

# ATLAS ARCHITECTURAL METALS, INC. COMPUTER SIMULATION REPORT

**SCOPE OF WORK**

7000 SERIES CURTAIN WALL - AAMA 507

**REPORT NUMBER**

Q9146.01-116-45 R0

**TEST DATE**

01/22/24

**ISSUE DATE**

01/22/24

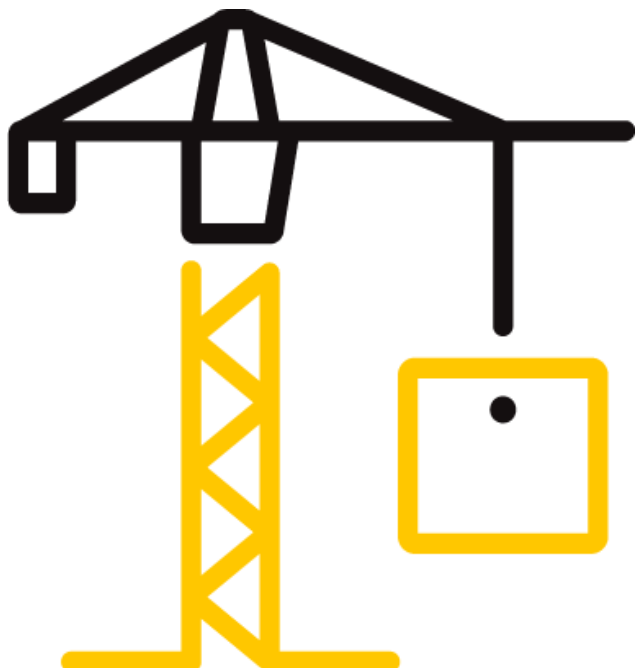
**PAGES**

23

**DOCUMENT CONTROL NUMBER**

RT-R-AMER-Test-3754 (02/20/18)

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## TEST REPORT FOR ATLAS ARCHITECTURAL METALS, INC.

Report No.: Q9146.01-116-45 R0

Date: 01/22/24

### REPORT ISSUED TO

#### ATLAS ARCHITECTURAL METALS, INC.

11940 Brittmoore Park Drive

Houston, Texas 77041

### SECTION 1

#### SUMMARY

#### SERIES/MODEL: 7000 Series Curtain Wall

Architectural Testing, Inc. (an Intertek company), dba Intertek Building & Construction (Intertek B&C) was contracted to perform AAMA 507 computer simulations utilizing thermal thermal modeling computer software developed by Lawrence Berkeley National Laboratory Laboratory (LBNL). Results obtained are simulated values and were secured using the designated test methods.

Intertek B&C is an NFRC accredited simulation laboratory and all simulations were conducted in full compliance with NFRC approved procedures and specifications.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. The record retention end date of this report is 01/22/29.

For INTERTEK B&C:

**COMPLETED BY:** Allison M. Ford  
**TITLE:** Technician Team Leader  
**SIGNATURE:**  
**DATE:** 01/22/24

AMF:amf

**REVIEWED BY:** Eric S. Leitner  
**TITLE:** Manager - Thermal Testing & Simulations  
**SIGNATURE:**  
**DATE:** 01/22/24

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## TEST REPORT FOR ATLAS ARCHITECTURAL METALS, INC.

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### SECTION 2

#### TEST METHODS

The products were evaluated in accordance with the following:

*AAMA 507-15, Standard Practice for Determining the Thermal Performance Characteristics of Fenestration Systems Installed in Commercial Buildings*

*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*

### SECTION 3

#### TEST PROCEDURE

The total product, including specific frame, spacer, and glass details, was modeled using NFRC approved software.

<b>FRAME AND EDGE MODELING</b>	THERM 7.8.57
<b>CENTER-OF-GLASS MODELING</b>	WINDOW 7.8.57
<b>TOTAL PRODUCT CALCULATIONS</b>	WINDOW 7.8.57
<b>SPECTRAL DATA LIBRARY</b>	IGDB 95.0

#### 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.
- 2) This product is available in either a painted or anodized finish. These two finish types may be grouped in accordance with ANSI/NFRC 100-2023, Section 4.2.1.L. The painted finish was simulated since it is the worst case (highest emissivity).
- 3) The center-line modeling approach was conducted using the horizontal intermediate for the head and sill members and the vertical intermediate for the jambs. This procedure is outlined in the NFRC Simulation Manual, Section 8.9.
- 4) Non-continuous hardware was not modeled.

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**SECTION 4**

**SIMULATION SPECIMEN DESCRIPTION**

<b>SERIES/MODEL</b>	7000 Series Curtain Wall
<b>PRODUCT TYPE</b>	Glazed Wall System
<b>FRAME MATERIAL</b>	AU - Thermally Improved
<b>SASH MATERIAL</b>	NA - Not Applicable

<b>GLAZING OPTIONS</b>					
	<i>OUTER PANE</i>	<i>MIDDLE PANE</i>	<i>INNER PANE</i>	<i>GAP SIZES</i>	<i>IG OVERALL</i>
GL1	1/4"	N/A	1/4"	0.500"	1"
GL2	1/4"	Heat Mirror	1/4"	0.250"	1"

GL1: Dual glazed IG unit (COG=0.48 - COG=0.20)

GL2: Dual glazed IG unit w/ heat mirror (COG=0.18 - COG=0.10)

<b>SPACER OPTIONS</b>			
<i>TYPE</i>	<i>PRIMARY SEAL</i>	<i>SECONDARY SEAL</i>	<i>CODE</i>
Generic Aluminum Dual Seal Spacer	Butyl Rubber	Butyl Rubber	A1-D

**SECTION 5**

**MEASURED SIMULATION DATA**

<b>U-FACTOR CALCULATIONS</b>	
Exterior Air Temperature	-0.4°F
Exterior Wind Velocity	12.3 mph (Perpendicular Flow)
Interior Air Temperature	69.8°F

## TEST REPORT FOR ATLAS ARCHITECTURAL METALS, INC.

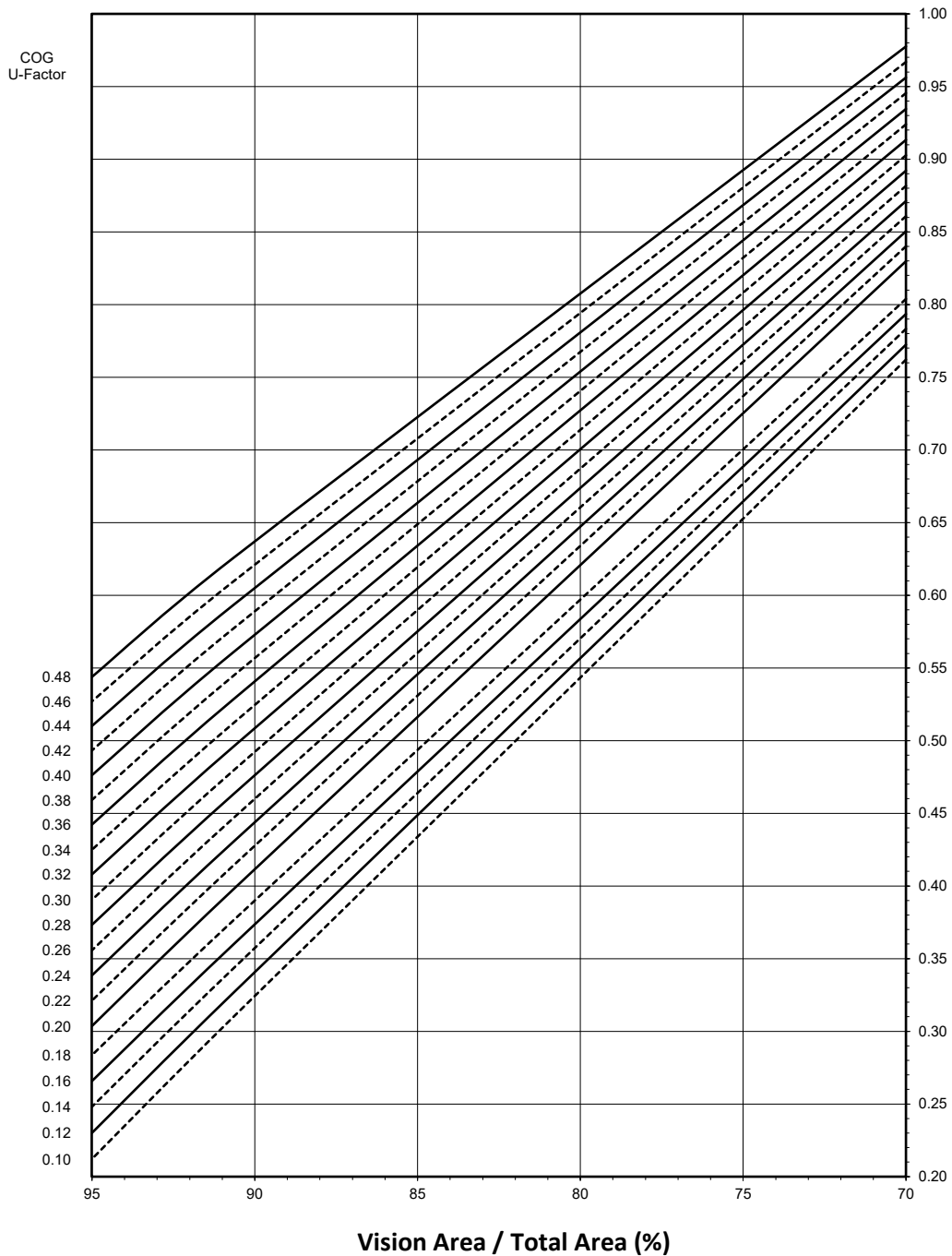
Report No.: Q9146.01-116-45 R0

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### SECTION 6

### SIMULATION RESULTS

#### U-FACTOR CALCULATIONS: System U-Factor vs. Percentage of Vision Area



## TEST REPORT FOR ATLAS ARCHITECTURAL METALS, INC.

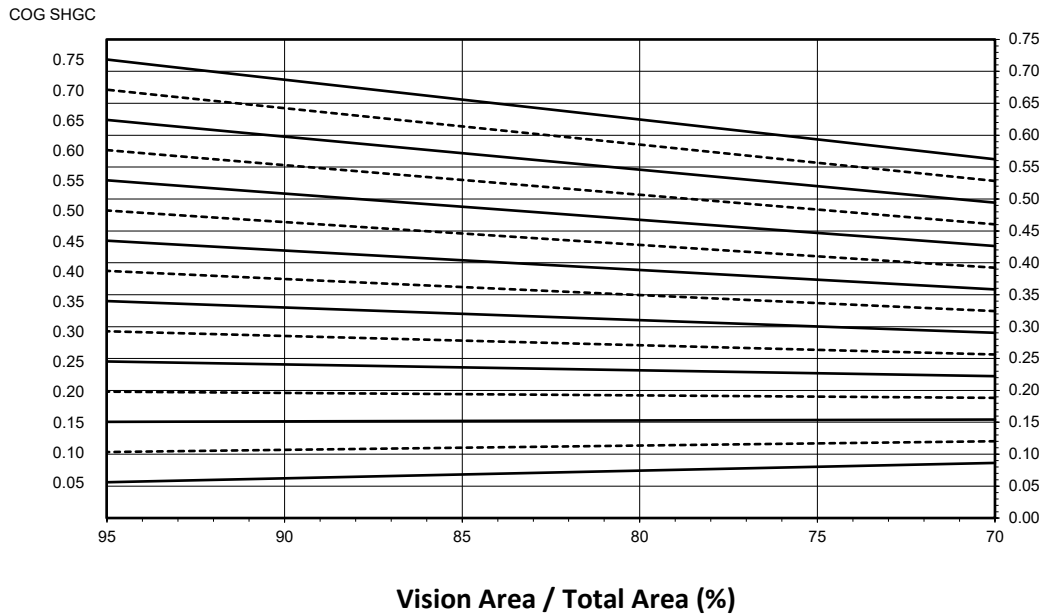
Report No.: Q9146.01-116-45 R0

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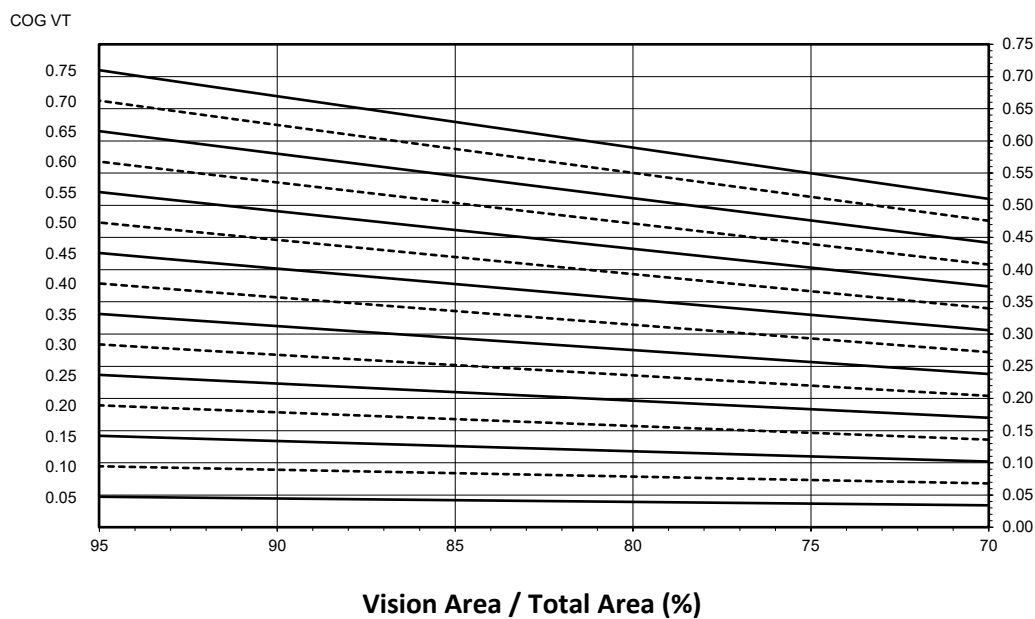
### SECTION 6

### SIMULATION RESULTS

#### SHGC CALCULATIONS: System SHGC vs. Percentage of Vision Area



#### VT CALCULATIONS: System VT vs. Percentage of Vision Area



**TEST REPORT FOR ATLAS ARCHITECTURAL METALS, INC.**

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**SECTION 6**

**SIMULATION RESULTS**

<b>U-FACTOR CALCULATIONS (7000 Series Curtain Wall)</b>		
<b>Size Specific U-Factor Matrix*</b>		
<b>Glazing Option</b>	<b>Center-of-Glass U-Factor</b>	<b>Overall U-Factor</b>
1	0.48	0.63
2	0.46	0.61
3	0.44	0.59
4	0.42	0.58
5	0.40	0.56
6	0.38	0.54
7	0.36	0.53
8	0.34	0.51
9	0.32	0.50
10	0.30	0.48
11	0.28	0.46
12	0.26	0.45
13	0.24	0.43
14	0.22	0.41
15	0.20	0.40
16	0.18	0.38
17	0.16	0.36
18	0.14	0.34
19	0.12	0.33
20	0.10	0.31

\*The size specific U-Factor matrix is based on the Glazed Wall System NFRC specimen size of 2000mm x 2000mm (78.75 in x 78.75 in). This represents 90.7% Vision Area / Total Area.

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**SECTION 6**

**SIMULATION RESULTS**

<b>SHGC/VT CALCULATIONS (7000 Series Curtain Wall)</b>			
<b>Size Specific SHGC Matrix*</b>		<b>Size Specific VT Matrix*</b>	
<b>Center-of-Glass SHGC</b>	<b>Overall SHGC</b>	<b>Center-of-Glass VT</b>	<b>Overall VT</b>
0.75	0.69	0.75	0.67
0.70	0.65	0.70	0.63
0.65	0.60	0.65	0.58
0.60	0.56	0.60	0.54
0.55	0.51	0.55	0.49
0.50	0.47	0.50	0.45
0.45	0.42	0.45	0.40
0.40	0.38	0.40	0.36
0.35	0.33	0.35	0.31
0.30	0.29	0.30	0.27
0.25	0.24	0.25	0.22
0.20	0.20	0.20	0.18
0.15	0.15	0.15	0.13
0.10	0.11	0.10	0.09
0.05	0.06	0.05	0.04

\*The size specific SHGC and VT matrices are based on the Glazed Wall System NFRC specimen size of 2000mm x 2000mm (78.75 in x 78.75 in). This represents 90.7% Vision Area / Total Area.



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**SECTION 6**

**SIMULATION RESULTS**

<b>TOTAL PRODUCT CALCULATIONS (7000 Series Curtain Wall)</b>									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70.00% Vision Area	ANSI/NFRC 100-2023	95.00% Vision Area
1	0.48	43.7°F	Head	1.3359	2.0336	0.4659	0.9776	0.6257	0.5439
			L. Jamb	1.3444	2.0684	0.4629			
			R. Jamb	1.3444	2.0684	0.4629			
			Mullion	2.6888	2.0684	0.4629			
			Sill	1.3529	1.9961	0.4659			
2	0.46	44.8°F	Head	1.3359	2.0338	0.4519	0.9669	0.6095	0.5270
			L. Jamb	1.3444	2.0707	0.4485			
			R. Jamb	1.3444	2.0707	0.4484			
			Mullion	2.6888	2.0707	0.4484			
			Sill	1.3529	1.9964	0.4520			
3	0.44	45.8°F	Head	1.3359	2.0363	0.4374	0.9562	0.5933	0.5101
			L. Jamb	1.3444	2.0709	0.4346			
			R. Jamb	1.3444	2.0709	0.4346			
			Mullion	2.6888	2.0709	0.4346			
			Sill	1.3529	1.9991	0.4375			
4	0.42	46.8°F	Head	1.3359	2.0366	0.4239	0.9455	0.5771	0.4933
			L. Jamb	1.3444	2.0713	0.4211			
			R. Jamb	1.3444	2.0712	0.4210			
			Mullion	2.6888	2.0712	0.4211			
			Sill	1.3529	1.9995	0.4239			
5	0.40	47.9°F	Head	1.3359	2.0369	0.4100	0.9346	0.5608	0.4762
			L. Jamb	1.3444	2.0717	0.4072			
			R. Jamb	1.3444	2.0716	0.4072			
			Mullion	2.6888	2.0717	0.4072			
			Sill	1.3529	2.0000	0.4100			
6	0.38	48.9°F	Head	1.3359	2.0373	0.3965	0.9240	0.5446	0.4592
			L. Jamb	1.3444	2.0721	0.3938			
			R. Jamb	1.3444	2.0721	0.3937			
			Mullion	2.6888	2.0721	0.3937			
			Sill	1.3529	2.0005	0.3965			

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**SECTION 6**

**SIMULATION RESULTS**

<b>TOTAL PRODUCT CALCULATIONS (7000 Series Curtain Wall)</b>									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70.00% Vision Area	ANSI/NFRC 100-2023	95.00% Vision Area
7	0.36	50.0°F	Head	1.3359	2.0377	0.3829	0.9133	0.5284	0.4423
			L. Jamb	1.3444	2.0726	0.3802			
			R. Jamb	1.3444	2.0726	0.3802			
			Mullion	2.6888	2.0726	0.3802			
			Sill	1.3529	2.0011	0.3829			
8	0.34	51.0°F	Head	1.3359	2.0382	0.3694	0.9027	0.5120	0.4250
			L. Jamb	1.3444	2.0732	0.3667			
			R. Jamb	1.3444	2.0732	0.3666			
			Mullion	2.6888	2.0732	0.3667			
			Sill	1.3529	2.0018	0.3694			
9	0.32	52.0°F	Head	1.3359	2.0388	0.3560	0.8921	0.4958	0.4080
			L. Jamb	1.3444	2.0738	0.3533			
			R. Jamb	1.3444	2.0738	0.3532			
			Mullion	2.6888	2.0738	0.3532			
			Sill	1.3529	2.0024	0.3559			
10	0.30	53.1°F	Head	1.3359	2.0393	0.3426	0.8817	0.4794	0.3905
			L. Jamb	1.3444	2.0744	0.3399			
			R. Jamb	1.3444	2.0744	0.3399			
			Mullion	2.6888	2.0744	0.3399			
			Sill	1.3529	2.0031	0.3426			
11	0.28	54.2°F	Head	1.3359	2.0400	0.3293	0.8712	0.4632	0.3733
			L. Jamb	1.3444	2.0752	0.3266			
			R. Jamb	1.3444	2.0752	0.3266			
			Mullion	2.6888	2.0752	0.3266			
			Sill	1.3529	2.0039	0.3292			
12	0.26	55.2°F	Head	1.3359	2.0407	0.3159	0.8608	0.4467	0.3558
			L. Jamb	1.3444	2.0760	0.3133			
			R. Jamb	1.3444	2.0760	0.3133			
			Mullion	2.6888	2.0760	0.3133			
			Sill	1.3529	2.0048	0.3159			

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**SIMULATION RESULTS**

<b>TOTAL PRODUCT CALCULATIONS (7000 Series Curtain Wall)</b>									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70.00% Vision Area	ANSI/NFRC 100-2023	95.00% Vision Area
13	0.24	56.3°F	Head	1.3359	2.0414	0.3027	0.8504	0.4304	0.3385
			L. Jamb	1.3444	2.0768	0.3001			
			R. Jamb	1.3444	2.0768	0.3001			
			Mullion	2.6888	2.0768	0.3001			
			Sill	1.3529	2.0057	0.3026			
14	0.22	57.3°F	Head	1.3359	2.0423	0.2894	0.8401	0.4141	0.3212
			L. Jamb	1.3444	2.0778	0.2868			
			R. Jamb	1.3444	2.0778	0.2868			
			Mullion	2.6888	2.0778	0.2868			
			Sill	1.3529	2.0067	0.2893			
15	0.20	58.4°F	Head	1.3359	2.0432	0.2763	0.8298	0.3977	0.3037
			L. Jamb	1.3444	2.0787	0.2737			
			R. Jamb	1.3444	2.0787	0.2737			
			Mullion	2.6888	2.0787	0.2737			
			Sill	1.3529	2.0077	0.2762			
16	0.18	59.5°F	Head	1.3359	1.9125	0.2540	0.8039	0.3763	0.2837
			L. Jamb	1.3444	2.0614	0.2527			
			R. Jamb	1.3444	2.0614	0.2528			
			Mullion	2.6888	2.0614	0.2528			
			Sill	1.3529	1.9901	0.2551			
17	0.16	60.6°F	Head	1.3359	1.9131	0.2405	0.7935	0.3598	0.2658
			L. Jamb	1.3444	2.0624	0.2394			
			R. Jamb	1.3444	2.0624	0.2394			
			Mullion	2.6888	2.0624	0.2394			
			Sill	1.3529	1.9911	0.2417			
18	0.14	61.6°F	Head	1.3359	1.9150	0.2264	0.7833	0.3433	0.2482
			L. Jamb	1.3444	2.0647	0.2254			
			R. Jamb	1.3444	2.0647	0.2254			
			Mullion	2.6888	2.0647	0.2254			
			Sill	1.3529	1.9934	0.2276			

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**SIMULATION RESULTS**

<b>TOTAL PRODUCT CALCULATIONS (7000 Series Curtain Wall)</b>									
Option Number	COG U-Factor	COG Temperature	Cross Section	Frame Height	Frame U-Factor	Edge U-Factor	Total Product U-Factor		
							70.00% Vision Area	ANSI/NFRC 100-2023	95.00% Vision Area
19	0.12	62.7°F	Head	1.3359	1.9157	0.2130	0.7724	0.3265	0.2302
			L. Jamb	1.3444	2.0657	0.2121			
			R. Jamb	1.3444	2.0657	0.2121			
			Mullion	2.6888	2.0657	0.2121			
			Sill	1.3529	1.9844	0.2141			
20	0.10	63.9°F	Head	1.3359	1.9164	0.1995	0.7621	0.3099	0.2122
			L. Jamb	1.3444	2.0668	0.1987			
			R. Jamb	1.3444	2.0668	0.1987			
			Mullion	2.6888	2.0668	0.1987			
			Sill	1.3529	1.9856	0.2007			

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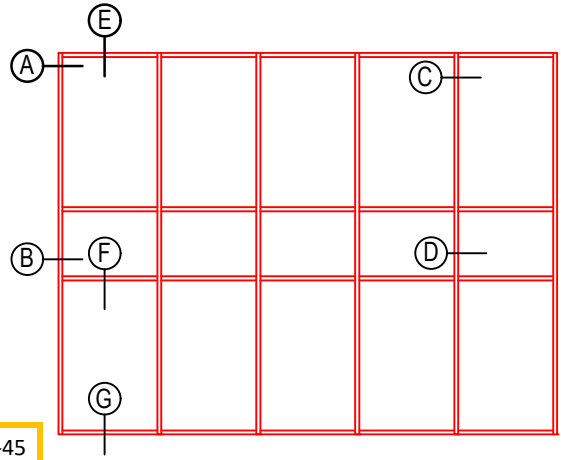
**SECTION 7**

**DRAWINGS / BILL OF MATERIALS**

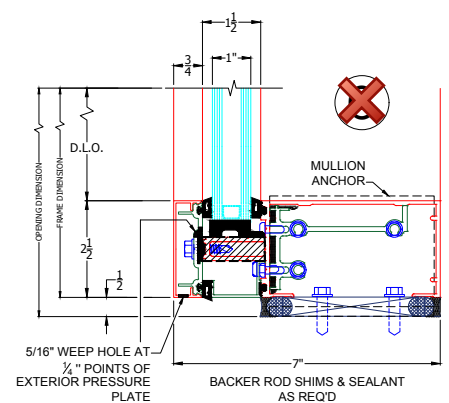
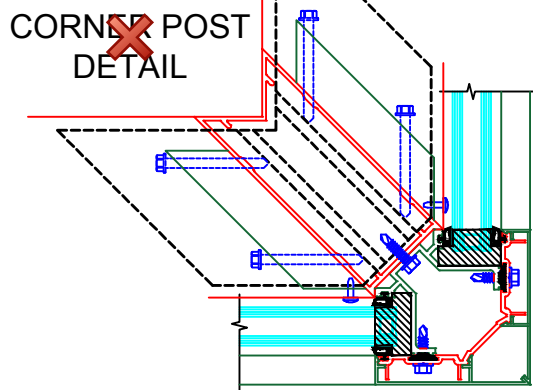
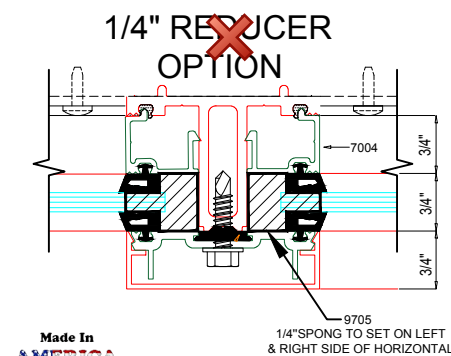
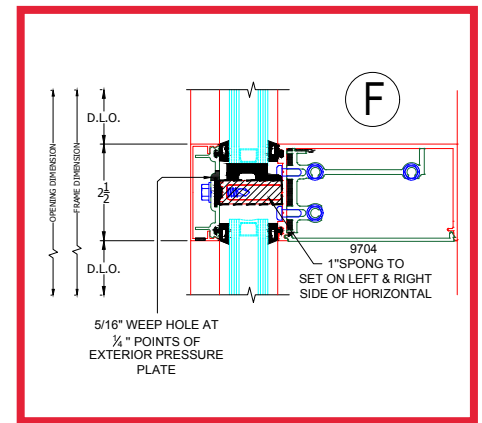
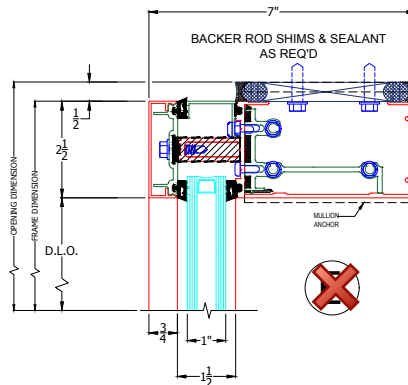
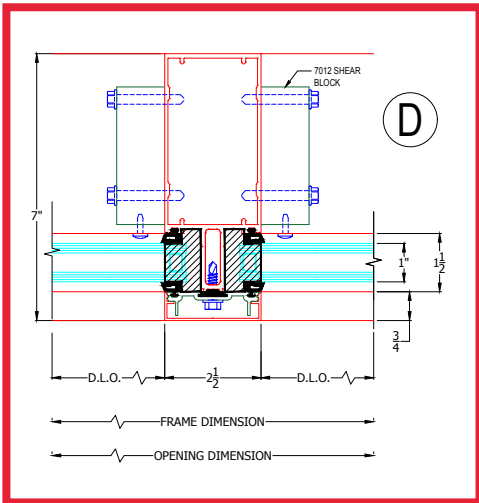
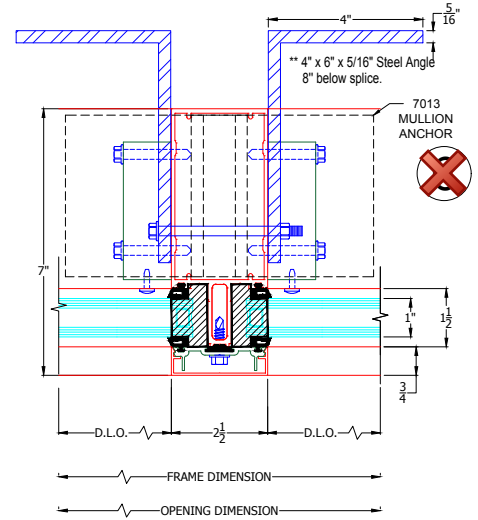
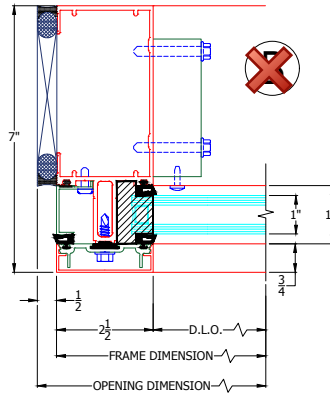
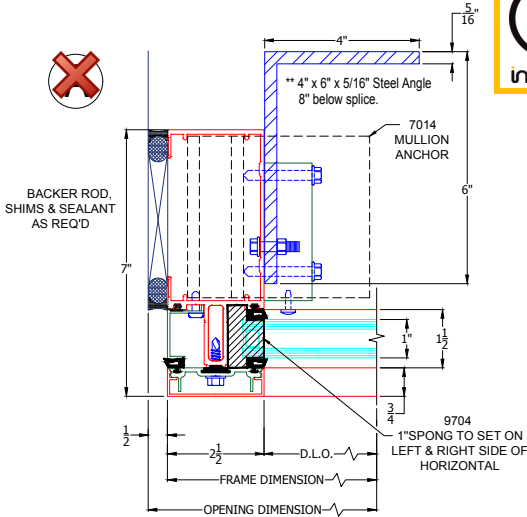
The drawings which follow have been reviewed by Intertek B&C and are representative of the simulation result(s) reported herein. Any deviations are documented herein or on the drawings.



# 7000 SERIES CURTAIN WALL 2-1/2" x 7" SYSTEM (1/4" & 1" GLAZING)



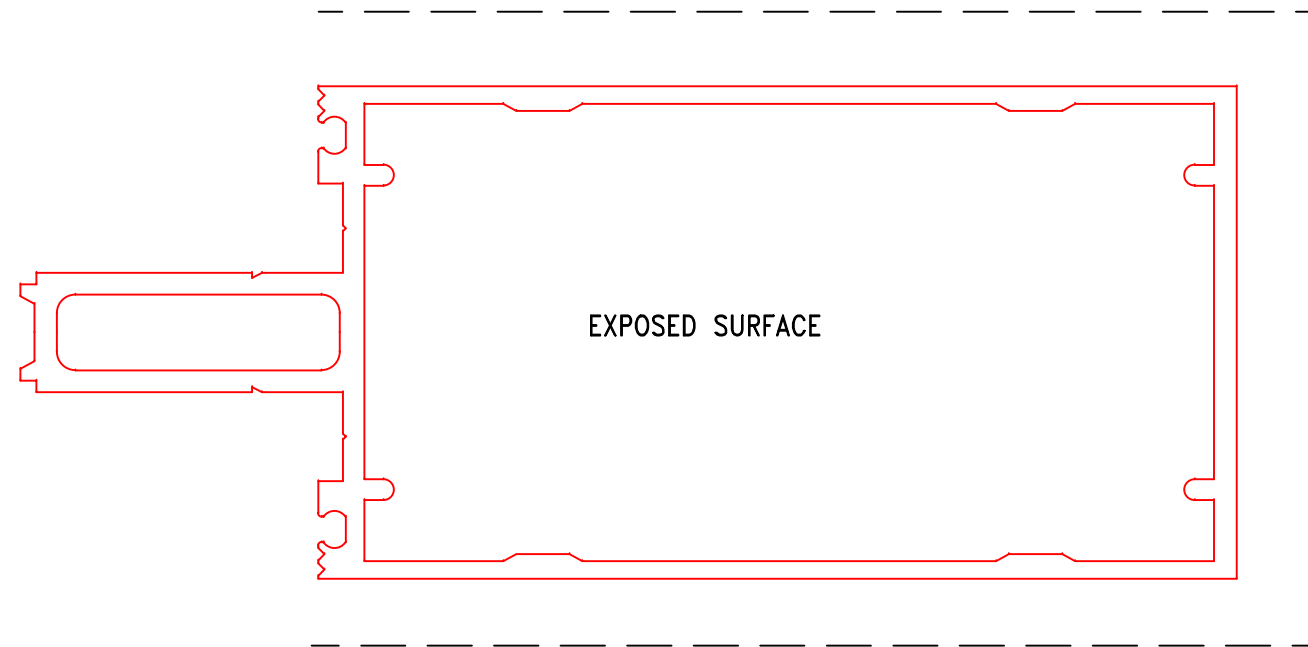
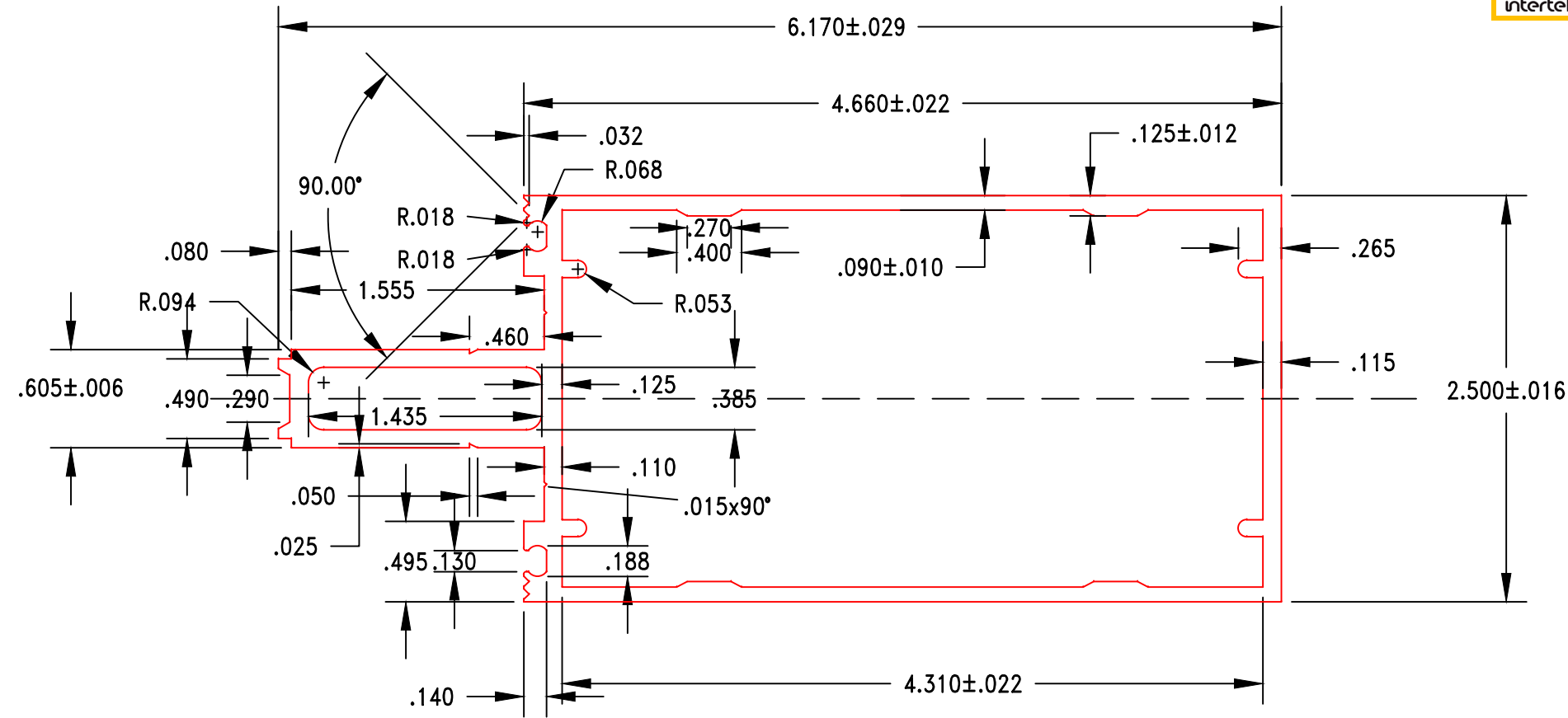

 Report #: Q9146-116-45  
 Date: 01/22/24  
 Verified by: *Allison M Ford*



STANDARD COMMERCIAL TOLERANCES APPLY UNLESS NOTED.  
 TYP WALL THICKNESS TO BE AS NOTED.  
 BREAK SHARP CORNERS AT R.010 UNLESS OTHERWISE NOTED.

NOT TO SCALE


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ACTUAL SIZE

PHONE: FAX:

CUSTOMER

DESCRIPTION

MATERIAL  
6063-T5

EST. AREA  
1.927

EST. WT/FT  
2.314

EST. PERIMETER  
18.720/17.829

BREAK SHARP CORNERS AT

UNSP. WALL THK.  
AS NOTED

SCALE  
FULL

FEEDER

DIE TYPE  
13X8-1HOLE HOLLOW

BACKER TYPE  
PORTHOLE

BOLSTER  
19437

CIRCLE SIZE  
6.432

DRAWN BY:  
FH

DATE  
5/13/13

DATE	REVISION


NFQ #

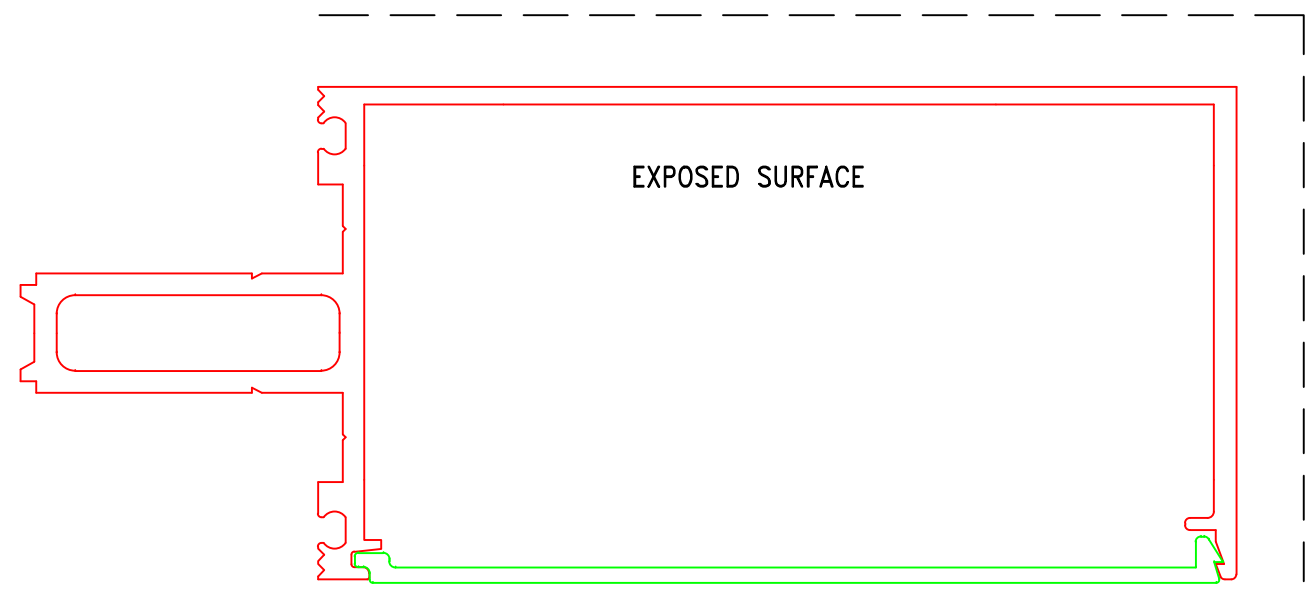
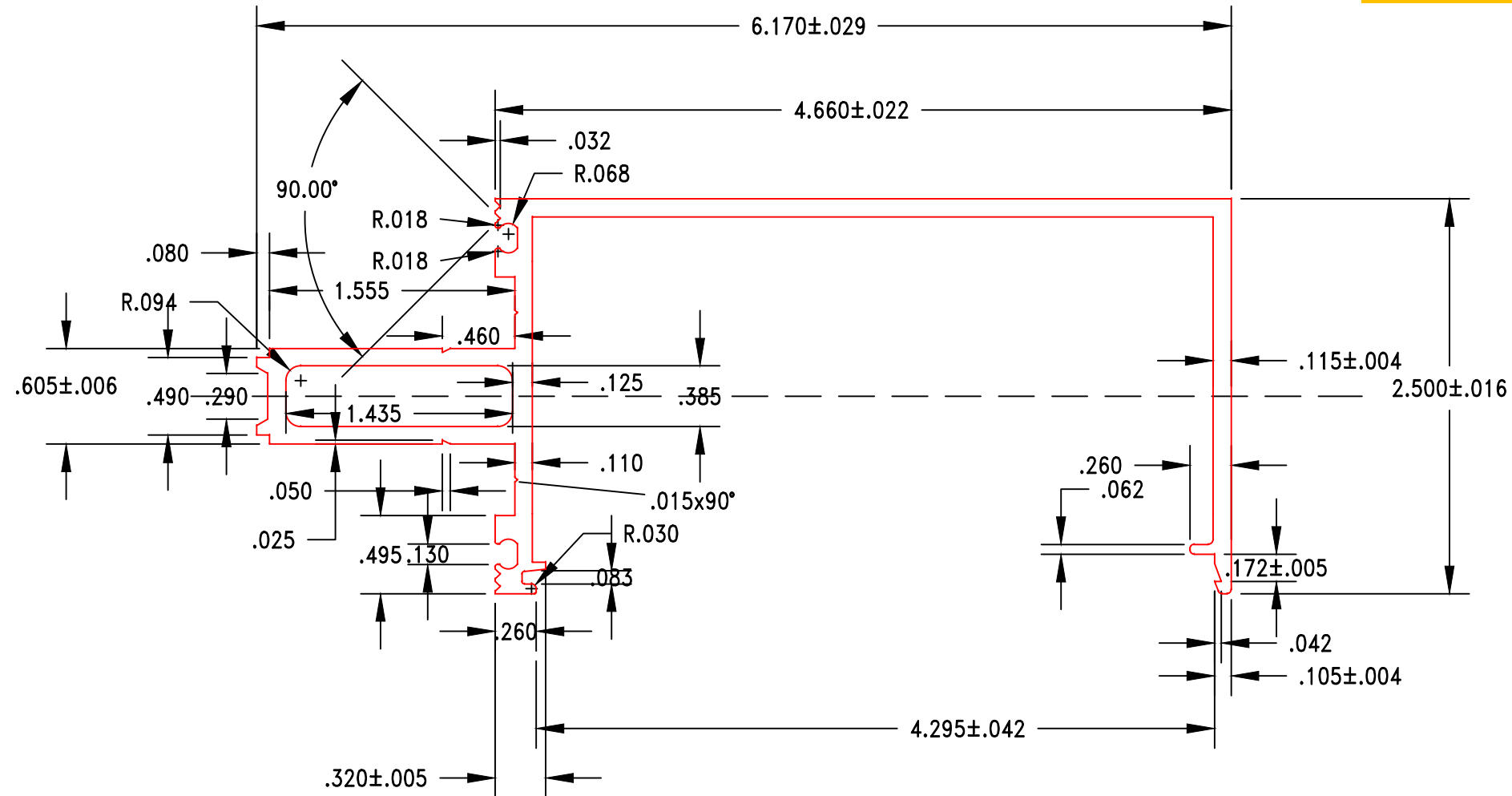
DIE NO. 7000

STANDARD COMMERCIAL TOLERANCES APPLY UNLESS NOTED.

TYP WALL THICKNESS TO BE AS NOTED.  
BREAK SHARP CORNERS AT R.010 UNLESS OTHERWISE NOTED.

NOT TO SCALE

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	Verified by: Allison M. Ford



MATES WITH NF8107, NF8109 & AE4424

ACTUAL SIZE

PHONE: FAX:

CUSTOMER

DESCRIPTION

MATERIAL  
6063-T5

EST. AREA  
1.545

EST. WT/FT  
1.854

EST. PERIMETER  
27.54

BREAK SHARP CORNERS AT

UNSP. WALL THK.  
AS NOTED

SCALE  
FULL  
FEEDER

DIE TYPE  
13X8-1HOLE

BACKER TYPE  
PORTHOLE

BOLSTER  
13X5-1HOLE

CIRCLE SIZE  
6.432

DRAWN BY:  
FH

DATE  
5/10/13

DATE	REVISION
------	----------

NFQ #

DIE NO. 7001



STANDARD COMMERCIAL TOLERANCES APPLY UNLESS NOTED.

TYP WALL THICKNESS TO BE AS NOTED.

BREAK SHARP CORNERS AT R.010 UNLESS OTHERWISE NOTED.

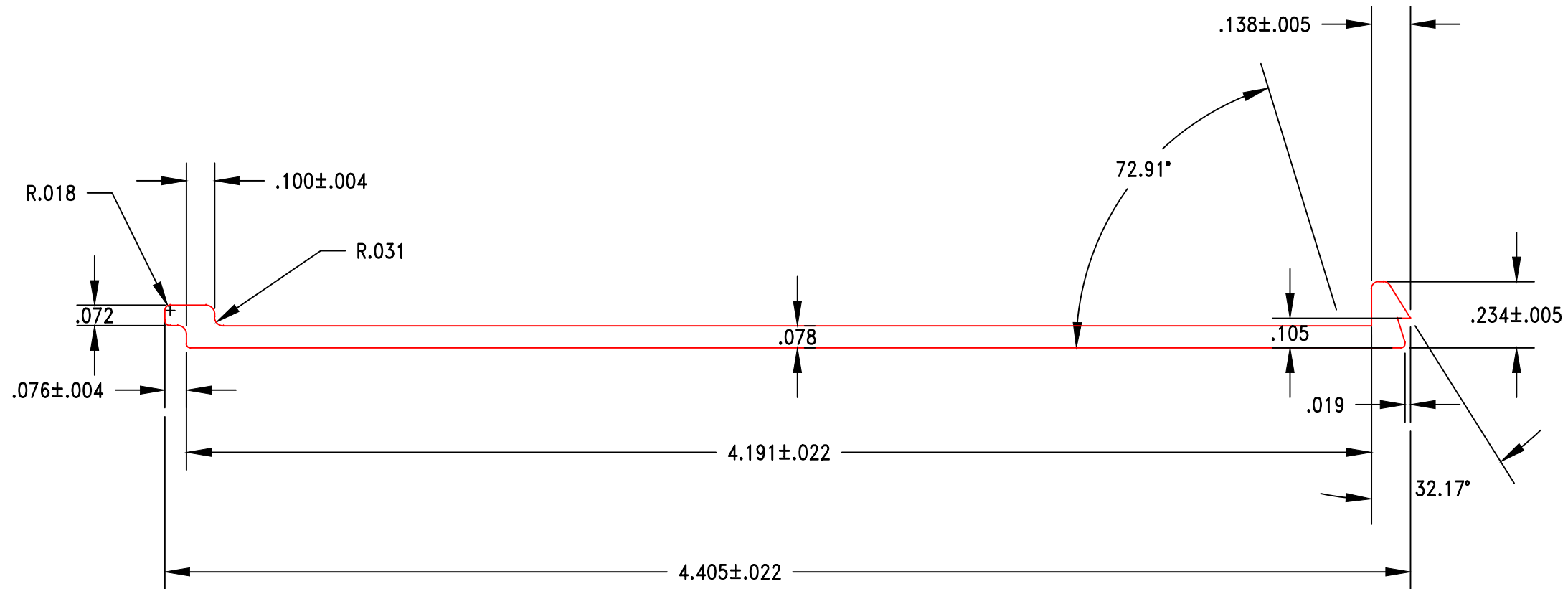
NOT TO SCALE



Report #: Q9146-116-45

Date: 01/22/24

Verified by: Allison M. Ford



EXPOSED SURFACE

ACTUAL SIZE

PHONE: FAX:

CUSTOMER

DESCRIPTION

MATERIAL  
6063-T5

EST. AREA  
.363

EST. WT/FT  
.436

EST. PERIMETER  
9.316

BREAK SHARP CORNERS AT

UNSP. WALL THK.  
AS NOTED

SCALE  
2X

FEEDER  
10X1-2HOLES

DIE TYPE  
10X1-1/2-2HOLES

BACKER TYPE  
10X2-3/4-2HOLES

BOLSTER  
7873

CIRCLE SIZE  
4.405

DRAWN BY:  
FH

DATE  
5/10/13

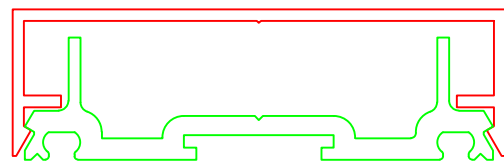
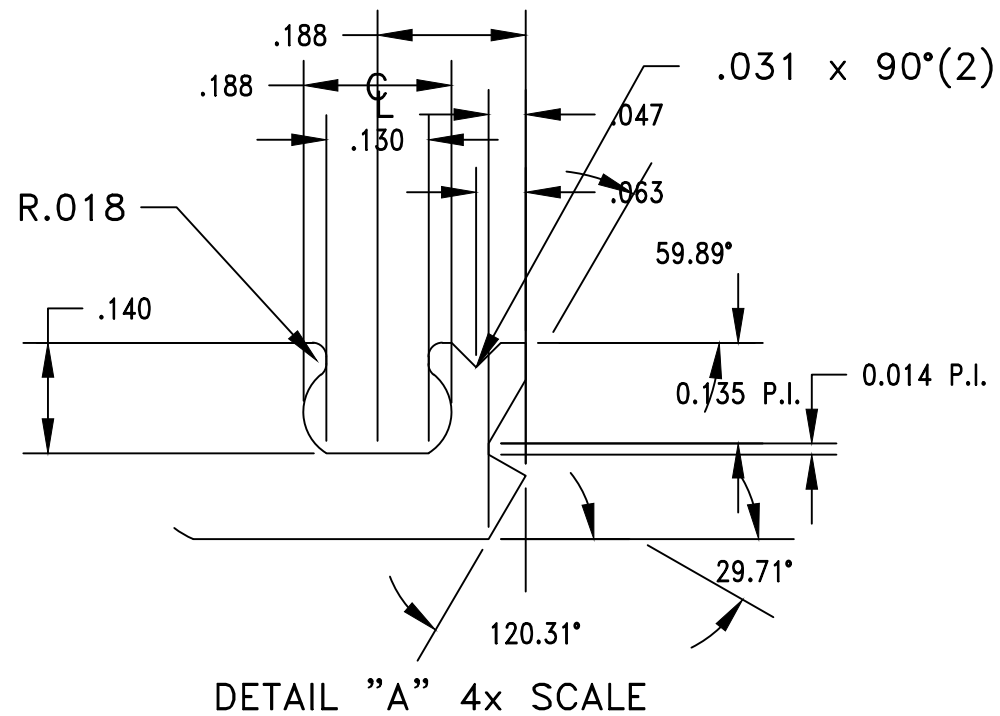
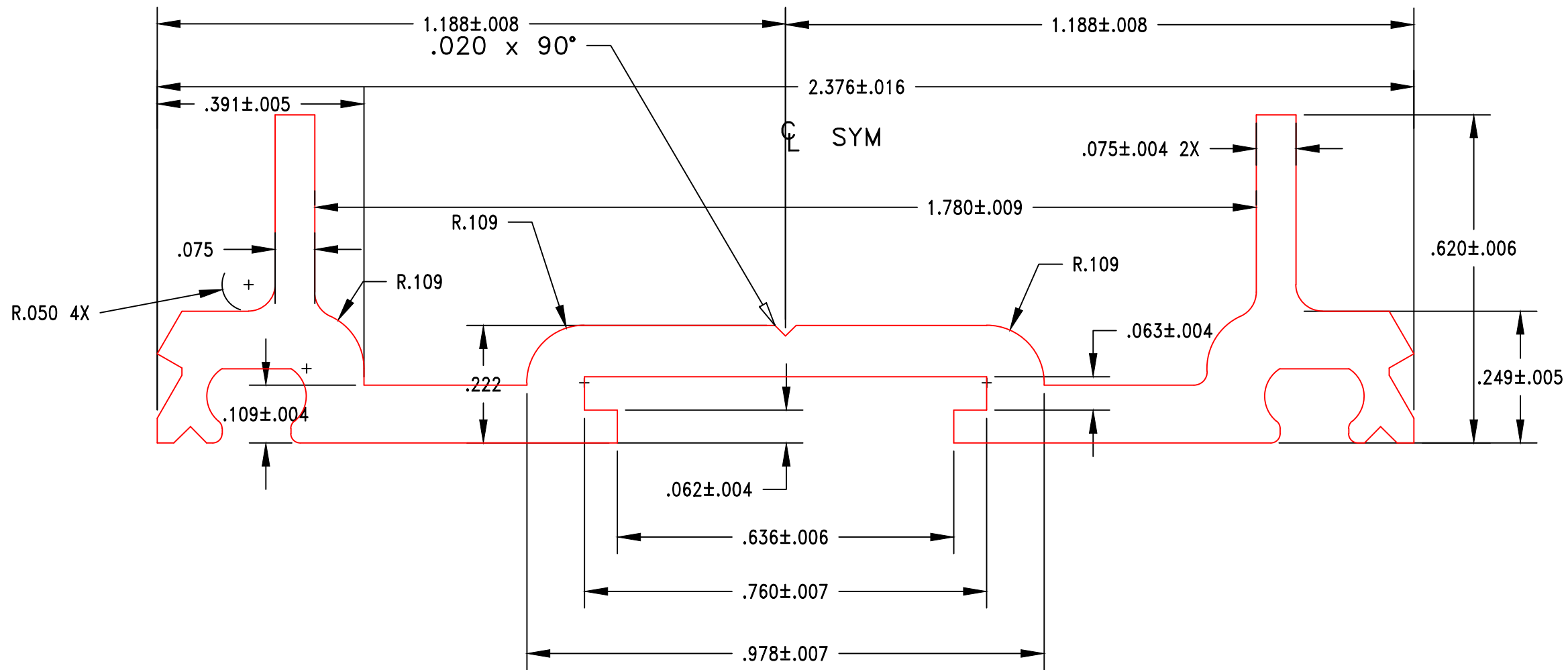
DATE REVISION

NFQ #

DIE NO. 7003

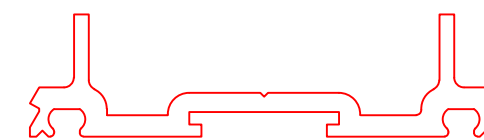
STANDARD COMMERCIAL TOLERANCES APPLY UNLESS NOTED.  
 TYP WALL THICKNESS TO BE AS NOTED.  
 BREAK SHARP CORNERS AT R.010 UNLESS OTHERWISE NOTED.

NOT TO SCALE



NOT TO SCALE

intertek Report #: Q9146-116-45  
 Date: 01/22/24  
 Verified by: Allison M. Ford



ACTUAL SIZE

PHONE: FAX:

CUSTOMER

DESCRIPTION

MATERIAL  
6005A-T5

EST. AREA  
.381

EST. WT/FT  
.457

EST. PERIMETER  
8.164

BREAK SHARP CORNERS AT

UNSP. WALL THK.  
AS NOTED

SCALE  
4X

FEEDER  
10X1-2HOLES

DIE TYPE  
10X1-1/2-2HOLES

BACKER TYPE  
10X2-3/4-2HOLES

BOLSTER  
STD-PIE

CIRCLE SIZE  
2.382

DRAWN BY:  
FH

DATE  
9/10/2014

DATE REVISION

NFQ #

DIE NO. 7006

STANDARD COMMERCIAL TOLERANCES APPLY UNLESS NOTED.

TYP WALL THICKNESS TO BE AS NOTED.

BREAK SHARP CORNERS AT R.010 UNLESS OTHERWISE NOTED.

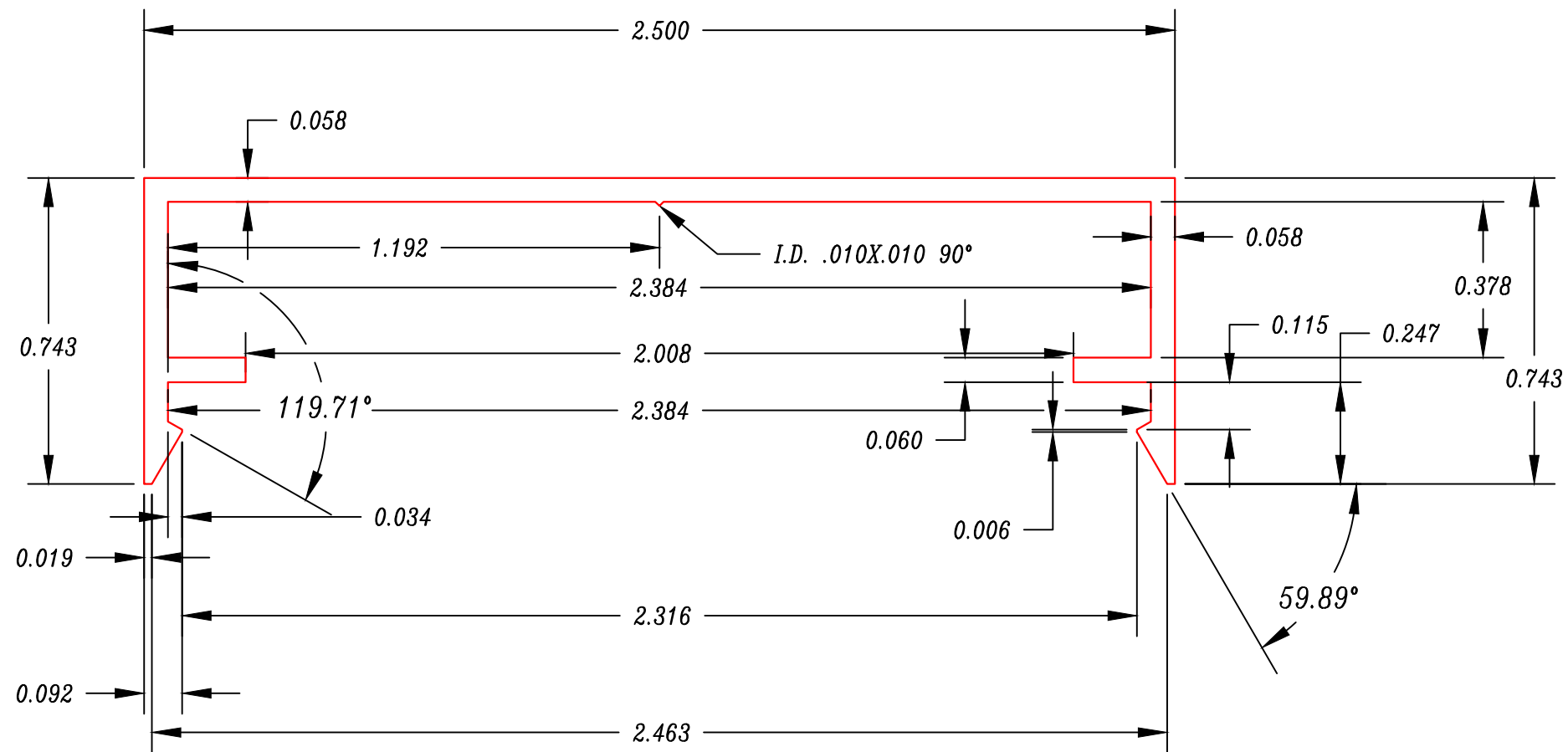
NOT TO SCALE



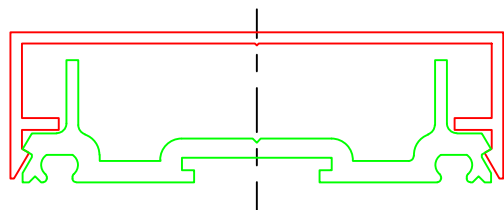
Report #: Q9146-116-45

Date: 01/22/24

Verified by: Allison M. Ford



MATES WITH NF8110



ACTUAL SIZE

PHONE: FAX:

CUSTOMER

DESCRIPTION  
FACE CAP

MATERIAL  
6063-T5

EST. AREA  
0.248

EST. WT/FT  
0.298

EST. PERIMETER  
8.617

BREAK SHARP CORNERS AT

UNSP.WALL THK.

SCALE  
2.5X

FEEDER  
10X1 2-HOLES

DIE TYPE  
10X1-1/2 2-HOLES

BACKER TYPE  
10X2-3/4 2-HOLES

BOLSTER  
STD-2

CIRCLE SIZE  
2.608

DRAWN BY:  
MEC

DATE  
08/25/2014

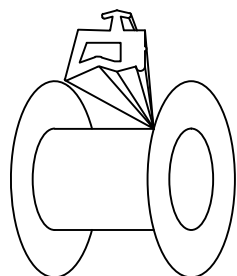
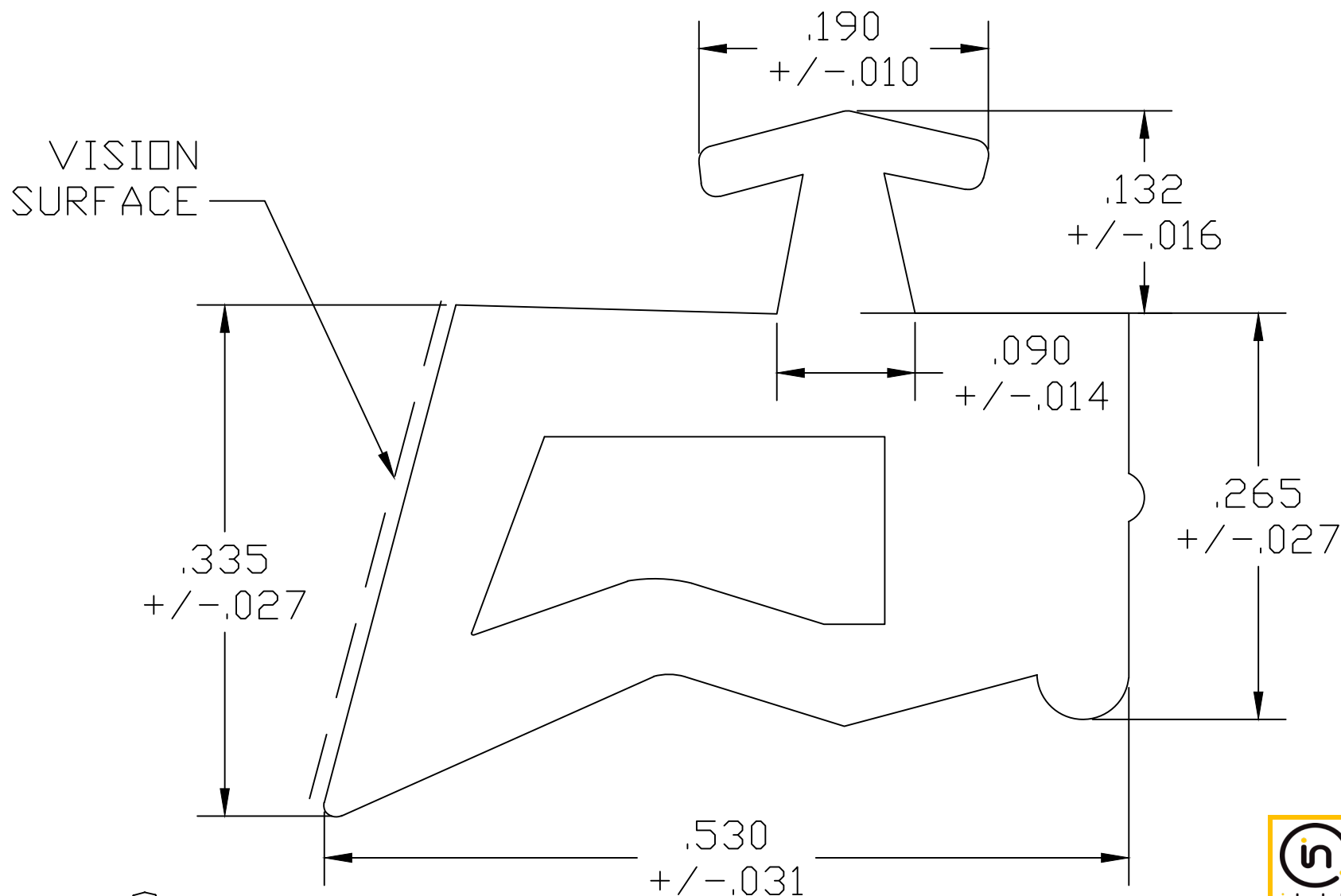
DATE REVISION

NFQ #

DIE NO. 7007



ACTUAL SIZE



REEL DART UP



Report #: Q9146-116-45  
 Date: 01/22/24  
 Verified by: *Allison M Ford*

ALL TOLERANCES ARE RMA CLASS II UNLESS OTHERWISE SPECIFIED

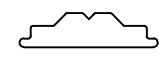
REVISION: DATE:



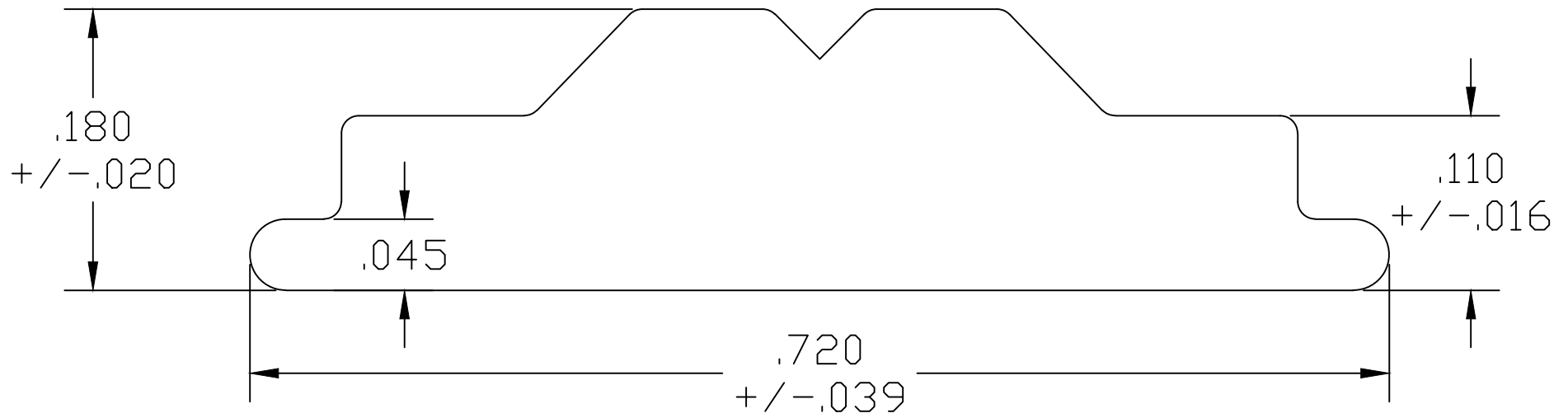
**ORAZEN**  
EXTRUDED POLYMERS

999 South Chillicothe Road  
 Aurora, OH 44202  
 Phone: (800) 625-9637  
 www.orazen.com


OEP PART NUMBER: 1028-02-00	CUSTOMER PART NUMBER: 9700/XXRX
COMPOUND: EPDM	DESCRIPTION: DENSE PRESET
DUROMETER: 70 ± 5	OEP COMPOUND NUMBER: 270000
SCALE: 10x1	DATE: 10/30/2013
	DRAWN BY: SS

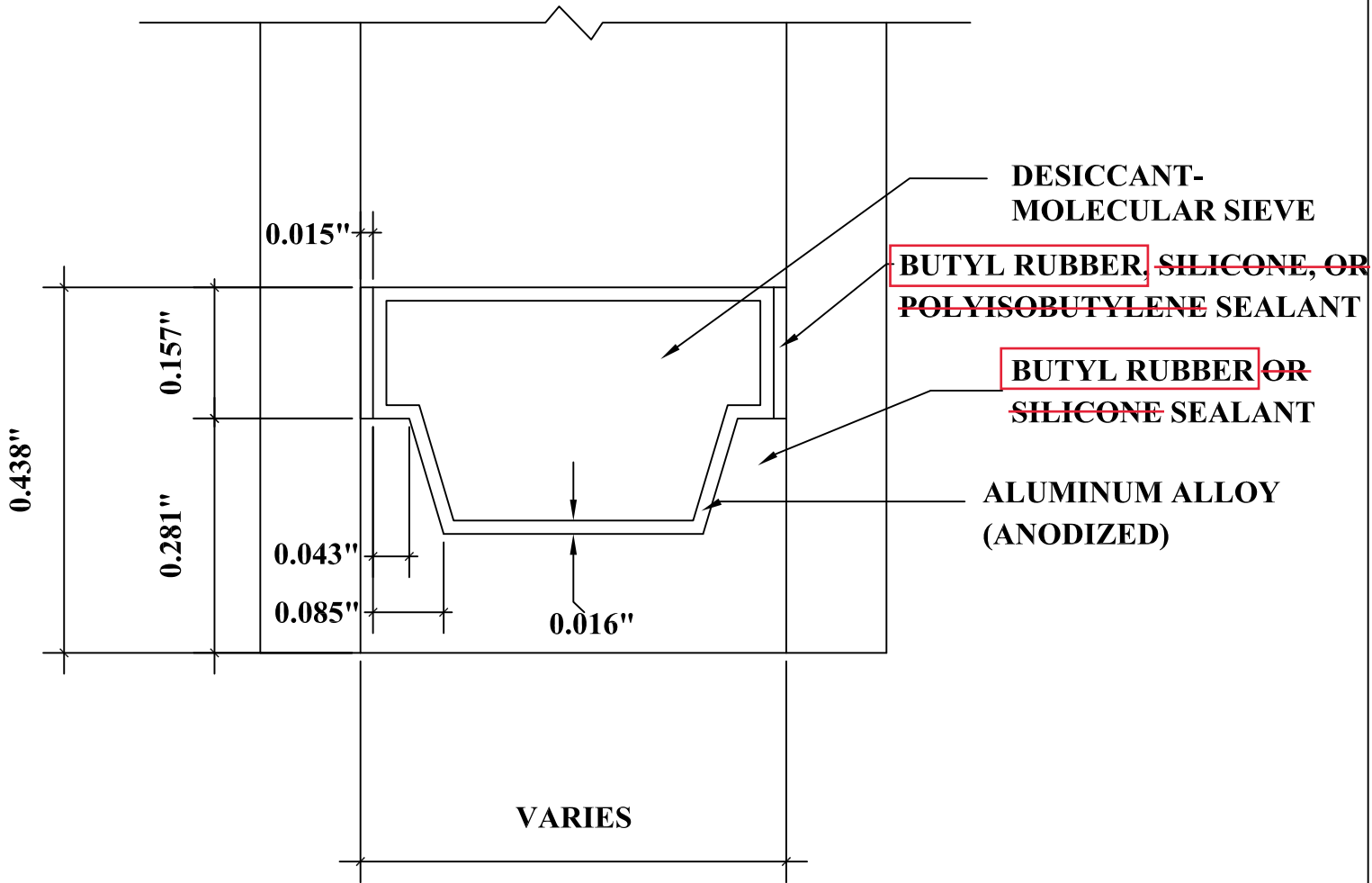


ACTUAL SIZE



 Report #: Q9146-116-45  
 Date: 01/22/24  
 Verified by: *Allison M. Ford*

ALL TOLERANCES ARE RMA CLASS II UNLESS OTHERWISE SPECIFIED			<b>ORAZEN</b> EXTRUDED POLYMERS	999 South Chillicothe Road Aurora, OH 44202 Phone: (800) 625-9637 www.orazen.com	
REVISION:	DATE:			OEP PART NUMBER: 1031-02-00	CUSTOMER PART NUMBER: 9701/XXRX
		COMPOUND: EPDM	DESCRIPTION: PRESSURE BAR GSK		
		DUROMETER: 85 ± 5	OEP COMPOUND NUMBER: 285000		
		SCALE: 10x1	DATE: 10/7/2014	DRAWN BY: SS	



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



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**TEST REPORT FOR ATLAS ARCHITECTURAL METALS, INC.**

Report No.: Q9146.01-116-45 R0

Date: 01/22/24

**SECTION 8**

**REVISION LOG**

<b>REVISION #</b>	<b>DATE</b>	<b>PAGES</b>	<b>REVISION</b>
.01R0	01/22/24	N/A	Original Report Issued to Atlas Architectural Metals, Inc..