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FRAMELESS HARDWARE COMPANY LLC COMPUTER SIMULATION REPORT

SCOPE OF WORK
200T SERIES STOREFRONT - NFRC 100/200/500

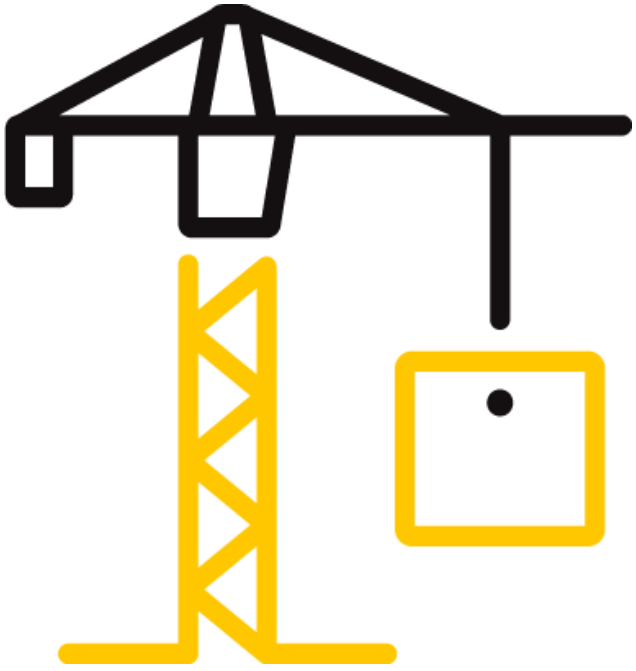
REPORT NUMBER
R3641.02-116-45 R0

TEST DATE
08/23/24

ISSUE DATE **REVISION DATE**
08/23/24 06/02/25

PAGES
22

DOCUMENT CONTROL NUMBER
RT-R-AMER-Test-4044 (04/11/22)



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TEST REPORT FOR FRAMELESS HARDWARE COMPANY LLC
Report No: R3641.02-116-45 R0
Date: 06/02/25

REPORT ISSUED TO
FRAMELESS HARDWARE COMPANY LLC
4361 Firestone Blvd.
South Gate, California 90280

SECTION 1
SUMMARY

SERIES/MODEL: 200T Series Storefront

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:	Caleb N. Walden	**REVIEWED BY:**	Eric S. Leitner
TITLE:	Simulation Technician, NFRC Certified Simulator	**TITLE:**	Manager - Simulations and Thermal Testing, SIRC
SIGNATURE:	Caleb Walden Digitally Signed by: Caleb Walden	**SIGNATURE:**	Eric S. Leitner Digitally Signed by: Eric S. Leitner
DATE:	06/02/25	**DATE:**	06/02/25

CNW:esl

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SECTION 2
TEST METHODS

The products were evaluated in accordance with the following:

ANSI/NFRC 100-2023, *Procedure for Determining Fenestration Product U-Factors*

ANSI/NFRC 200-2023, *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 7.8.71
CENTER-OF-GLASS MODELING	WINDOW 7.8.71
TOTAL PRODUCT CALCULATIONS	WINDOW 7.8.71
SPECTRAL DATA LIBRARY	IGDB 104.0

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.

SECTION 4
SIMULATION SPECIMEN DESCRIPTION

SERIES/MODEL	200T Series Storefront
PRODUCT TYPE	Window Wall
FRAME MATERIAL	AN - Aluminum (Non-Thermally Broken)
SASH MATERIAL	NA - Not Applicable
STANDARD SIZE	2000mm x 2000mm

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SECTION 4 (Continued)
SIMULATION SPECIMEN DESCRIPTION

SPACER OPTIONS			
TYPE	***PRIMARY SEAL***	***SECONDARY SEAL***	***CODE***
Aluminum Spacer	PIB	Butyl Rubber	A1-D
Quanex Super Spacer	Butyl Rubber	-	ZF-S

GRID OPTIONS		
GRID SIZE	***GRID TYPE***	***GRID PATTERN***
None	-	-

REINFORCEMENT OPTIONS	
LOCATION	***MATERIAL***
None	-

GAS FILLING TECHNIQUE	
FILL TYPE	***METHOD***
90% Argon	Single Probe

EDGE-OF-GLASS CONSTRUCTION	
INTERIOR CONDITION	EPDM gasket between frame and glass
EXTERIOR CONDITION	EPDM gasket between frame and glass

WEATHERSTRIPPING		
TYPE	***QUANTITY***	***LOCATION***
None	-	-

FRAME/SASH MATERIALS FINISH	
INTERIOR	Anodized aluminum
EXTERIOR	Anodized aluminum

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 7.8.71. 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	0.011564	0.014968	0.018156
SHGC1	0.887546	0.787237	0.693246
VT0	0.000000	0.000000	0.000000
VT1	0.875981	0.772269	0.675090

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

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

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SECTION 6
SIMULATION RESULTS

TOTAL PRODUCT CALCULATIONS (200T Series Storefront)

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 (6mm/6mm) - 25mm IG											
	0.225	0.500	0.225					AIR		CL	A1-D	N
	U-Factor		**0.58**	**SHGC(N)**			**0.63**		**VT(N)**	**0.69**	**CR**	**25**
2	SB70 (#2) / air / clear (5mm/5mm) - 25mm IG											
	0.184	0.625	0.184					AIR	0.018(#2)	CL	A1-D	N
	U-Factor		**0.44**	**SHGC(N)**			**0.25**		**VT(N)**	**0.57**	**CR**	**26**
3	SNX62/27 (#2) / arg / IS-20 (#4) (6mm/6mm) - 25mm IG											
	0.221	0.500	0.221					ARG90	0.020(#2) / 0.198(#4)	CL	ZF-S	N
	U-Factor		**0.34**	**SHGC(N)**			**0.23**		**VT(N)**	**0.52**	**CR**	**29**
4	SB60 (#2) / arg / clear (6mm/6mm) - 25mm IG											
	0.223	0.500	0.223					AIR	0.035(#2)	CL	A1-D	N
	U-Factor		**0.44**	**SHGC(N)**			**0.35**		**VT(N)**	**0.62**	**CR**	**26**
5	SB90 (#2) / arg / clear (6mm/6mm) - 25mm IG											
	0.223	0.500	0.223					AIR	0.023(#2)	CL	A1-D	N
	U-Factor		**0.43**	**SHGC(N)**			**0.22**		**VT(N)**	**0.45**	**CR**	**26**
6	SB72 (#2) / arg / clear (6mm/6mm) - 25mm IG											
	0.223	0.500	0.223					AIR	0.018(#2)	CL	A1-D	N
	U-Factor		**0.43**	**SHGC(N)**			**0.25**		**VT(N)**	**0.58**	**CR**	**26**
7	SNX51/23 (#2) / arg / clear (6mm/6mm) - 25mm IG											
	0.221	0.500	0.223					AIR	0.021(#2)	CL	A1-D	N
	U-Factor		**0.43**	**SHGC(N)**			**0.22**		**VT(N)**	**0.44**	**CR**	**26**

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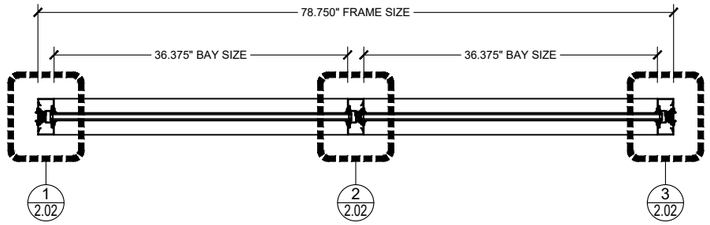
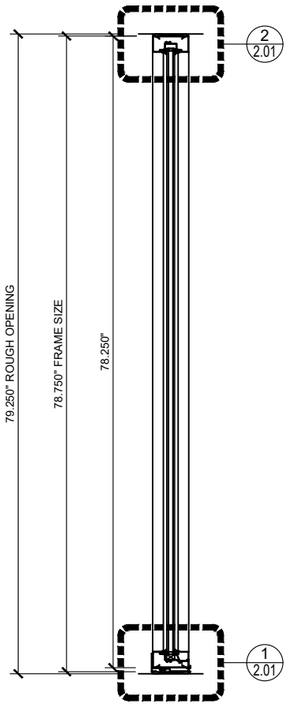
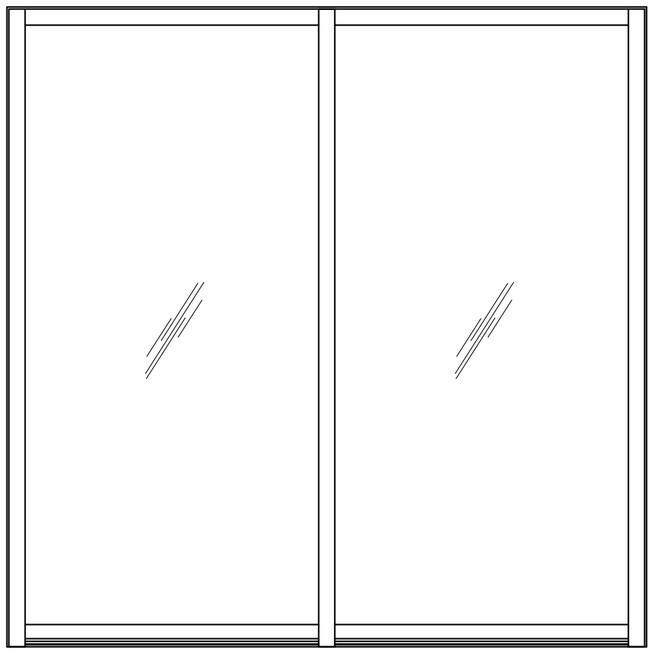
SECTION 7
DRAWINGS / BILL OF MATERIALS

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.







1 FHC 200T SERIES ELEVATION

ARCH REF: NONE

SCALE: 1-1/2"=1'-0"

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Job Name: NFRC THERMAL
INTERTEK (ATI) FHC ALUM 200T THERMAL
REF QUOTEE: 304864
Phone: (717) 767-3758
Fax: N/A
Contact: KIRBY MOSER

Customer:
Phone:
Fax:
Contact:

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Date: 4/29/24
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Project #: 12756-5-1

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1.01

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BILL OF MATERIALS

ITEM:	PART NUMBER:	DESCRIPTION:	MATERIAL:	FINISH:
1	6455TCA	2 X 4-1/2 THERMAL CENTER GLAZED HEAD/JAMB	6063-T6 ALUMINUM	CLEAR ANODIZE
2	6925CA	1-3/4 & 2 X 4-1/2 SNAP IN FLAT FILLER	6063-T6 ALUMINUM	CLEAR ANODIZE
3	7700RL	STOREFRONT GLAZING GASKET - EMUL/CORD	EPDM/DUROMETER 70	BLACK
4	6457TCA	2 X 4-1/2 THERMAL CENTER GLAZED SILL/ HORIZONTAL	6063-T6 ALUMINUM	CLEAR ANODIZE
5	6917TCA	2 X 4-1/2 THERMAL HIGH PERFORMANCE SUB SILL	6063-T6 ALUMINUM	CLEAR ANODIZE
6	6498CA	2 X 4-1/2 THERMAL FLUSH GLAZED SNAP ON FACE STOP	6063-T6 ALUMINUM	CLEAR ANODIZE
7	6473TCA	2 X 4-1/2 THERMAL CENTER GLAZED SNAP IN POCKET FILLER W/GLASS POCKET	6063-T6 ALUMINUM	CLEAR ANODIZE
8	9681A	GLASS SETTING BLOCK (1" X 5/8" X 3")	NEOPRENE/GRADE 80	BLACK

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Fax: N/A
Contact: KIRBY MOSER

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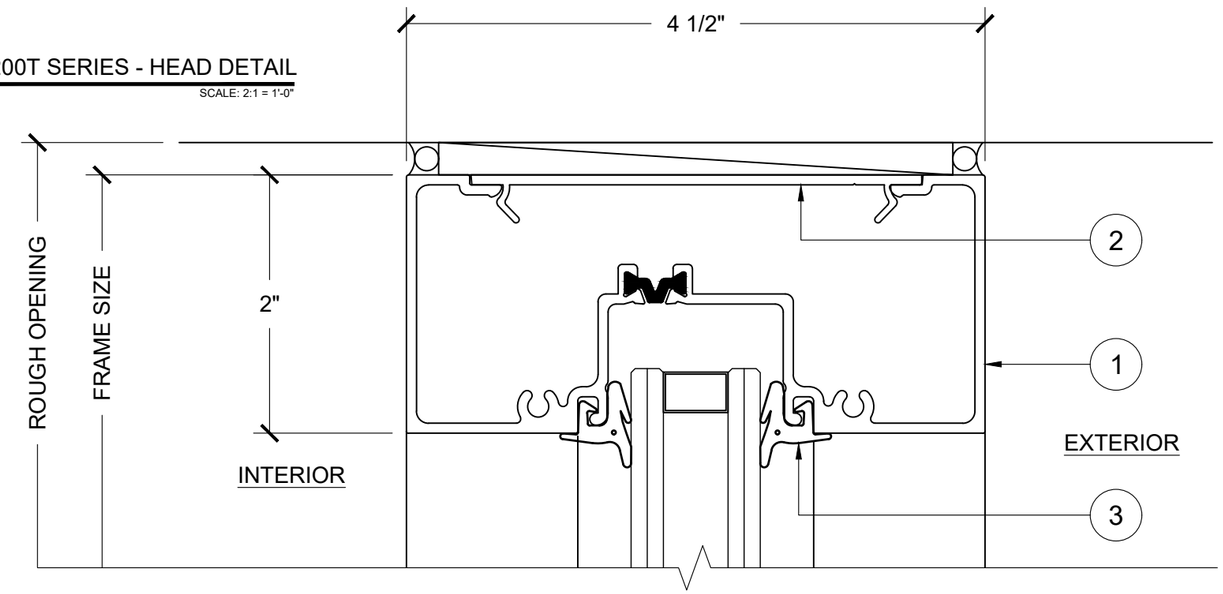
② FHC 200T SERIES - HEAD DETAIL

ARCH REF: NONE SCALE: 2:1 = 1'-0"



① FHC 200T SERIES - SILL DETAIL

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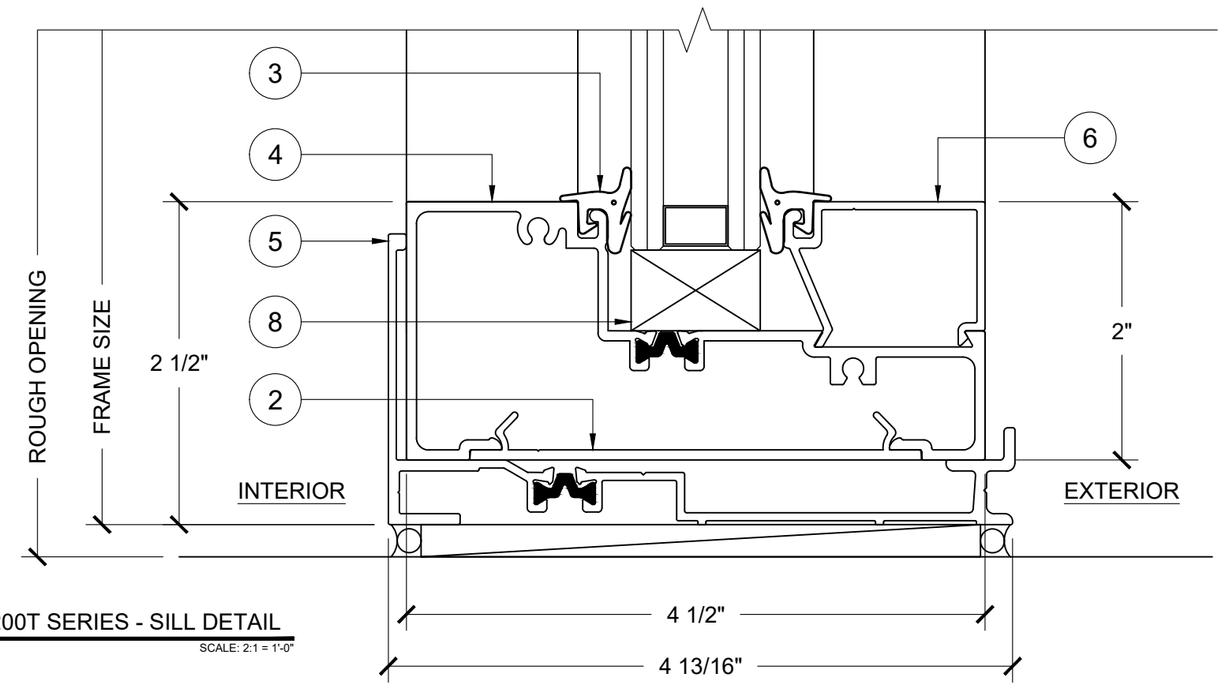

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Contact:

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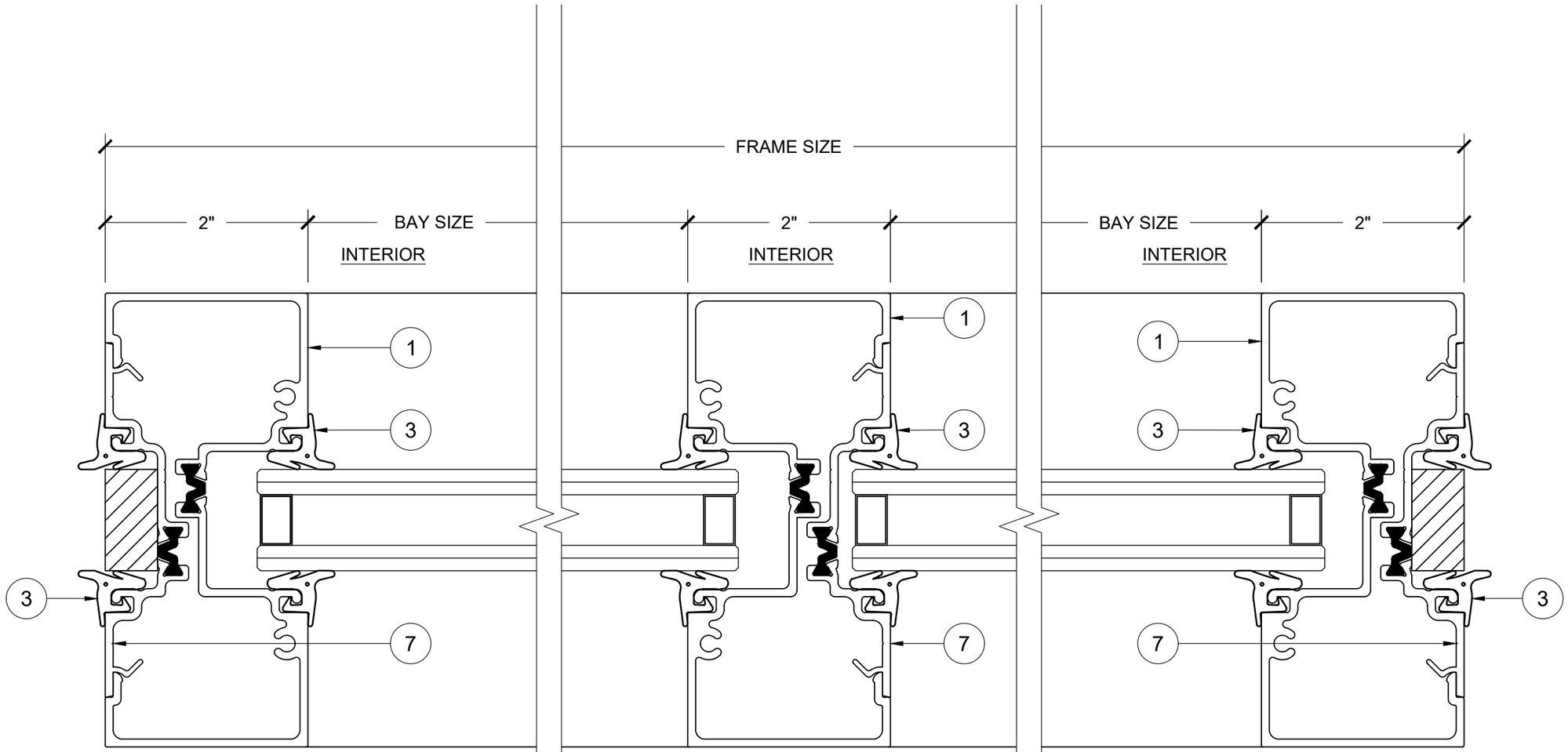

1 FHC 200T SERIES - JAMB DETAIL
ARCH REF: NONE SCALE: 2:1 = 1'-0"

2 FHC 200T SERIES - MULLION DETAIL
ARCH REF: NONE SCALE: 2:1 = 1'-0"

3 FHC 200T SERIES - JAMB DETAIL
ARCH REF: NONE SCALE: 2:1 = 1'-0"

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P/N: 6455TCA
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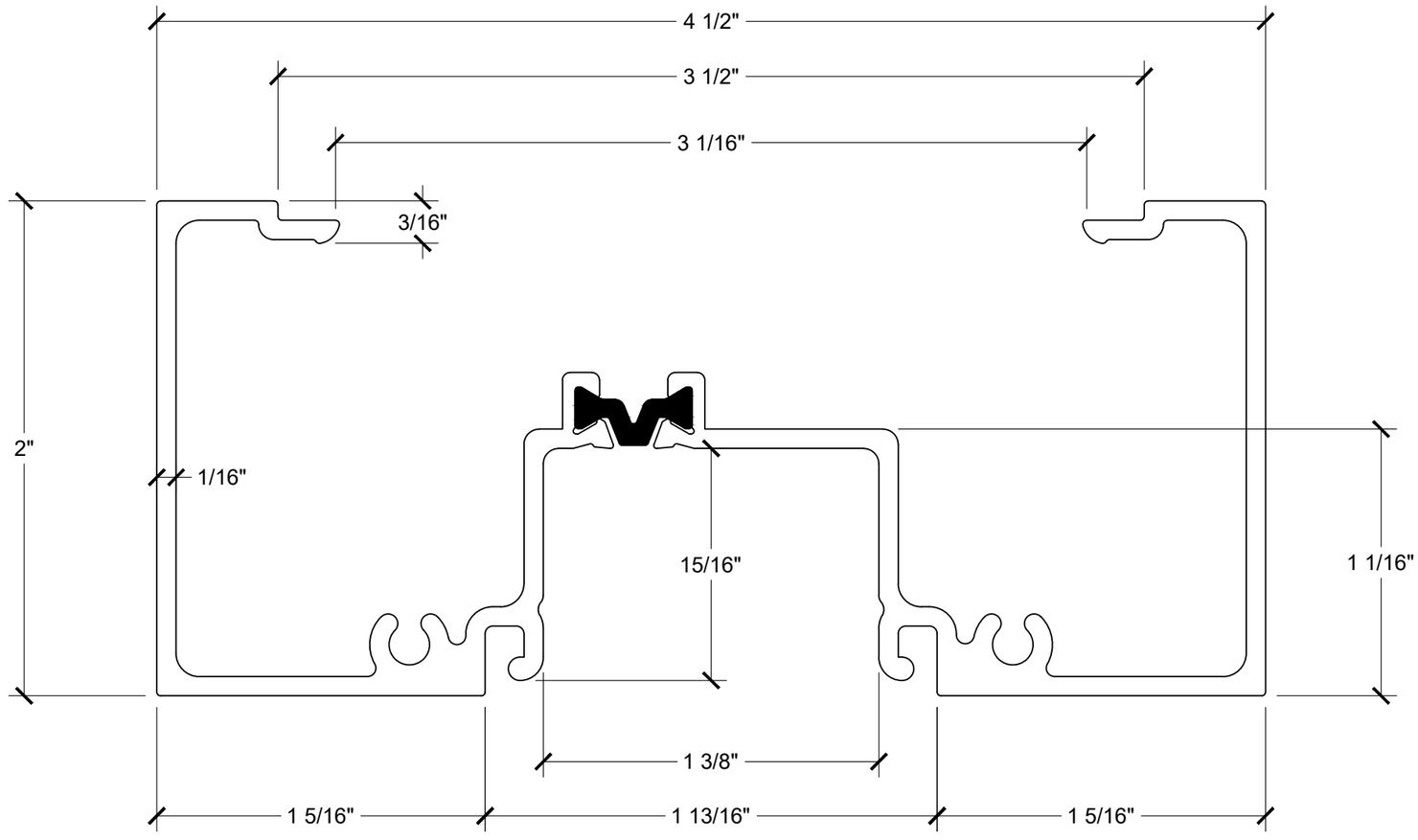
2 X 4-1/2 THERMAL CENTER GLAZED HEAD/JAMB



MATERIAL: 6063-T6 ALUMINUM
FINISH: CLEAR ANODIZE

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REF QUOTEE: 304864
Phone: (717) 767-3758
Fax: N/A
Contact: KIRBY MOSER

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Phone:
Fax:
Contact:

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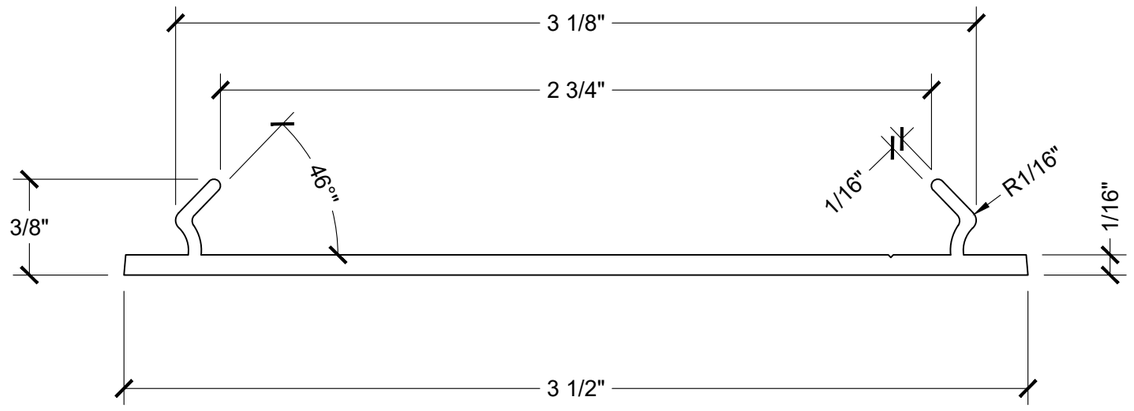
1-3/4 & 2 X 4-1/2 SNAP IN FLAT FILLER



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INTERTEK (ATI) FHC ALUM 200T THERMAL
REF QUOTEE: 304864
Phone: (717) 767-3758
Fax: N/A
Contact: KIRBY MOSER

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P/N: 6457TCA
ITEM #: 4
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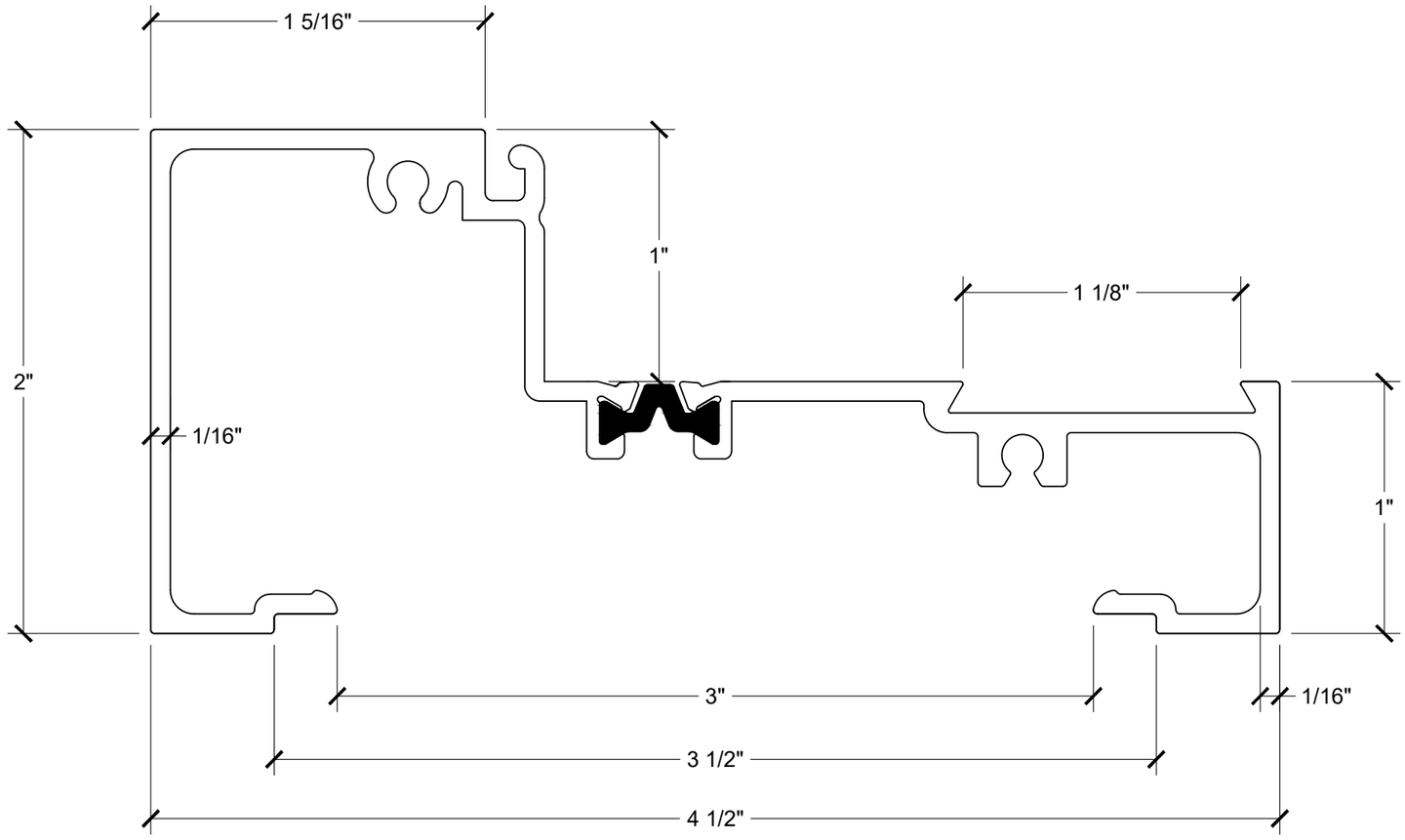

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REF QUOTEE: 304864
Phone: (717) 767-3758
Fax: N/A
Contact: KIRBY MOSER

Customer:
Phone:
Fax:
Contact:

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P/N: 6917TCA
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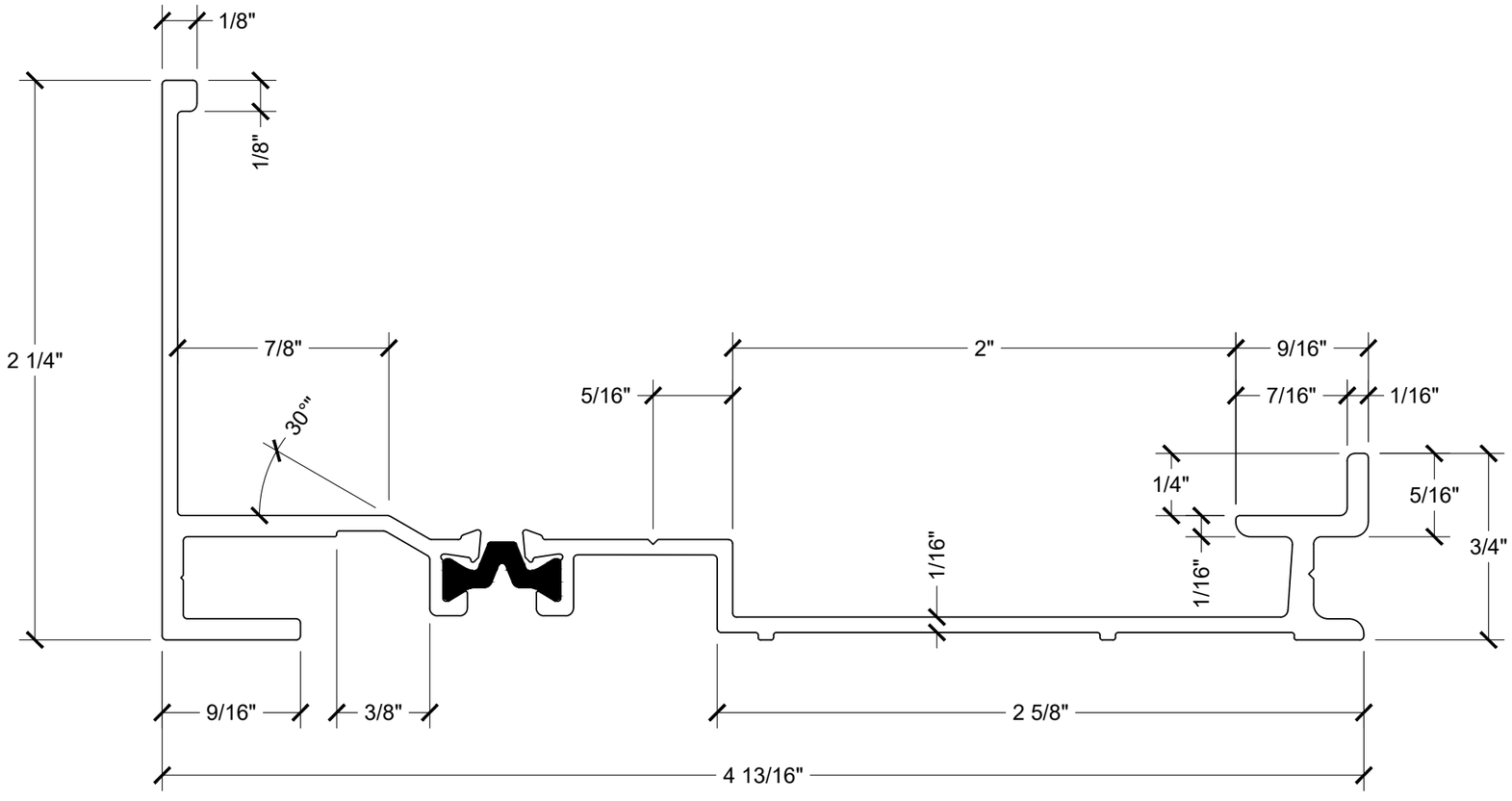
2 X 4-1/2 THERMAL HIGH PERFORMANCE SUB SILL



MATERIAL: 6063-T6 ALUMINUM
FINISH: CLEAR ANODIZE

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REF QUOTEE: 304864
Phone: (717) 767-3758
Fax: N/A
Contact: KIRBY MOSER

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Project #: 12756-5-1

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3.04

P/N: 6498CA
ITEM #: 6
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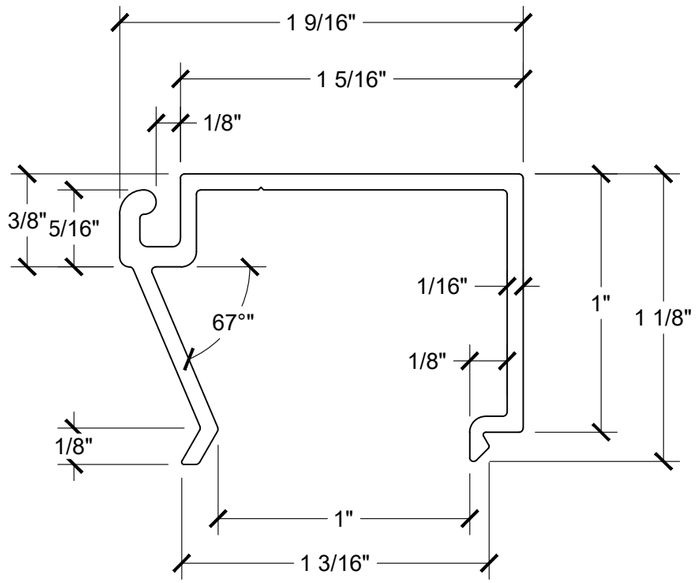

MATERIAL: 6063-T6 ALUMINUM
FINISH: CLEAR ANODIZE

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Report #: R3641-116-45
Date: 8/23/2024
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Job Name: NFRC THERMAL
INTERTEK (ATI) FHC ALUM 200T THERMAL
REF QUOTE#: 304864
Phone: (717) 767-3758
Fax: N/A
Contact: KIRBY MOSER

Customer:
Phone:
Fax:
Contact:

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Project #: 12756-5-1

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3.05

P/N: 6473TCA
ITEM #: 7
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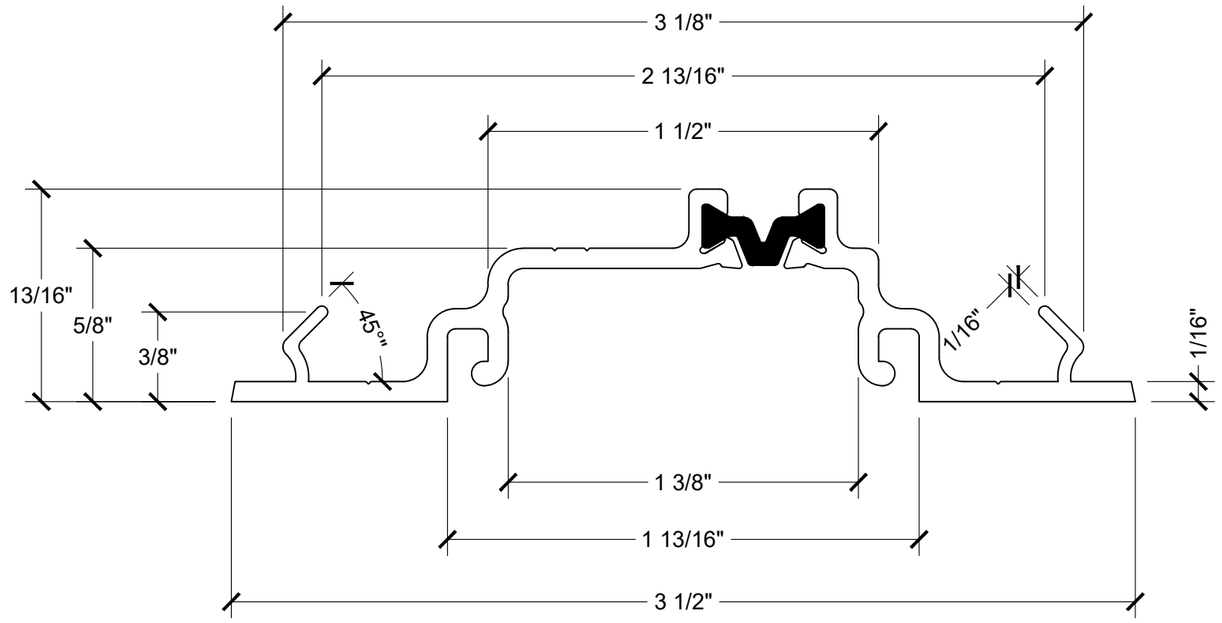

MATERIAL: 6063-T6 ALUMINUM
FINISH: CLEAR ANODIZE

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Report #: R3641-116-45
Date: 8/23/2024
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Job Name: NFRC THERMAL
INTERTEK (ATI) FHC ALUM 200T THERMAL
REF QUOTEE: 304864
Phone: (717) 767-3758
Fax: N/A
Contact: KIRBY MOSER

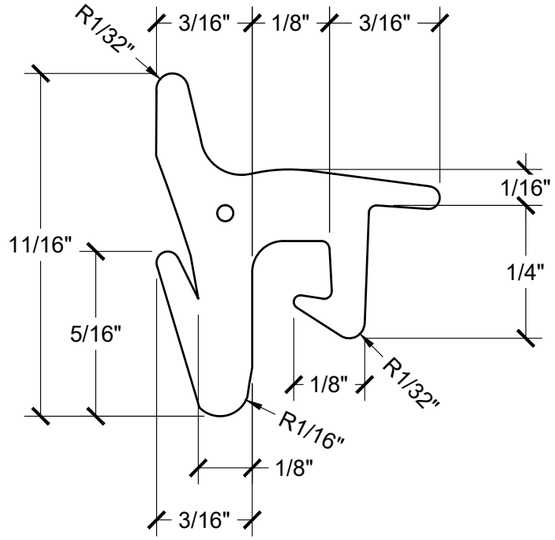
Customer:
Phone:
Fax:
Contact:

REV#	DATE	DRAWN BY
0	------	--
1	6/12/24	MS

Drawn By: MS
Checked By:
Date: 4/29/24
Scale: AS NOTED
Project #: 12756-5-1

Sheet No.
3.06

P/N: 7700RL
ITEM #: 3
STOREFRONT GLAZING GASKET - EMUL/CORD



MATERIAL: EPDM /DUROMETER 70
FINISH: BLACK

Report #: R3641-116-45
Date: 8/23/2024
Verified by:

FHC
FRAMELESS HARDWARE COMPANY
FHCUSA.COM 888-295-4531

ENGINEER STAMP

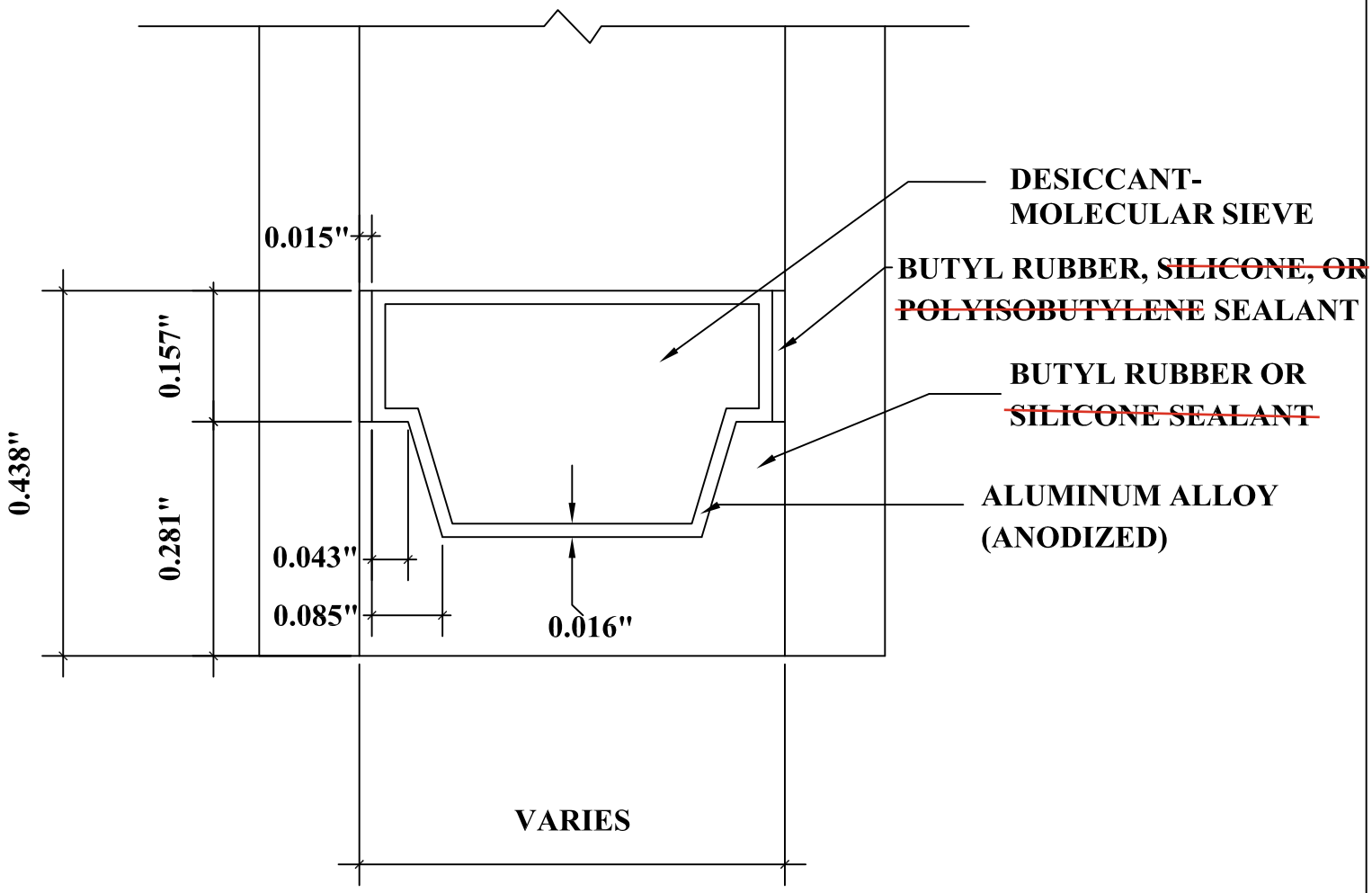
Job Name: NFRC THERMAL
INTERTEK (ATI) FHC ALUM 200T THERMAL
REF QUOTEE: 304864
Phone: (717) 767-3758
Fax: N/A
Contact: KIRBY MOSER

Customer:
Phone:
Fax:
Contact:

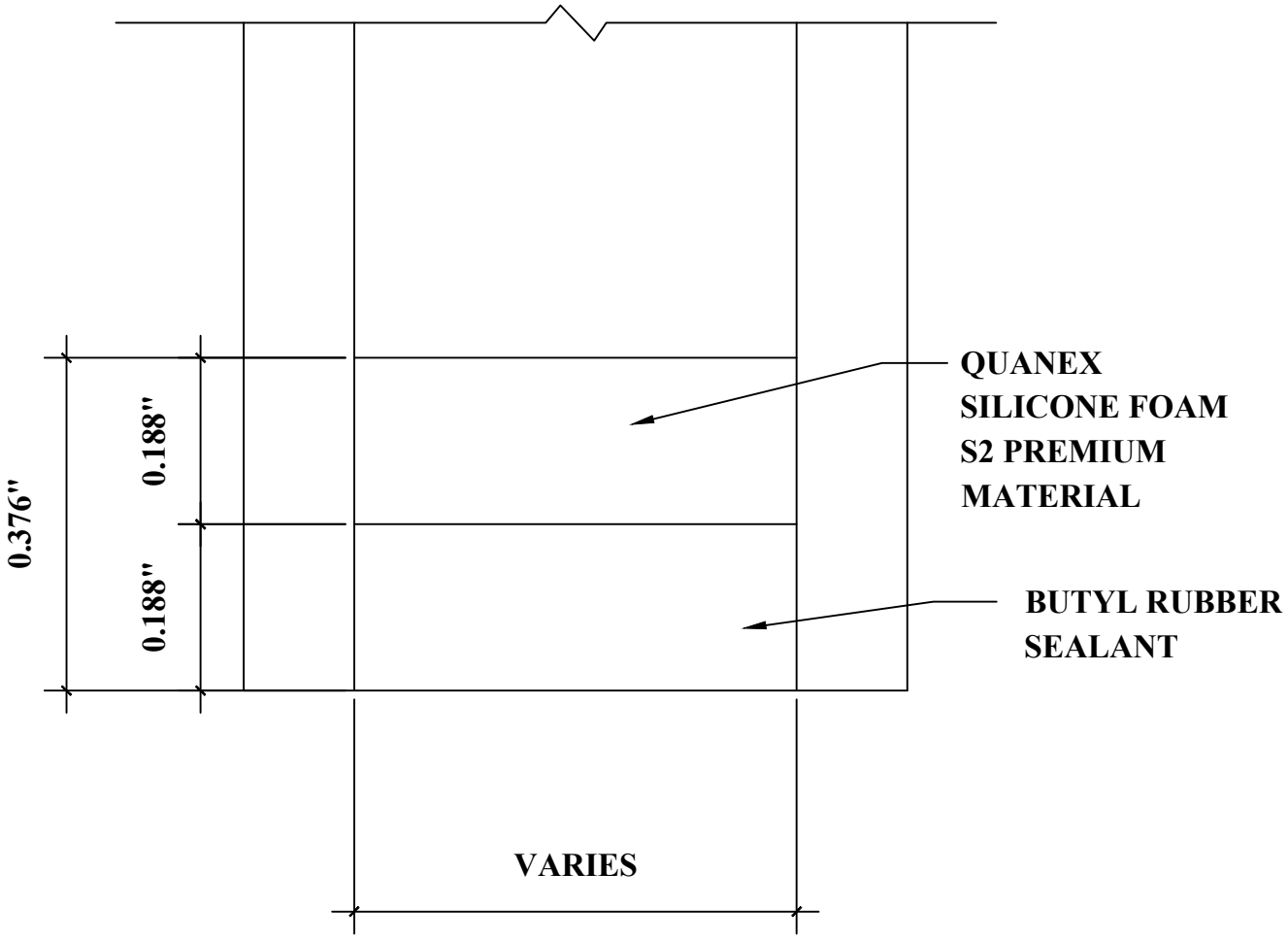
REV#	DATE	DRAWN BY
0	------	--
1	6/12/24	MS

Drawn By: MS
Checked By:
Date: 4/29/24
Scale: AS NOTED
Project #: 12756-5-1

Sheet No.
4.01



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



DETAIL FOR THERMAL MODELING OF
QUANEX SUPER SPACER PREMIUM (ZF-S)

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

SECTION 8
REVISION LOG

REVISION #	DATE	PAGES	REVISION
.01 R0	08/23/24	N/A	Original report issue.
.02 R0	06/02/25	N/A	Revised report issue. Report revised to add glass options (IDs 4-7).