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ATLAS ARCHITECTURAL METALS, INC.
COMPUTER SIMULATION REPORT

SCOPE OF WORK
HD500-T IMPACT STOREFRONT - AAMA 507

REPORT NUMBER
Q4941.01-116-45 R0

TEST DATE
10/13/23

ISSUE DATE
10/13/23

PAGES
16

DOCUMENT CONTROL NUMBER
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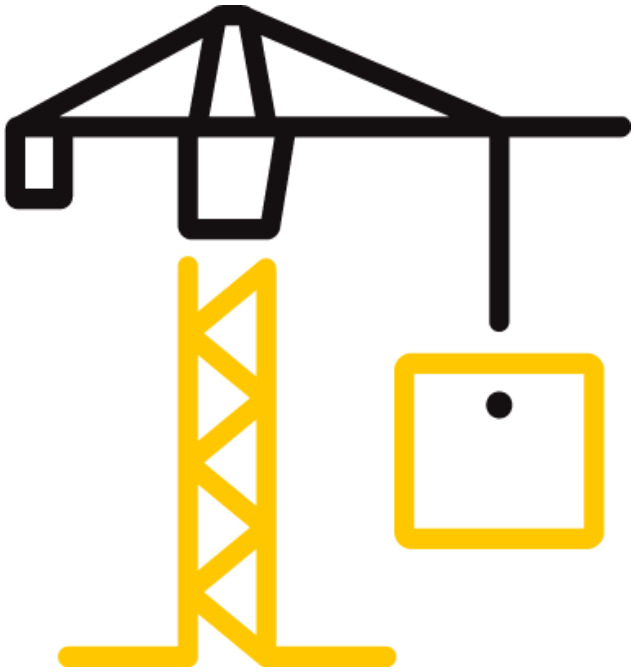

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TEST REPORT FOR ATLAS ARCHITECTURAL METALS, INC.
Report No.: Q4941.01-116-45 R0
Date: 10/13/23

REPORT ISSUED TO

ATLAS ARCHITECTURAL METALS, INC.
11940 Brittmore Park Drive
Houston, Texas 77041

SECTION 1

SUMMARY

SERIES/MODEL: HD500-T Impact Storefront

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 10/13/28.

For INTERTEK B&C:

COMPLETED BY:	Eric S. Leitner	**REVIEWED BY:**	Allison M. Ford
TITLE:	Manager - Simulations & Thermal Testing, SIRC	**TITLE:**	Technician Team Leader
SIGNATURE:	Digitally Signed by: Eric S. Leitner	**SIGNATURE:**	Digitally Signed by: Allison Ford
DATE:	10/13/23	**DATE:**	10/13/23

ESL:esl

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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 100-2020, *Procedure for Determining Fenestration Product U-Factors*

ANSI/NFRC 200-2020, *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.

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 93.0

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 100-2020, 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

SERIES/MODEL	HD500-T Impact Storefront
PRODUCT TYPE	Glazed Wall System
FRAME MATERIAL	AT - Aluminum w/ Thermal Breaks - All Members
SASH MATERIAL	NA - Not Applicable

GLAZING OPTIONS					
	OUTER PANE	***MIDDLE PANE***	***INNER PANE***	***GAP SIZES***	***IG OVERALL***
GL1	1/4"	N/A	1/4"	0.500"	1-5/16"
GL2	1/4"	Heat Mirror	1/4"	0.250"	1-5/16"

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)

SPACER OPTIONS			
TYPE	***PRIMARY SEAL***	***SECONDARY SEAL***	***CODE***
Aluminum Dual Seal Spacer	Butyl Rubber	Butyl Rubber	A1-D

SECTION 5
MEASURED SIMULATION DATA

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

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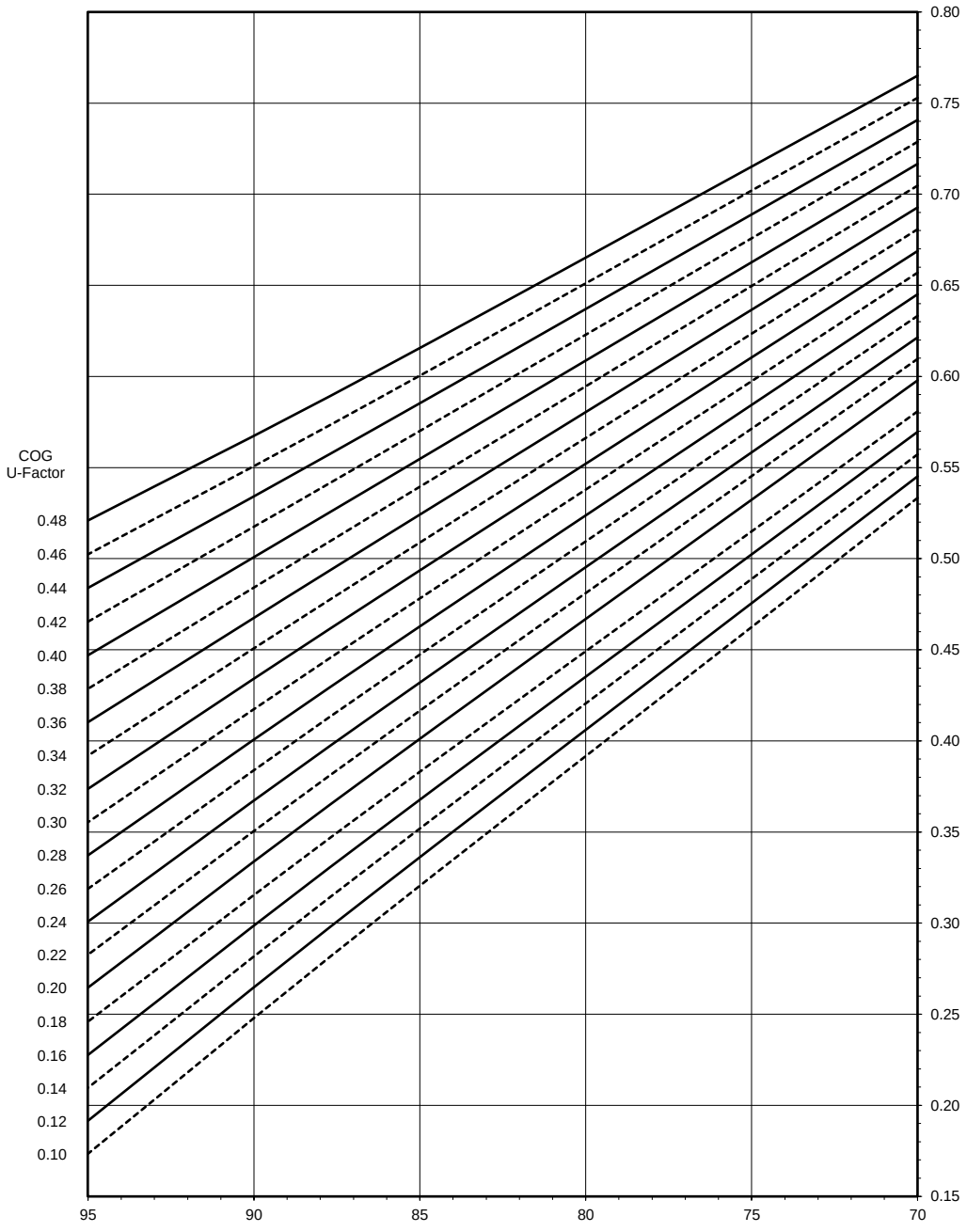
SECTION 6
SIMULATION RESULTS

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



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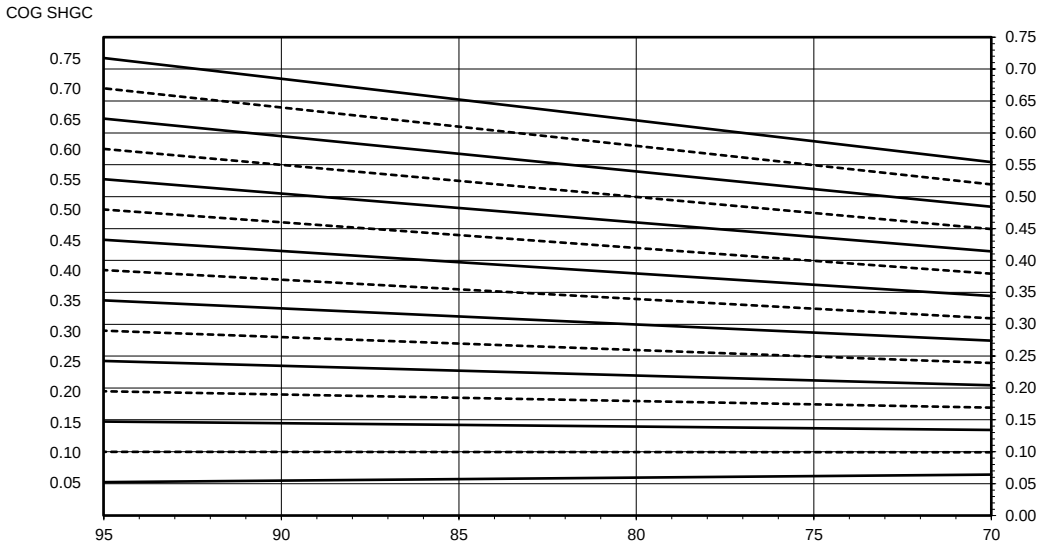
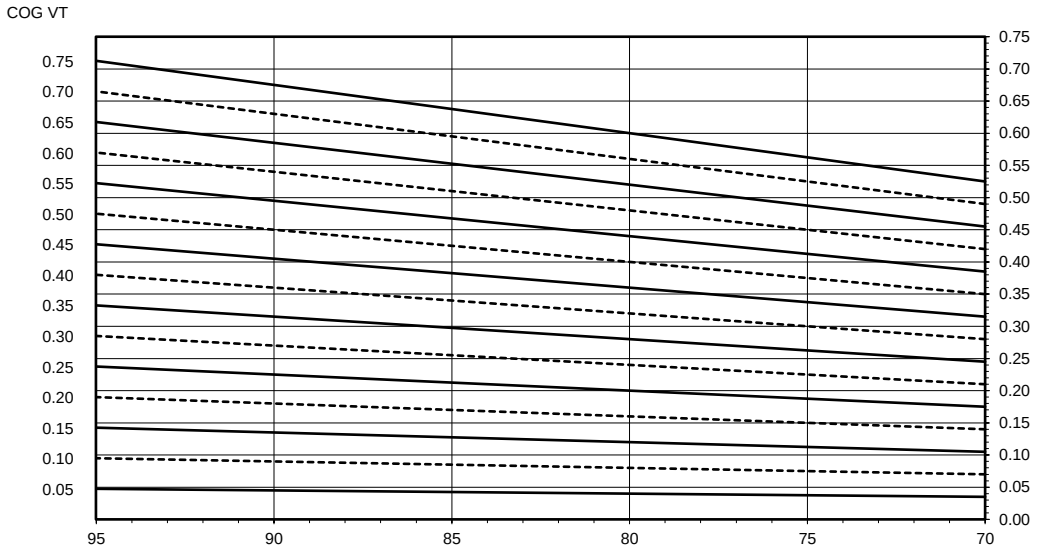
SIMULATION RESULTS

SHGC CALCULATIONS: System SHGC vs. Percentage of Vision Area



VT CALCULATIONS: System VT vs. Percentage of Vision Area



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SECTION 6
SIMULATION RESULTS

U-FACTOR CALCULATIONS (HD500-T Impact Storefront)		
Size Specific U-Factor Matrix*		
Glazing Option	**Center-of-Glass U-Factor**	**Overall U-Factor**
1	0.48	0.60
2	0.46	0.59
3	0.44	0.57
4	0.42	0.56
5	0.40	0.54
6	0.38	0.53
7	0.36	0.51
8	0.34	0.49
9	0.32	0.48
10	0.30	0.46
11	0.28	0.45
12	0.26	0.43
13	0.24	0.42
14	0.22	0.40
15	0.20	0.38
16	0.18	0.37
17	0.16	0.35
18	0.14	0.34
19	0.12	0.32
20	0.10	0.30

*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 86.2% Vision Area / Total Area.

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SIMULATION RESULTS

SHGC/VT CALCULATIONS (HD500-T Impact Storefront)			
Size Specific SHGC Matrix*		Size Specific VT Matrix*	
Center-of-Glass SHGC	Overall SHGC	Center-of-Glass VT	Overall VT
0.75	0.66	0.75	0.65
0.70	0.62	0.70	0.60
0.65	0.57	0.65	0.56
0.60	0.53	0.60	0.52
0.55	0.49	0.55	0.47
0.50	0.44	0.50	0.43
0.45	0.40	0.45	0.39
0.40	0.36	0.40	0.34
0.35	0.32	0.35	0.30
0.30	0.27	0.30	0.26
0.25	0.23	0.25	0.22
0.20	0.19	0.20	0.17
0.15	0.14	0.15	0.13
0.10	0.10	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 86.2% Vision Area / Total Area.

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TOTAL PRODUCT CALCULATIONS (HD500-T Impact Storefront)									
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 100-2020	95.00% Vision Area
1	0.48	43.7°F	Head	2.6255	1.2023	0.4956	0.7650	0.6037	0.5210
			L. Jamb	2.6255	1.2023	0.4956			
			R. Jamb	2.7510	1.7579	0.5097			
			Mullion	1.3755	1.7691	0.5098			
			Sill	3.1254	1.0036	0.4793			
2	0.46	44.8°F	Head	2.6255	1.2020	0.4816	0.7529	0.5882	0.5024
			L. Jamb	2.6255	1.2020	0.4816			
			R. Jamb	2.7510	1.7583	0.4961			
			Mullion	1.3755	1.7696	0.4962			
			Sill	3.1254	1.0026	0.4650			
3	0.44	45.8°F	Head	2.6255	1.2016	0.4676	0.7408	0.5727	0.4840
			L. Jamb	2.6255	1.2016	0.4676			
			R. Jamb	2.7510	1.7586	0.4825			
			Mullion	1.3755	1.7699	0.4826			
			Sill	3.1254	1.0017	0.4507			
4	0.42	46.8°F	Head	2.6255	1.2012	0.4539	0.7288	0.5572	0.4655
			L. Jamb	2.6255	1.2012	0.4539			
			R. Jamb	2.7510	1.7590	0.4693			
			Mullion	1.3755	1.7703	0.4694			
			Sill	3.1254	1.0009	0.4368			
5	0.40	47.9°F	Head	2.6255	1.2009	0.4399	0.7166	0.5416	0.4470
			L. Jamb	2.6255	1.2009	0.4399			
			R. Jamb	2.7510	1.7594	0.4557			
			Mullion	1.3755	1.7708	0.4558			
			Sill	3.1254	1.0001	0.4225			
6	0.38	48.9°F	Head	2.6255	1.2006	0.4263	0.7047	0.5260	0.4287
			L. Jamb	2.6255	1.2006	0.4263			
			R. Jamb	2.7510	1.7599	0.4426			
			Mullion	1.3755	1.7712	0.4427			
			Sill	3.1254	0.9993	0.4087			

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TOTAL PRODUCT CALCULATIONS (HD500-T Impact Storefront)									
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 100-2020	95.00% Vision Area
7	0.36	50.0°F	Head	2.6255	1.2003	0.4126	0.6927	0.5105	0.4103
			L. Jamb	2.6255	1.2003	0.4126			
			R. Jamb	2.7510	1.7603	0.4293			
			Mullion	1.3755	1.7717	0.4294			
			Sill	3.1254	0.9986	0.3947			
8	0.34	51.0°F	Head	2.6255	1.2000	0.3989	0.6807	0.4948	0.3920
			L. Jamb	2.6255	1.2000	0.3989			
			R. Jamb	2.7510	1.7608	0.4160			
			Mullion	1.3755	1.7722	0.4161			
			Sill	3.1254	0.9979	0.3807			
9	0.32	52.0°F	Head	2.6255	1.1997	0.3853	0.6688	0.4792	0.3737
			L. Jamb	2.6255	1.1997	0.3853			
			R. Jamb	2.7510	1.7614	0.4029			
			Mullion	1.3755	1.7728	0.4029			
			Sill	3.1254	0.9972	0.3669			
10	0.30	53.1°F	Head	2.6255	1.1995	0.3718	0.6569	0.4635	0.3555
			L. Jamb	2.6255	1.1995	0.3718			
			R. Jamb	2.7510	1.7619	0.3898			
			Mullion	1.3755	1.7734	0.3899			
			Sill	3.1254	0.9965	0.3532			
11	0.28	54.2°F	Head	2.6255	1.1993	0.3583	0.6451	0.4479	0.3373
			L. Jamb	2.6255	1.1993	0.3583			
			R. Jamb	2.7510	1.7625	0.3767			
			Mullion	1.3755	1.7740	0.3768			
			Sill	3.1254	0.9959	0.3395			
12	0.26	55.2°F	Head	2.6255	1.1991	0.3448	0.6332	0.4321	0.3189
			L. Jamb	2.6255	1.1991	0.3448			
			R. Jamb	2.7510	1.7631	0.3636			
			Mullion	1.3755	1.7746	0.3637			
			Sill	3.1254	0.9953	0.3258			

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TOTAL PRODUCT CALCULATIONS (HD500-T Impact Storefront)									
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 100-2020	95.00% Vision Area
13	0.24	56.3°F	Head	2.6255	1.1990	0.3314	0.6214	0.4164	0.3009
			L. Jamb	2.6255	1.1990	0.3314			
			R. Jamb	2.7510	1.7638	0.3506			
			Mullion	1.3755	1.7753	0.3507			
			Sill	3.1254	0.9948	0.3121			
14	0.22	57.3°F	Head	2.6255	1.1989	0.3180	0.6096	0.4007	0.2828
			L. Jamb	2.6255	1.1989	0.3180			
			R. Jamb	2.7510	1.7646	0.3374			
			Mullion	1.3755	1.7762	0.3375			
			Sill	3.1254	0.9943	0.2985			
15	0.20	58.4°F	Head	2.6255	1.1988	0.3046	0.5978	0.3849	0.2647
			L. Jamb	2.6255	1.1988	0.3046			
			R. Jamb	2.7510	1.7653	0.3245			
			Mullion	1.3755	1.7769	0.3246			
			Sill	3.1254	0.9938	0.2849			
16	0.18	59.5°F	Head	2.6255	1.1893	0.2872	0.5808	0.3668	0.2460
			L. Jamb	2.6255	1.1893	0.2872			
			R. Jamb	2.7510	1.7539	0.3062			
			Mullion	1.3755	1.7657	0.3063			
			Sill	3.1254	0.9798	0.2656			
17	0.16	60.6°F	Head	2.6255	1.1910	0.2732	0.5696	0.3511	0.2277
			L. Jamb	2.6255	1.1910	0.2732			
			R. Jamb	2.7510	1.7576	0.2925			
			Mullion	1.3755	1.7694	0.2926			
			Sill	3.1254	0.9814	0.2516			
18	0.14	61.6°F	Head	2.6255	1.1885	0.2611	0.5572	0.3350	0.2097
			L. Jamb	2.6255	1.1885	0.2611			
			R. Jamb	2.7510	1.7543	0.2808			
			Mullion	1.3755	1.7662	0.2808			
			Sill	3.1254	0.9782	0.2391			

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TOTAL PRODUCT CALCULATIONS (HD500-T Impact Storefront)									
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 100-2020	95.00% Vision Area
19	0.12	62.7°F	Head	2.6255	1.1888	0.2471	0.5452	0.3190	0.1916
			L. Jamb	2.6255	1.1888	0.2471			
			R. Jamb	2.7510	1.7557	0.2671			
			Mullion	1.3755	1.7676	0.2672			
			Sill	3.1254	0.9757	0.2247			
20	0.10	63.9°F	Head	2.6255	1.1890	0.2332	0.5333	0.3030	0.1735
			L. Jamb	2.6255	1.1890	0.2332			
			R. Jamb	2.7510	1.7570	0.2533			
			Mullion	1.3755	1.7690	0.2534			
			Sill	3.1254	0.9755	0.2107			

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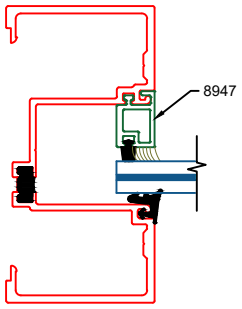
SECTION 7
DRAWINGS / BILL OF MATERIALS

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.

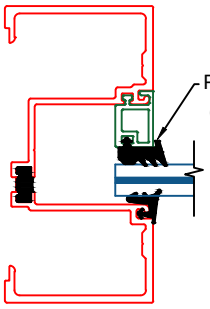
ARCHITECTURAL METALS

2-1/2" x 5" H500 HURRICANE SYSTEM

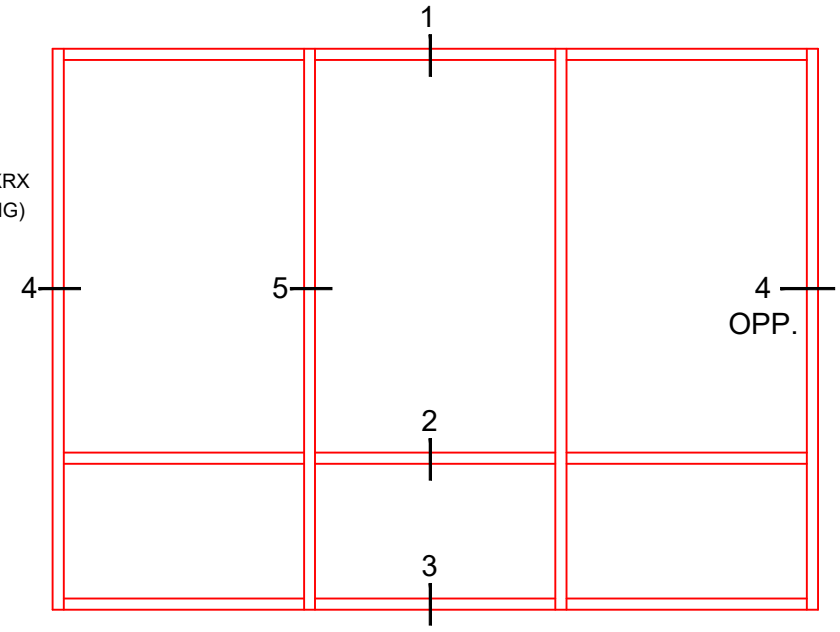
(1-5/16" & 9/16" GLAZING, THERMAL)

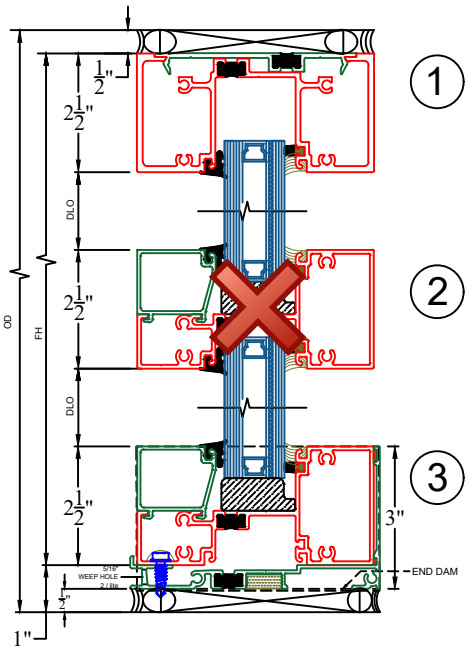


REDUCER OPTION
FOR 9/16" GLASS
(WET GLAZE)

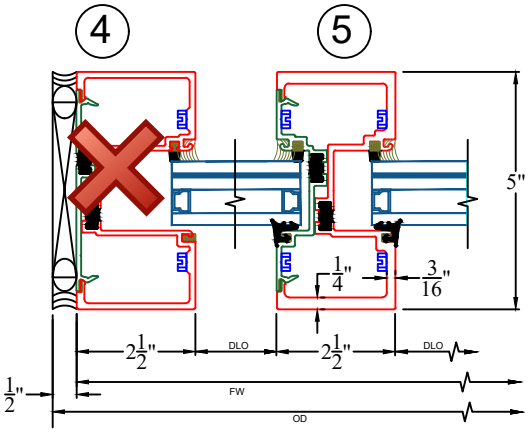


REDUCER OPTION
FOR 9/16" GLASS
(DRY GLAZE)

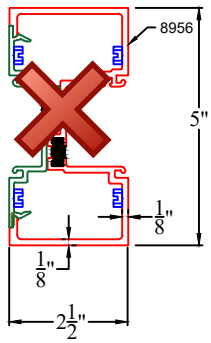


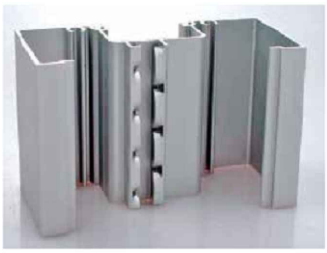


ANCHOR BOLT/
BACKER ROD/
SEALANT AND
SHIMS BY OTHERS.

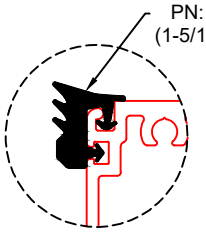


LIGHT WALL
MULLION OPTION





MECHANICAL LOCK
(LANCED METHOD FOR THERMAL OPTION)



DRY GLAZE OPTION

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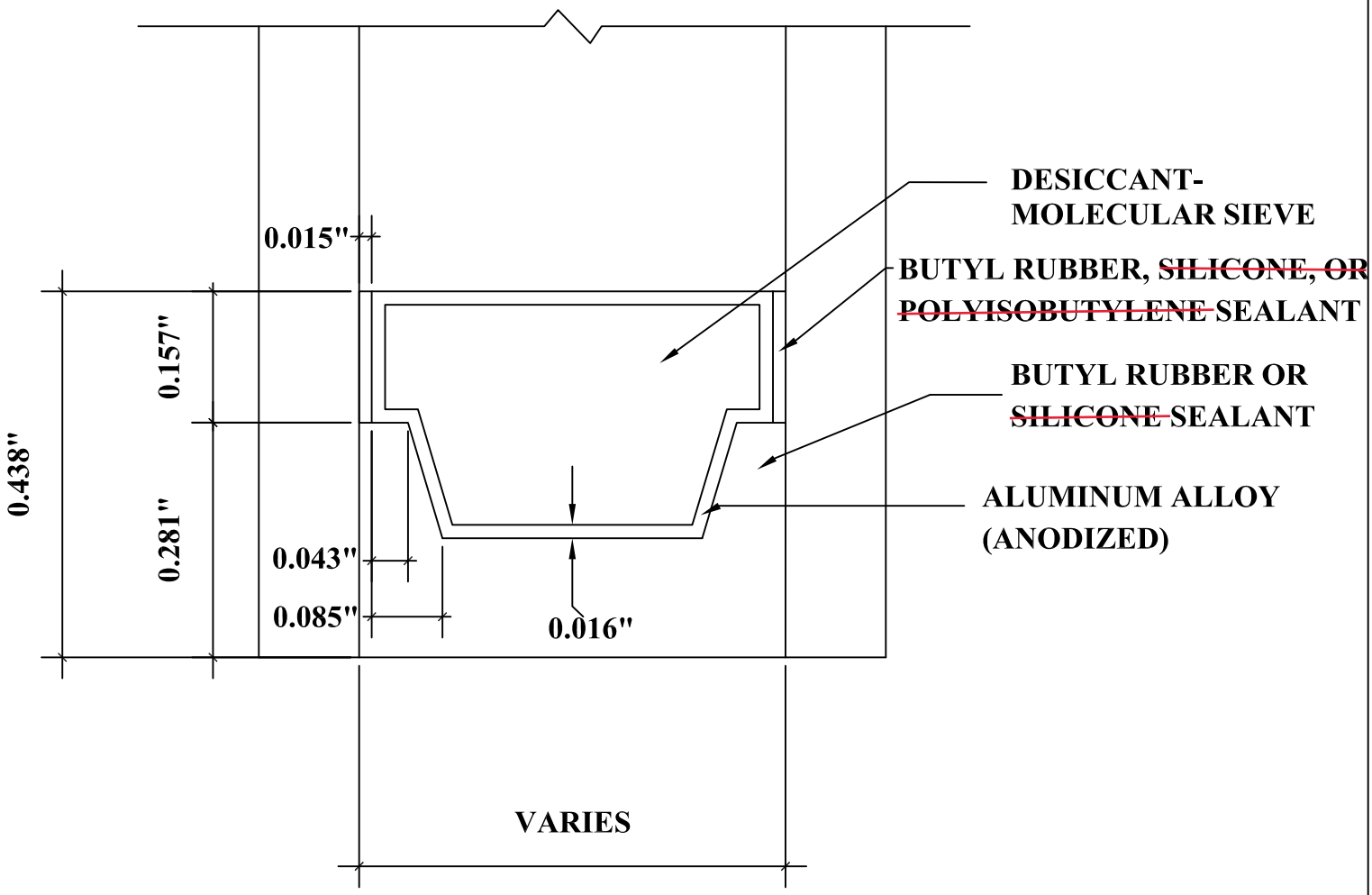

DETAIL FOR THERMAL MODELING OF
ALUMINUM SPACER (A1-D)

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SECTION 8
REVISION LOG

REVISION #	DATE	PAGES	REVISION
.01R0	10/13/23	N/A	Original Report Issued to Atlas Architectural