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ALUMIL SA
THERMAL PERFORMANCE TEST REPORT

SCOPE OF WORK
S77 FIXED WINDOW

REPORT NUMBER
J6339.02-116-46 R0

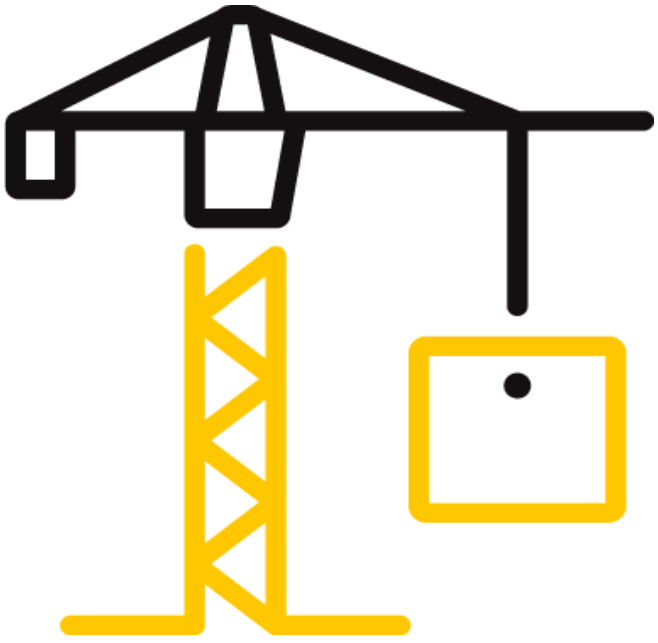
TEST DATE
07/30/19

ISSUE DATE
09/30/19

RECORD RETENTION END DATE
07/30/24

PAGES
19

DOCUMENT CONTROL NUMBER
RTTDS-R-AMER-Test-2822(c) (07/07/18)



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TEST REPORT FOR ALUMIL SA
Report No.: J6339.02-116-46 R0
Date: 09/30/19

REPORT ISSUED TO

ALUMIL SA
Iatrou Gogousi 8 GR 56429
Thessaloniki, GR 56429 (Greece)

SECTION 1

SCOPE

SERIES/MODEL: S77 Fixed Window
TYPE: Fixed

Intertek Building & Construction (Intertek B&C) was contracted by Alumil SA 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):	77
Condensation Resistance Factor - Glass (CRFg):	72
Thermal Transmittance (U):	0.32 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	09/30/19	**DATE**	09/30/19

RPM:pan

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SECTION 3
TEST SPECIMEN SUMMARY

SERIES/MODEL	S77 Fixed Window
TYPE	Fixed
OVERALL SIZE	47-1/4" x 59"
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 two 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
Ryan P. Moser	Intertek B&C
Shon W. Einsig	Intertek B&C

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SECTION 7
TEST SAMPLE DESCRIPTION

Frame

MATERIAL	AT (1.27"): Aluminum with Thermal Breaks - All Members		
SIZE	47-1/4" x 59"		
DAYLIGHT OPENING	42-5/8" x 54-1/2"	**GLAZING METHOD**	Interior
EXTERIOR COLOR	White	**EXTERIOR FINISH**	Paint
INTERIOR COLOR	White	**INTERIOR FINISH**	Paint
CORNER JOINERY	Mitered / Keys & Stakes / Sealed		

Glazing Information

LAYER 1	1/4"	CL Extereme 60/28 II (e=0.026*, #2)	
GAP 1	0.56"	TP-D: Saint-Gobain Swisspacer	100% Air*
LAYER 2	1/4"	Clear	
GAS FILL METHOD		N/A*	
DESICCANT		Yes	

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

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SECTION 7 (CONTINUED)

TEST SAMPLE DESCRIPTION (CONTINUED)

Weatherstripping

DESCRIPTION	QUANTITY	LOCATION
Glazing gasket	1 Row	Interior glazing perimeter
Glazing gasket	1 Row	Exterior glazing perimeter

Hardware

DESCRIPTION	QUANTITY	LOCATION
No hardware		

Drainage

DRAINAGE METHOD	SIZE	QUANTITY	LOCATION
No visible weeps			

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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)	53.48	F
4.	Average of 4 Roving Thermocouples (FTr)	49.68	F
5.	Weighting Factor (W)	0.035	
6.	Weighted Frame Temperature (FT)	53.35	F
7.	Average Glass Temperature (GT)	50.19	F
8.	Condensation Resistance Factor – Frame (CRFf)	77	
9.	Condensation Resistance Factor – Glass (CRFg)	72	

The CRF number was determined to be 72 (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)	19.36	ft^2
5.	Total Measured Input into Metering Box (Qtotal)	509.56	Btu/hr
6.	Total Correction	71.83	Btu/hr
7.	Net Specimen Heat Loss (Qs)	437.73	Btu/hr
8.	Thermal Transmittance (U)	0.32	$Btu/hr \cdot ft^2 \cdot F$

SECTION 10
TEST DURATION

1. The environmental systems were started at 13:00 hours, 07/29/19.
2. The test parameters were considered stable for two consecutive four hour test periods from 22:01 hours, 07/29/19 to 06:01 hours, 07/30/19.
3. The thermal performance test results were derived from 02:01 hours, 07/30/19 to 06:01 hours, 07/30/19.

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SECTION 11
TEMPERATURE AND CONDENSATION RESISTANCE CALCULATION

Time	04:01	04:31	05:01	05:31	06:01	**Average**
Pre-Specified Thermocouples - Frame						
1	49.16	49.17	49.21	49.20	49.23	49.19
2	50.82	50.86	50.89	50.88	50.88	50.86
3	50.50	50.51	50.51	50.53	50.53	50.52
4	56.32	56.29	56.30	56.33	56.39	56.33
5	56.84	56.85	56.88	56.88	56.88	56.87
6	57.01	57.01	57.04	57.02	57.03	57.02
7	55.66	55.66	55.67	55.69	55.67	55.67
8	56.51	56.53	56.51	56.55	56.55	56.53
9	54.50	54.50	54.52	54.53	54.52	54.52
10	54.50	54.50	54.52	54.53	54.52	54.52
11	52.31	52.29	52.33	52.35	52.38	52.33
12	53.09	53.11	53.13	53.13	53.13	53.12
13	49.81	49.82	49.80	49.84	49.86	49.83
14	51.40	51.39	51.40	51.42	51.41	51.40
FTp	53.46	53.46	53.48	53.49	53.50	53.48
Pre-Specified Thermocouples - Glass						
15	38.71	38.74	38.73	38.78	38.77	38.75
16	54.28	54.28	54.28	54.33	54.31	54.30
17	47.26	47.30	47.27	47.31	47.29	47.29
18	53.75	53.74	53.76	53.78	53.75	53.76
19	55.26	55.28	55.30	55.31	55.28	55.29
20	51.77	51.76	51.74	51.77	51.78	51.76
GT	50.17	50.18	50.18	50.21	50.20	50.19
Cold Point (Roving) Thermocouples						
21	49.20	49.20	49.20	49.20	49.20	49.20
22	49.40	49.40	49.40	49.40	49.40	49.40
23	49.80	49.80	49.80	49.80	49.80	49.80
24	50.30	50.30	50.30	50.30	50.30	50.30
FTr	49.68	49.68	49.68	49.68	49.68	49.68
W	0.035	0.035	0.035	0.035	0.035	0.035
FT	53.33	53.33	53.35	53.36	53.37	53.35
Warm Side - Room Ambient Air Temperature						
	69.78	69.79	69.79	69.78	69.81	69.79
Cold Side - Room Ambient Air Temperature						
	-0.37	-0.43	-0.26	-0.38	-0.42	-0.37
Condensation Resistance Factor						
CRFf	77	77	77	77	77	77
CRFg	72	72	72	72	72	72

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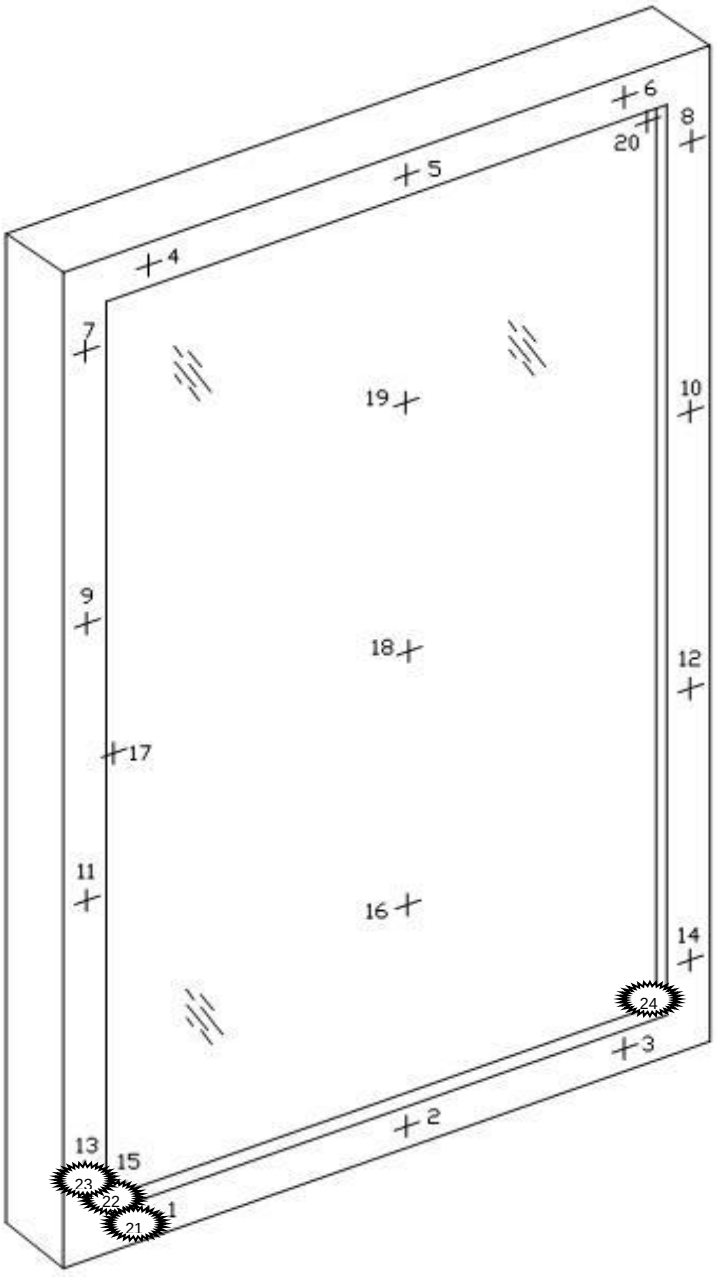
SECTION 12
THERMOCOUPLE LOCATION DIAGRAM



COLD POINT LOCATIONS	
21	49.20
22	49.40
23	49.80
24	50.30

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SECTION 13
GLAZING DEFLECTION

	FRAME
EDGE GAP WIDTH	0.56"
ESTIMATED CENTER GAP WIDTH upon receipt of specimen in laboratory (after stabilization)	0.53"
CENTER GAP WIDTH at laboratory ambient conditions on day of testing	0.53"
CENTER GAP WIDTH at test conditions	0.41"

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 2019 in accordance with Intertek B&C calibration procedure. A CTS Calibration verification was performed August 2018. A Metering Box Wall Transducer and Surround Panel Flanking Loss Characterization was performed August 2018.

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 2.00%.

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

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.

High Configuration

Κατ. 005, Ποσότητα: 1
Έργο:S77-US INTERTEK
Σειρά: Alumil S77 & SD77 Τετράγωνα (Vertical Passing) High
Εσωτερική Όψη 63 kg

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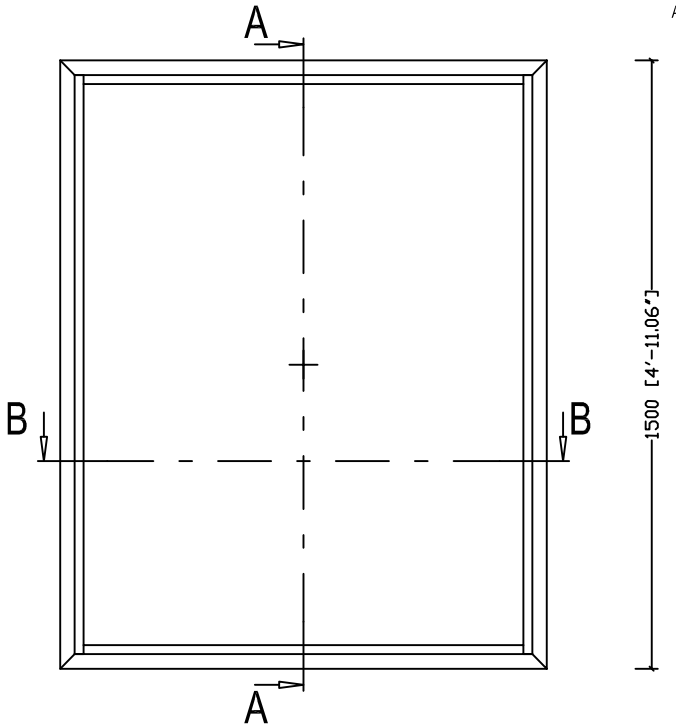

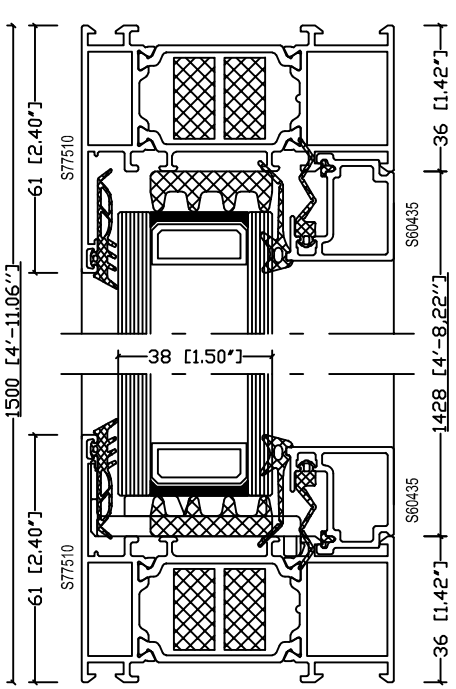

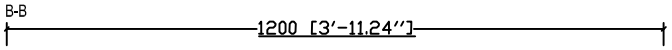

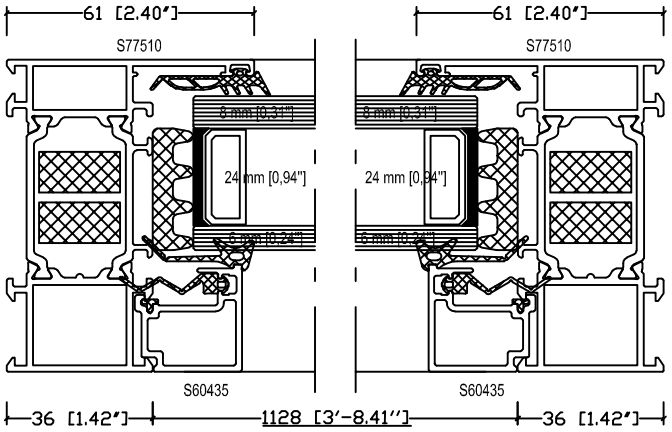

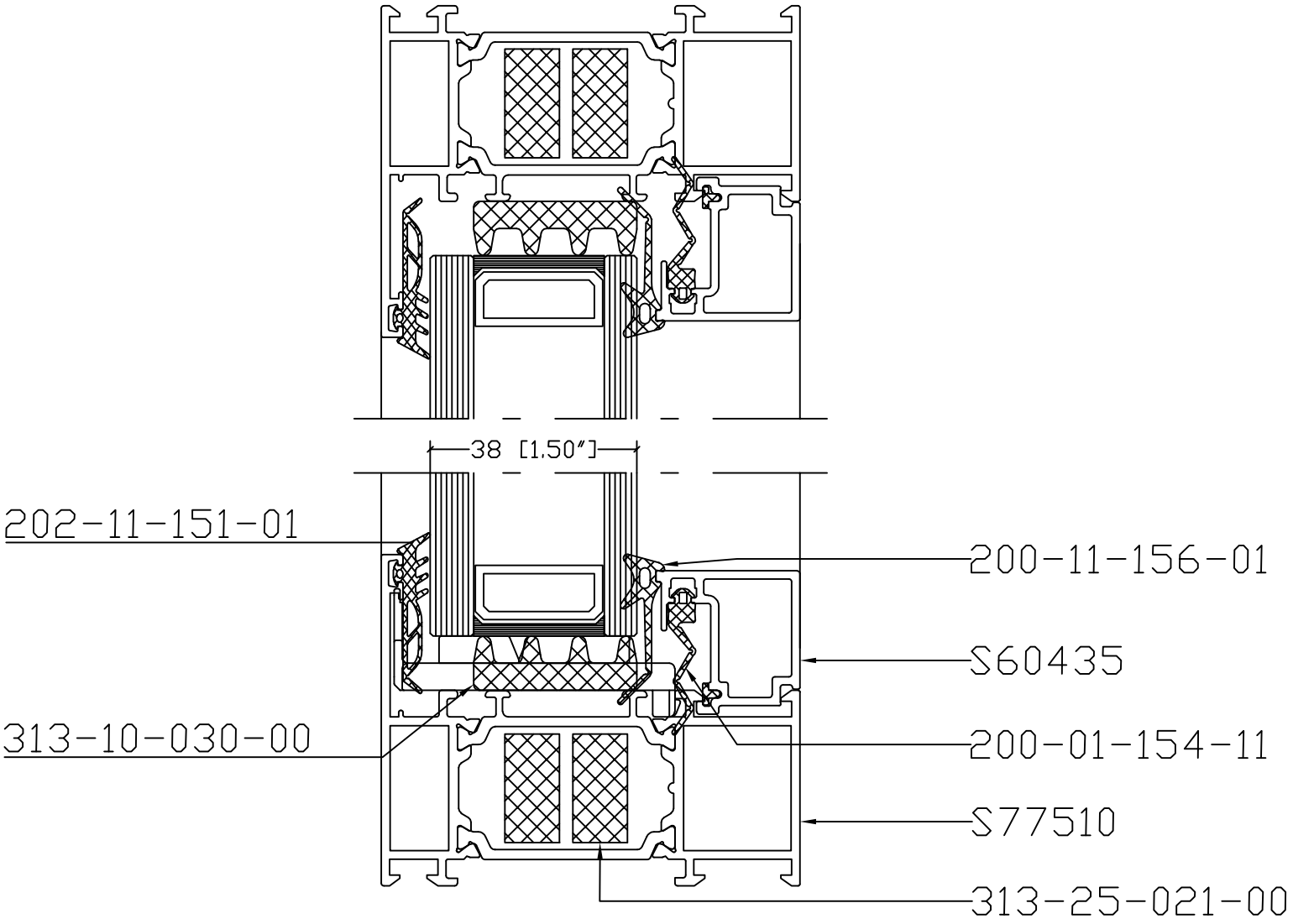
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200-11-156-01
S60435
313-10-030-00
200-01-154-11
S77510
313-25-021-00

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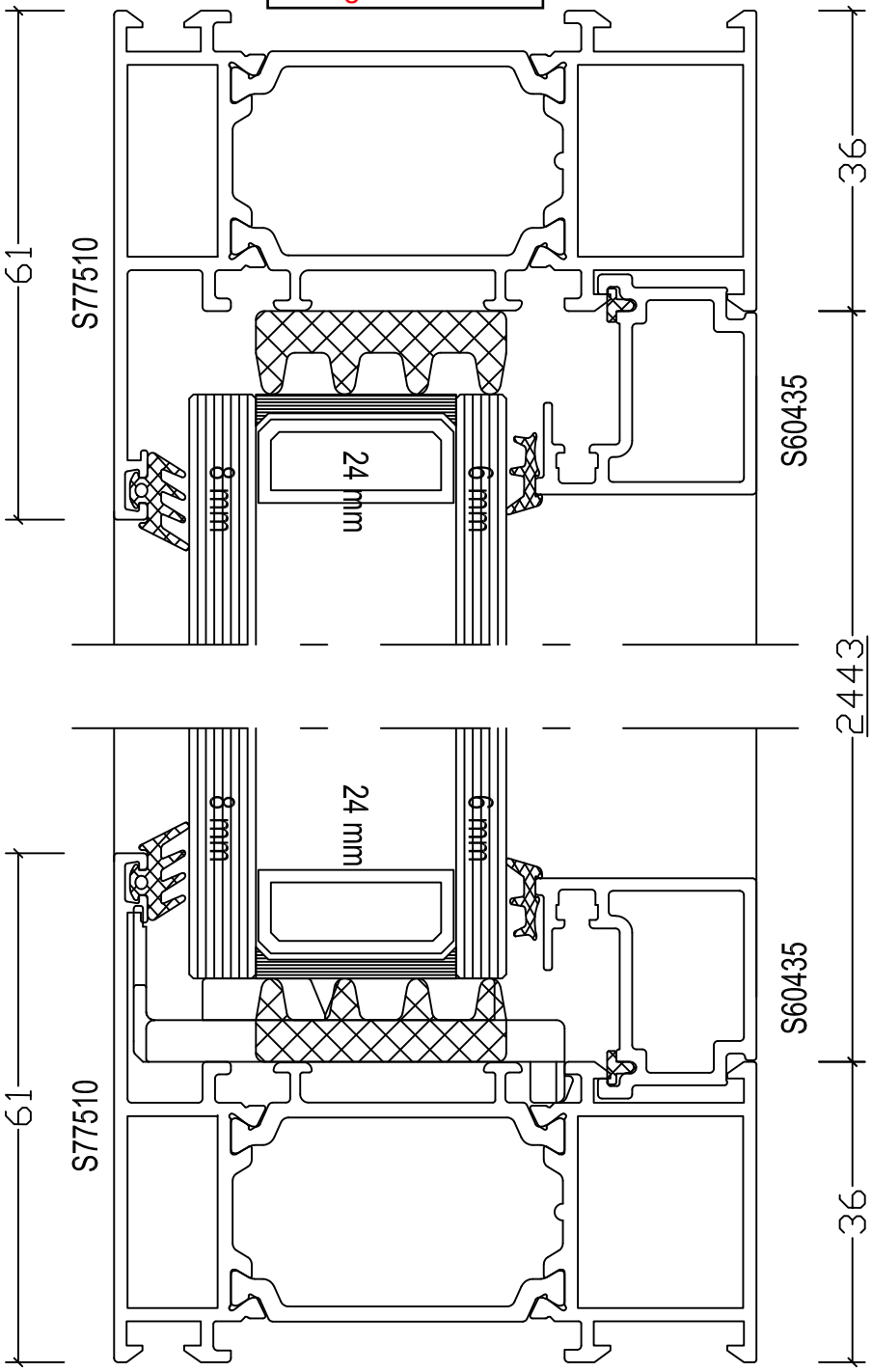
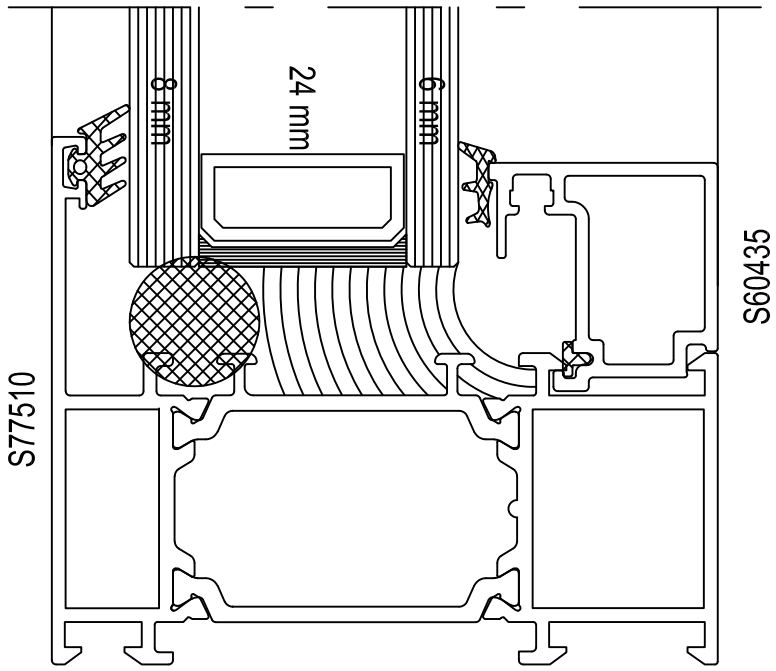
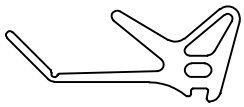
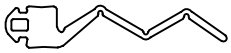
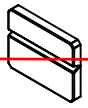
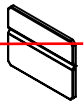
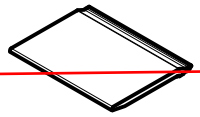
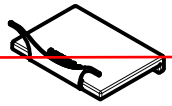
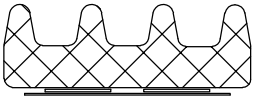
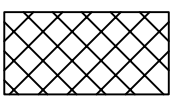
Advanced Configuration



Advanced Configuration- Back Bed Sill



S77510 Frame width	intertek Total Quality. Assured. Report #: J6339-116-46 Date: 07/30/2019 Verified by: Ryan P. Moser	2 pieces
S77510 Frame height		2 pieces
S60435 Glazing bead width		2 pieces
S60435 Glazing bead height		2 pieces
202-11-151-01		External glass gasket
200-11-156-01		Internal glass gasket
200-01-154-11		Gasket for glazing bead
220-11-449-12		Gasket for glazing bead
~~290-00-005-00~~		~~5mm Shim~~
~~290-00-002-00~~		~~2mm Shim~~
~~290-77-001-00~~		~~Glazing bridge~~
~~290-77-002-00~~		~~Glazing bridge~~
313-10-030-00		Glazing foam 30x10 mm Foam Rubber
313-25-021-00		NRG bar 25x21 Expanded Polystyrene

200-06-860-01		External glazing gasket
200-08-004-01		Internal glazing gasket

S77510

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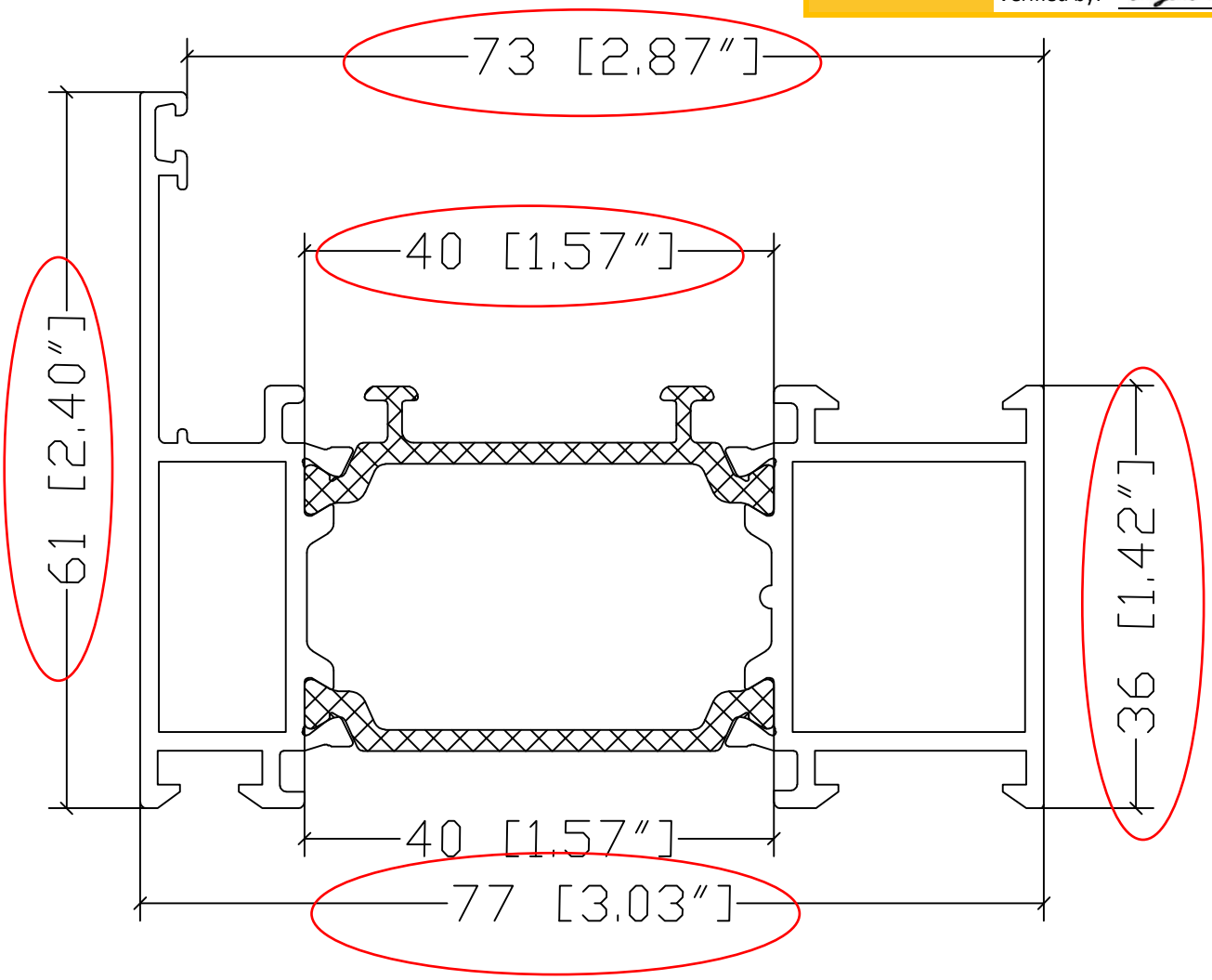
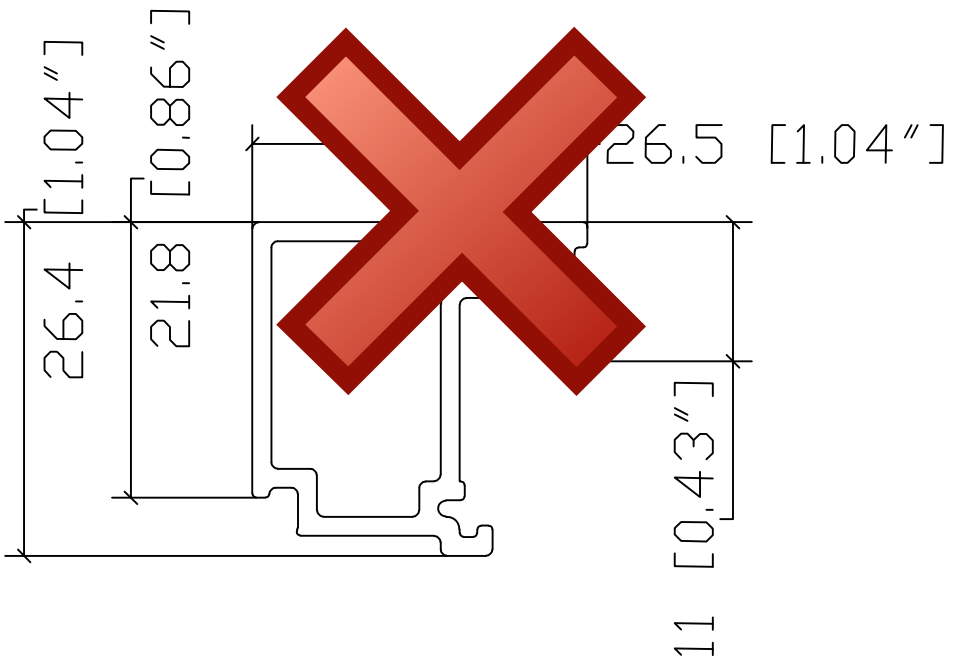


S60435



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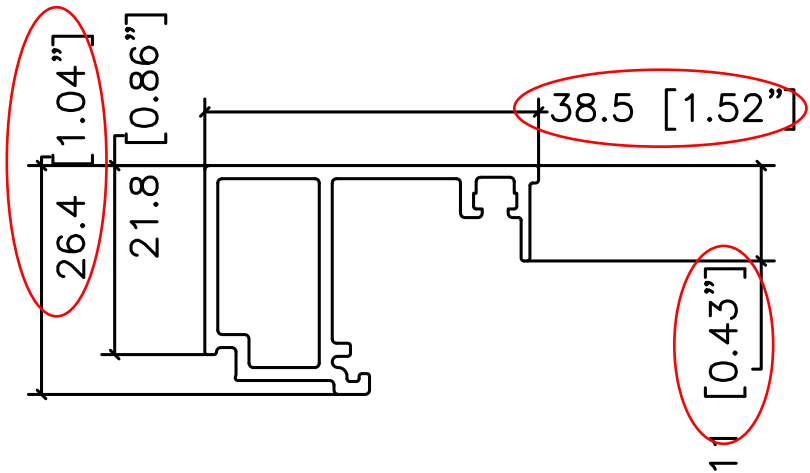

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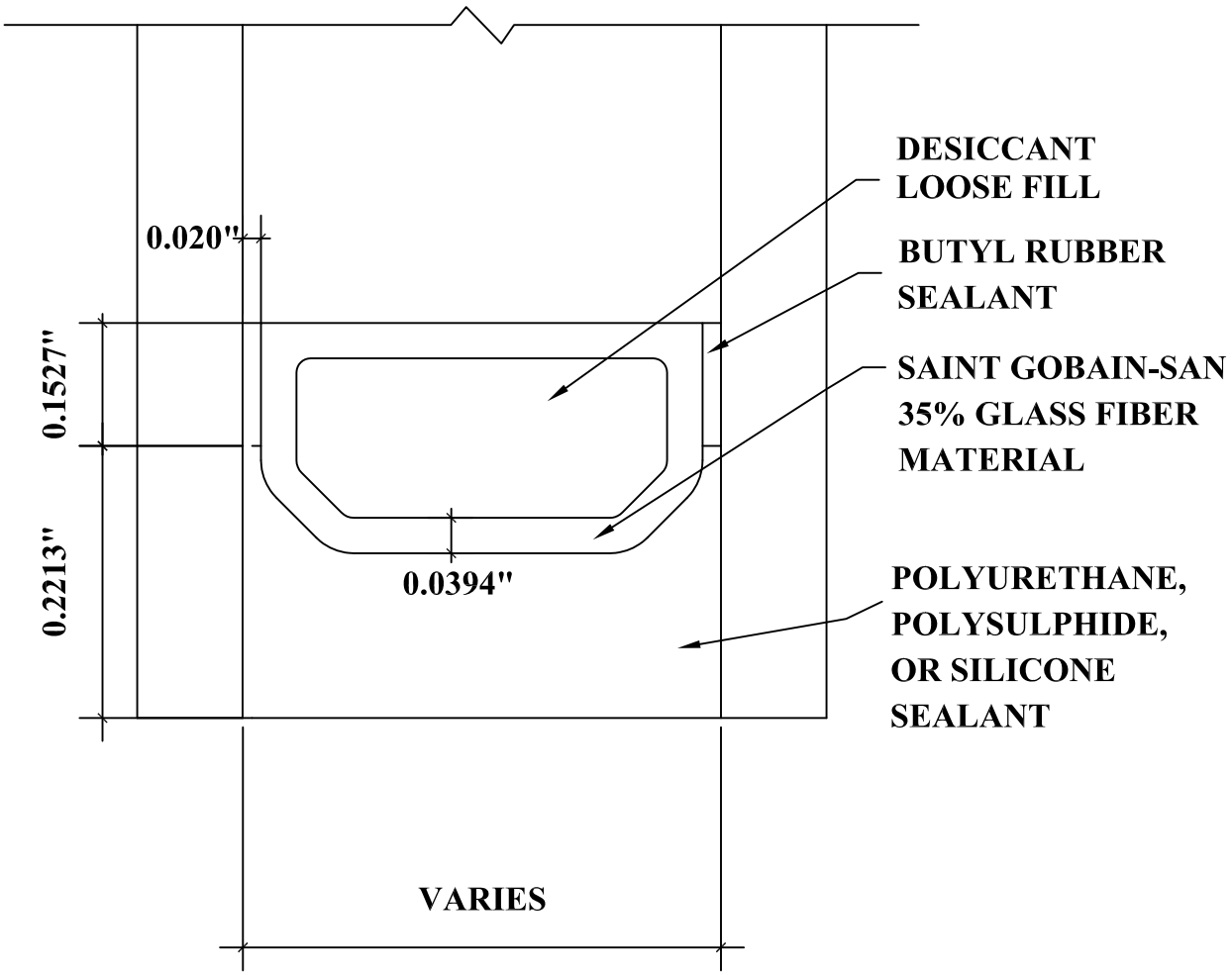

DETAIL FOR THERMAL MODELING OF
SAINT-GOBAIN SWISSPACER (TP-D)

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SECTION 15
REVISION LOG

REVISION #	DATE	PAGES	REVISION
.02 R0	09/30/19	N/A	Original Report Issue