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RENLITA DOORS NORTH AMERICA LLC

THERMAL PERFORMANCE TEST REPORT

SCOPE OF WORK
S-500 / S-1000 / S-2000 / S-3000 GARAGE DOORS

REPORT NUMBER
L0326.01-116-46 R0

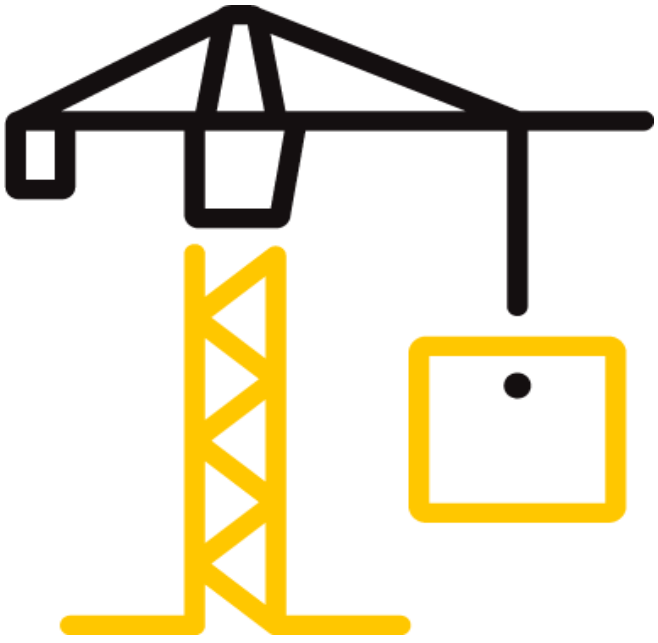
TEST DATE
06/11/20

ISSUE DATE
06/30/20

RECORD RETENTION END DATE
06/11/25

PAGES
27

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



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TEST REPORT FOR RENLITA DOORS NORTH AMERICA LLC
Report No.: L0326.01-116-46 R0
Date: 06/30/20

REPORT ISSUED TO

RENLITA DOORS NORTH AMERICA LLC
200 East 1st Street
Bonham, Texas 75418

SECTION 1

SCOPE

SERIES/MODEL: S-500 / S-1000 / S-2000 / S-3000 Garage Doors
TYPE: GARAGE DOOR

Intertek Building & Construction (Intertek B&C) was contracted by Renlita Doors North America LLC to evaluate the thermal performance per NFRC 102-2017. The purpose of this testing was to evaluate the U-Factor performance. 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

Standardized U-factor (Ust) (Area-weighted): 0.56 Btu/hr·ft^2·F (A.W. Method)

For INTERTEK B&C:

COMPLETED BY	Shon W. Einsig	**REVIEWED BY**	Ryan P. Moser
TITLE	Technician Team Leader, IIRC	**TITLE**	Senior Technician
SIGNATURE	Digitally Signed by: Shon W. Einsig	**SIGNATURE**	Digitally Signed by: Ryan P. Moser
DATE	06/30/20	**DATE**	06/30/20

SWE:kmm

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SECTION 3
TEST SPECIMEN SUMMARY

SERIES/MODEL	S-500 / S-1000 / S-2000 / S-3000 Garage Doors
TYPE	Garage Door
OVERALL SIZE	83" x 82-3/8"" (2108 mm x 2092 mm)
NFRC STANDARD SIZE	84" x 84" (2134 mm wide x 2134 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 102-2017**, Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems

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 and half years from the submittal date to the Inspection Agency and no more than 5 years from the test 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

Panel 1

MATERIAL	AU (0.07"): Aluminum with Thermal Improvement - All Members		
SIZE	83" x 59-1/2"		
DAYLIGHT OPENING	38-1/2" x 18-1/2" (x2)	**GLAZING METHOD**	Exterior
EXTERIOR COLOR	Gray	**EXTERIOR FINISH**	Anodized
INTERIOR COLOR	Black	**INTERIOR FINISH**	Paint
CORNER JOINERY	Mitered / Screws / Welds / Sealed		

Panel 2

MATERIAL	AU (0.07"): Aluminum with Thermal Improvement - All Members		
SIZE	83" x 22-3/4"		
DAYLIGHT OPENING	38-1/2" x 18-1/2" (x2)	**GLAZING METHOD**	Exterior
EXTERIOR COLOR	Gray	**EXTERIOR FINISH**	Anodized
INTERIOR COLOR	Black	**INTERIOR FINISH**	Paint
CORNER JOINERY	Mitered / Screws / Welds / Sealed		

Glazing Information

LAYER 1	1/4"	SolarBan 60 (e=0.035*, #2)	
GAP 1	0.50"	A1-D: Aluminum Spacer	100% Air*
LAYER 2	1/4"	Clear	
GAS FILL METHOD	N/A*		

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

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SECTION 7 (CONTINUED)

TEST SAMPLE DESCRIPTION (CONTINUED)

Weatherstripping

DESCRIPTION	QUANTITY	LOCATION
(1-1/4" dia.) Custom rubber ridgid flexible hollow bulb gasket	1 Row	Bottom of bottom panel
(1" dia.) Flexible hollow foam gasket	1 Row	Top of bottom panel, bottom of top panel
(1/2" dia.) Flexible hollow vinyl gasket	1 Row	Top of top panel

Hardware

DESCRIPTION	QUANTITY	LOCATION
(1" dia.) Steel lifting/cable rod	2	Bottom panel stiles
Mortise hinge	3 Sets	Top / bottom panels joint
Steel lifting bracket	2	Top panel ends

Drainage

DRAINAGE METHOD	SIZE	QUANTITY	LOCATION
Diameter weephole	(1/4" dia.)	8	Four per each panel bottom

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

Heat Flows

1.	Total Measured Input into Metering Box (Qtotal)	2236.54	Btu/hr
2.	Surround Panel Heat Flow (Qsp)	80.76	Btu/hr
3.	Surround Panel Thickness	4.00	inches
4.	Surround Panel Conductance	0.0476	$Btu/hr \cdot ft^2 \cdot F$
5.	Metering Box Wall Heat Flow (Qmb)	12.89	Btu/hr
6.	EMF vs Heat Flow Equation (equivalent information)	0.0117*EMF + -0.044	
7.	Flanking Loss Heat Flow (Qfl)	16.81	Btu/hr
8.	Net Specimen Heat Loss (Qs)	2126.08	Btu/hr

Areas

1.	Test Specimen Projected Area (As)	49.22	ft^2
2.	Test Specimen Interior Total (3-D) Surface Area (Ah)	57.01	ft^2
3.	Test Specimen Exterior Total (3-D) Surface Area (Ac)	45.77	ft^2
4.	Metering Box Opening Area (Amb)	75.11	ft^2
5.	Metering Box Baffle Area (Ab1)	70.84	ft^2
6.	Surround Panel Interior Exposed Area (Asp)	25.89	ft^2

Test Conditions

1.	Average Metering Room Air Temperature (th)	69.80	F
2.	Average Cold Side Air Temperature (tc)	-0.41	F
3.	Average Guard/Environmental Air Temperature	71.24	F
4.	Metering Room Average Relative Humidity	7.39	%
5.	Metering Room Maximum Relative Humidity	8.07	%
6.	Metering Room Minimum Relative Humidity	6.83	%
7.	Measured Cold Side Wind Velocity (Perpendicular Flow)	12.66	mph
8.	Measured Warm Side Wind Velocity (Parallel Flow)	N/A	mph
9.	Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"	H_2O

Average Surface Temperatures

1.	Metering Room Surround Panel	65.51	F
2.	Cold Side Surround Panel	0.01	F

Results

1.	Thermal Transmittance of Test Specimen (Us)	0.62	$Btu/hr \cdot ft^2 \cdot F$
2.	Standardized Thermal Transmittance of Test Specimen (Ust)	0.56	$Btu/hr \cdot ft^2 \cdot F$

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

Area-Weighted Method Results

1.	Area-Weighted Warm Side Surface Temperature (t1)	49.92	F
2.	Area-Weighted Cold Side Surface Temperature (t2)	9.74	F
3.	Measured Warm Side Surface Conductance (hh)	1.88	Btu/hr·ft^2·F
4.	Measured Cold Side Surface Conductance (hc)	4.58	Btu/hr·ft^2·F
5.	Standardized Warm Side Surface Conductance (hsth)	1.36	Btu/hr·ft^2·F
6.	Standardized Cold Side Surface Conductance (hstc)	5.28	Btu/hr·ft^2·F
7.	Standardized Thermal Transmittance (Ust)	0.56	Btu/hr·ft^2·F

SECTION 10
TEST DURATION

1. The environmental systems were started at 11:38 hours, 06/10/20.
2. The test parameters were considered stable for two consecutive four hour test periods from 22:10 hours, 06/10/20 to 06:10 hours, 06/11/20.
3. The thermal performance test results were derived from 02:10 hours, 06/11/20 to 06:10 hours, 06/11/20.

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SECTION 11
GLAZING DEFLECTION

	PANEL 1	PANEL 2
EDGE GAP WIDTH	0.50" / 0.50" / 0.50" / 0.50"	0.50" / 0.50"
ESTIMATED CENTER GAP WIDTH upon receipt of specimen in laboratory (after stabilization)	0.50" / 0.50" / 0.50" / 0.50"	0.50" / 0.50"
CENTER GAP WIDTH at laboratory ambient conditions on day of testing	0.50" / 0.50" / 0.50" / 0.50"	0.50" / 0.50"
CENTER GAP WIDTH at test conditions	0.47" / 0.47" / 0.47" / 0.47"	0.47" / 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 March 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	08/11/18	
2.	CTS Size	43.06	ft^2
3.	CTS Glass/Core Conductance	0.42	$Btu/hr \cdot ft^2 \cdot F$
4.	Warm Side Air Temperature	69.79	F
5.	Cold Side Air Temperature	-0.40	F
6.	Warm Side Average Surface Temperature	54.30	F
7.	Cold Side Average Surface Temperature	3.52	F
8.	Convection Coefficient (Kc)	0.34	$Btu/(hr \cdot ft^2 \cdot F^{1.25})$
9.	Measured Cold Side Surface Conductance (hc)	5.50	$Btu/hr \cdot ft^2 \cdot F$
10.	Measured Thermal Transmittance	0.31	$Btu/hr \cdot ft^2 \cdot F$

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 1.54%.

"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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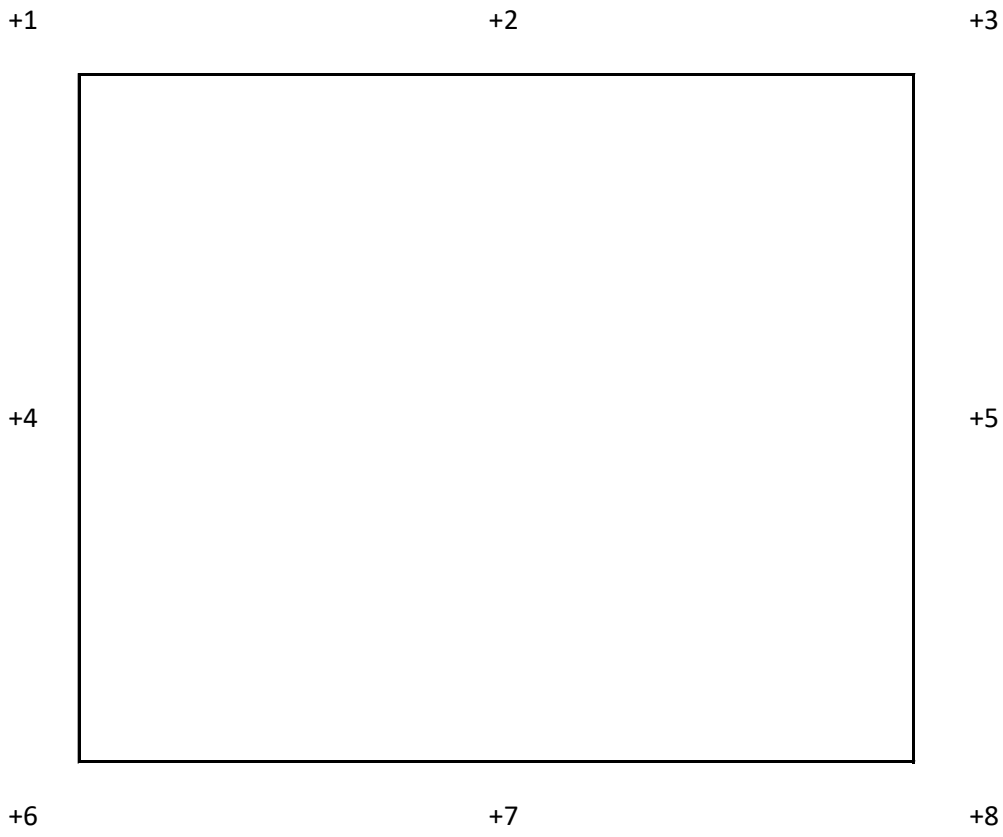
SECTION 13
SURROUND PANEL WIRING DIAGRAM



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SECTION 14

BAFFLE WIRING DIAGRAM

+1	+2	+3	+4	+5	+6
+7	+8	+9	+10	+11	+12
+13	+14	+15	+16	+17	+18
+19	+20	+21	+22	+23	+24
+25	+26	+27	+28	+29	+30

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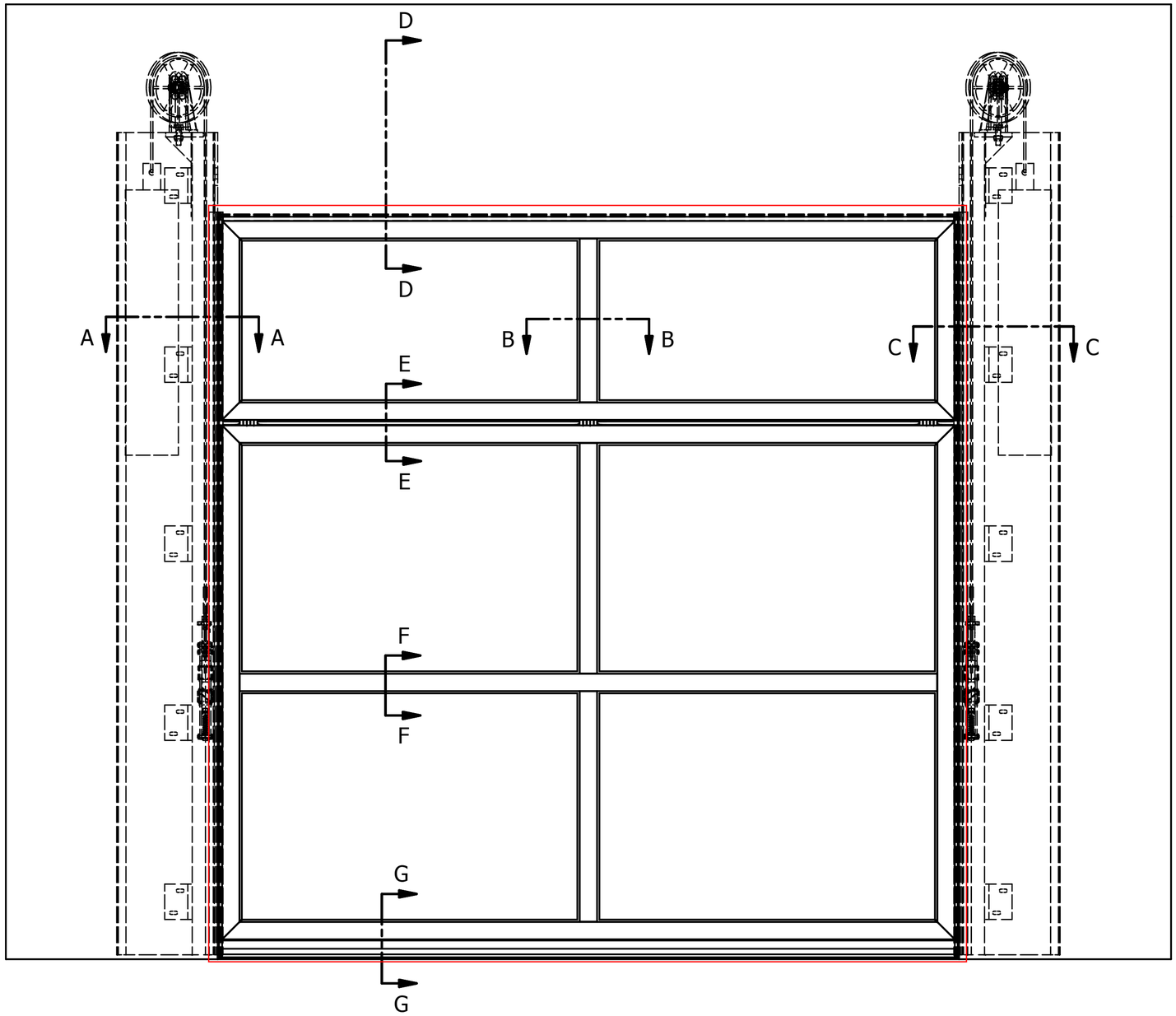
SECTION 15
SUBMITTAL FORM AND DRAWINGS

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.



NOTE:
VIEW IS FROM EXTERIOR

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

TOLERANCES

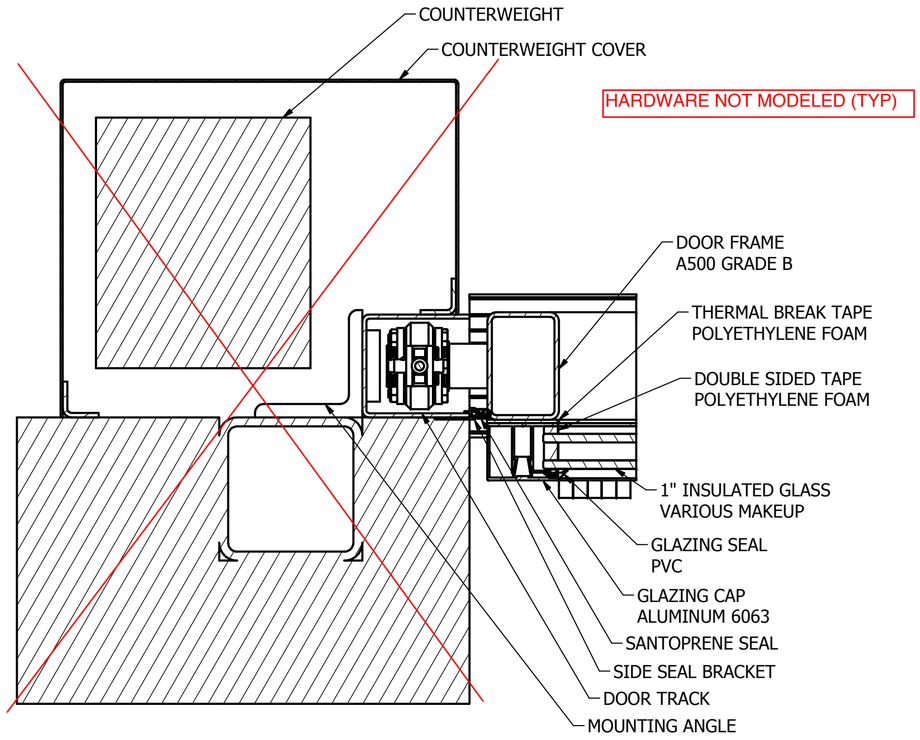
.X=±.050
.XX=±.015
.XXX=±.005

ANGLULAR ±.5'

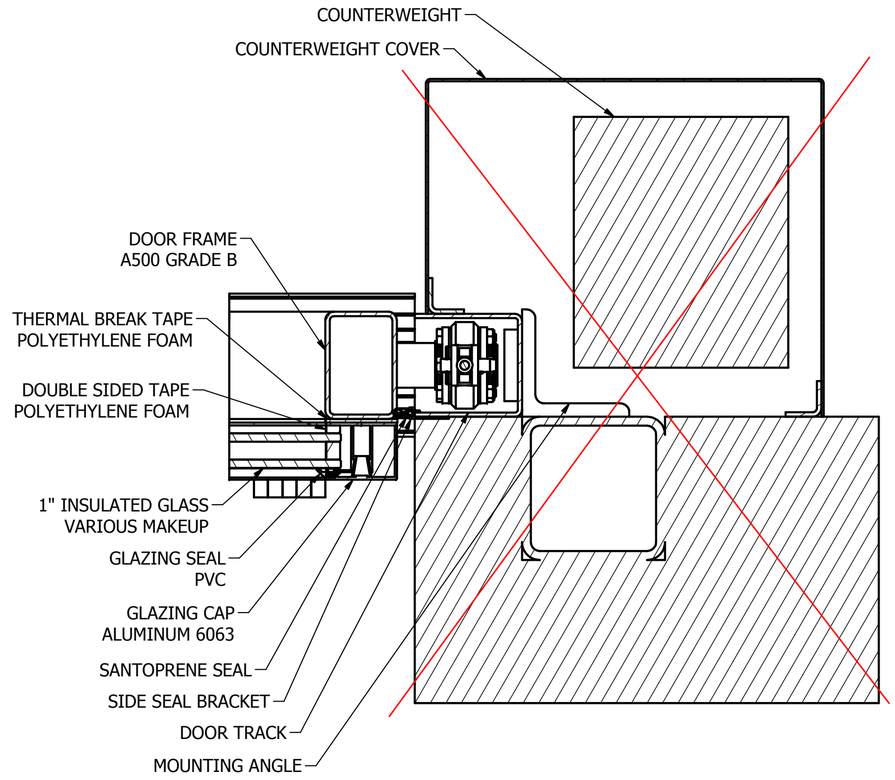
DRAWN DSF	12/19/2016	RENLITA
CHECKED		TITLE: S-2000 ENERGY TESTING
QA		
MFG		
APPROVED		

SIZE C | DWG NO 2K-ENERGY | REV 1

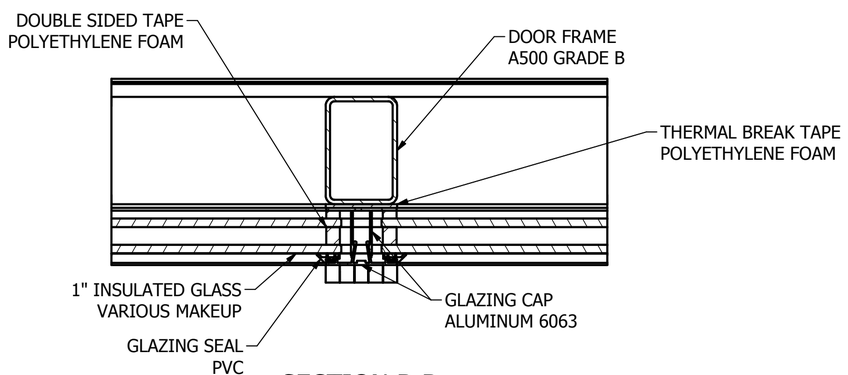
SCALE 1:1 | SHEET 1 OF 3



SECTION A-A



SECTION C-C



SECTION B-B

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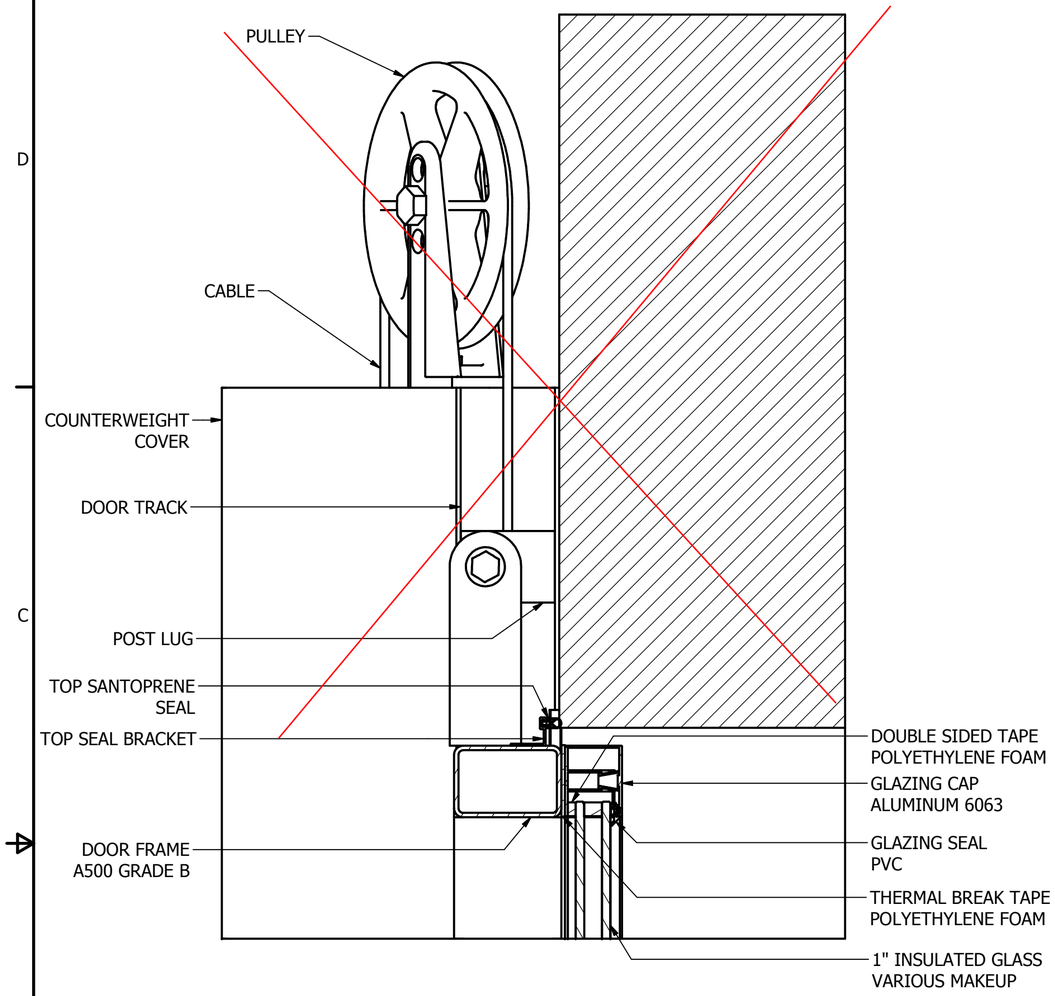
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

TOLERANCES

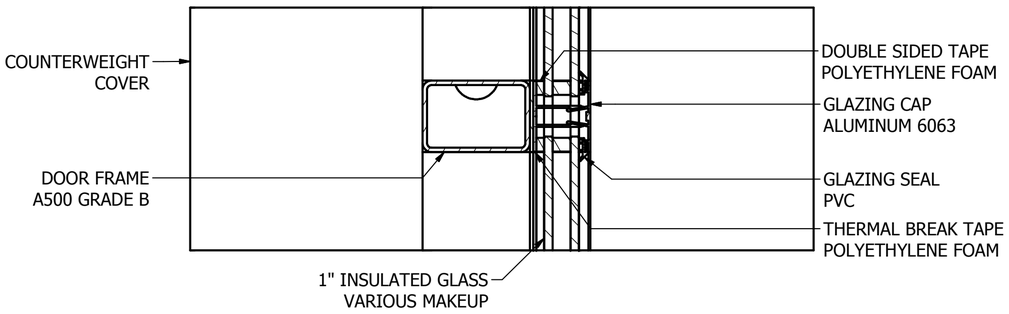
.X=±.050
.XX=±.015
.XXX=±.005

ANGULAR ±.5˚

DRAWN DSF	12/19/2016	RENLITA
CHECKED		TITLE: S-2000 ENERGY TESTING
QA		
MFG		
APPROVED		
		SIZE C | DWG NO 2K-ENERGY | REV 1
		SCALE 1:1 | SHEET 2 OF 3



SECTION D-D



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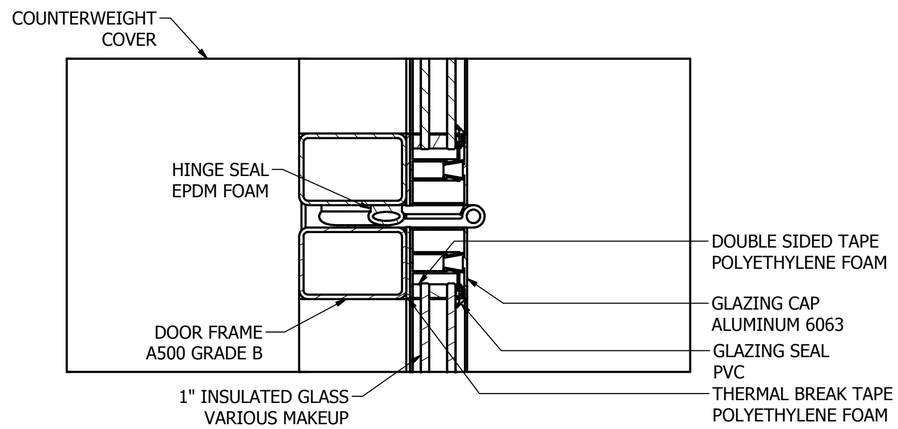

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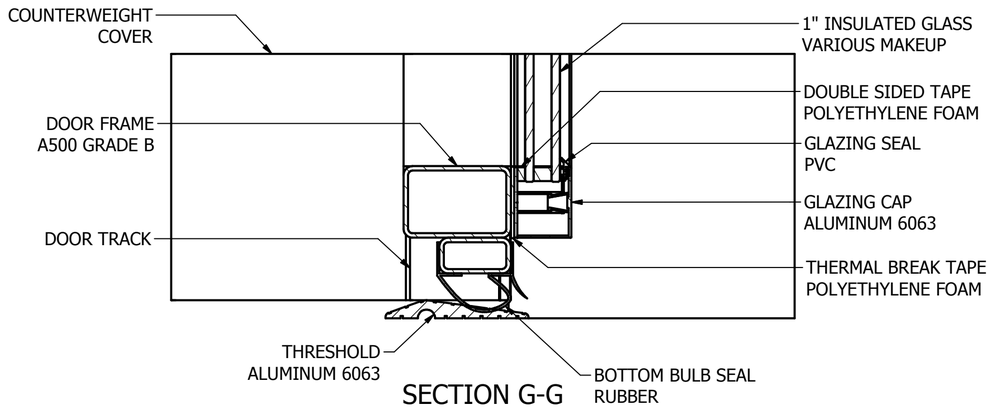

SECTION G-G

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

TOLERANCES

.X=±.050
.XX=±.015
.XXX=±.005

ANGLULAR ±.5°

DRAWN DSF	12/19/2016	RENLITA
CHECKED		TITLE: S-2000 ENERGY TESTING
QA		
MFG		
APPROVED		
		SIZE C · DWG NO 2K-ENERGY · REV 1
		SCALE 1:1 · SHEET 3 OF 3

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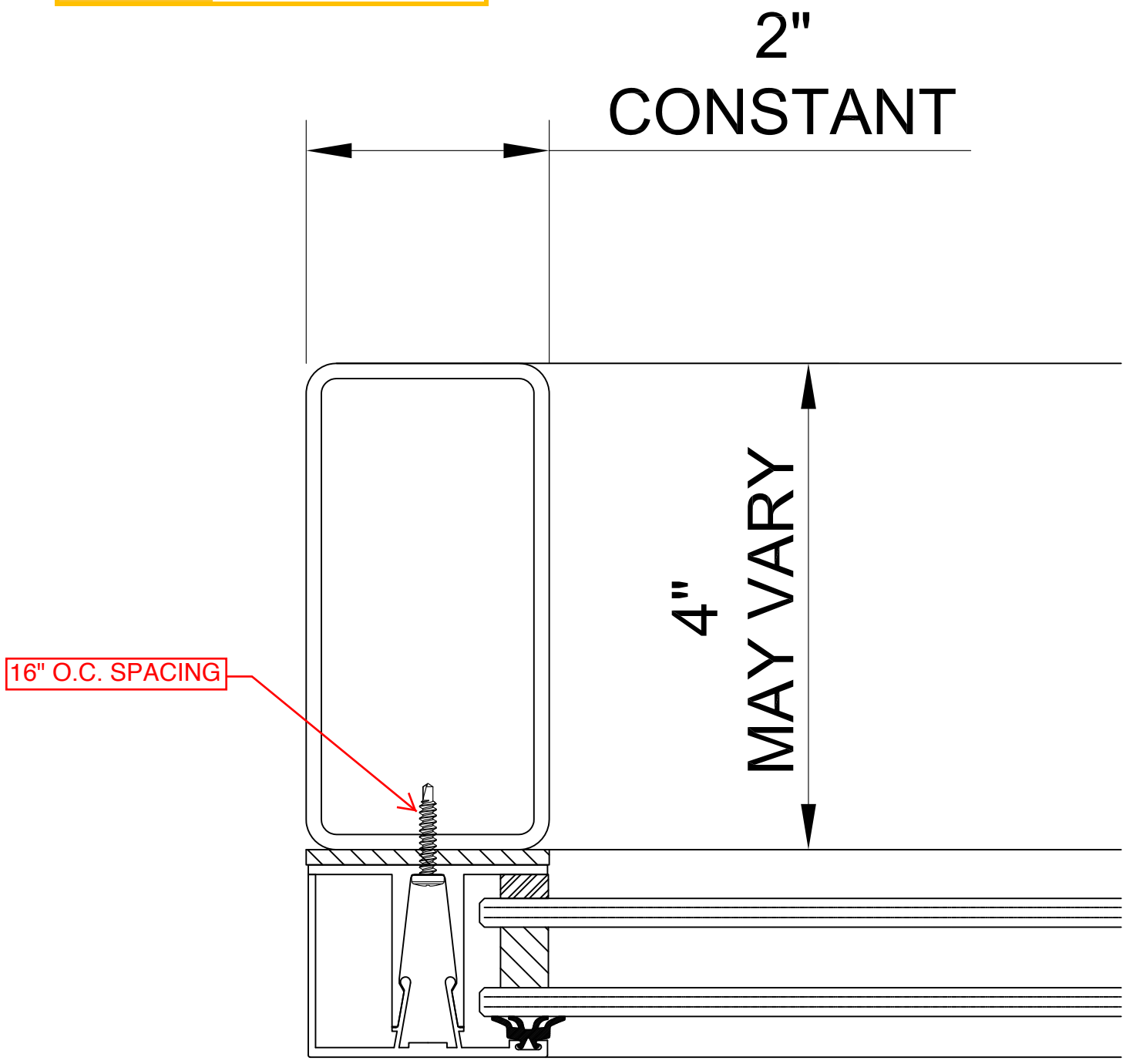
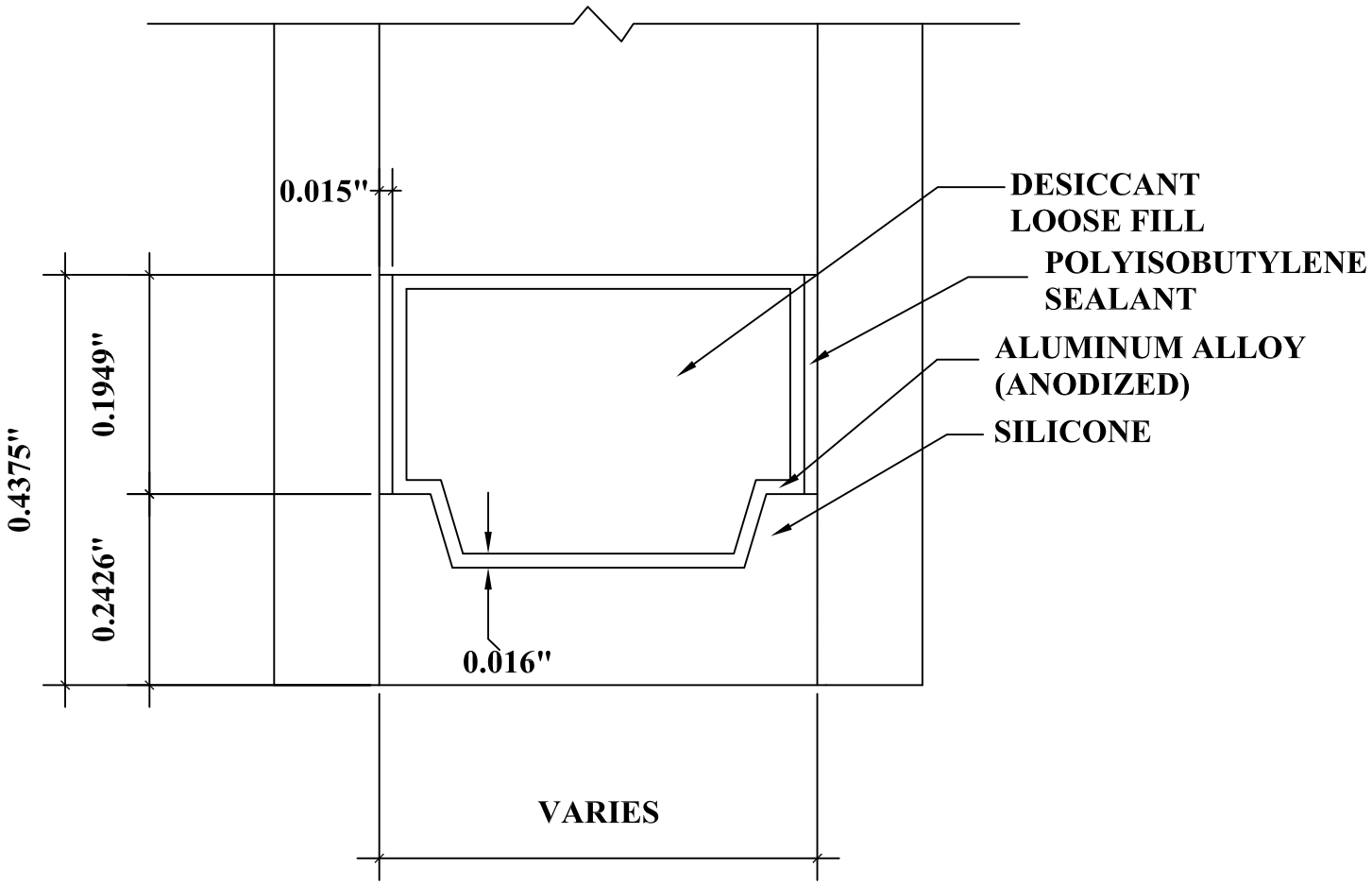


TYP. GLAZING DETAIL



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

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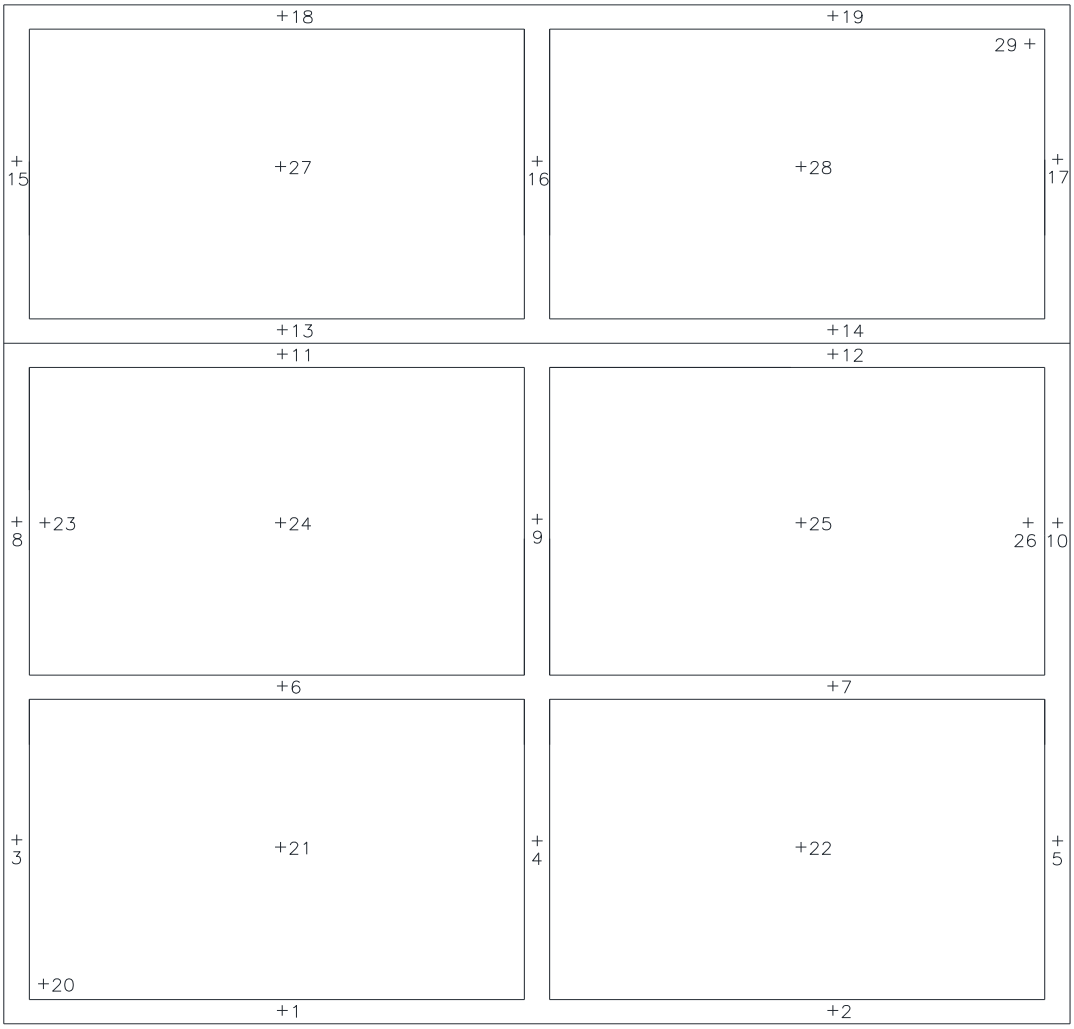
SECTION 16
THERMOCOUPLE LOCATION DIAGRAM AND TEMPERATURE CHART



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SECTION 16 CONT.

THERMOCOUPLE LOCATION DIAGRAM AND TEMPERATURE CHART

TEMPERATURE CHART - (F)		
THERMOCOUPLE	**EXTERIOR**	**INTERIOR**
1	19.45	39.50
2	18.99	40.32
3	35.47	50.79
4	17.62	45.57
5	32.56	51.35
6	18.87	47.85
7	19.24	46.53
8	34.60	52.13
9	14.05	44.64
10	32.07	50.75
11	18.46	41.44
12	19.71	40.87
13	21.13	44.32
14	19.71	43.15
15	40.80	58.66
16	20.98	48.47
17	32.58	56.03
18	34.12	62.74
19	31.68	60.73
20	10.56	34.39
21	4.33	51.82
22	4.43	52.53
23	13.01	42.61
24	4.50	52.55
25	3.92	51.53
26	10.56	43.16
27	5.53	61.60
28	3.92	60.25
29	17.29	42.56
AVERAGE	19.32	48.93

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SECTION 17
PHOTOGRAPHS

PHOTOGRAPH 1 - Interior of garage door installed

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SECTION 17 CONT.

PHOTOGRAPHS

PHOTOGRAPH 2 - Exterior of garage door installed

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SECTION 17 CONT.

PHOTOGRAPHS

PHOTOGRAPH 3 - Interior bottom of garage door installed

PHOTOGRAPH 4 - Interior bottom left of garage door installed

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SECTION 17 CONT.

PHOTOGRAPHS

PHOTOGRAPH 5 - Interior top of garage door installed

PHOTOGRAPH 6 - Interior top left of garage door installed

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SECTION 17 CONT.

PHOTOGRAPHS

PHOTOGRAPH 7 - Interior bottom left of garage door installed

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SECTION 17 CONT.

PHOTOGRAPHS

PHOTOGRAPH 8 - Interior bottom right of garage door installed

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SECTION 17 CONT.

PHOTOGRAPHS

PHOTOGRAPH 9 - Interior top right of garage door installed

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SECTION 18

REVISION LOG

REVISION #	DATE	PAGES	REVISION
.01 R0	06/30/20	N/A	Original Report Issue