
**PERFORMANCE EVALUATION OF
VERTICAL SLIDING WINDOW “740 SERIES DOUBLE HUNG”
For Windspec Inc.**

IN ACCORDANCE WITH:

**AAMA/WDMA/CSA 101/I.S.2/A440-11 and
A440S1-17**

Report to: Windspec Inc.
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Original Report No.: 21-06-B0050-1N
7 Pages, 1 Appendix

Proposal No.: 21-006-235426

Original Report Date: July 22, 2021

Product Manufacturer:	Windspec Inc.
Product Type:	Vertical Sliding Window
Product Series/Model:	740 Series Double Hung
Primary Product Designator:	Class CW – PG3360 – Size tested 1400 x 2300 mm – Hung Class CW – PG70 – Size tested 55.12 x 90.55 in – H
Secondary Product Designator:	
Positive Design Pressure:	3360 Pa (70.18 psf)
Negative Design Pressure:	3360 Pa (70.18 psf)
Water Penetration Resistance:	720 Pa (15.04 psf)
Air Infiltration/Exfiltration	Canadian A3 Level
Test Completion Date:	July 14, 2021
Report Number:	21-06-B0050-1N

1.0 INTRODUCTION

At the request of Windspec Inc., Element Materials Technology Inc. was retained to evaluate the physical performance of a vertical sliding window, identified as "740 Series Double Hung", in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-11 Standard, "NAFS – North American Fenestration Standard/Specification for windows, doors, and skylights," and A440S1-17 Canadian Supplement, as outlined in proposal number 21-006-235426.

Note: The results reported herein also meet or exceed the requirements of the AAMA/WDMA/CSA 101/I.S.2/A440-17 standard.

Element Specimen No.: 21-06-B0050-1
Type: Vertical Sliding Windows
Model: 740 Series Double Hung
Overall Window Size: 1400 mm x 2300 mm (55.12" x 90.55")
Sampling: Not Applicable

2.0 SAMPLE DESCRIPTION

The following sample description has verified by Element. Details and drawings of the described test specimen, as provided by the manufacturer, have been included in Appendix A.

Product Type: Vertical Slider, Double Hung Window,
Frame: Double hung, extruded Aluminum 1400 mm x 2300 mm x 113 mm (55.12" x 90.55" x 4.45")

Sashes: Extruded Aluminum, 1340 mm x 1135 mm x 45 mm (52.76" x 45.67" x 1.77")

Joinery:
Frame: Butt joined, each corner fastened with two #8 x 2" pan head screws, sealed with butyl pad
Sash: Mitred corner, each corner fastened with one aluminium corner key crimp in place, sealed with butyl pad

Installation:
Test Buck: Wood Buck
Fasteners: Frame fastened to buck with ten #8 x 2" flat head screws, one per head/sill, center, four per jamb, paired, 100 mm (3.94") from the ends, screw heads sealed with flexible sealant
Shims: Wood shims, four, 155 mm x 13 mm x 4 mm (6.10" x 0.51" x 0.16"), two per jamb 100 mm (3.94") from the ends.
Sealant: Exterior frame perimeters sealed with flexible sealant

Glazing Type: One per sash, dual glazed IG unit, tempered, over thickness 25.4 mm (1.00") glass thickness 6 mm (0.24"), gap thickness 13.4 mm (0.53"), dual sealed, painted metal spacer, argon filled

Glazing Method: Laid in, dried glazed
Glazing Stop: Extruded aluminium, interior perimeter
Dual Fin: Flexible PVC, one row 5 mm (0.20") high, interior perimeter, at glazing stop, kerf mounted
Setting Block: Rubber, eight, 50 mm x 30 mm x 13 mm (1.97" x 1.18" x 0.51"), two per member, glazing cavity, 100 mm (3.94") from the ends.
Tape: Butyl, exterior perimeter
Corner Bead: Flexible sealant, exterior corners

Reinforcement: None

Thermal Break:

Frame: Polyurethane, 7 mm (0.28") exposed, full perimeter, pour and debridged,
Sash: Polyurethane, 7 mm (0.28") exposed, pour and debridged
One row, stiles and pull rails
Two rows, meeting stiles

Drainage/Ventilation:

Frame:
Drain Slot: Two, 25 mm x 4 mm (0.98" x 0.16"), sill, screen channel, 150 mm (5.91") from the ends

Drain Hole: One, 6 mm (0.24") diameter, sill, interior channel pocket cover, center
Drain Slot with
Eye Lid Cover: Two, 35 mm x 6 mm (1.38" x 0.24"), sill, interior channel, 90 mm (3.54") from the ends

Weather-stripping:

Sashes:
Pile with High
Fin: 2 rows, 3 mm (0.12") high pile, 4 mm (0.16") high pile, stiles and pull rails, interior and exterior face

Pile with Fin: 1 row, 4 mm (0.16") high, upper meeting rail, interior face
Dust Plug: Pile with fin, 10 mm x 10 mm x 6 mm (0.39" x 0.39" x 0.24"), upper meeting rail, interior face, at the ends

Add-ons:

Pocket Cover: Extruded PVC, sill, interior channel, full length, snap on/in

Hardware:

Latch: Aluminum, snap-in, one per sash, pull rails, center
Balance Stops: Plastic, two per sash, top rail, each fastened to sash with three #6x5/8 pan head screws
Spring Balance: Metal, snap-in, eight, 900 mm (35.43") long, four per jamb, two per interior and exterior channel, at the head
Balance Catch: Spring Steel, eight, four per jamb, two per interior and exterior channel, 200 mm (7.87") from the head
Balance Corner Cap: Rigid PVC, two per sash, stiles, at the bottom rail, fastened with two #6x5/8" pan head screws

3.0 TEST RESULTS

Table 1 - Summarized Testing Results in Accordance with to AAMA/WDMA/CSA 101/I.S.2/A440-11 and A440S1-17 Canadian Supplement					
Test	Requirements		Results		Rating
Operating Force (Clause 9.3.1) <i>Per</i> <i>ASTM E2068</i> Test Date: June 10, 2021	Operating: The maximum force to initiate and maintain the sash shall be less than the following, N (lbf)		Sash Measured Force, N (lbf)		PASS
	US Application:				
	Force to Initiate	Report	Initiate:	199.7 (44.89)	
	Force to Maintain	200 (44.96)	Maintain:	196.4 (44.15)	
	Canadian Application:				
	Force to Initiate:	200 (44.96)			
	Force to Maintain:	200 (44.96)			
	Latching Device: The maximum force required to open and close the latch shall be less than the following:		Latching Device Measured force, N (lbf)		
			Open:	31.3 (7.03)	
Close:			N/A		
Air Leakage Resistance (Clause 9.3.2) <i>Per</i> <i>ASTM E283</i> Test Date: June 10, 2021	Allowable rate of air leakage shall be less than or equal to the following, L/s.m² (cfm/ft²), at the subsequent test pressure:		Test area, m² (ft²): 3.2 (34.51)		PASS Canadian A3 Level
	Test Pressure, Pa (psf):	75 (1.57)	Measured Air Leakage Rate, L/s.m² (cfm/ft²):		
	Gateway, A2:	1.5 (0.30)	Infiltration:	0.4 (0.08)	
	Canadian A3:	0.5 (0.10)	Exfiltration:	0.5 (0.10)	

**Table 1, Continued - Summarized Testing Results in Accordance with to
AAMA/WDMA/CSA 101/I.S.2/A440-11 and A440S1-17 Canadian Supplement**

Test	Requirements	Results	Rating
Water Penetration Resistance (Clause 9.3.3) <i>Per ASTM E547</i> Test Date: June 10, 2021	No water leakage shall be observed at the following specified pressure differential, Pa (psf):	No water leakage was observed at the following specified pressure differential, Pa (psf):	PASS Gateway (CW30-H) Optional Performance (CW100-H)
	Gateway Performance:	Optional Performance:	
	Test Pressure: 220 (4.59)	Test Pressure: 720 (15.04)	
	Optional Performance:		
	Test Pressure: 720 (15.04)		
Uniform Load Deflection (Clause 9.3.4.2) <i>Per ASTM E330</i> Test Date: June 10, 2021	The deflection of the unsupported span shall not exceed L/175 at the following specified test pressures, Pa (psf):	Measured net deflection of Meeting Rail mm (in):	PASS Gateway (CW30-H) Optional Performance (CW70-H)
	Allowable deflection: 7.7 mm (0.30)	Span, mm (in): 1340 (52.76)	
	Gateway Performance:	Positive: 5.5 (0.22)	
	Test Pressure: ±1440 (30.08)	Negative: -5.2 (0.20)	
	Optional Performance:		
	Test Pressure: ±3360 (70.18)		
Uniform Load Structural (Clause 9.3.4.3) <i>Per ASTM E330</i> Test Date: June 10 2021	There shall be no permanent damage to the window components after the following specified test pressures, Pa (psf). No member shall have permanent deflect more that 0.3% of span.	Measured net deflection of Meeting Rail mm (in):	PASS Gateway (CW30-H) Optional Performance (CW70-H)
	Allowable permanent deflection, mm (in): 4.0 (0.16)	Span, mm (in): 1340 (52.76)	
	Optional Performance:	Positive: 0.3 (0.01)	
	Test pressure: ±2160 (45.11)	Negative: -1.0 (-0.04)	
	Optional Performance:		
	Test Pressure: ±5040 (105.26)		

**Table 1, Continued - Summarized Testing Results in Accordance with to
AAMA/WDMA/CSA 101/I.S.2/A440-11 and A440S1-17 Canadian Supplement**

Test	Requirements					Results		Rating
Forced-Entry Resistance (Clause 9.3.5) <i>Per ASTM F588</i> Test Date: July 14, 2021	No entry shall be gained during the following test sequence:					For Type A Window no entry was gained during the following specified test sequence:		PASS Grade 20
	Load Identification	Grade Loads, N (lbf)						
		10	20	30	40			
	Disassembly T1:	5 min		10 min		Disassembly T1:	No Entry	
	Manipulation T1:	5 min		10 min		Manipulation T1:	No Entry	
	L1:	667 (150)	890 (200)	1112 (250)	1334 (300)	L1:	No Entry	
	L2:	333 (75)	445 (100)	667 (125)	667 (150)	L1+L2	No Entry	
	L3:	111 (25)	155 (35)	222 (50)	267 (60)	L1+L2+L3	No Entry	
						L1+L2+L3+lift	No Entry	
Deglazing (Clause 9.3.6.3) Test Date July 14, 2021	The panel shall be operable and there shall be no glass breakage or disengagement of glazing materials from panel frame after the application following test loads , N(lbf)					Measured Panel deflection, mm (in):		PASS
						Member:	Deflection:	
						Top Rail:	0.5 (0.02)	
						Bottom Rail:	0.6 (0.02)	
	Stiles test load:		320 (71.94)		Pull Stile:	0.5 (0.02)		
	Rails test load:		230 (51.71)		Meeting Stile:	0.5 (0.02)		

4.0 MODIFICATIONS

No modification was made to the Windspec Inc, Vertical Sliding Window "740 Series Double Hung" Element Specimen No.: 21-06-B0050-1, during testing to achieve the results stated in this report.

5.0 CONCLUSION

Based on the results of the testing, the Windspec Inc., Vertical Sliding Window "740 Series Double Hung" Element Specimen No.: 21-06-B0050-1 met the following requirements as outlined in the AAMA/WDMA/CSA 101/I.S.2/A440-11 and A440S1-17.

Performance Rating

- Air Leakage Resistance Canadian A3 Level
- Water Penetration Resistance 720 Pa (15.04 psf) (CAN)
580 Pa (12.11 psf) (US)
- Uniform Load Deflection ± 3360 Pa (70.18 psf)
- Uniform Load Structural ± 5040 Pa (105.26 psf)
- Forced Entry Resistance Grade 20
- Deglazing Pass

Product Designation for Class CW:

- Class CW – PG3360 – Size tested 1400 x 2300 mm – Hung
- Class CW – PG70 – Size tested 55.12 x 90.55 in – H

Product Manufacturer:	Windspec Inc.
Product Type:	Vertical Sliding Window
Product Series/Model:	74 Series Double Hung
Primary Product Designator:	Class CW – PG3360 – Size tested 1400 x 2300 mm – Hung Class CW – PG70 – Size tested 55.12 x 90.55 in – H
Secondary Product Designator:	
Positive Design Pressure:	3360 Pa (70.18 psf)
Negative Design Pressure:	3360 Pa (70.18 psf)
Water Penetration Resistance:	720 Pa (15.04 psf)
Air Infiltration/Exfiltration	Canadian A3 Level
Test Completion Date:	July 14, 2021
Report Number:	21-06-B0050-1N

6.0 REPORT REVISION SUMMARY

<u>Report No.:</u>	<u>Date:</u>	<u>Description of Revisions:</u>
20-06-B0050-1N	July 22, 2021	Report Issued

Reported by:



Scott Hallam, B.Eng. Ext 11511
Building Systems Specialist, Building Systems
Building Science Division

Reviewed by:



Allan Lawrence, Ext. 11212
Supervisor, Building Systems
Building Science Division

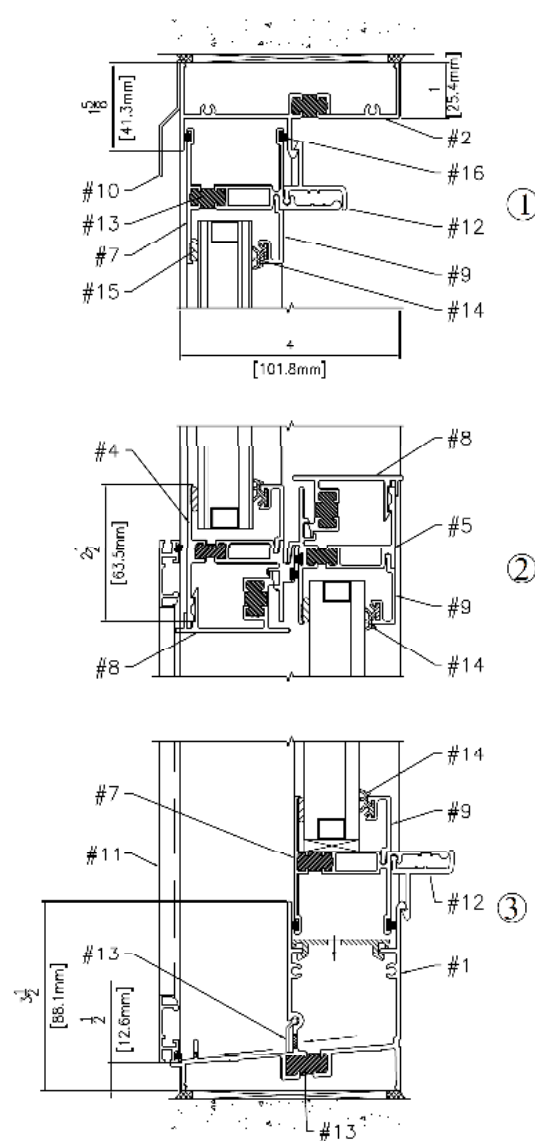
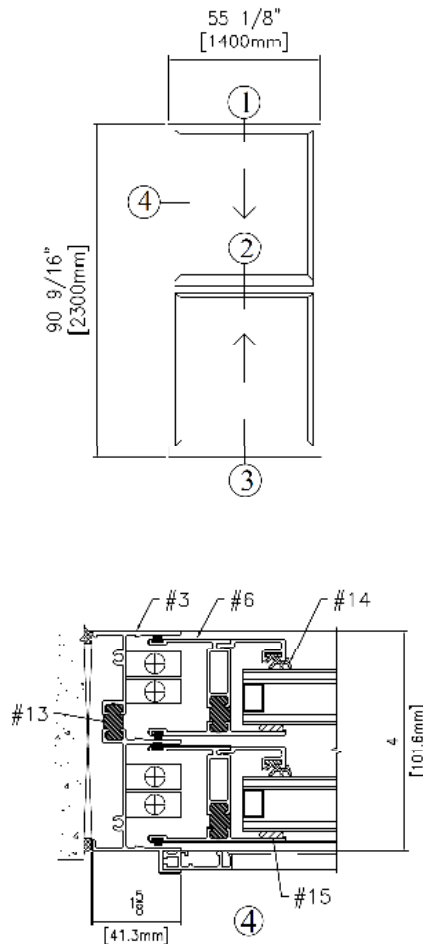
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APPENDIX A

Manufacturer's Detail Drawings

(12 Pages)

740 SERIES (DOUBLE HUNG VERTICAL SLIDER)

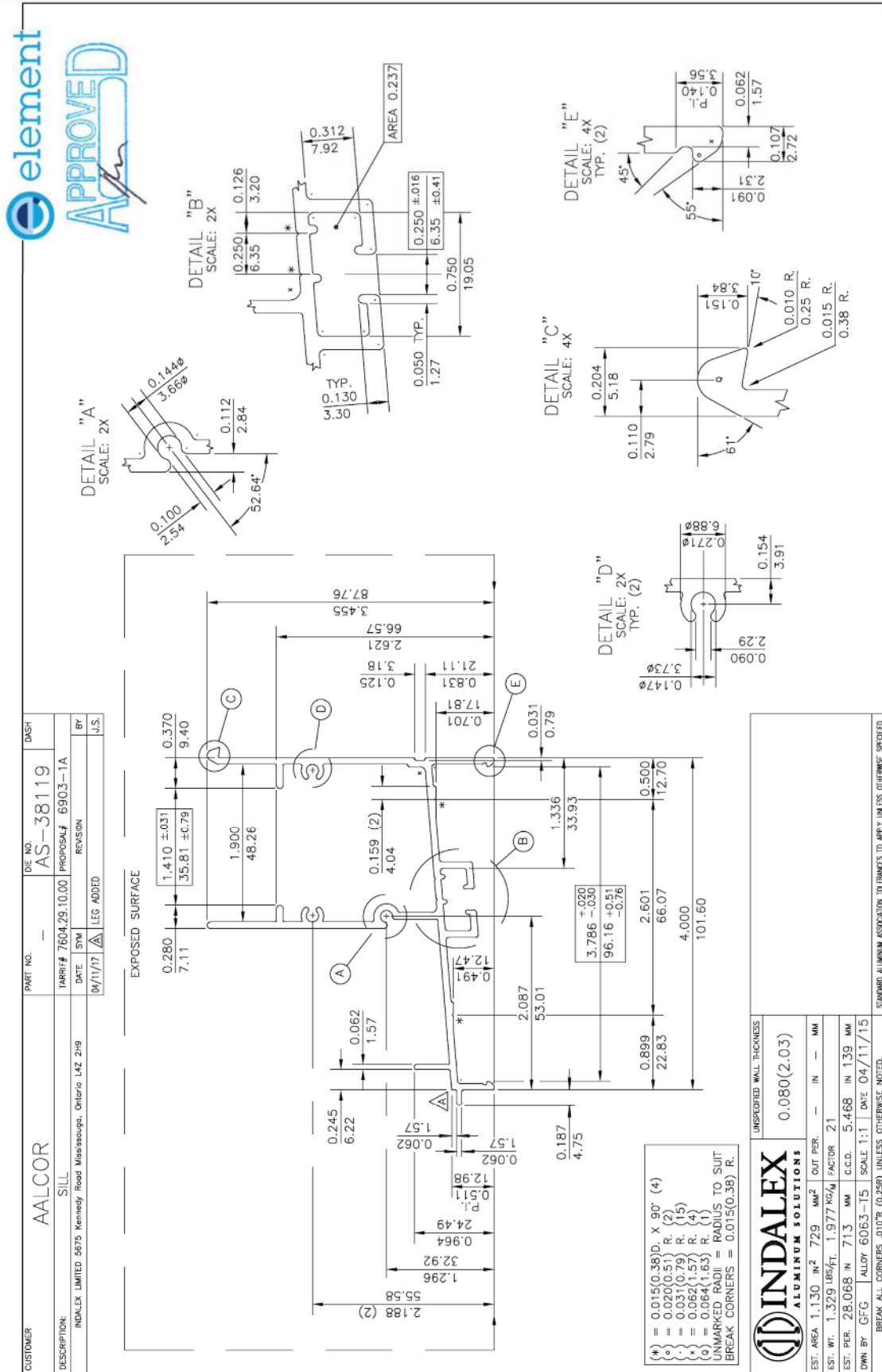


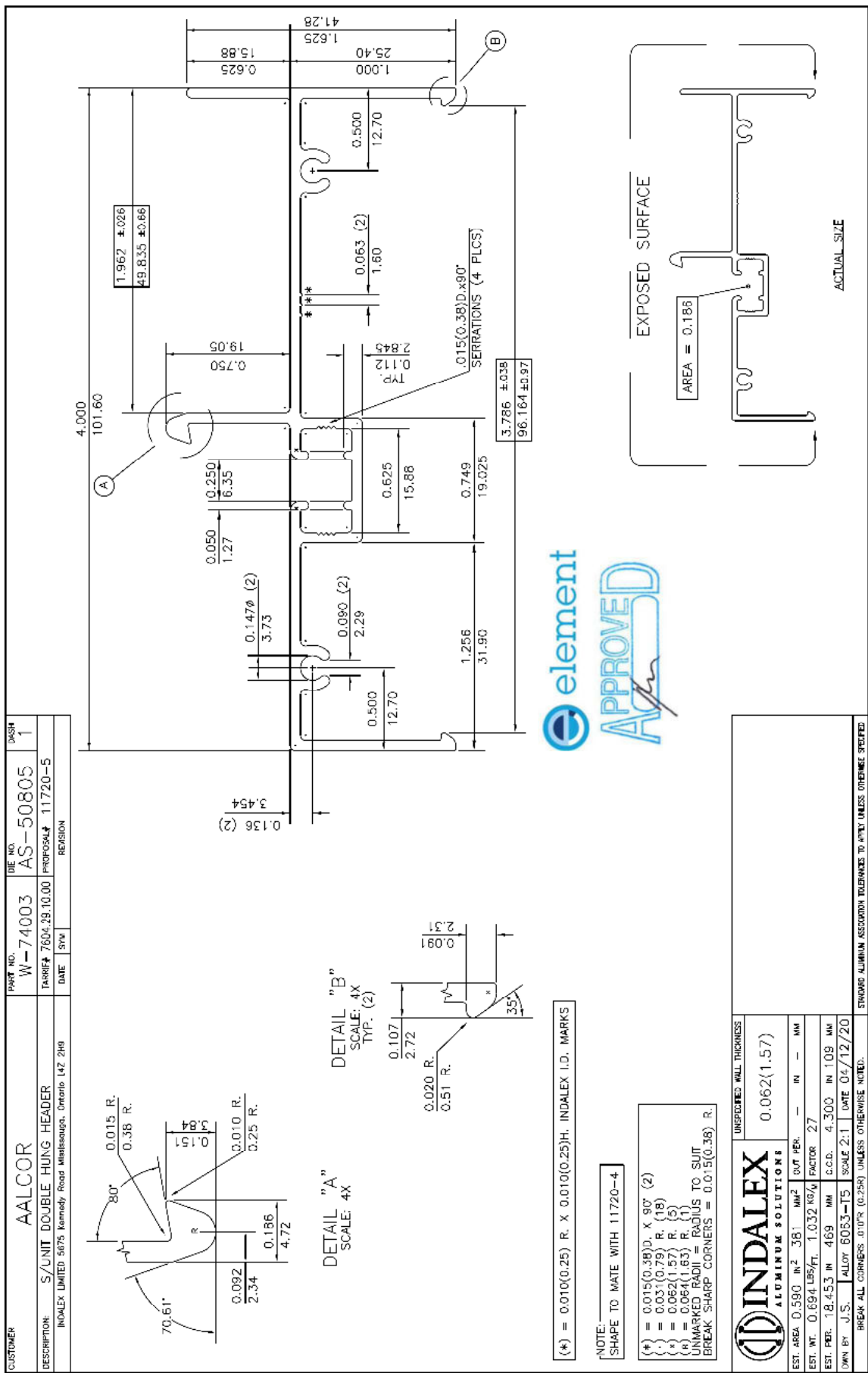
SEALED UNIT GLAZING 1" THK:

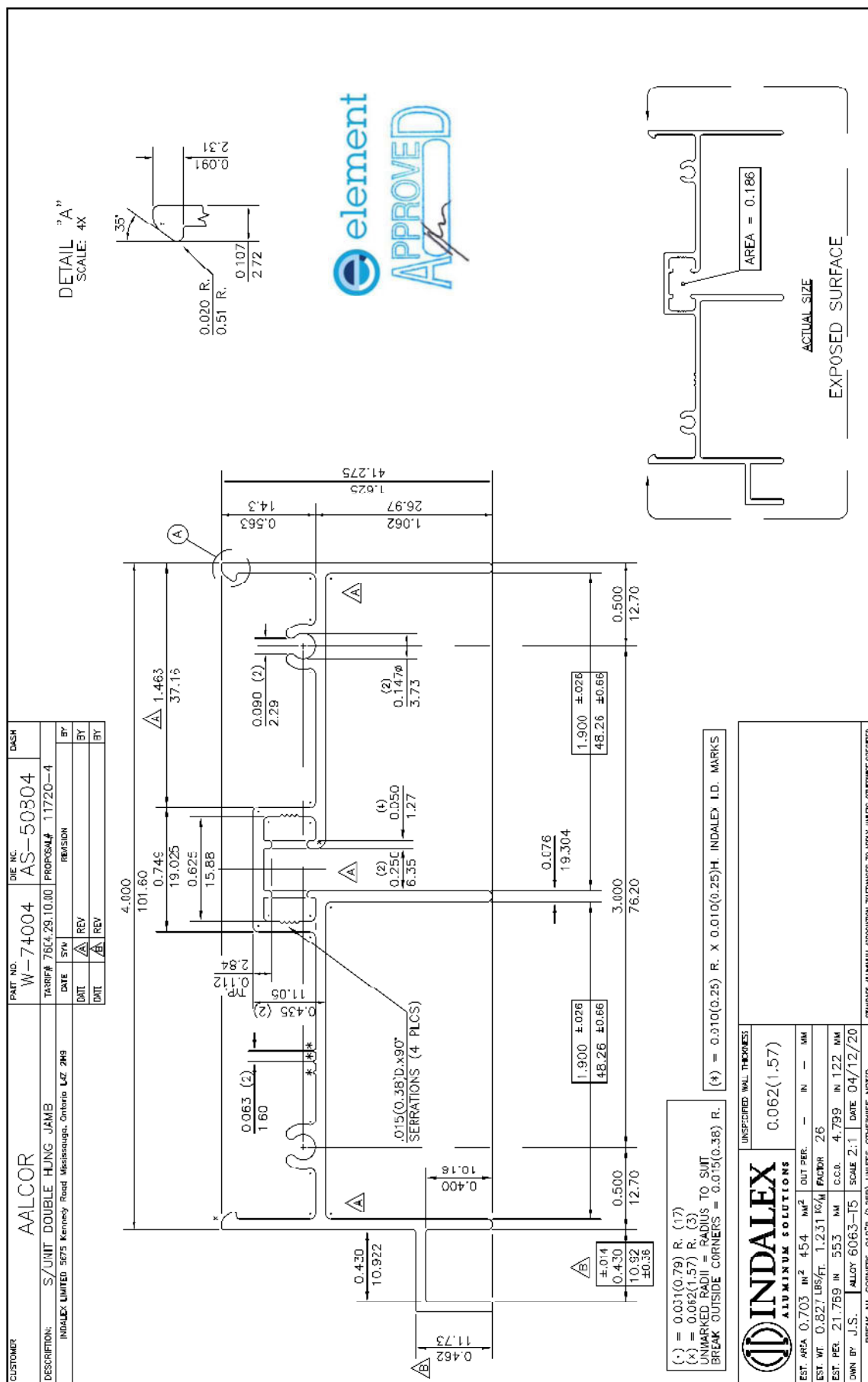
EXTERIOR GLASS: 6mm CLEAR TEMPERED
13mm AIR SPACE WITH ALUM. SPACERS
INTERIOR GLASS: 6mm CLEAR TEMPERED
2 @ 48 5/8" X 40 5/8"

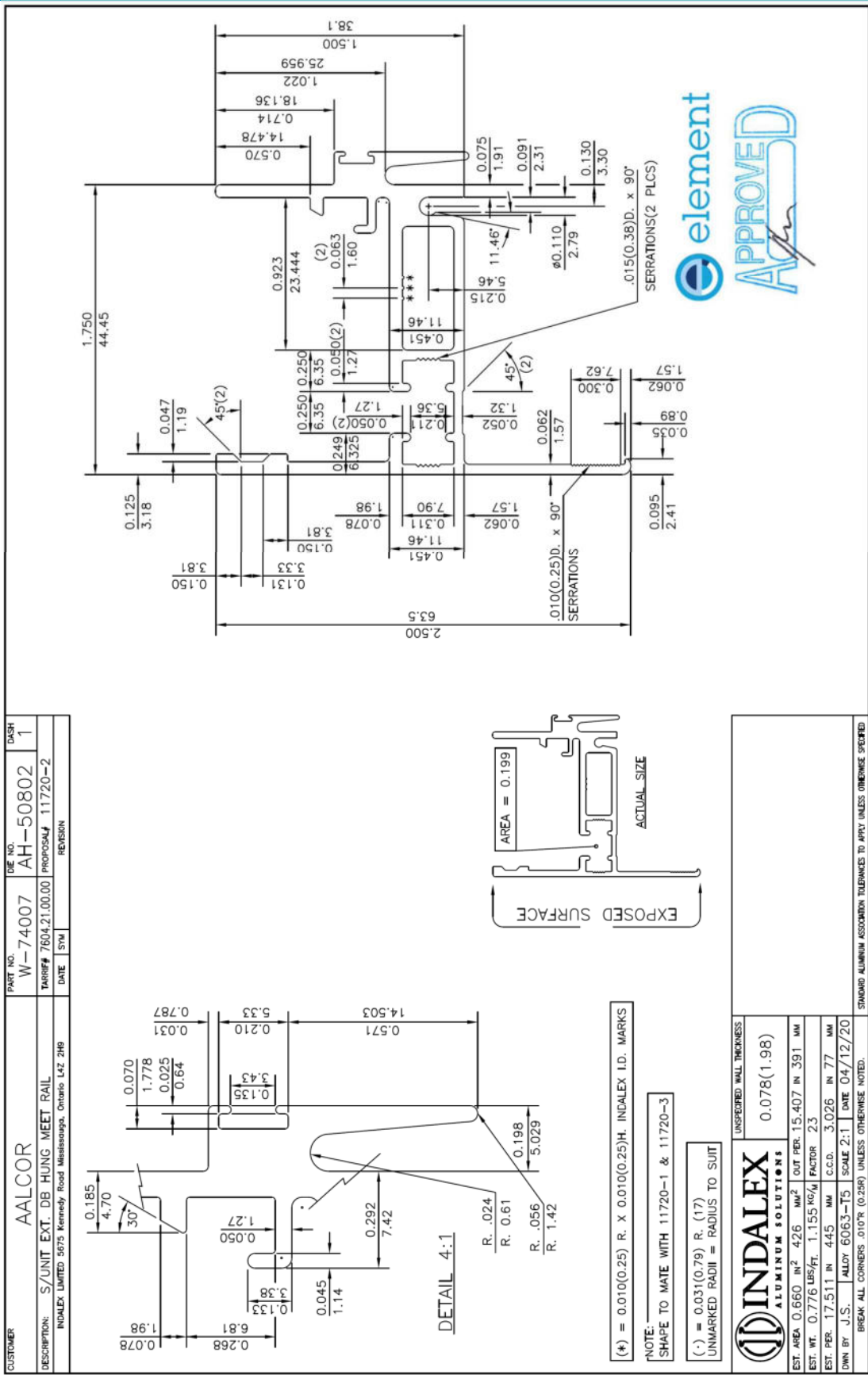


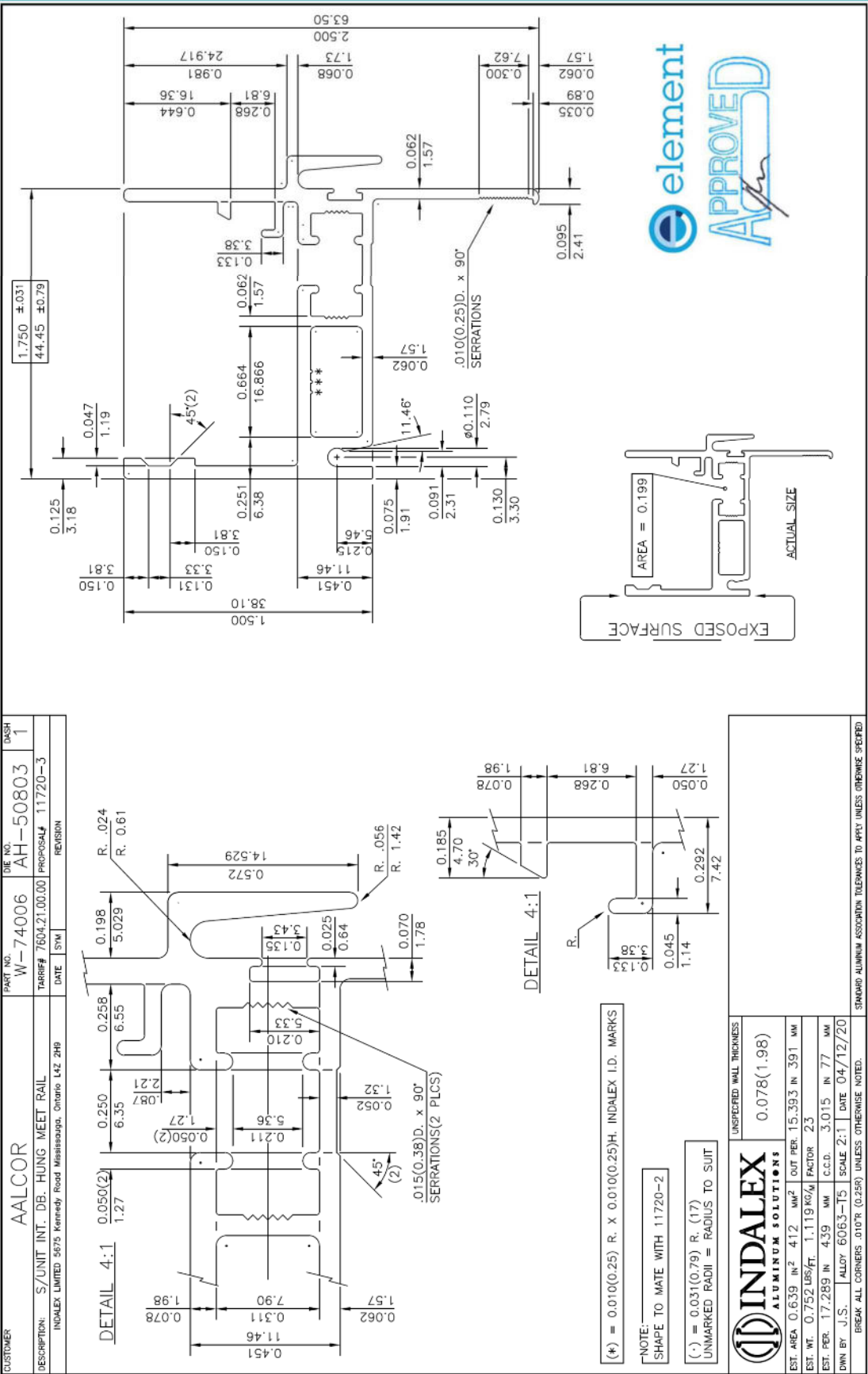
#	DIE #	DESCRIPTIONS
1	W-74002-2	4" S/H D/H SILL
2	W-74003-2	4" S/U D/H HEADER
3	W-74004-2	4" S/U D/H JAMB
4	W-74007-2	EXTERIOR D/H MEETING RAIL
5	W-74006-2	INTERIOR D/H MEETING RAIL
6	W-72009-2	SASH
7	W-72008-2	SASH LOCK RAIL
8	W-74008-2	D/H MEETING RAIL COVER
9	W-72012-2	GLASS STOP
10	W-74005-2	WATER DEFLECTOR
11	W-74018-2	SCREEN
12	AS-38626	HANDLE
13	-	THERMAL BREAK
14	-	GLAZING SPLINE
15	R-C0006	POLYSHIM TAPE
16	R-60187	MOHAIR WEATHER STRIPPING

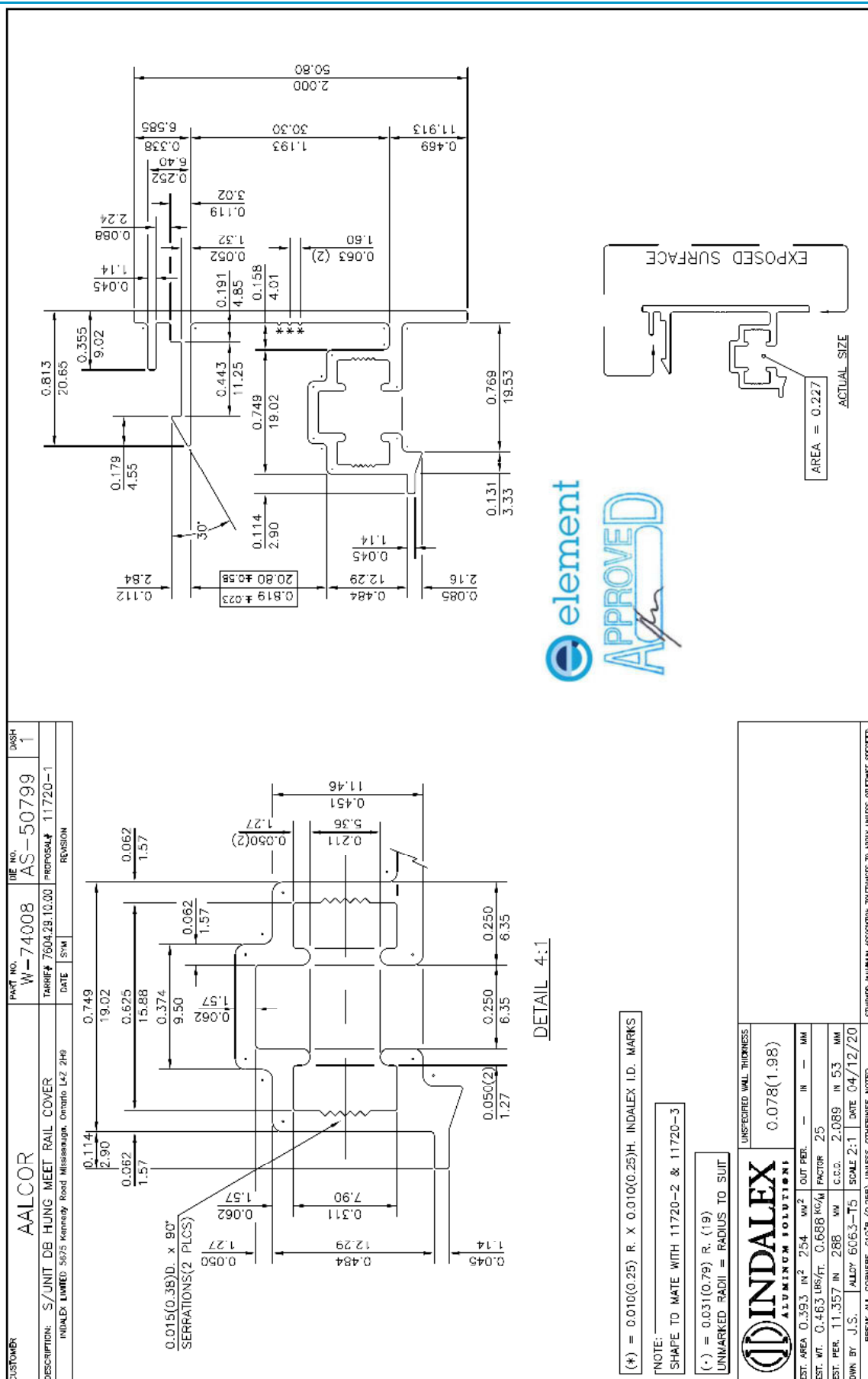












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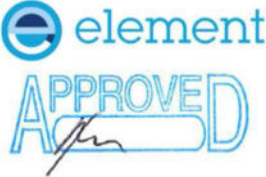
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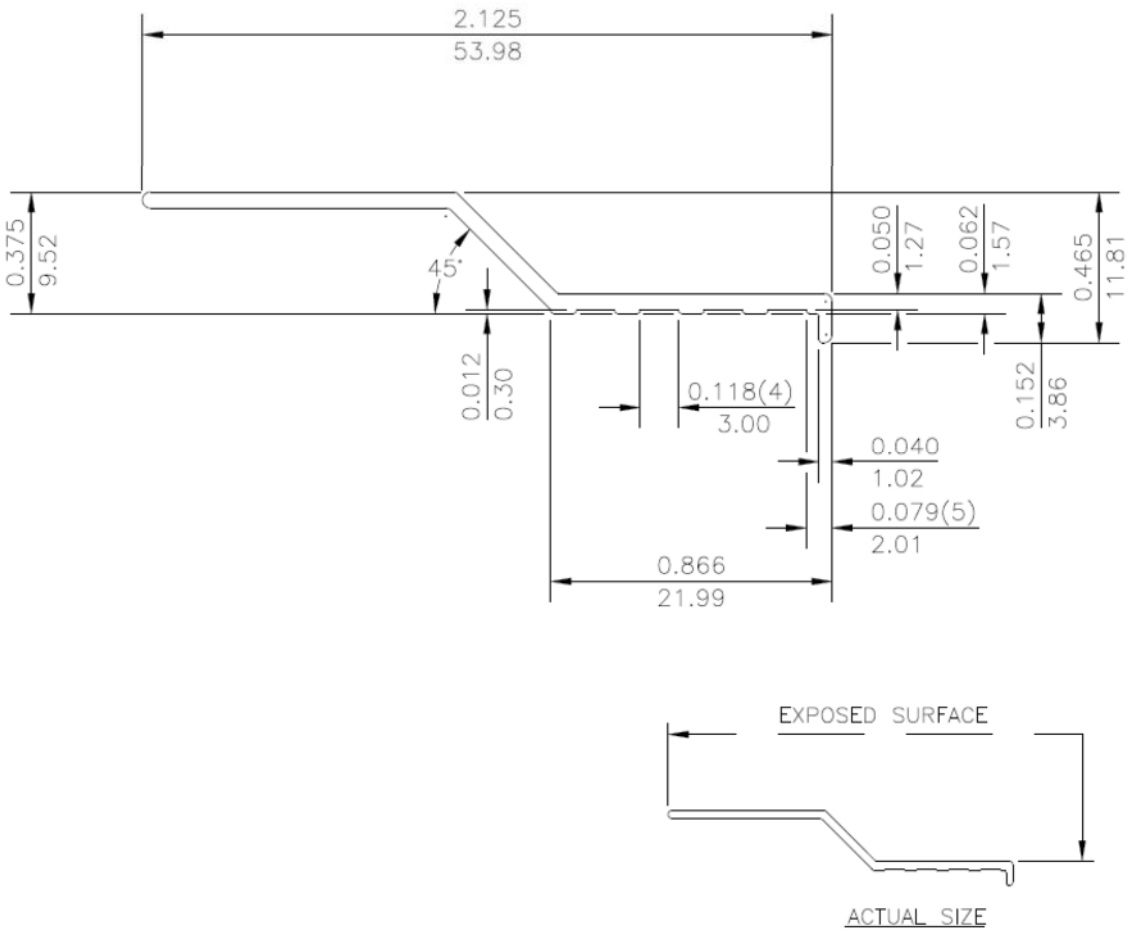
CUSTOMER AALCOR		PART NO. —	DIE NO. AS-38456	DASH 1
DESCRIPTION: 1" GLASS STOP		TARRIF# 7604.29.10.00	PROPOSAL# 7063-1	
		DATE	SYM	REVISION

(x) = 0.031(0.79) R. (6)
(R) = 0.063(1.60) R. (2)
UNMARKED RADII = RADIUS TO SUIT

		UNSPECIFIED WALL THICKNESS	0.062(1.57)
EST. AREA 0.141 IN ² 91 MM ²	OUT PER. — IN — MM		
EST. WT. 0.166 LBS/FT. 0.247 KG/M	FACTOR 28		
EST. PER. 4.608 IN 117 MM	C.C.D. 1.286 IN 33 MM		
DWN BY GFG	ALLOY 6063-T5	SCALE 4:1	DATE 00/09/28
BREAK ALL CORNERS .010"R (0.25R) UNLESS OTHERWISE NOTED.		STANDARD ALUMINUM ASSOCIATION TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED.	

CUSTOMER AALCOR		PART NO. —	DIE NO. AS-38781	DASH 1
DESCRIPTION: WATER DEFLECTOR		TARIFF# 7604.29.10.00	PROPOSAL# 7202-1	
INDALEX LIMITED 5675 Kennedy Road Mississauga, Ontario L4Z 2H9		DATE	SYM	REVISION

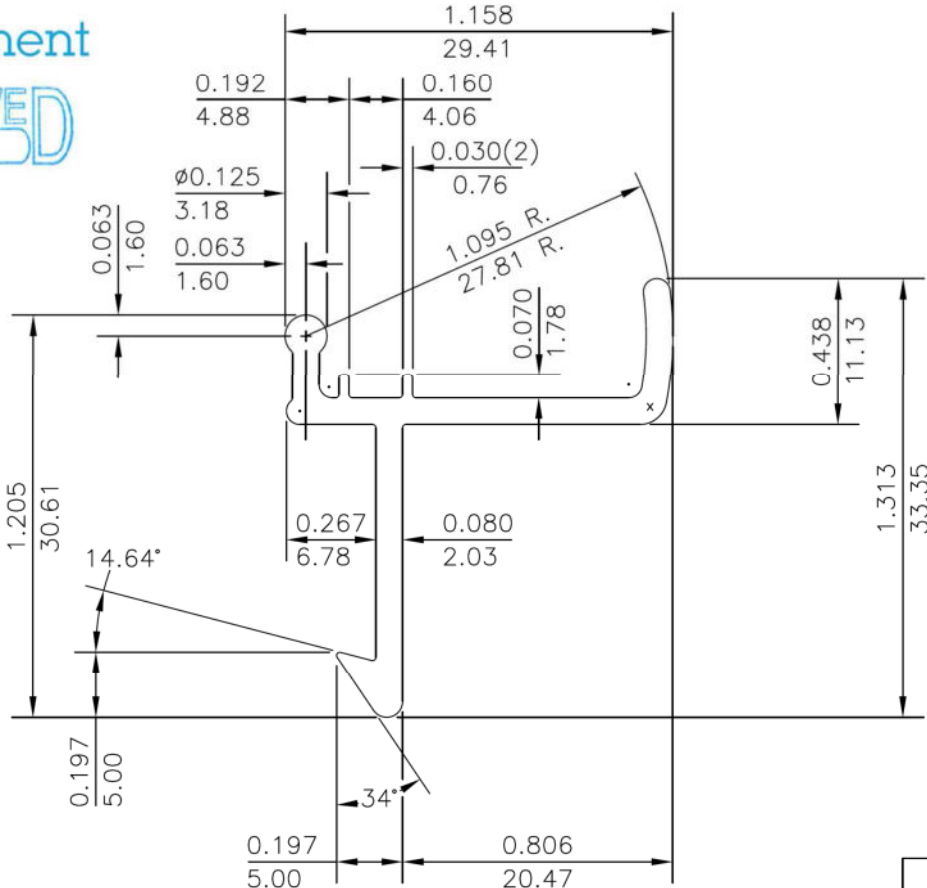




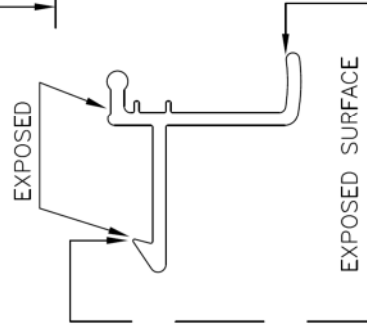
(·) = 0.025(0.64) R. (4)
 UNMARKED RADII = RADIUS TO SUIT

		UNSPECIFIED WALL THICKNESS
		0.050(1.27)
EST. AREA 0.120 IN ² 78 MM ²	OUT PER. — IN — MM	
EST. WT. 0.142 LBS/FT. 0.211 KG/M	FACTOR 34	
EST. PER. 4.817 IN 122 MM	C.C.D. 2.163 IN 55 MM	
DWN BY GFG	ALLOY 6063-T5	SCALE 2:1 DATE 00/11/14
BREAK ALL CORNERS .010"R (0.25R) UNLESS OTHERWISE NOTED.		STANDARD ALUMINUM ASSOCIATION TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED

CUSTOMER AALCOR		PART NO. —	DIE NO. AS-38626	DASH 1
DESCRIPTION: —		TARRIF# 7604.29.10.00	PROPOSAL# 7111-4A	
INDALEX LIMITED 5675 Kennedy Road Mississauga, Ontario L4Z 2H9		DATE	SYM	REVISION

(.) = 0.040(1.02) R. (3)
(x) = 0.080(2.03) R. (1)
UNMARKED RADII = RADIUS TO SUIT



ACTUAL SIZE

		UNSPECIFIED WALL THICKNESS
		0.080(2.03)
EST. AREA 0.224 IN ² 144 MM ²	OUT PER. — IN — MM	
EST. WT. 0.263 LBS/FT. 0.392 KG/M	FACTOR 21	
EST. PER. 5.656 IN 144 MM	C.C.D. 1.580 IN 40 MM	
DWN BY GFG	ALLOY 6063-T5	SCALE 2:1 DATE 00/10/23
BREAK ALL CORNERS .010"R (0.25R) UNLESS OTHERWISE NOTED.		STANDARD ALUMINUM ASSOCIATION TOLERANCES TO APPLY UNLESS OTHERWISE SPECIFIED