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US WEATHERSEAL WINDOWS & DOORS CORP.

THERMAL PERFORMANCE TEST REPORT

SCOPE OF WORK
TILT TURN WINDOW

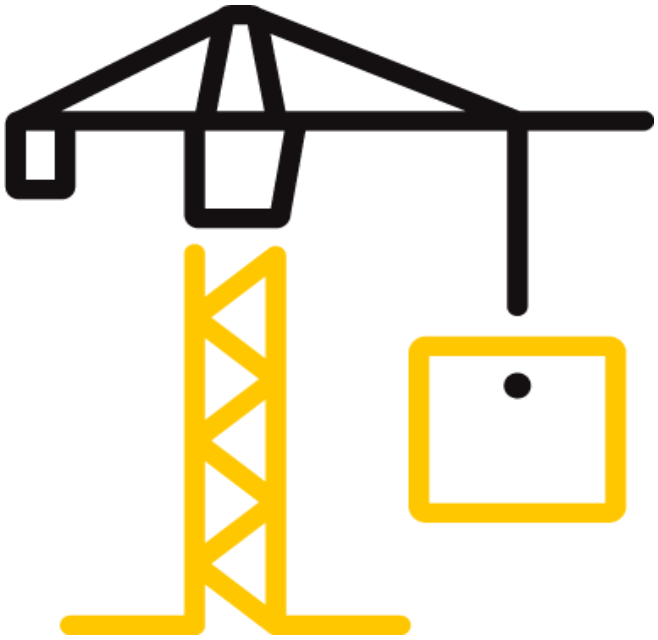
REPORT NUMBER
L2851.01-116-46 R0

TEST DATE
08/22/20

ISSUE DATE
12/10/20

PAGES
19

DOCUMENT CONTROL NUMBER
RTTDS-R-AMER-Test-2822(a) (07/01/20)



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TEST REPORT FOR US WEATHERSEAL WINDOWS & DOORS CORP.
Report No.: L2851.01-116-46 R0
Date: 12/10/20

REPORT ISSUED TO

US WEATHERSEAL WINDOWS & DOORS CORP.
4916 3rd Avenue
Brooklyn, New York 11220

SECTION 1

SCOPE

SERIES/MODEL: Tilt Turn Window
TYPE: Dual-Action

Intertek Building & Construction (Intertek B&C) was contracted by US Weatherseal Windows & Doors Corp. to evaluate the thermal performance per NFRC 102-2020. 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.

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, or other pertinent project documentation, will be retained for the entire test record retention period. Representative samples of the test specimen will be retained by Intertek B&C for a minimum of two and a half years from the submittal date to the Inspection Agency and no more than five years from the test date.

For INTERTEK B&C:

COMPLETED BY	Ryan P. Moser	**REVIEWED BY**	Shon W. Einsig
TITLE	Senior Technician	**TITLE**	Technician Team Leader, IIRC
SIGNATURE	Digitally Signed by: Ryan P. Moser	**SIGNATURE**	Digitally Signed by: Shon W. Einsig
DATE	12/10/20	**DATE**	12/10/20

RPM:pan

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SECTION 2
SUMMARY OF TEST RESULTS

Standardized U-factor (Ust): 0.30 Btu/hr·ft^2·F (CTS Method)

SECTION 3
TEST SPECIMEN SUMMARY

SERIES/MODEL	Tilt Turn Window
TYPE	Dual-Action
OVERALL SIZE	47-1/4" x 59-1/8" (1200 mm x 1502 mm) (Model Size)
NFRC STANDARD SIZE	47.2" x 59.1" (1200 mm wide x 1500 mm high)
TEST SAMPLE SUBMITTED BY	Client
TEST SAMPLE SUBMITTED FOR	Validation for Initial Certification (Production Line Unit) & Plant Qualification

SECTION 4
TEST METHOD

The specimens were evaluated in accordance with the following:

NFRC 102-2020, Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems

SECTION 5
MATERIAL SOURCE/INSTALLATION

The test specimen was provided by the client.

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
Shon W. Einsig	Intertek B&C
Ryan P. Moser	Intertek B&C

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SECTION 7
TEST SAMPLE DESCRIPTION

Frame

MATERIAL	AT (1.00"): Aluminum with Thermal Breaks - All Members		
SIZE	47-1/4" x 59-1/8" (Model Size)		
DAYLIGHT OPENING	N/A	**GLAZING METHOD**	N/A
EXTERIOR COLOR	Gray	**EXTERIOR FINISH**	Paint
INTERIOR COLOR	Gray	**INTERIOR FINISH**	Paint
CORNER JOINERY	Mitered / Keys & Stakes / Sealed		

Vent

MATERIAL	AT (1.00"): Aluminum with Thermal Breaks - All Members		
SIZE	44-5/8" x 56-3/8"		
DAYLIGHT OPENING	39-1/4" x 51"	**GLAZING METHOD**	Interior
EXTERIOR COLOR	Gray	**EXTERIOR FINISH**	Paint
INTERIOR COLOR	Gray	**INTERIOR FINISH**	Paint
CORNER JOINERY	Mitered / Keys & Stakes / Sealed		

Glazing Information

LAYER 1	3/16"	XETG0160 Low-E (e=0.114*, #2)	
GAP 1	0.50"	A1-D: Aluminum Spacer	90% Argon*
LAYER 2	3/16"	Clear	
GAP 2	0.50"	A1-D: Aluminum Spacer	90% Argon*
LAYER 3	3/16"	Clear	
GAS FILL METHOD	Single-Probe Method*		

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

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SECTION 7 (CONTINUED)

TEST SAMPLE DESCRIPTION (CONTINUED)

Weatherstripping

DESCRIPTION	QUANTITY	LOCATION
Flexible hollow bulb gasket	1 Row	Frame perimeter
Center gasket	1 Row	Frame perimeter
Single-fin flexible hollow bulb gasket	1 Row	Vent perimeter
Wedge gasket	1 Row	Interior glazing perimeter
Compression gasket	1 Row	Exterior glazing perimeter

Hardware

DESCRIPTION	QUANTITY	LOCATION
Multi-point lock assembly	1	Lock stile
Metal keeper	5	Three per lock jamb, one per head and sill
Dual action hinge	2	Head/top rail, sill/bottom rail
Single-arm hinge	1	Head/top rail, sill/bottom rail
Vinyl insert	4	Frame perimeter

Drainage

DRAINAGE METHOD	SIZE	QUANTITY	LOCATION
Weepslot with cover	1.00" x 0.31"	2	Sill face
Weepslot	0.88" x 0.25"	2	Bottom rail

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SECTION 8
THERMAL TRANSMITTANCE (U-FACTOR): MEASURED TEST DATA

Heat Flows

1.	Total Measured Input into Metering Box (Qtotal)	493.71	Btu/hr
2.	Surround Panel Heat Flow (Qsp)	52.01	Btu/hr
3.	Surround Panel Thickness	4.00	inches
4.	Surround Panel Conductance	0.0476	Btu/hr·ft^2·F
5.	Metering Box Wall Heat Flow (Qmb)	10.55	Btu/hr
6.	EMF vs Heat Flow Equation (equivalent information)	0.0124*EMF + -0.206	
7.	Flanking Loss Heat Flow (Qfl)	13.59	Btu/hr
8.	Net Specimen Heat Loss (Qs)	417.55	Btu/hr

Areas

1.	Test Specimen Projected Area (As)	19.40	ft^2
2.	Test Specimen Projected Frame Area (Af)	5.50	ft^2
3.	Test Specimen Projected Glazing Area (Ag)	13.90	ft^2
4.	Metering Box Opening Area (Amb)	36.11	ft^2
5.	Metering Box Baffle Area (Ab1)	33.94	ft^2
6.	Surround Panel Interior Exposed Area (Asp)	16.71	ft^2

Test Conditions

1.	Average Metering Room Air Temperature (th)	69.80	F
2.	Average Cold Side Air Temperature (tc)	-0.39	F
3.	Average Guard/Environmental Air Temperature	71.25	F
4.	Metering Room Average Relative Humidity	13.00	%
5.	Metering Room Maximum Relative Humidity	13.42	%
6.	Metering Room Minimum Relative Humidity	12.61	%
7.	Measured Cold Side Wind Velocity (Perpendicular Flow)	12.66	mph
8.	Measured Warm Side Wind Velocity (Parallel Flow)	NA	mph
9.	Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"	H_2O

Average Surface Temperatures

1.	Metering Room Surround Panel	66.19	F
2.	Cold Side Surround Panel	0.82	F

Results

1.	Thermal Transmittance of Test Specimen (Us)	0.31	Btu/hr·ft^2·F
2.	Standardized Thermal Transmittance of Test Specimen (Ust)	0.30	Btu/hr·ft^2·F

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SECTION 9
THERMAL TRANSMITTANCE (U-FACTOR): CALCULATED TEST DATA

CTS Method Results

1.	Warm Side Surface Emittance of CTS (e1)	0.84	
2.	Warm Side Area-Weighted Surface Emittance of Specimen Frame (ef1)	0.90	
3.	Warm Side Area-Weighted Surface Emittance of Specimen Glazing (eg1)	0.84	
4.	Warm Side Surface Emittance of Surround Panel (esp1)	0.90	
5.	Warm Side Area-Weighted Surface Emittance in View of the Baffle (es1)	0.88	
6.	Warm Side Baffle Emittance (eb1)	0.92	
7.	Cold Side Baffle Emittance (eb2)	N/A	
8.	Equivalent Warm Side Surface Temperature (t1)	54.13	F
9.	Equivalent Cold Side Surface Temperature (t2)	3.73	F
10.	Warm Side Baffle Surface Temperature	68.12	F
11.	Cold Side Baffle Surface Temperature	N/A	F
12.	Measured Warm Side Surface Conductance (hh)	1.37	$Btu/hr \cdot ft^2 \cdot F$
13.	Measured Cold Side Surface Conductance (hc)	5.23	$Btu/hr \cdot ft^2 \cdot F$
14.	Test Specimen Thermal Conductance (Cs)	0.43	$Btu/hr \cdot ft^2 \cdot F$
15.	Convection Coefficient (Kc)	0.34	$Btu/(hr \cdot ft^2 \cdot F^{1.25})$
16.	Radiative Test Specimen Heat Flow (Qr1)	214.14	Btu/hr
17.	Conductive Test Specimen Heat Flow (Qc1)	203.41	Btu/hr
18.	Radiative Heat Flux of Test Specimen (qr1)	11.04	$Btu/hr \cdot ft^2 \cdot F$
19.	Convective Heat Flux of Test Specimen (qc1)	10.48	$Btu/hr \cdot ft^2 \cdot F$
20.	Standardized Warm Side Surface Conductance (hsth)	1.25	$Btu/hr \cdot ft^2 \cdot F$
21.	Standardized Cold Side Surface Conductance (hstc)	5.28	$Btu/hr \cdot ft^2 \cdot F$
22.	Standardized Thermal Transmittance (Ust)	0.30	$Btu/hr \cdot ft^2 \cdot F$

SECTION 10
TEST DURATION

1. The environmental systems were started at 07:10 hours, 08/21/20.
2. The test parameters were considered stable for two consecutive four hour test periods from 03:53 hours, 08/22/20 to 11:53 hours, 08/22/20.
3. The thermal performance test results were derived from 07:53 hours, 08/22/20 to 11:53 hours, 08/22/20.

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SECTION 11
GLAZING DEFLECTION

	VENT EXT. / INT.
EDGE GAP WIDTH	0.50" / 0.50"
ESTIMATED CENTER GAP WIDTH upon receipt of specimen in laboratory (after stabilization)	0.50" / 0.53"
CENTER GAP WIDTH at laboratory ambient conditions on day of testing	0.50" / 0.53"
CENTER GAP WIDTH at test conditions	0.38" / 0.47"

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.

"This test method does not include procedures to determine the heat flow due to either air movement through the specimen or solar radiation effects. As a consequence, the thermal transmittance results obtained do not reflect performances which are expected from field installations due to not accounting for solar radiation, air leakage effects, and the thermal bridge effects that have the potential to occur due to the specific design and construction of the fenestration system opening. The latter can only be determined by in-situ measurements. Therefore, it is important to recognize that the thermal transmittance results obtained from this test method are for ideal laboratory conditions and should only be used for fenestration product comparisons and as input to thermal performance analyses which also include solar, air leakage and thermal bridge effects."

Required annual calibrations for the Intertek B&C, 'thermal test chamber' (ICN 000001) in York, Pennsylvania were last conducted in April 2020 in accordance with Intertek B&C calibration procedure. A CTS Calibration verification was performed July 2020. A Metering Box Wall Transducer and Surround Panel Flanking Loss Characterization was performed April 2020.

The reported Standardized Thermal Transmittance (Ust) was determined using CTS Method, per Section 9.2(A) of NFRC 102.

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SECTION 12
CTS CALIBRATION DATA

1.	CTS Test Date	12/18/19	
2.	CTS Size	21.53	ft^2
3.	CTS Glass/Core Conductance	0.42	$Btu/hr \cdot ft^2 \cdot F$
4.	Warm Side Air Temperature	69.81	F
5.	Cold Side Air Temperature	-0.39	F
6.	Warm Side Average Surface Temperature	54.17	F
7.	Cold Side Average Surface Temperature	3.65	F
8.	Convection Coefficient (Kc)	0.34	$Btu/(hr \cdot ft^2 \cdot F^{1.25})$
9.	Measured Cold Side Surface Conductance (hc)	5.23	$Btu/hr \cdot ft^2 \cdot F$
10.	Measured Thermal Transmittance	0.30	$Btu/hr \cdot ft^2 \cdot F$

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 2.06%.

"Ratings included in this report are for submittal to an NFRC licensed IA for certification purposes and are not meant to be used for labeling purposes. Only those options identified on a valid Certificate of Authorization (CA) are to be used for labeling purposes."

The direction of heat transfer was from the interior (warm side) to the exterior (cold side) of the specimen. The ratings were rounded in accordance to NFRC 601, NFRC Unit and Measurement Policy. The data acquisition frequency is 5 minutes.

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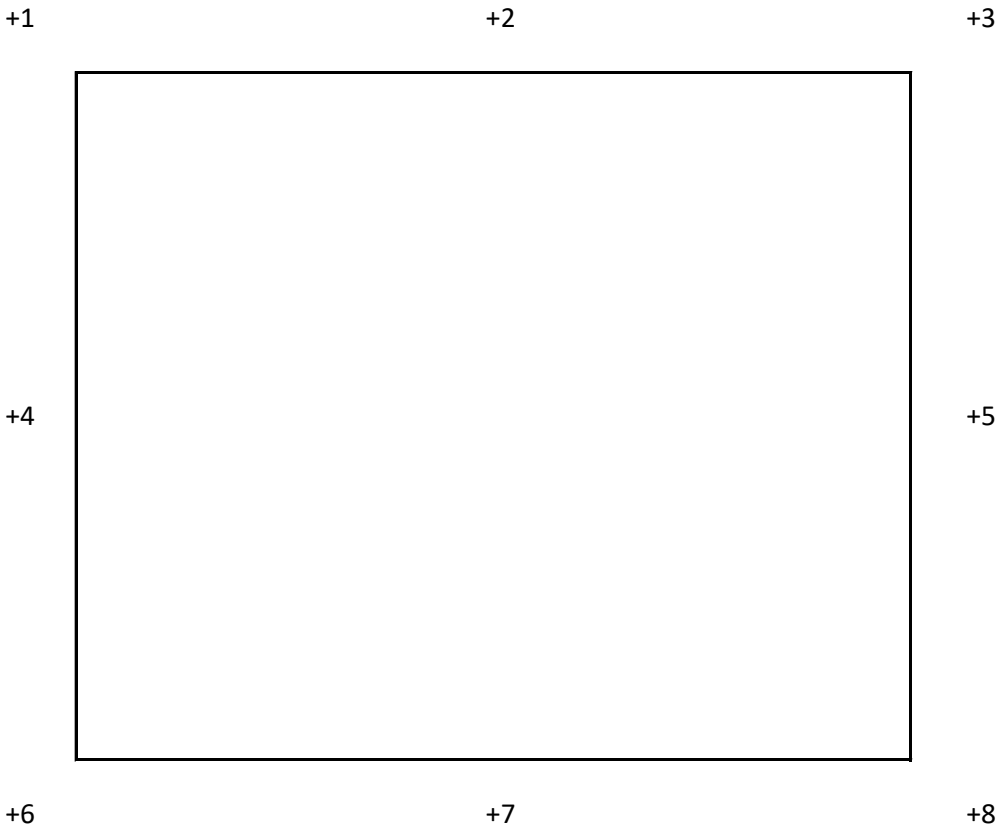
SECTION 13

SURROUND PANEL WIRING DIAGRAM



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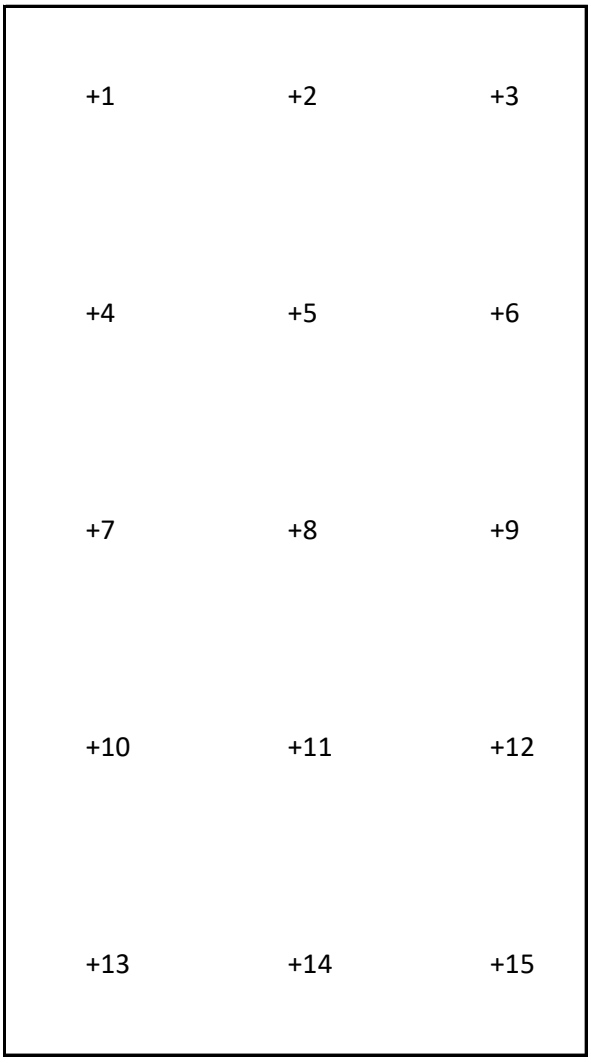
SECTION 14
BAFFLE WIRING DIAGRAM



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SECTION 15
SUBMITTAL FORM AND DRAWINGS

The test specimen drawings which follow have been reviewed by Intertek B&C and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.

窗号：JC-02
型材：LAN-70内开内倒窗系列
玻璃：5G+12A+5G+12A+5G Low-e
五金：GIESSE(吉斯)
数量：1樘

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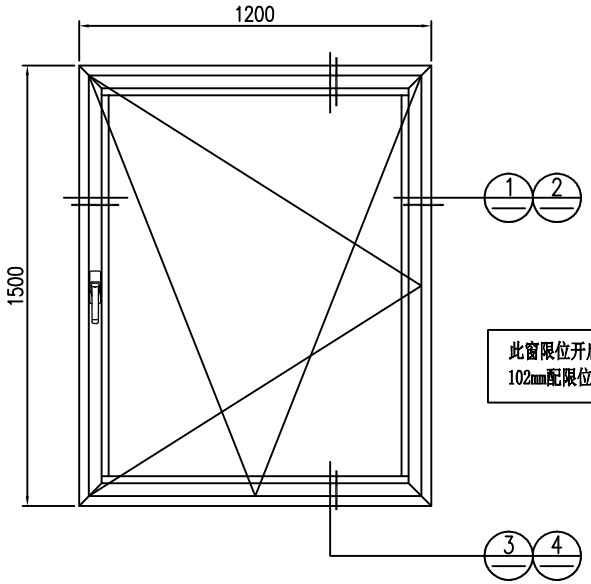

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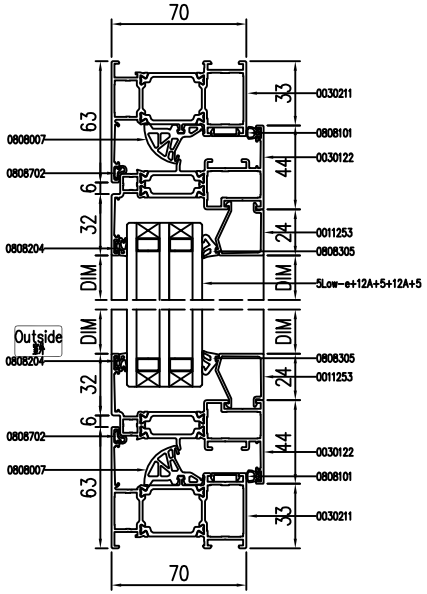
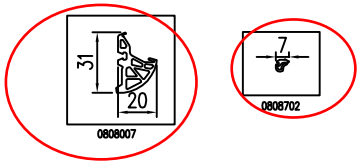
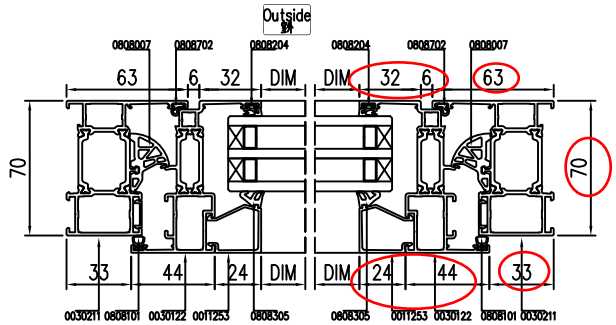
102mm配限位器







Painted Aluminum

NFRC

内视图

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Window Glass

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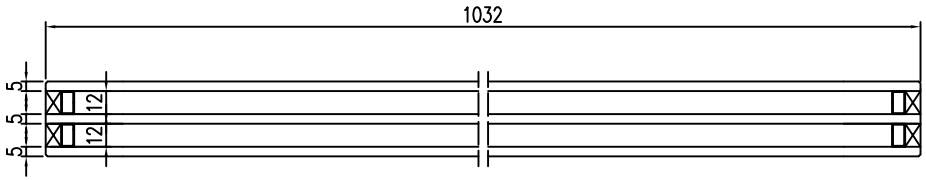

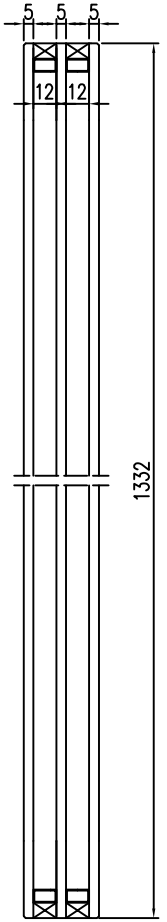

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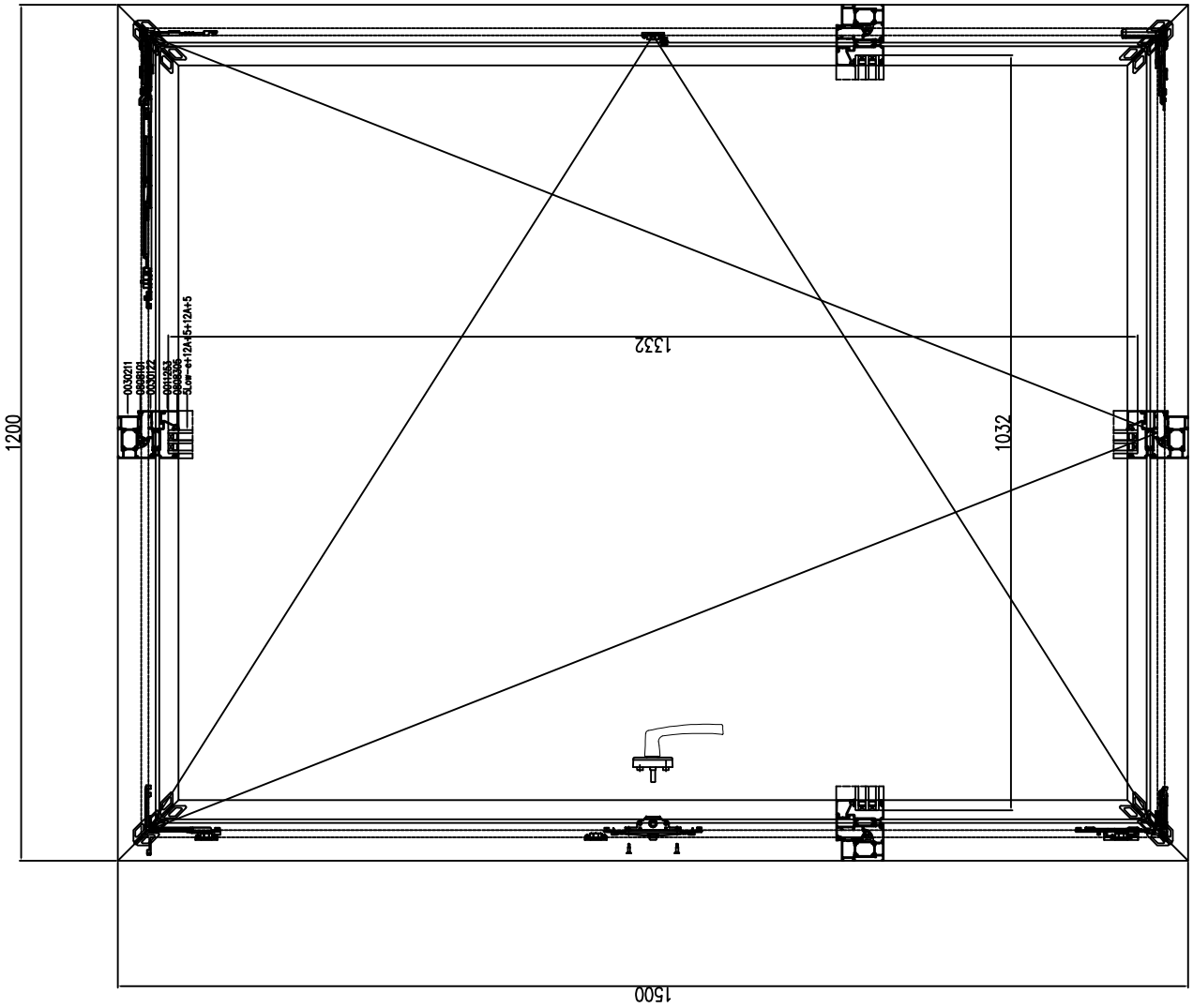

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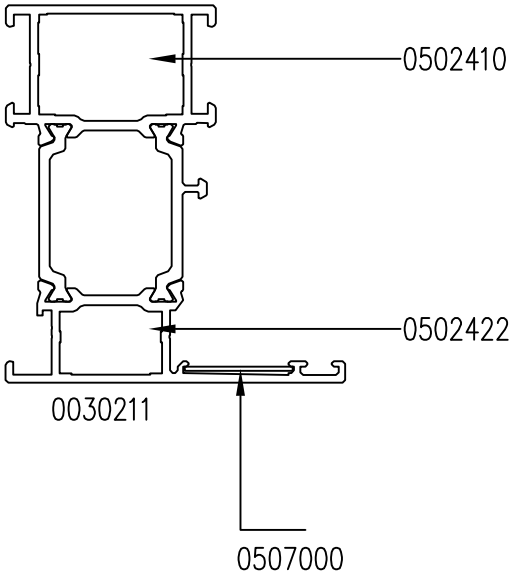
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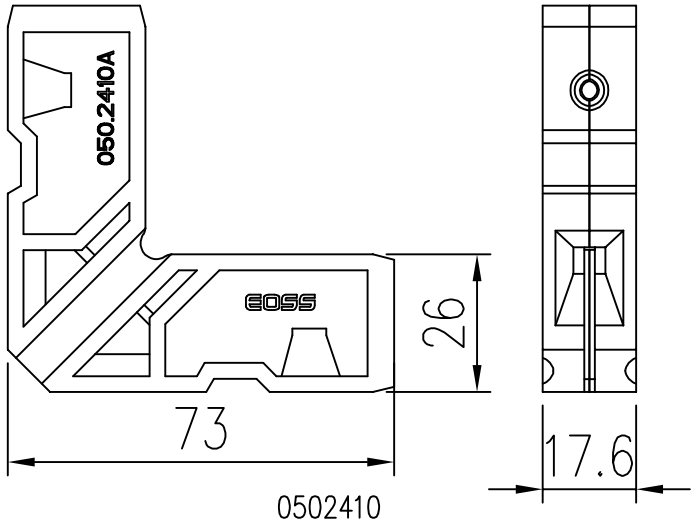
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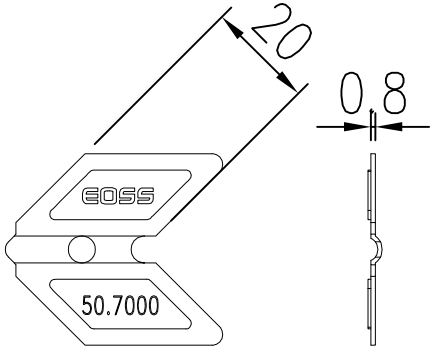
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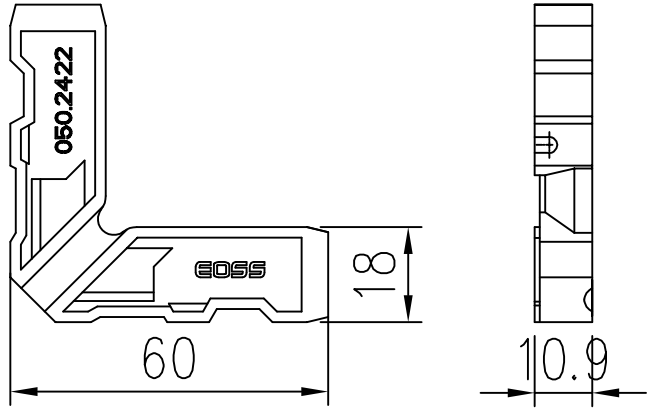
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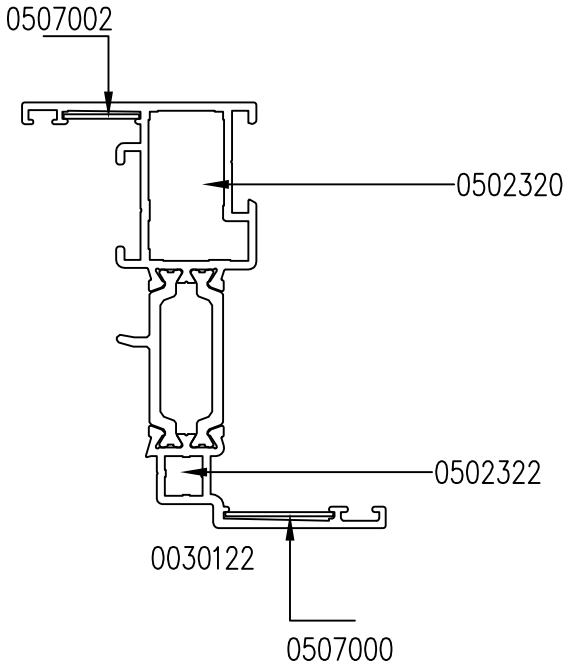

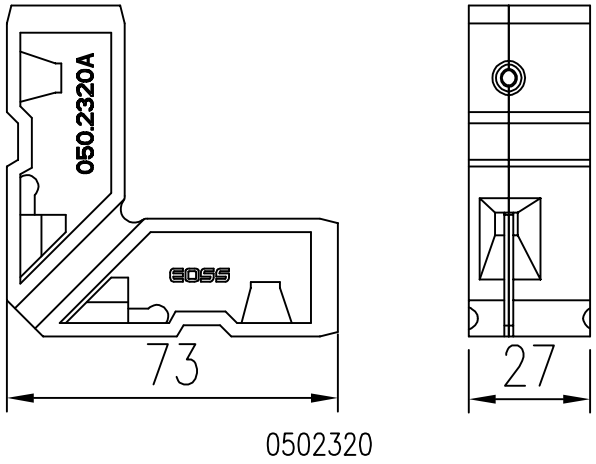

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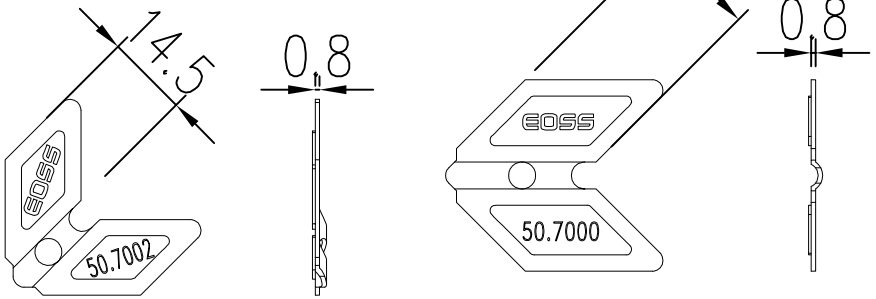

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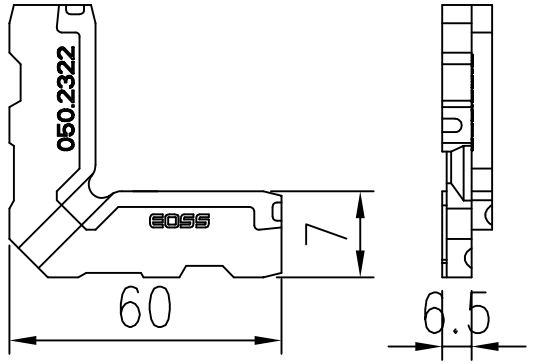

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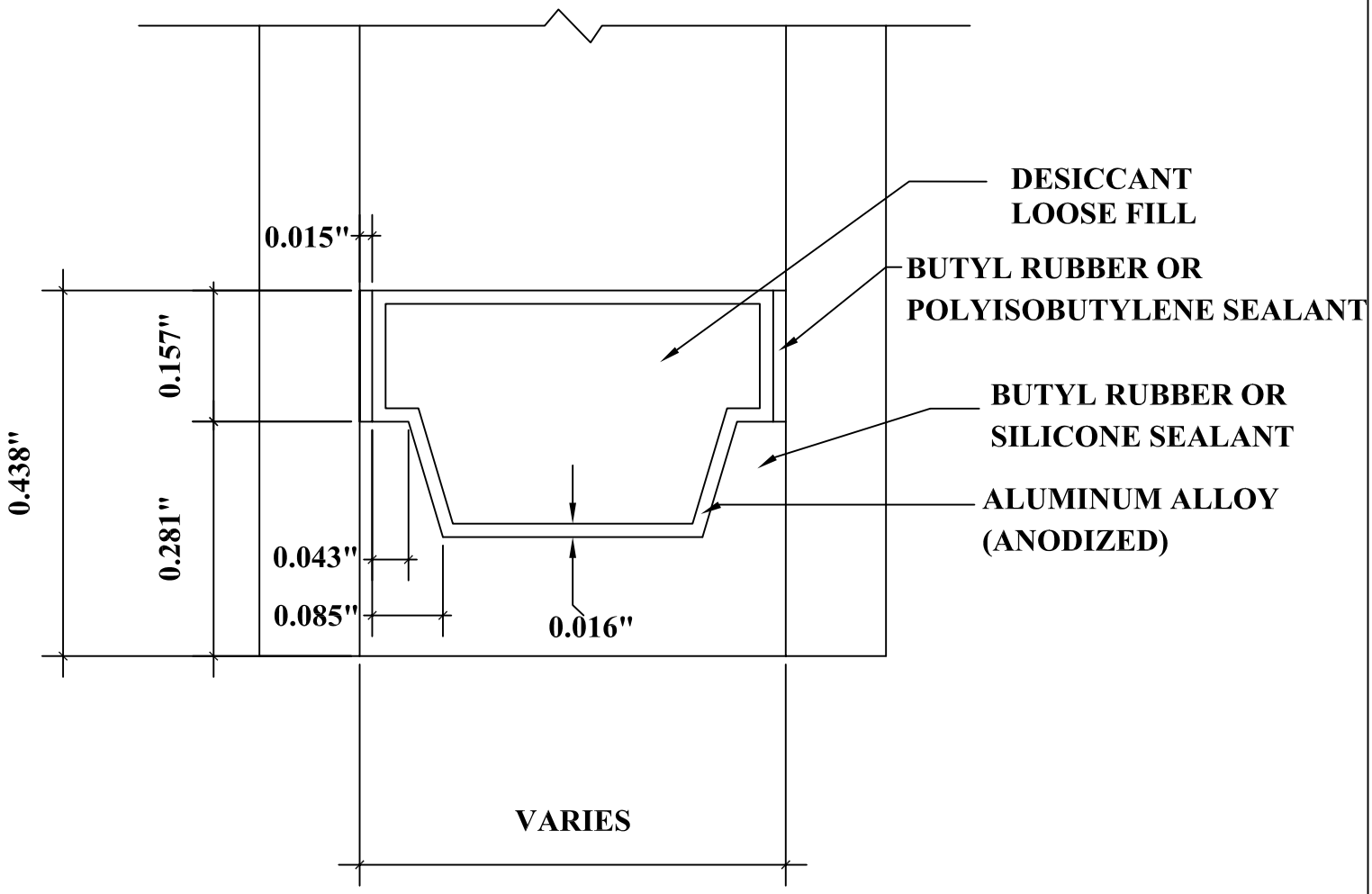

DETAIL FOR THERMAL MODELING OF
ALUMINUM SPACER (A1-D)

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SECTION 16
REVISION LOG

REVISION #	DATE	PAGES	REVISION
.01 R0	12/10/20	N/A	Original Report Issue