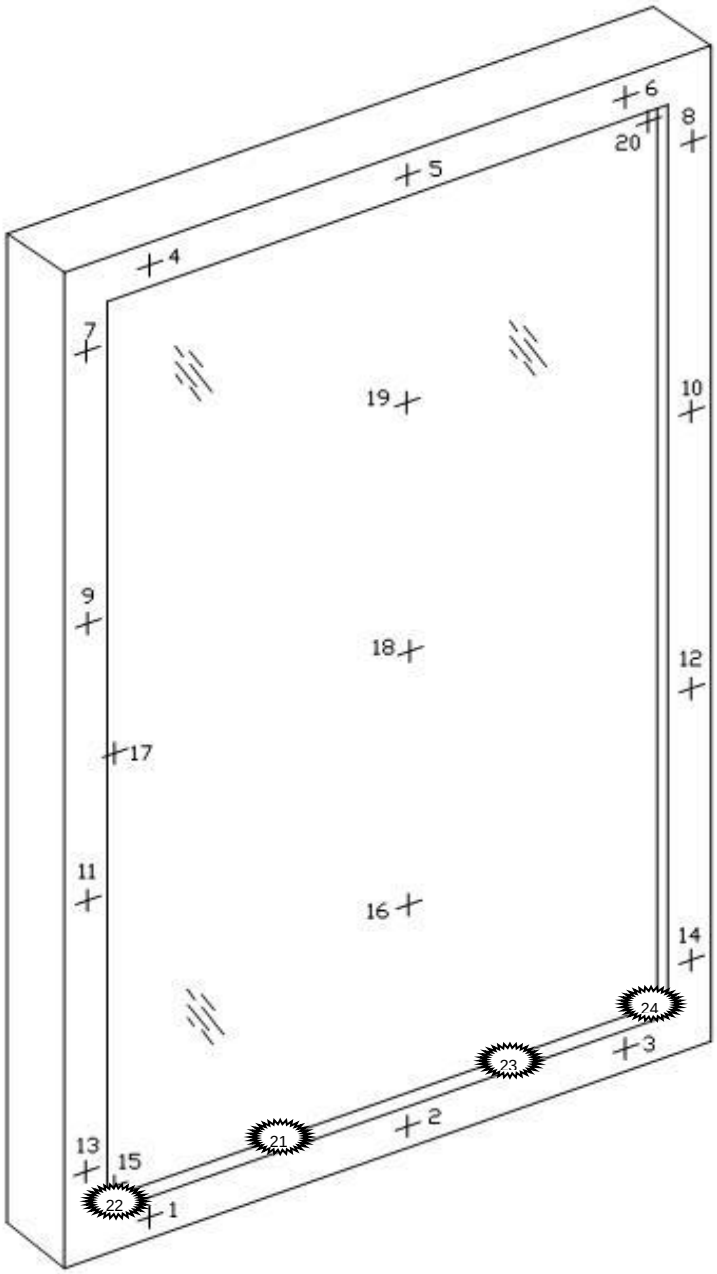
SECTION 12
THERMOCOUPLE LOCATION DIAGRAM



COLD POINT LOCATIONS	
21	43.40
22	43.80
23	44.10
24	44.60

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SECTION 13
GLAZING DEFLECTION

	FRAME
EDGE GAP WIDTH	N/A
ESTIMATED CENTER GAP WIDTH upon receipt of specimen in laboratory (after stabilization)	N/A
CENTER GAP WIDTH at laboratory ambient conditions on day of testing	N/A
CENTER GAP WIDTH at test conditions	N/A

Glass collapse determined using a digital glass and air space meter

The sample was inspected for the formation of frost or condensation, which may influence the surface temperature measurements. The sample showed no evidence of condensation/frost at the conclusion of the test.

Required annual calibrations for the Intertek B&C, 'thermal test chamber' (ICN 000001) in York, Pennsylvania were last conducted in May 2018 in accordance with Intertek B&C calibration procedure. A CTS Calibration verification was performed March 2018. A Metering Box Wall Transducer and Surround Panel Flanking Loss Characterization was performed April 2018.

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 1.66%.

Prior to testing the specimen was sealed with silicone on the interior side and checked for air infiltration per Section 9.3.4.

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SECTION 14
DRAWINGS

Note: Dimensioned part drawings were unavailable at the time of testing; therefore, certain part details could not be confirmed by Intertek.

INOVUES
ADAPTIVE GLAZING SHIELDS

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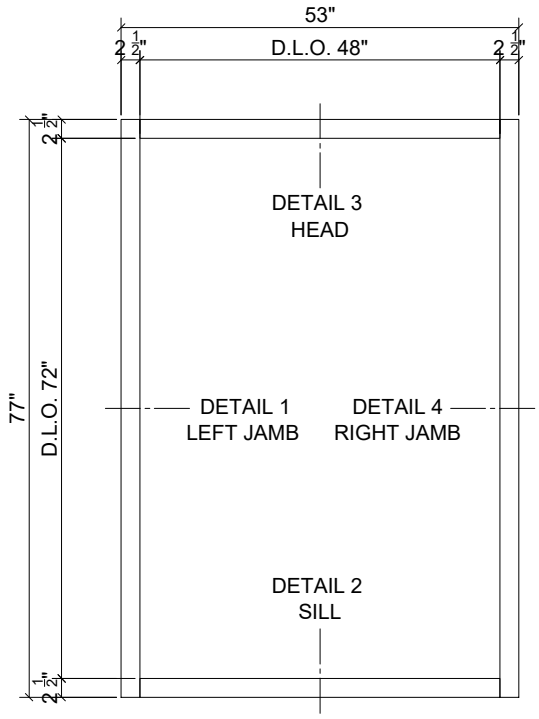

ELEVATION
SCALE - 1 : 1

ITEM	PART NO.	PART DESCRIPTION
CW1	GENERIC	MULLION/HORIZONTAL
CW2	GENERIC	SHEAR BLOCK
CW3	GENERIC	PERIMETER PRESSURE PLATE
CW4	GENERIC	ADAPTOR
CW5	GENERIC	COVER CAP
CW6	GENERIC	EPDM GASKET - GLASS
CW7	GENERIC	EPDM GASKET - P.P.
CW8		NEOPRENE SETTING BLOCK
CW9		#12-14 2" BOLT
CW10		5/16" WEEP HOLE
CW10	GL-2	1/4" TINTED ANNEALED GLASS
CW11		SILICONE SEALANT
CW12		#12-14 1" SCREW

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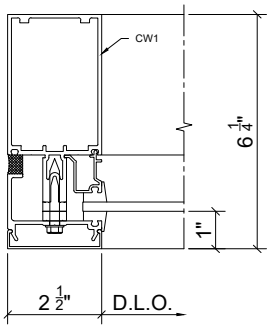
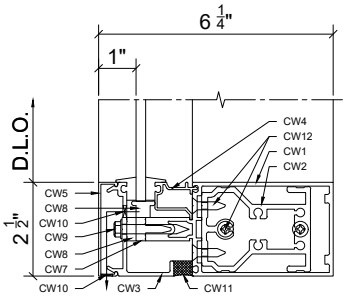
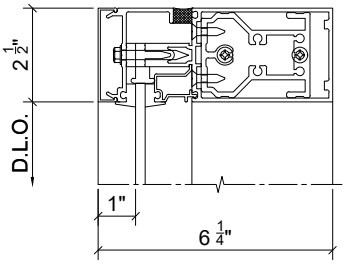
Report #: I6637.01-116-46
Date: 07/14/2018
Verified by: Ryan P. Moser



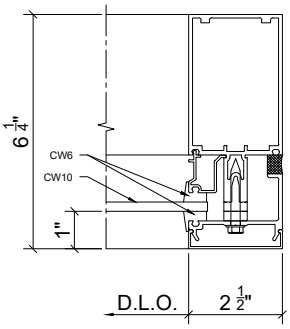
DETAIL 1
LEFT JAMB
SCALE - 5 : 1



DETAIL 2
SILL
SCALE - 5 : 1



DETAIL 3
HEAD
SCALE - 5 : 1



DETAIL 4
RIGHT JAMB
SCALE - 5 : 1

NOTES:

ALL DIMENSIONS ARE IN INCHES

DRAWN BY: AA	CHECKED BY: .	SCALE AS SHOWN	SCH. DWG. NO. INO-002-04002	MOCKUP 1_CW_GENERIC SINGLE-GLAZED STICK-BUILT CURTAINWALL
DATE: 2018-07-19	CUSTOMER/REF.NO. INTERTEK-ATI		REVISION R0	

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SECTION 15
REVISION LOG

REVISION #	DATE	PAGES	REVISION
.01 R0	07/26/18	N/A	Original Report Issue