



**NFRC U-FACTOR, SHGC, VT, &
CONDENSATION RESISTANCE
COMPUTER SIMULATION REPORT**

(Revised)

**Rendered to:
COEUR D'ALENE WINDOW COMPANY**

**SERIES/MODEL:
3821 Patio Door / 5821 French Rail Patio Door**

Report Number: E8393.01-201-45
Original Report Date: 06/10/15
Revised Report Date: 09/04/15



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Rendered to:
COEUR D'ALENE WINDOW COMPANY
3808 North Sullivan Road
Spokane Valley, Washington 99216

Report Number: E8393.01-201-45
Simulation Date: 06/10/15
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Revised Report Date: 09/04/15

Project Summary:

Architectural Testing, Inc. was contracted to perform U-Factor, Solar Heat Gain Coefficient, Visible Transmittance, and Condensation Resistance* computer simulations in accordance with the National Fenestration Rating Council (NFRC). The products were evaluated in full compliance with NFRC requirements to the standards listed below.

**NFRC's Condensation Resistance rating is NOT equivalent to a Condensation Resistance Factor (CRF) determined in accordance with AAMA 1503.*

Standards:

NFRC 100-2014: Procedure for Determining Fenestration Product U-Factors
NFRC 200-2014: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
NFRC 500-2014: Procedure for Determining Fenestration Product Condensation Resistance Values

Software:

Frame and Edge Modeling: THERM 6.3.46
Center-of-Glass Modeling: WINDOW 6.3.74
Total Product Calculations: WINDOW 6.3.74
Spectral Data Library: IGDB 41.0

Simulations Specimen Description:

Series/Model: 3821 Patio Door / 5821 French Rail Patio Door
Type: Sliding Glass Door, Sliding Glass Door (XX or OX)
Frame Material: VI Vinyl w/ Reinforcement - Interlock
OT Vinyl w/ Foam-filled Insulation w/ Reinforcement - Interlock
Sash Material: VI Vinyl w/ Reinforcement - Interlock
OT Vinyl w/ Foam-filled Insulation w/ Reinforcement - Interlock
Standard Size: 2000mm x 2000mm

Modeling Assumptions/Technical Interpretations:

- 1) Nailing fin was removable and not simulated, per NFRC 100-2014 section 4.2.5.A.
- 2) Dividers were not modeled for options where there was at least 3mm of air/gas space between the divider and both adjacent glazing surfaces per NFRC 100-2014, section 4.2.4.1.D.ii.a.
- 3) Divider grouping per NFRC 100-2014, section 4.2.4.1:
 - 0.250" x 0.313", 0.250" x 0.375", 0.250" x 0.500", 0.250" x 0.625", 0.250" x 0.875", and 0.250" x 1.000" dividers were grouped with 0.250" x 1.000" dividers as the group leader for 4mm options.
 - 0.188" x 0.625", 0.188" x 0.750", 0.188" x 0.813", 0.188" x 1.000", 0.250" x 0.313", 0.250" x 0.375", 0.250" x 0.500", 0.250" x 0.625", 0.250" x 0.875", and 0.250" x 1.000" dividers were grouped with 0.250" x 1.000" dividers as the group leader for 5mm and 5mm-Lami options.
- 4) Frame grouping per NFRC 100-2014, section 4.2.1.I.ii.: Standard and French Rail Frames were individual products in the same product line because components were added or replaced for equal and unequal lite configuration options.
- 5) Frame grouping per NFRC 100-2014, section 4.2.1.K: With and without foam were individual products within the same product line.

Specialty Products Table:

The specialty products method allow 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 6.3.74. The method gives overall product SHGC and VT indexed on center of glass properties. All values used in the calculations are truncated to six decimal place precision.

3821 Standard	No Dividers	Dividers < 1	Dividers > 1
SHGC0	0.002742	0.006010	0.009067
SHGC1	0.825622	0.728472	0.637641
VT0	0.000000	0.000000	0.000000
VT1	0.822880	0.722461	0.628574

5821 French	No Dividers	Dividers < 1	Dividers > 1
SHGC0	0.006201	0.009126	0.011837
SHGC1	0.667278	0.580368	0.499778
VT0	0.000000	0.000000	0.000000
VT1	0.661077	0.571243	0.487941

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

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

Validation Matrix:

The following products are part of a validation matrix. Only one is required for validation testing.

<i>Product Line</i>	<i>Report Number</i>
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Spacer Option Description

<i>Spacer Type</i>	<i>Sealant</i>		<i>Code</i>
	<i>Primary</i>	<i>Secondary</i>	
Cardinal Endur	Polyisobutylene	Silicone	SS-D

Reinforcement Option Description

<i>Location</i>	<i>Material</i>
Lock Stile - NS1011-2	Steel (rolled, ground)
Keeper Stile - NS1041	Steel (rolled, ground)

Gas Filling Technique Description

<i>Fill Type</i>	<i>Method</i>
90% Argon	Dual Probe

Grid Option Description

<i>Grid Size</i>	<i>Grid Type</i>	<i>Grid Pattern</i>
0.188" x 0.625"	Aluminum Rectangular Grid	NFRC Standard
0.188" x 0.750"	Aluminum Rectangular Grid	NFRC Standard
0.188" x 0.813"	Aluminum Rectangular Grid	NFRC Standard
0.188" x 1.000"	Aluminum Rectangular Grid	NFRC Standard
0.250" x 0.313"	Aluminum Rectangular Grid	NFRC Standard
0.250" x 0.375"	Aluminum Rectangular Grid	NFRC Standard
0.250" x 0.500"	Aluminum Rectangular Grid	NFRC Standard
0.250" x 0.625"	Aluminum Rectangular Grid	NFRC Standard
0.250" x 0.875"	Aluminum Rectangular Grid	NFRC Standard
0.250" x 1.000"	Aluminum Rectangular Grid	NFRC Standard

Edge-of-Glass Construction

<i>Interior Condition</i>	Foam Glazing Tape
<i>Exterior Condition</i>	Vinyl Glazing Bead

Weatherstripping

<i>Type</i>	<i>Quantity</i>	<i>Location</i>
Mohair	1 Row	Operable Sash Perimeter, Lock Stile

Frame/Sash Materials Finish

<i>Interior</i>	Vinyl
<i>Exterior</i>	Vinyl

NFRC 100/200/500 Summary Sheet
3821 Patio Door / 5821 French Rail Patio Door

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
Standard Frame (IDs 1-20)												
1	3mm 270 Arg 3mm - 3/4"											
	0.118	0.512	0.118					ARG90	0.037(#2)	CL	SS-D	N,G,S
	U-Factor 0.27			SHGC (N / <1 / >1) 0.31 / 0.27 / 0.24				VT (N / <1 / >1) 0.58 / 0.51 / 0.44			CR	57
2	3mm 366 Arg 3mm - 3/4"											
	0.117	0.512	0.118					ARG90	0.022(#2)	CL	SS-D	N,G,S
	U-Factor 0.27			SHGC (N / <1 / >1) 0.23 / 0.20 / 0.18				VT (N / <1 / >1) 0.53 / 0.47 / 0.41			CR	57
3	3mm 366 Arg 3mm i89 - 3/4"											
	0.117	0.512	0.117					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N,G,S
	U-Factor 0.23			SHGC (N / <1 / >1) 0.22 / 0.20 / 0.18				VT (N / <1 / >1) 0.52 / 0.46 / 0.40			CR	46
4	4mm 270 Arg 4mm - 3/4"											
	0.157	0.453	0.154					ARG90	0.037(#2)	CL	SS-D	N
	U-Factor 0.27			SHGC (N) 0.30				VT (N) 0.57			CR	57
5	4mm 270 Arg 4mm - 3/4"											
	0.157	0.453	0.154					ARG90	0.037(#2)	CL	SS-D	G,S
	U-Factor 0.30			SHGC (<1 / >1) 0.27 / 0.24				VT (<1 / >1) 0.50 / 0.44			CR	57
6	4mm 366 Arg 4mm - 3/4"											
	0.153	0.453	0.154					ARG90	0.022(#2)	CL	SS-D	N
	U-Factor 0.27			SHGC (N) 0.23				VT (N) 0.53			CR	57
7	4mm 366 Arg 4mm - 3/4"											
	0.153	0.453	0.154					ARG90	0.022(#2)	CL	SS-D	G,S
	U-Factor 0.29			SHGC (<1 / >1) 0.20 / 0.18				VT (<1 / >1) 0.46 / 0.40			CR	57
8	4mm 366 Arg 4mm i89 - 3/4"											
	0.153	0.453	0.160					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N
	U-Factor 0.23			SHGC (N) 0.22				VT (N) 0.52			CR	46
9	4mm 366 Arg 4mm i89 - 3/4"											
	0.153	0.453	0.160					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	G,S
	U-Factor 0.25			SHGC (<1 / >1) 0.20 / 0.18				VT (<1 / >1) 0.45 / 0.39			CR	46
10	5mm 270 Arg 5mm - 3/4"											
	0.197	0.386	0.185					ARG90	0.037(#2)	CL	SS-D	N
	U-Factor 0.29			SHGC (N) 0.30				VT (N) 0.57			CR	54

NFRC 100/200/500 Summary Sheet
3821 Patio Door / 5821 French Rail Patio Door

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)		Condensation Resistance		
11	5mm 270 Arg 5mm - 3/4"											
	0.197	0.386	0.185					ARG90	0.037(#2)	CL	SS-D	G,S
	U-Factor 0.32			SHGC (<1 / >1) 0.27 / 0.24				VT (<1 / >1) 0.50 / 0.43		CR 54		
12	5mm 366 Arg 5mm - 3/4"											
	0.187	0.386	0.185					ARG90	0.022(#2)	CL	SS-D	N
	U-Factor 0.28			SHGC (N) 0.23				VT (N) 0.52		CR 55		
13	5mm 366 Arg 5mm - 3/4"											
	0.187	0.386	0.185					ARG90	0.022(#2)	CL	SS-D	G,S
	U-Factor 0.31			SHGC (<1 / >1) 0.21 / 0.18				VT (<1 / >1) 0.46 / 0.40		CR 55		
14	5mm 366 Arg 5mm i89 - 3/4"											
	0.187	0.386	0.187					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N
	U-Factor 0.24			SHGC (N) 0.22				VT (N) 0.51		CR 43		
15	5mm 366 Arg 5mm i89 - 3/4"											
	0.187	0.386	0.187					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	G,S
	U-Factor 0.26			SHGC (<1 / >1) 0.20 / 0.18				VT (<1 / >1) 0.45 / 0.39		CR 43		
16	4mm 270 Arg 3mm - 3/4"											
	0.157	0.512	0.118					ARG90	0.037(#2)	CL	SS-D	N,G,S
	U-Factor 0.28			SHGC (N / <1 / >1) 0.30 / 0.27 / 0.24				VT (N / <1 / >1) 0.57 / 0.50 / 0.44		CR 57		
17	4mm 366 Arg 3mm - 3/4"											
	0.153	0.512	0.118					ARG90	0.022(#2)	CL	SS-D	N,G,S
	U-Factor 0.27			SHGC (N / <1 / >1) 0.23 / 0.20 / 0.18				VT (N / <1 / >1) 0.53 / 0.47 / 0.41		CR 58		
18	4mm 366 Arg 3mm i89 - 3/4"											
	0.153	0.512	0.117					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N,G,S
	U-Factor 0.23			SHGC (N / <1 / >1) 0.22 / 0.20 / 0.18				VT (N / <1 / >1) 0.52 / 0.46 / 0.40		CR 47		
19	5mm 366 Arg Lami - 3/4"											
	0.187	0.315	0.243					ARG90	0.022(#2)	CL	SS-D	N
	U-Factor 0.30			SHGC (N) 0.23				VT (N) 0.52		CR 54		
20	5mm 366 Arg Lami - 3/4"											
	0.187	0.315	0.243					ARG90	0.022(#2)	CL	SS-D	G,S
	U-Factor 0.35			SHGC (<1 / >1) 0.21 / 0.18				VT (<1 / >1) 0.45 / 0.40		CR 54		

NFRC 100/200/500 Summary Sheet
3821 Patio Door / 5821 French Rail Patio Door

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Width 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)					Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
French Rail without Foam (IDs 21-40)													
21	3mm 270 Arg 3mm - 3/4"												
	0.118	0.512	0.118						ARG90	0.037(#2)	CL	SS-D	N,G,S
	U-Factor 0.28			SHGC (N / <1 / >1) 0.25 / 0.22 / 0.19					VT (N / <1 / >1) 0.46 / 0.40 / 0.34			CR	57
22	3mm 366 Arg 3mm - 3/4"												
	0.117	0.512	0.118						ARG90	0.022(#2)	CL	SS-D	N,G,S
	U-Factor 0.28			SHGC (N / <1 / >1) 0.19 / 0.16 / 0.14					VT (N / <1 / >1) 0.43 / 0.37 / 0.32			CR	57
23	3mm 366 Arg 3mm i89 - 3/4"												
	0.117	0.512	0.117						ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N,G,S
	U-Factor 0.24			SHGC (N / <1 / >1) 0.18 / 0.16 / 0.14					VT (N / <1 / >1) 0.42 / 0.36 / 0.31			CR	46
24	4mm 270 Arg 4mm - 3/4"												
	0.157	0.453	0.154						ARG90	0.037(#2)	CL	SS-D	N
	U-Factor 0.28			SHGC (N) 0.25					VT (N) 0.46			CR	57
25	4mm 270 Arg 4mm - 3/4"												
	0.157	0.453	0.154						ARG90	0.037(#2)	CL	SS-D	G,S
	U-Factor 0.30			SHGC (<1 / >1) 0.22 / 0.19					VT (<1 / >1) 0.40 / 0.34			CR	57
26	4mm 366 Arg 4mm - 3/4"												
	0.153	0.453	0.154						ARG90	0.022(#2)	CL	SS-D	N
	U-Factor 0.28			SHGC (N) 0.19					VT (N) 0.42			CR	57
27	4mm 366 Arg 4mm - 3/4"												
	0.153	0.453	0.154						ARG90	0.022(#2)	CL	SS-D	G,S
	U-Factor 0.30			SHGC (<1 / >1) 0.17 / 0.15					VT (<1 / >1) 0.37 / 0.31			CR	57
28	4mm 366 Arg 4mm i89 - 3/4"												
	0.153	0.453	0.160						ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N
	U-Factor 0.24			SHGC (N) 0.18					VT (N) 0.41			CR	46
29	4mm 366 Arg 4mm i89 - 3/4"												
	0.153	0.453	0.160						ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	G,S
	U-Factor 0.26			SHGC (<1 / >1) 0.16 / 0.14					VT (<1 / >1) 0.36 / 0.31			CR	46
30	5mm 270 Arg 5mm - 3/4"												
	0.197	0.386	0.185						ARG90	0.037(#2)	CL	SS-D	N
	U-Factor 0.29			SHGC (N) 0.25					VT (N) 0.45			CR	54

NFRC 100/200/500 Summary Sheet
3821 Patio Door / 5821 French Rail Patio Door

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
31	5mm 270 Arg 5mm - 3/4"											
	0.197	0.386	0.185					ARG90	0.037(#2)	CL	SS-D	G,S
	U-Factor 0.32			SHGC (<1 / >1) 0.22 / 0.19				VT (<1 / >1) 0.39 / 0.34			CR 54	
32	5mm 366 Arg 5mm - 3/4"											
	0.187	0.386	0.185					ARG90	0.022(#2)	CL	SS-D	N
	U-Factor 0.29			SHGC (N) 0.19				VT (N) 0.42			CR 54	
33	5mm 366 Arg 5mm - 3/4"											
	0.187	0.386	0.185					ARG90	0.022(#2)	CL	SS-D	G,S
	U-Factor 0.31			SHGC (<1 / >1) 0.17 / 0.15				VT (<1 / >1) 0.36 / 0.31			CR 54	
34	5mm 366 Arg 5mm i89 - 3/4"											
	0.187	0.386	0.187					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N
	U-Factor 0.25			SHGC (N) 0.18				VT (N) 0.41			CR 43	
35	5mm 366 Arg 5mm i89 - 3/4"											
	0.187	0.386	0.187					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	G,S
	U-Factor 0.27			SHGC (<1 / >1) 0.16 / 0.14				VT (<1 / >1) 0.35 / 0.30			CR 43	
36	4mm 270 Arg 3mm - 3/4"											
	0.157	0.512	0.118					ARG90	0.037(#2)	CL	SS-D	N,G,S
	U-Factor 0.28			SHGC (N / <1 / >1) 0.25 / 0.22 / 0.19				VT (N / <1 / >1) 0.46 / 0.40 / 0.34			CR 56	
37	4mm 366 Arg 3mm - 3/4"											
	0.153	0.512	0.118					ARG90	0.022(#2)	CL	SS-D	N,G,S
	U-Factor 0.28			SHGC (N / <1 / >1) 0.19 / 0.17 / 0.15				VT (N / <1 / >1) 0.43 / 0.37 / 0.31			CR 57	
38	4mm 366 Arg 3mm i89 - 3/4"											
	0.153	0.512	0.117					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N,G,S
	U-Factor 0.24			SHGC (N / <1 / >1) 0.18 / 0.16 / 0.14				VT (N / <1 / >1) 0.42 / 0.36 / 0.31			CR 46	
39	5mm 366 Arg Lami - 3/4"											
	0.187	0.315	0.243					ARG90	0.022(#2)	CL	SS-D	N
	U-Factor 0.30			SHGC (N) 0.19				VT (N) 0.42			CR 54	
40	5mm 366 Arg Lami - 3/4"											
	0.187	0.315	0.243					ARG90	0.022(#2)	CL	SS-D	G,S
	U-Factor 0.35			SHGC (<1 / >1) 0.17 / 0.15				VT (<1 / >1) 0.36 / 0.31			CR 54	

NFRC 100/200/500 Summary Sheet
3821 Patio Door / 5821 French Rail Patio Door

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Width 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)					Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
French Rail with Foam (IDs 41-60)													
41	3mm 270 Arg 3mm - 3/4"												
	0.118	0.512	0.118						ARG90	0.037(#2)	CL	SS-D	N,G,S
	U-Factor 0.27			SHGC (N / <1 / >1) 0.25 / 0.22 / 0.19					VT (N / <1 / >1) 0.46 / 0.40 / 0.34			CR	57
42	3mm 366 Arg 3mm - 3/4"												
	0.117	0.512	0.118						ARG90	0.022(#2)	CL	SS-D	N,G,S
	U-Factor 0.26			SHGC (N / <1 / >1) 0.19 / 0.16 / 0.14					VT (N / <1 / >1) 0.43 / 0.37 / 0.32			CR	57
43	3mm 366 Arg 3mm i89 - 3/4"												
	0.117	0.512	0.117						ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N,G,S
	U-Factor 0.23			SHGC (N / <1 / >1) 0.18 / 0.16 / 0.14					VT (N / <1 / >1) 0.42 / 0.36 / 0.31			CR	47
44	4mm 270 Arg 4mm - 3/4"												
	0.157	0.453	0.154						ARG90	0.037(#2)	CL	SS-D	N
	U-Factor 0.26			SHGC (N) 0.25					VT (N) 0.46			CR	57
45	4mm 270 Arg 4mm - 3/4"												
	0.157	0.453	0.154						ARG90	0.037(#2)	CL	SS-D	G,S
	U-Factor 0.28			SHGC (<1 / >1) 0.22 / 0.19					VT (<1 / >1) 0.40 / 0.34			CR	57
46	4mm 366 Arg 4mm - 3/4"												
	0.153	0.453	0.154						ARG90	0.022(#2)	CL	SS-D	N
	U-Factor 0.26			SHGC (N) 0.19					VT (N) 0.42			CR	58
47	4mm 366 Arg 4mm - 3/4"												
	0.153	0.453	0.154						ARG90	0.022(#2)	CL	SS-D	G,S
	U-Factor 0.28			SHGC (<1 / >1) 0.17 / 0.15					VT (<1 / >1) 0.37 / 0.31			CR	58
48	4mm 366 Arg 4mm i89 - 3/4"												
	0.153	0.453	0.160						ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N
	U-Factor 0.23			SHGC (N) 0.18					VT (N) 0.41			CR	47
49	4mm 366 Arg 4mm i89 - 3/4"												
	0.153	0.453	0.160						ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	G,S
	U-Factor 0.24			SHGC (<1 / >1) 0.16 / 0.14					VT (<1 / >1) 0.36 / 0.31			CR	47
50	5mm 270 Arg 5mm - 3/4"												
	0.197	0.386	0.185						ARG90	0.037(#2)	CL	SS-D	N
	U-Factor 0.28			SHGC (N) 0.25					VT (N) 0.45			CR	54

NFRC 100/200/500 Summary Sheet
3821 Patio Door / 5821 French Rail Patio Door

ID	Pane Thickness 1	Gap Width 1	Pane Thickness 2	Gap Width 2	Pane Thickness 3	Gap Width 3	Pane Thickness 4	Gap Fill	Low-e (Surface#)	Tint	Spacer	Grid Type
	U-Factor			Solar Heat Gain Coefficient (SHGC) Grids (None / <1 / >=1)				Visible Transmittance (VT) Grids (None / <1 / >=1)			Condensation Resistance	
51	5mm 270 Arg 5mm - 3/4"											
	0.197	0.386	0.185					ARG90	0.037(#2)	CL	SS-D	G,S
	U-Factor 0.30			SHGC (<1 / >1) 0.22 / 0.19				VT (<1 / >1) 0.39 / 0.34			CR 54	
52	5mm 366 Arg 5mm - 3/4"											
	0.187	0.386	0.185					ARG90	0.022(#2)	CL	SS-D	N
	U-Factor 0.27			SHGC (N) 0.19				VT (N) 0.42			CR 55	
53	5mm 366 Arg 5mm - 3/4"											
	0.187	0.386	0.185					ARG90	0.022(#2)	CL	SS-D	G,S
	U-Factor 0.30			SHGC (<1 / >1) 0.17 / 0.15				VT (<1 / >1) 0.36 / 0.31			CR 55	
54	5mm 366 Arg 5mm i89 - 3/4"											
	0.187	0.386	0.187					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N
	U-Factor 0.24			SHGC (N) 0.18				VT (N) 0.41			CR 44	
55	5mm 366 Arg 5mm i89 - 3/4"											
	0.187	0.386	0.187					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	G,S
	U-Factor 0.26			SHGC (<1 / >1) 0.16 / 0.14				VT (<1 / >1) 0.35 / 0.30			CR 44	
56	4mm 270 Arg 3mm - 3/4"											
	0.157	0.512	0.118					ARG90	0.037(#2)	CL	SS-D	N,G,S
	U-Factor 0.27			SHGC (N / <1 / >1) 0.25 / 0.22 / 0.19				VT (N / <1 / >1) 0.46 / 0.40 / 0.34			CR 57	
57	4mm 366 Arg 3mm - 3/4"											
	0.153	0.512	0.118					ARG90	0.022(#2)	CL	SS-D	N,G,S
	U-Factor 0.26			SHGC (N / <1 / >1) 0.19 / 0.17 / 0.15				VT (N / <1 / >1) 0.43 / 0.37 / 0.31			CR 57	
58	4mm 366 Arg 3mm i89 - 3/4"											
	0.153	0.512	0.117					ARG90	0.022(#2) / 0.149(#4)	CL	SS-D	N,G,S
	U-Factor 0.23			SHGC (N / <1 / >1) 0.18 / 0.16 / 0.14				VT (N / <1 / >1) 0.42 / 0.36 / 0.31			CR 46	
59	5mm 366 Arg Lami - 3/4"											
	0.187	0.315	0.243					ARG90	0.022(#2)	CL	SS-D	N
	U-Factor 0.29			SHGC (N) 0.19				VT (N) 0.42			CR 55	
60	5mm 366 Arg Lami - 3/4"											
	0.187	0.315	0.243					ARG90	0.022(#2)	CL	SS-D	G,S
	U-Factor 0.33			SHGC (<1 / >1) 0.17 / 0.15				VT (<1 / >1) 0.36 / 0.31			CR 55	

The 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 Certification Authorization Report (CAR) by an NFRC accredited Inspection Agency (IA) are to be used for labeling purposes. The ratings values were rounded in accordance to NFRC 601, NFRC Unit and Measurement Policy.

Architectural Testing, Inc. is an NFRC accredited simulation laboratory and all simulations were conducted in full compliance with NFRC approved procedures and specifications. The NFRC procedure requires that the computational results be verified through actual test results.

Architectural Testing will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period. The test record retention end date for this report is June 10, 2019.

Results obtained are simulated values and were secured by using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the product simulated. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

SIMULATED BY:

REVIEWED BY:

Emmett T. Houlihan
Simulation Technician

Andrew C. Walczak
Simulations Project Manager
Simulator-In-Responsible-Charge

ETH:eth

E8393.01-201-45

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Drawings and Bills of Material (32)

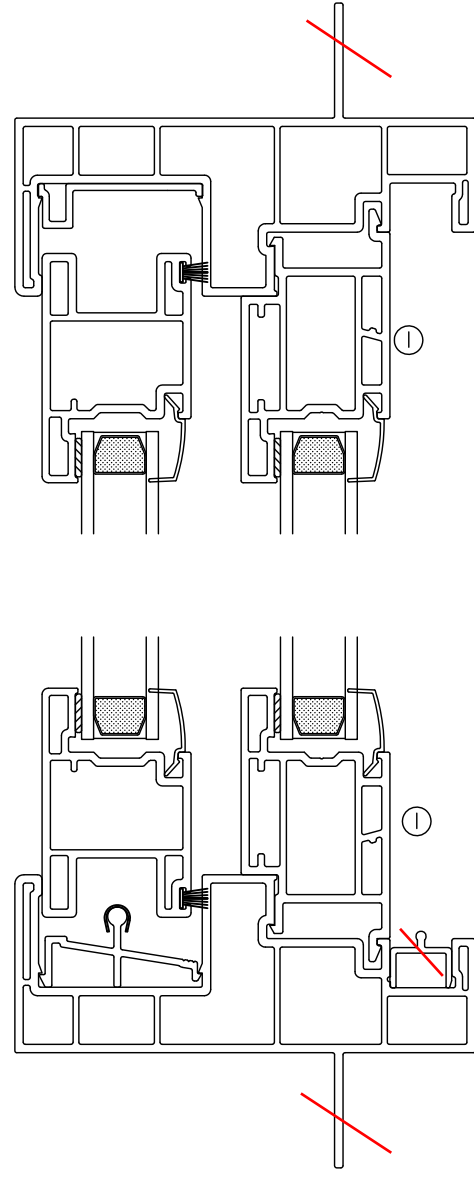
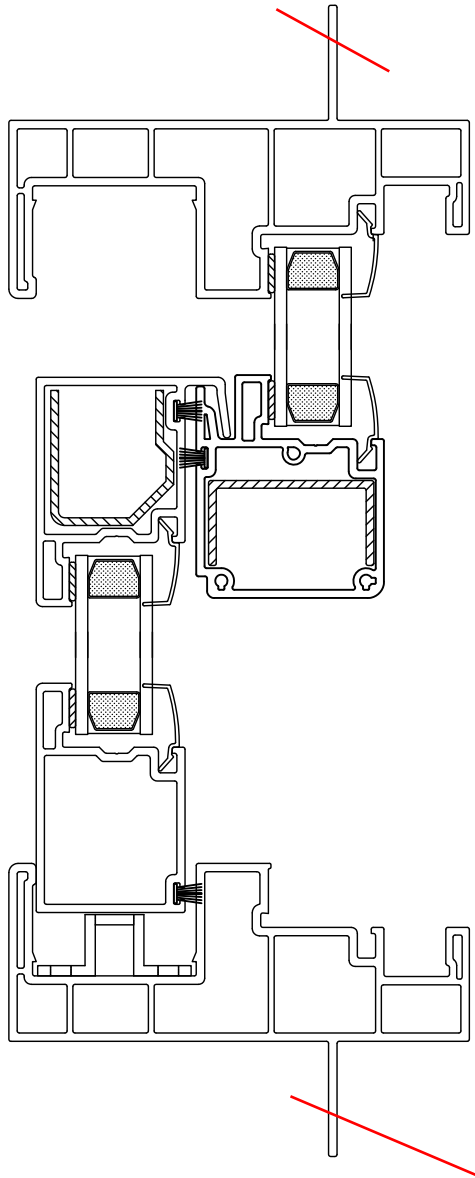
Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
01-R0	06/10/15	N/A	Original report issue. Work requested by Mr. Blake Doll of Coeur d'Alene Window Company.
01-R1	09/04/15	All	Revised report issue. Report revised to change name of French Rail options from "3821 French Rail Patio Door" to "5821 French Rail Patio Door".

All drawings and Bills of Material used to simulate this product are enclosed in this Appendix

Part	Part #
Main Frame	RS1295
Fixed Interlock	R1300
Vent Interlock	RS1298
Vent Common	RS1297
Vent Sill	RS1296
Screen Track	RS1060
Slider Track	RS1301
XOP Bar	RS1306
Anti Lift	RS1076
Bead	RS1994
Filler Bar	RS1307
OXXO Bar (astragal)	RS1304
Equal Site	RS1299
Fixed Interlock Metal	U150205
Vent Interlock Metal	U960550
XOP Bar Metal	U150220
Slider Track Metal	U780011
Handle (Interior & Exterior)	97BDFG01
Roller Wheel	21000
Mortise Lock	DR05-7601
Keeper	DR05-2510-00
Fixed Interlock Screw	08A20PT4HUHLDNEO
Bumper	R112-2602
Bumper Screw	#8 x 5/8

SCALE: 1/2: 1



REV	DATE	REMARKS
1	18-MAY-99	TIT EXTENDED

EPI DATE: 11-FEB-98 NO: 308-BRK1 A

TITLE: SPD PLAN VIEW

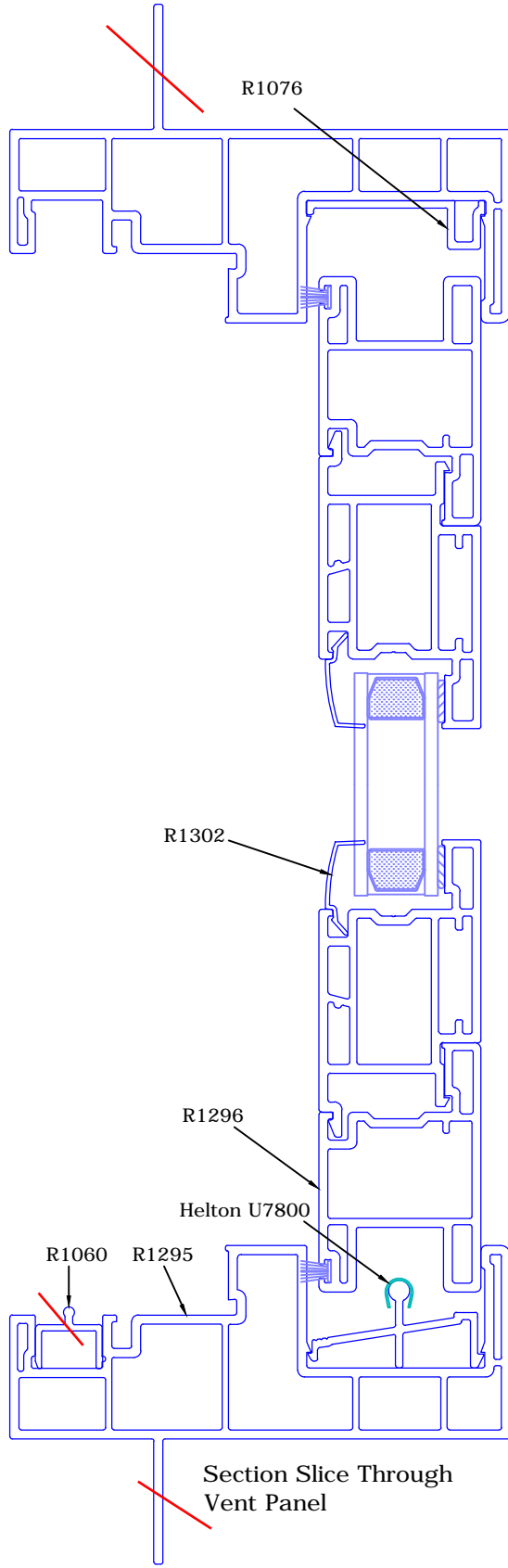
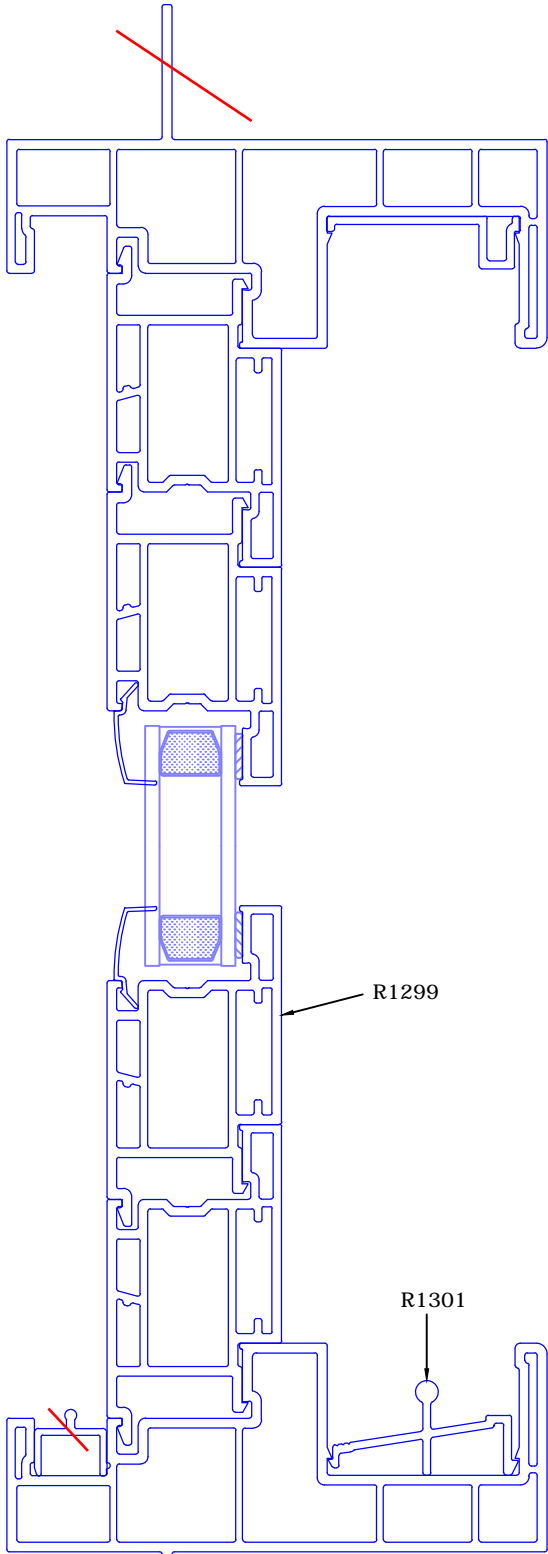
Intertek



Report #: E8393.01-201-45

Date: 06/10/15

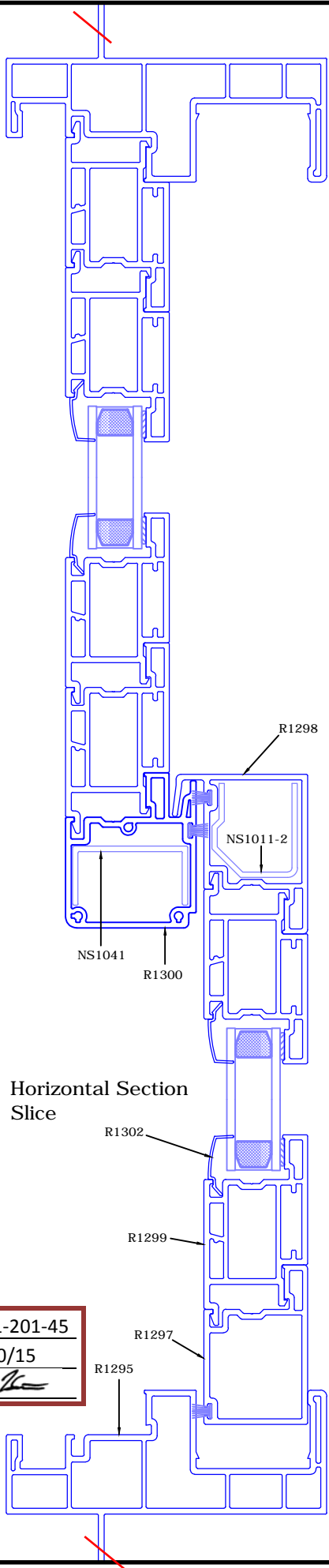
Verified by: *[Signature]*



Intertek
 Architectural Testing


Report #: E8393.01-201-45
 Date: 06/10/15
 Verified by: *[Signature]*

ROYAL Building Products <small>111 Royal Group Crescent Woodbridge, Ontario Canada L4H 1X9</small>	Die # 308-L300_V CUSTOMER: Cda	THIS DOCUMENT CONTAINS PROPRIETARY AND/OR CONFIDENTIAL INFORMATION AND IS NOT TO BE REPRODUCED, COPIED, OR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS GIVEN, WITHOUT THE WRITTEN PERMISSION OF ROYAL GROUP INC.	Copyright © 2015 Royal Group, Inc. All Rights Reserved PROJECT: 308 DATE: April 28, 2014	Layout Name: Vertical Sections Drawn by: gmc SCALE: 0.625:1 AREA: .000 W/T/FT: .000	ACAD #: 308-L300_R1299 Stacked WALL TOLERANCES: 0.000-0.099 ±0.006 WALL THICKNESS: Exterior .000 SHARP Interior .000 FLEX ANGULAR TOLERANCES: x.x ±1/2" SYMBOL: SHARP CRITICAL EXPOSED	Ref: RADI: UNMARKED UNMARKED 0.015 a b c f s FULL SHARP
	TITLE 308 SPD Vertical Sections - Stacked				LINEAR TOLERANCES: 0.000-0.999 ±0.010 1.000-1.999 ±0.015 2.000-3.999 ±0.020	

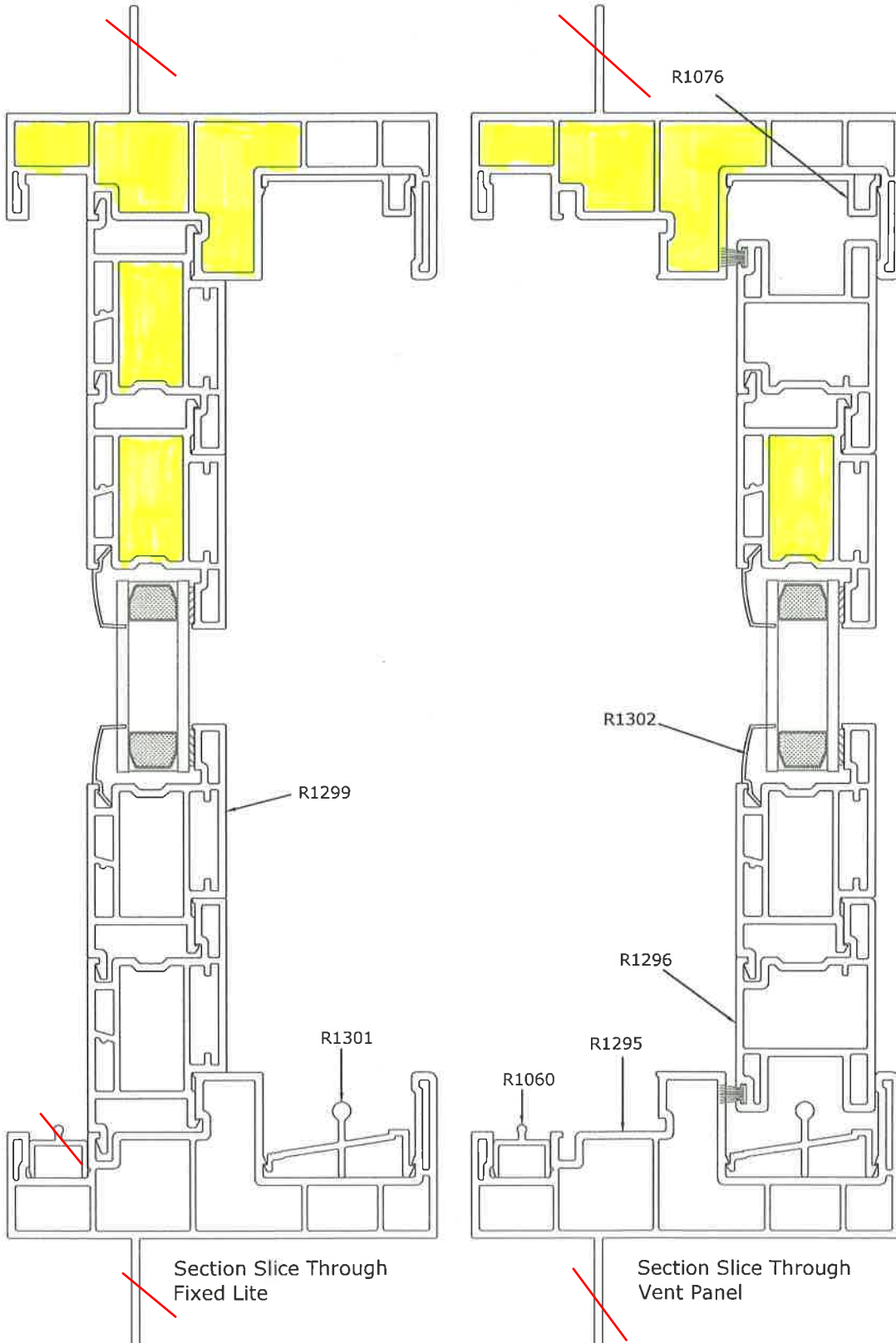


Horizontal Section Slice


 Report #: E8393.01-201-45
 Date: 06/10/15
 Verified by: [Signature]

 111 Royal Group Crescent Woodbridge, Ontario Canada L4H 1X9	Die #	Copyright © 2015 Royal Group, Inc. All Rights Reserved		Layout Name: Horizontal Sections	ACAD #: 308-L300_R1299 Stacked	Ref
	Sys No. 308-L301_V CUSTOMER Cda	PROJECT: 308 DATE: April 29, 2014	Drawn by: gmc SCALE: 0.47:1	WALL TOLERANCES: 0.000-0.099 ±0.006 WALL THICKNESS: Exterior .000 SHARP Interior .000 FLEX	LINEAR TOLERANCES: 0.000-0.999 ±0.010 1.000-1.999 ±0.015 2.000-3.999 ±0.020	ANGULAR TOLERANCES: x.x ±1/2° SYMBOL: SHARP FLEX CRITICAL EXPOSED
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TITLE: 308 SPD Horizontal Section - Stacked						

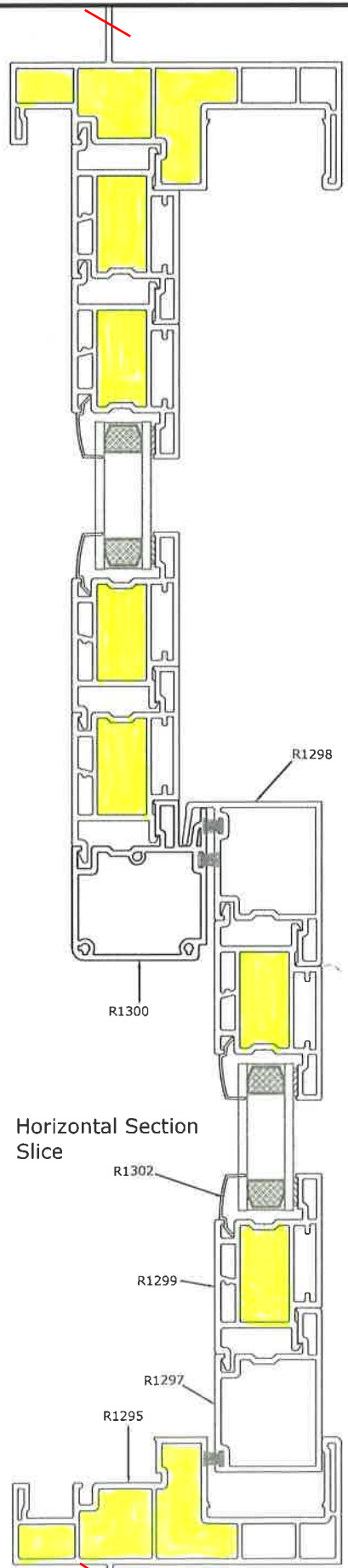
Polyurethane Foam Insulation (Spray Applied)



ROYAL Building Products <small>111 Royal Group Crescent Canada L4H 1J8</small>	Die#	Copyright © 2015 Royal Group, Inc. All Rights Reserved		ACAD#: 308-L300_R1299 Stacked PACI: UNMARKED 0.015	Ref
	Sys No. 308-L300_V CUSTOMER Cda	PROJECT: 308 DATE: April 28, 2014	Vertical Sections SCALE 0.625:1	WALL TOLERANCES: ±0.006 WALL THICKNESS: .000 SYMBOL: SHARP	UNMARKED 0.015 g b c f s
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND SHALL NOT BE COPIED, REPRODUCED OR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS PERMITTED BY ROYAL GROUP INC.		Drawn by: gmcc AREA .000 WT/FT .000	LINEAR TOLERANCES: ±0.010 ±0.015 ±0.020	EXTERIOR .000 INTERIOR .000 .xxx .xxx	SHARP FLEX CRITICAL EXPOSED
TITLE 308 SPD Vertical Sections - Stacked					

Intertek
 Report #: E8393.01-201-45
 Date: 06/10/15
 Verified by: *[Signature]*

Polyurethane Foam Insulation (Spray Applied)



Horizontal Section Slice

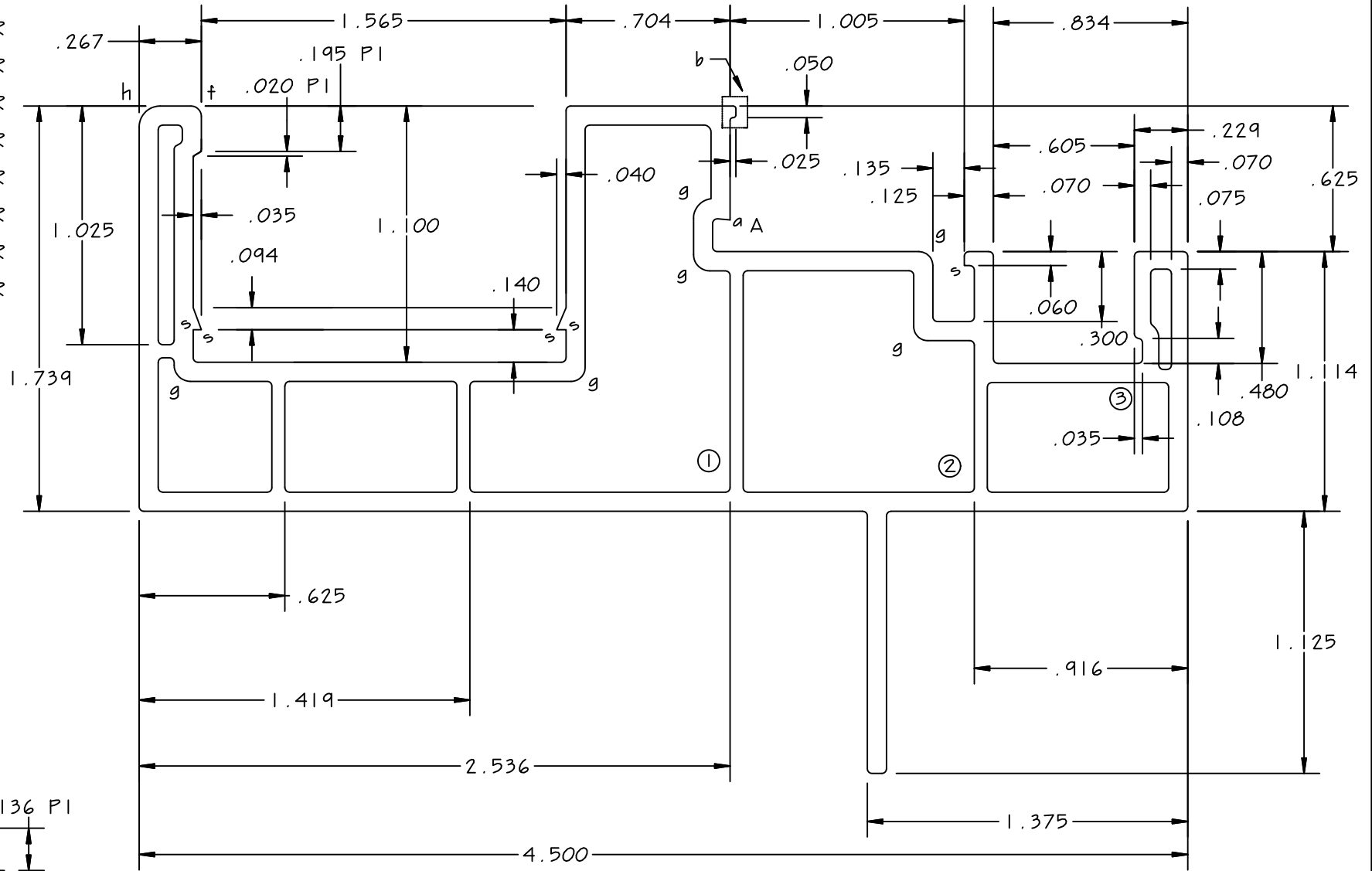
ROYAL Building Products	Die#	308-L301_V	ACAD#:	308-L300_R1299 Stacked	Ref
	Sys No.	308-L301_V	WALL TOLERANCES:	0.000-0.099 ±0.006	UNMARKED
CUSTOMER	CdA	PROJECT:	308	ANGULAR TOLERANCES:	±1/2"
111 Royal Group Crescent Woodbridge, Ontario Canada L7L 1P5		DATE:	April 29, 2014	WALL THICKNESS:	STYMBOL:
TITLE		308 SPD Horizontal Section - Stacked		EXTERIOR:	0.000
		AREA	.000	INTERIOR:	0.000
		WT/FT	.000	CRITICAL:	0.000
				EXPOSED:	0.000
				SHARP:	0.000
				FLEX:	0.000
				CRITICAL:	0.000
				EXPOSED:	0.000
				SHARP:	0.000
				UNMARKED:	0.015

Intertek	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	

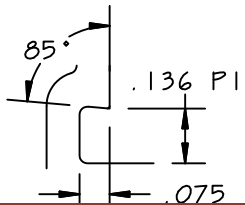


SCALE: 1.5:1

- a=0.006R
- b=0.012R
- c=0.015R
- d=0.020R
- e=0.030R
- f=0.045R
- g=0.060R
- h=0.090R
- s=sharp



DETAIL A
SCALE: 2:1



Intertek Report #: E8393.01-201-45
 Date: 06/10/15
 Verified by: *[Signature]*

APPROVED
 16-FEB-98
 CYCLOID DESIGNS

3	01-18-98	RETAINER DETAL ADDED; WT WAS .954
2	01-18-98	WALL MOVED; DIM WAS 0.954
1	01-18-98	WALL MOVED; DIM WAS 2.716

FAB REF	308-F2A	308-F5A	FIT TO	305-D35	308-D18	181-D8	308-D19
308-F2	308-F3		308-D13	308-D15	308-D20	181-D15	291-D7

CYCLOID
DESIGNS

DWG: 308-D1

DATE: 11-FEB-98

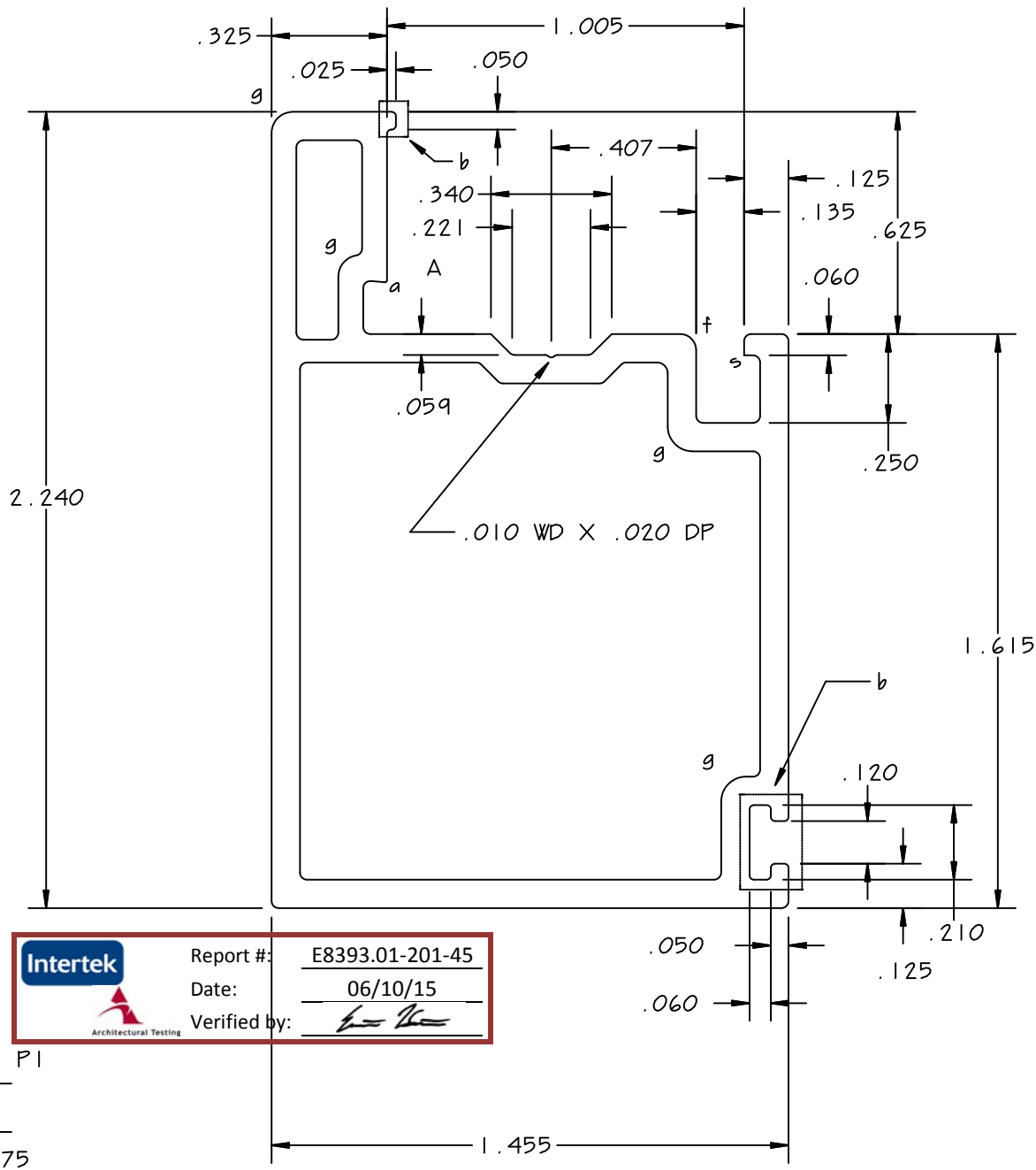
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EXTERNAL WALL: 0.082
 INTERNAL WALL: 0.056
 CORNER TYP: 0.020R
 WEIGHT: 0.953 LB/FT

TITLE: FRAME WITH FIN

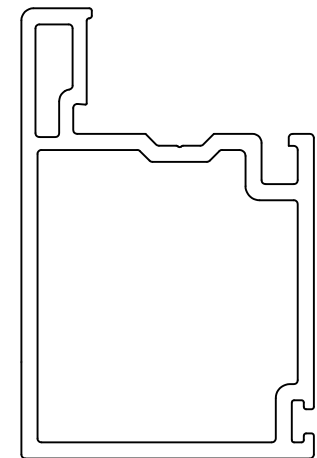
RS1295

SCALE: 2:1



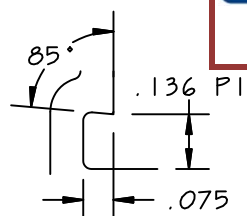
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- b=0.012R
- c=0.015R
- d=0.020R
- e=0.030R
- f=0.045R
- g=0.060R
- s=sharp

APPROVED
 16-FEB-98
 CYCLOID DESIGNS



ACTUAL SIZE

DETAIL A
 SCALE: 2:1



	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

1	01-18-98	DIM CHANGE: WAS .124		
REV	DATE	REMARKS		
FIT TO	305-D35	308-D18	308-D13	
	308-D15	291-D7		

CYCLOID
 DESIGNS

DWG: 308-D11

DATE: 11-FEB-98

TITLE: SASH

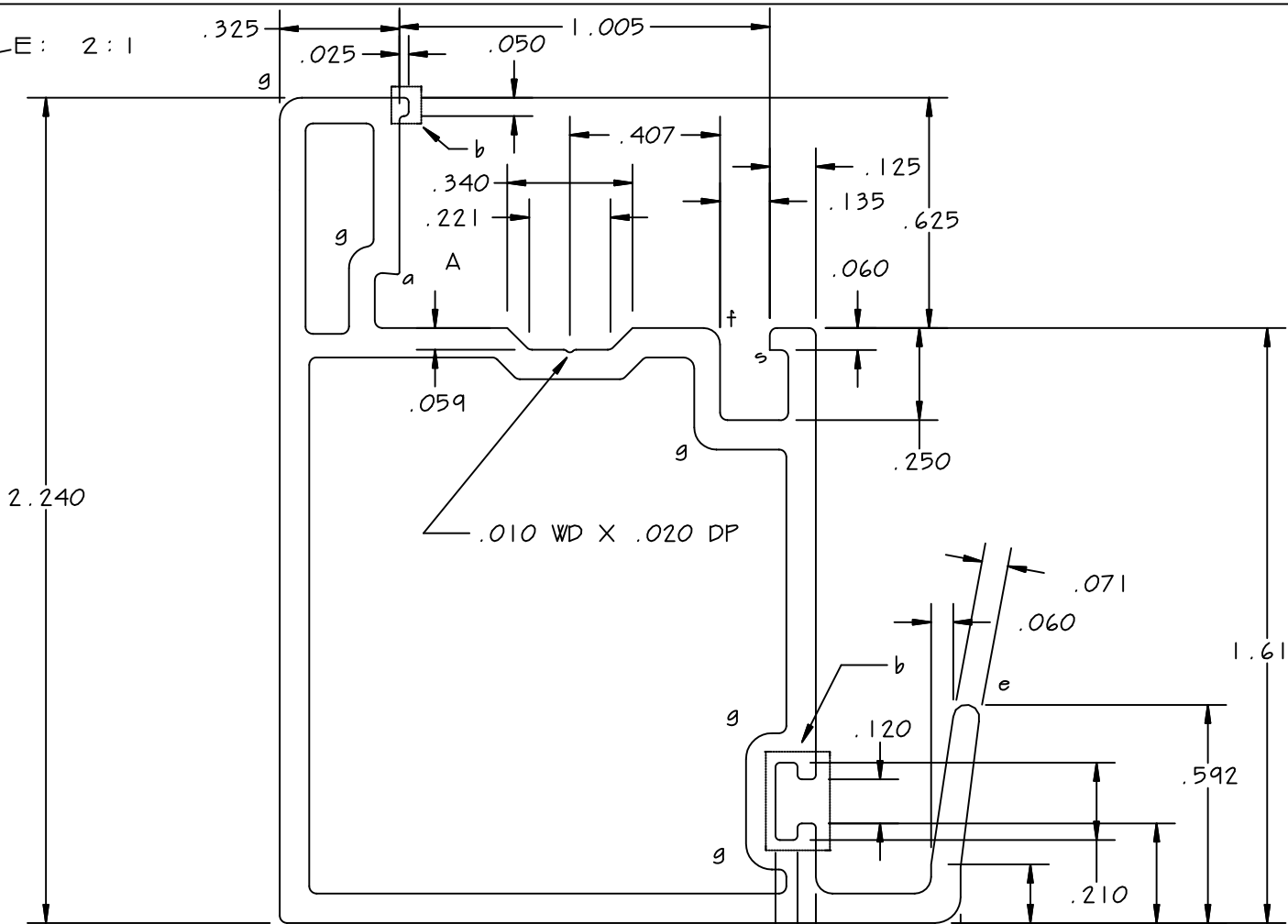
RS1297

FAB REF	308-F5D		
	308-F5	308-F6	

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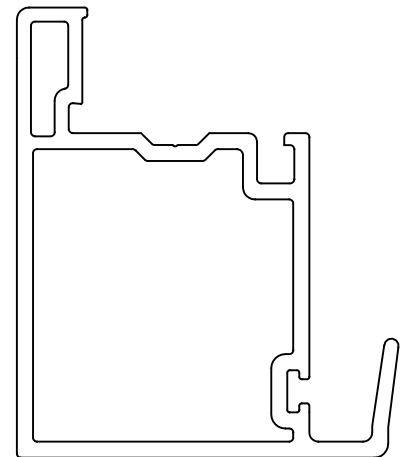
EXTERNAL WALL: 0.080
 INTERNAL WALL: 0.064
 CORNER TYP: 0.020R
 WEIGHT: 0.381 LB/FT

SCALE: 2:1



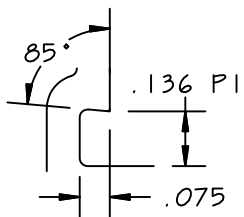
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- c = 0.015R
- d = 0.020R
- e = 0.036R
- f = 0.045R
- g = 0.060R
- s = sharp

APPROVED
 16-FEB-98
 CYCLOID DESIGNS



ACTUAL SIZE

DETAIL A
 SCALE: 2:1



	Report #: E8393.01-201-45
	Date: 06/10/15
	Verified by: <i>[Signature]</i>

FAB REF				FIT TO	305-D35	308-D13	308-D18
308-F6				308-D15	291-D7		

CYCLOID
 DESIGNS

DWG: 308-D12

DATE: 11-FEB-98

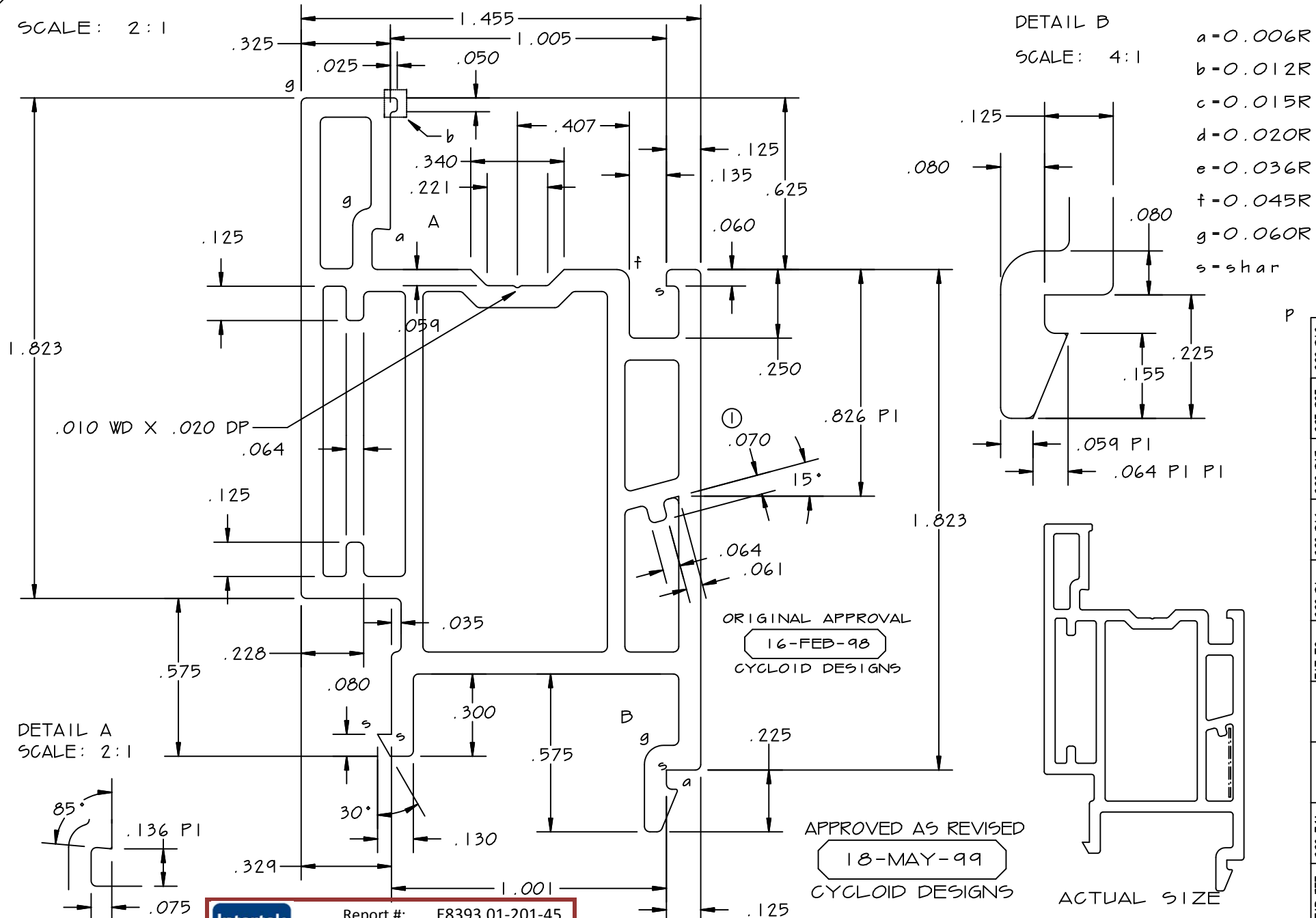
RS1298

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EXTERNAL WALL: 0.080
 INTERNAL WALL: 0.064
 CORNER TYP: 0.020R
 WEIGHT: 0.426 LB/FT

TITLE: INTERLOCK

SCALE: 2:1

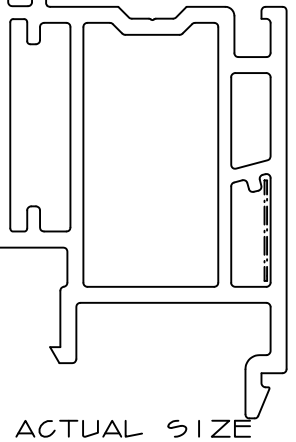


DETAIL B
SCALE: 4:1

- a = 0.006R
- b = 0.012R
- c = 0.015R
- d = 0.020R
- e = 0.036R
- f = 0.045R
- g = 0.060R
- s = sharp

ORIGINAL APPROVAL
16-FEB-98
CYCLOID DESIGNS

APPROVED AS REVISED
18-MAY-99
CYCLOID DESIGNS



FAD REF	308-F1D	308-F4A	308-F1D	308-F1D	308-F1D	308-F1D	308-F1D	308-F1D	308-F1D	308-F1D	308-F1D	308-F1D
FIT TO	308-D1	308-D10	308-D11	308-D16	308-D17	308-D12	308-D13	308-D14	308-D16	308-D16	308-D16	308-D16
	291-D7	308-D10	308-D11	308-D16	308-D17	308-D12	308-D13	308-D14	308-D16	308-D16	308-D16	308-D16

Intertek 	Report #: E8393.01-201-45
	Date: 06/10/15
	Verified by: [Signature]
	DWG: 308 D13 DATE: FEB-98

CYCLOID
DESIGNS

TITLE: VENTILATOR

RS1299

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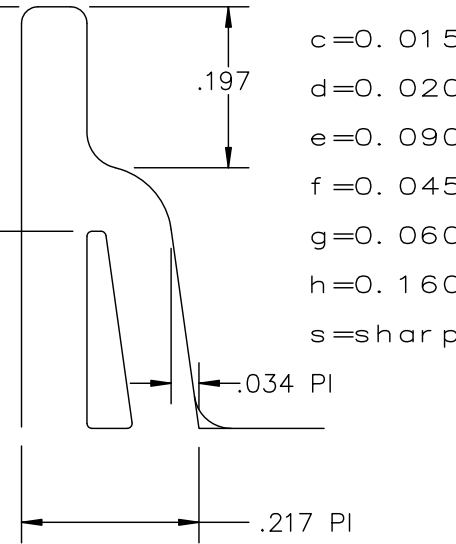
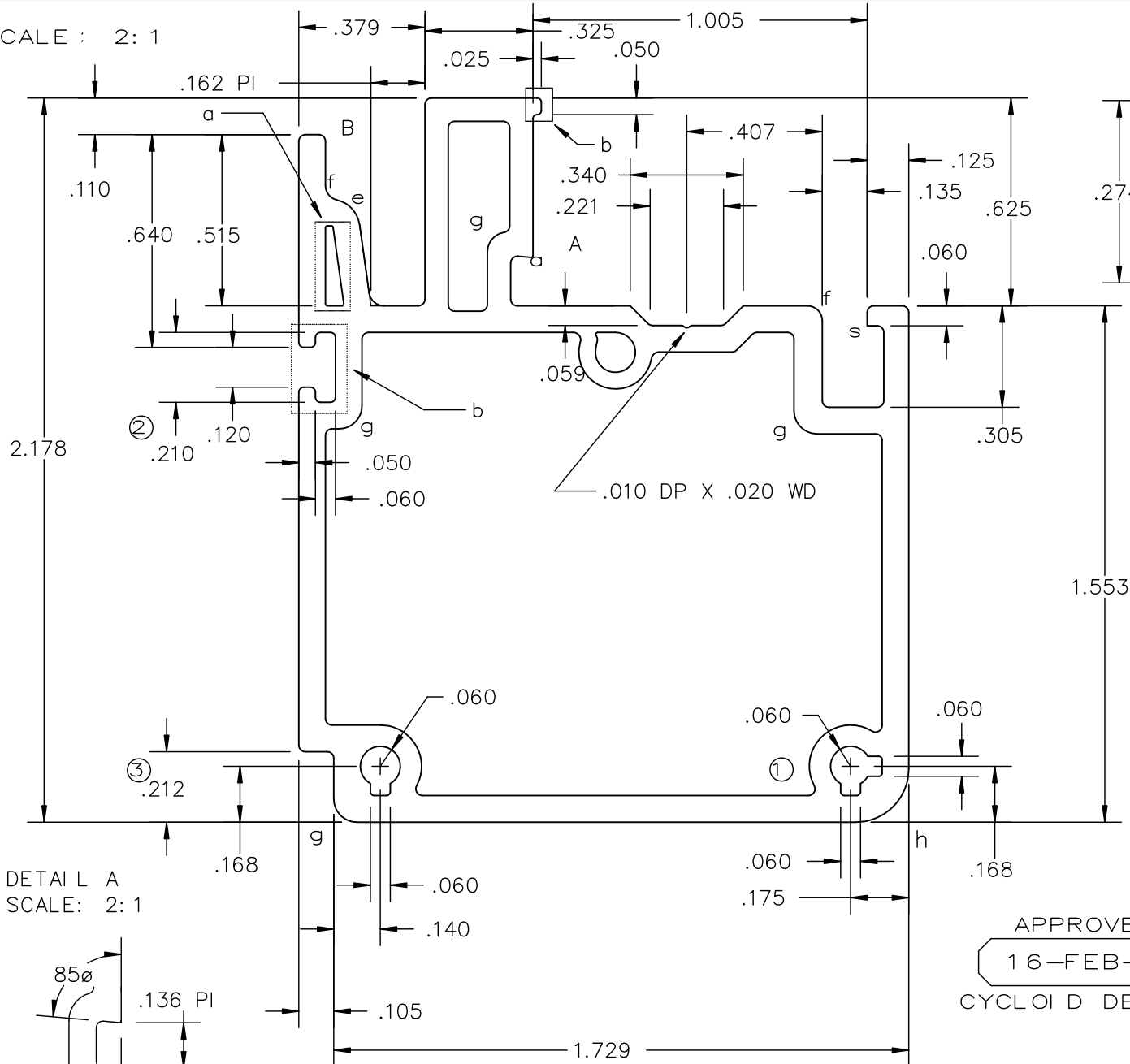
1	18-MAY-99	TIT EXTENDED, WASH .035: WT WA9 .517
REV	DATE	REMARKS

EXTERNAL WALL: 0.080
INTERNAL WALL: 0.064
CORNER TYP: 0.020R
WEIGHT: 0.518 LB/FT

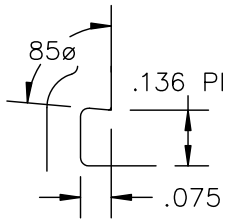
SCALE : 2:1

DETAIL L B
SCALE: 4:1

a=0.006R
b=0.012R
c=0.015R
d=0.020R
e=0.090R
f=0.045R
g=0.060R
h=0.160R
s=sharp



DETAIL L A
SCALE: 2:1



APPROVED
16-FEB-98
CYCLOID DESIGNS

ACTUAL SIZE

Intertek Report #: E8393.01-201-45
Date: 06/10/15
Verified by: *[Signature]*

3	08-21-98	DI M CORRECTED, WAS .424	
2	01-18-98	DI M CORRECTED, WAS .205	
1	01-18-98	HOLE MOVED; WT WAS .428	
REV	DATE	REMARKS	
FIT TO	305-D35	308-D18	308-D13
	308-D15	291-D7	

CYCLOID DESIGNS

DWG: 308-D14

DATE: 11-FEB-98

FAB REF				
308-F1				

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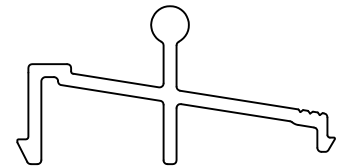
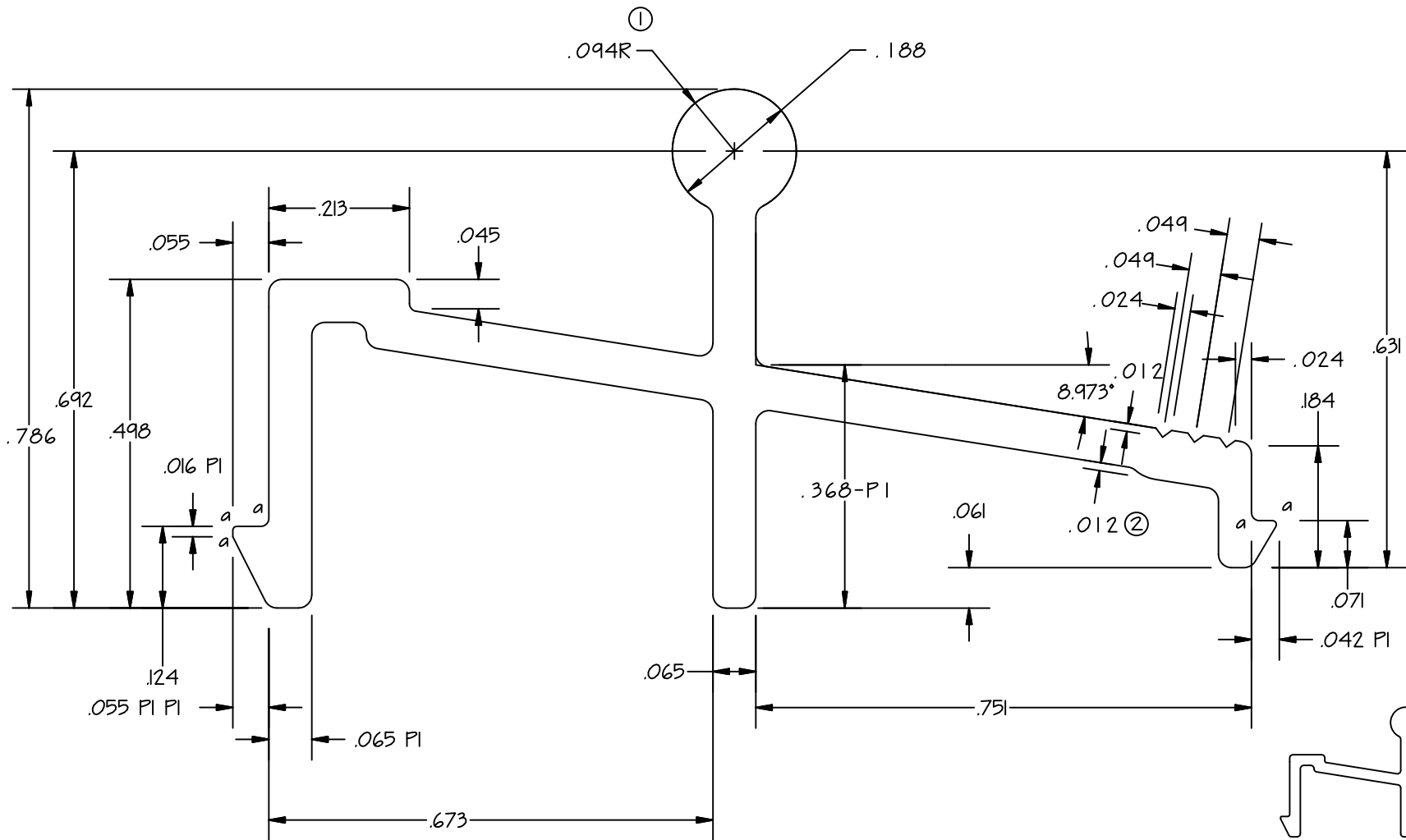
EXTERNAL WALL: 0.080
INTERNAL WALL: 0.064
CORNER TYP: 0.020R
WEIGHT: 0.483 LB/FT

TITLE: MULLION

RS1300

SCALE: 4:1

a=0.006R
 b=0.012R
 c=0.015R
 d=0.020R
 e=0.030R
 f=0.045R
 g=0.060R
 s=sharp



ACTUAL SIZE

APPROVED
 23-APR-98
 CYCLOID DESIGNS

Intertek Report #: E8393.01-201-45
 Date: 06/10/15
 Verified by: *[Signature]*

REV	DATE	REMARKS
2	06-23-98	CORRECTED NOMINAL WALL; ADDED DIM
1	04-23-98	DIA CHANGED; WAS .210, WT WAS .132
	FIT TO	308-D1 308-D16
	308-D17	

CYCLOID
 DESIGNS
 TITLE: TRACK

DWG: 308-D19
 RS1301

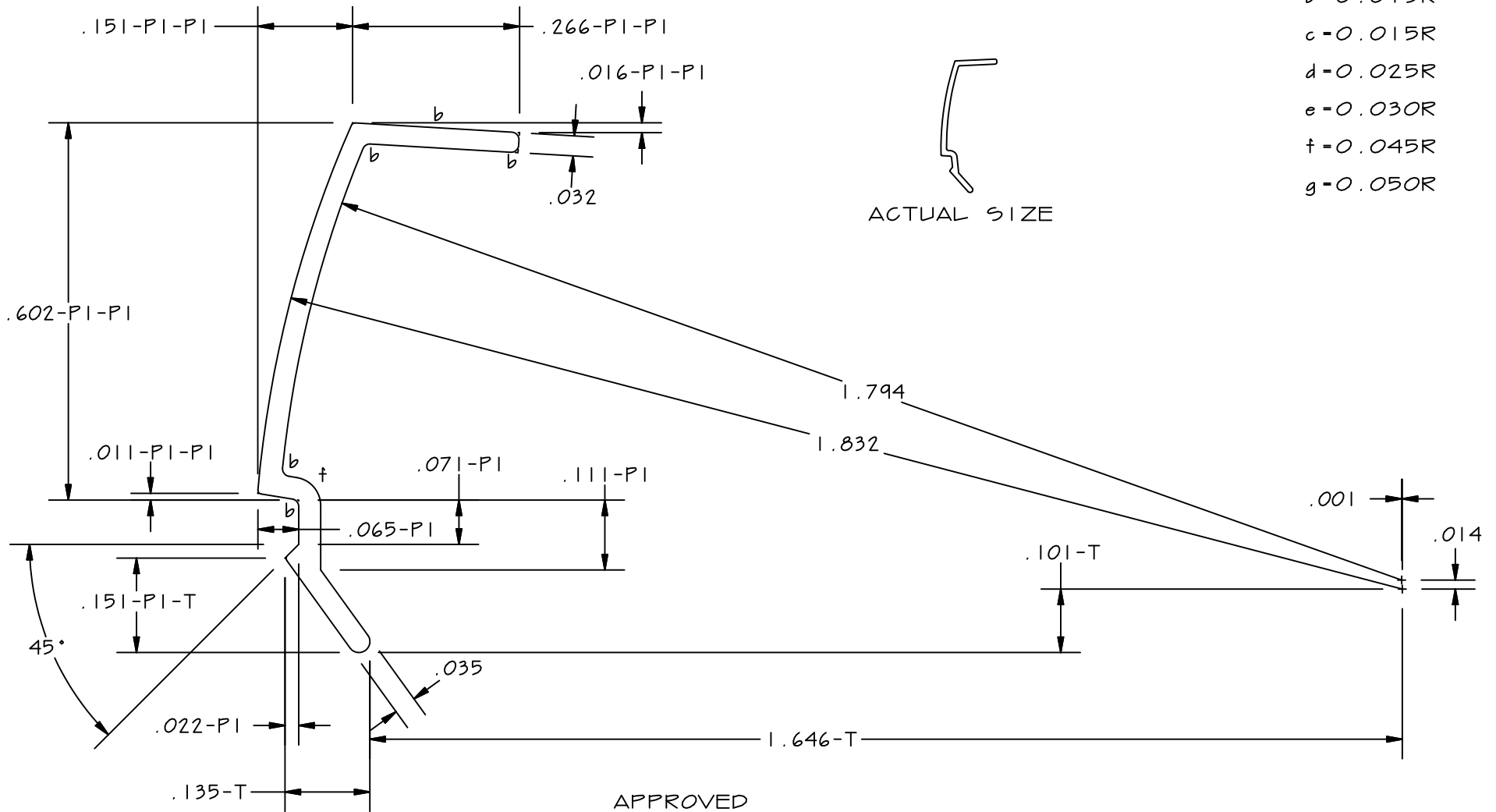
DATE: 11-FEB-98

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EXTERNAL WALL: ② 0.065
 INTERNAL WALL: 0.XXX
 CORNER TYP: 0.020R
 WEIGHT: 0.128 LB/FT

SCALE: 4:1

- a = 0.006R
- b = 0.013R
- c = 0.015R
- d = 0.025R
- e = 0.030R
- f = 0.045R
- g = 0.050R



APPROVED
 16-FEB-98
 CYCLOID DESIGNS

	Report #: E8393.01-201-45
	Date: 06/10/15
	Verified by:

FIT TO	308-D1	308-D10	308-D11	308-D12	308-D13	308-D14	308-D15
	308-D16	308-D17					

CYCLOID
 DESIGNS

DWG: 308-D18

DATE: 02-JAN-97

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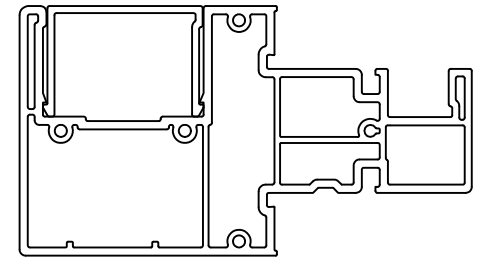
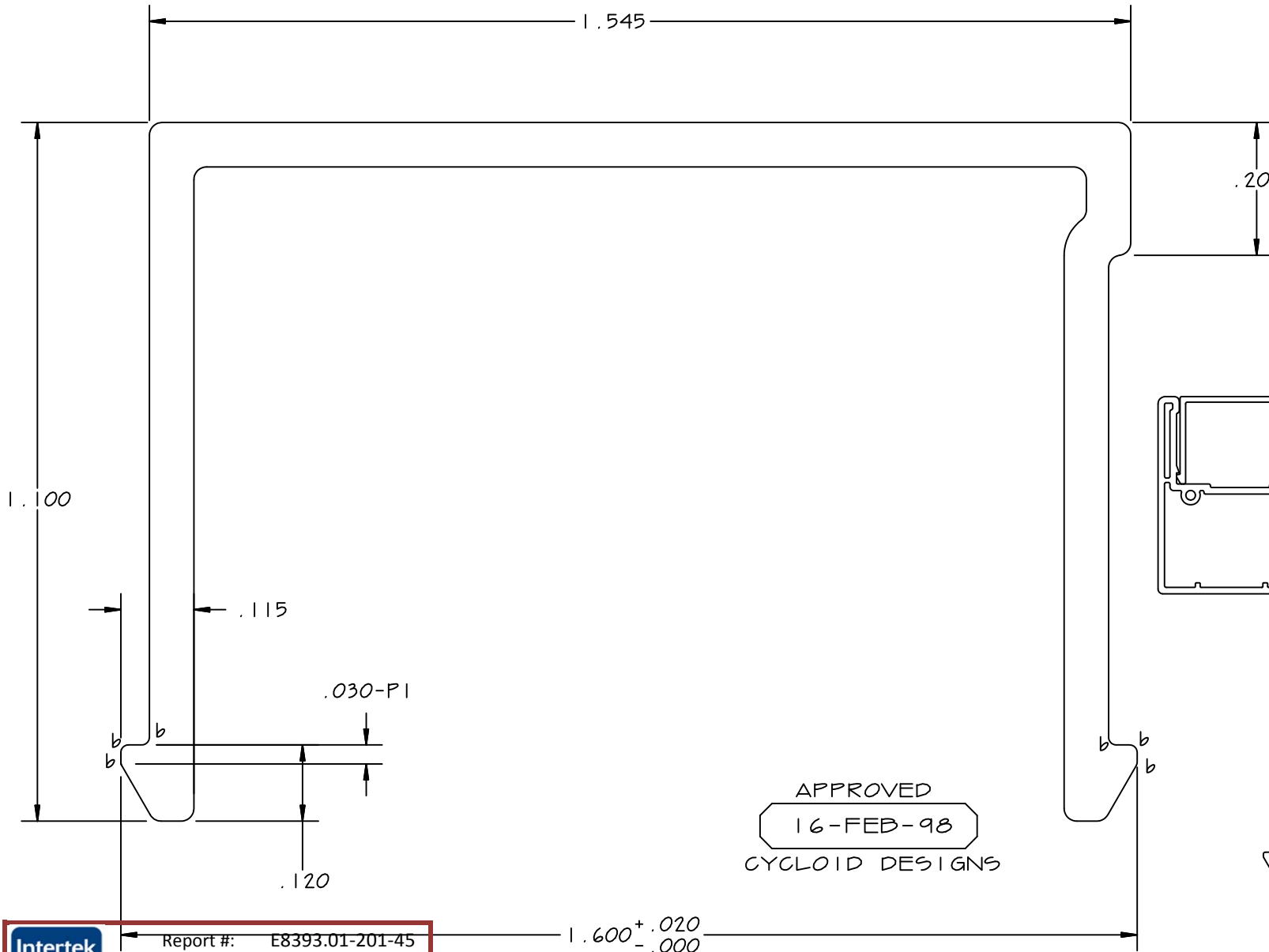
EXTERNAL WALL: 0.035
 INTERNAL WALL: X.XXX
 CORNER TYP: 0.006R
 WEIGHT: 0.025 LB/FT

TITLE: GLAZING BEAD: 3/4" GLASS

RS1302

SCALE: 4:1

- a=0.006R
- b=0.012R
- c=0.015R
- d=0.020R
- e=0.030R
- f=0.045R
- g=0.060R
- s=sharp



ACTUAL SIZE

APPROVED
16-FEB-98
CYCLOID DESIGNS

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

1.600^{+.020}/_{-.000}

CYCLOID DESIGNS

DWG: 308-D20

DATE: 16-JAN-98

TITLE: SPD TRACK FILLER

RS1307

FAB REF				
XXX-XXX				

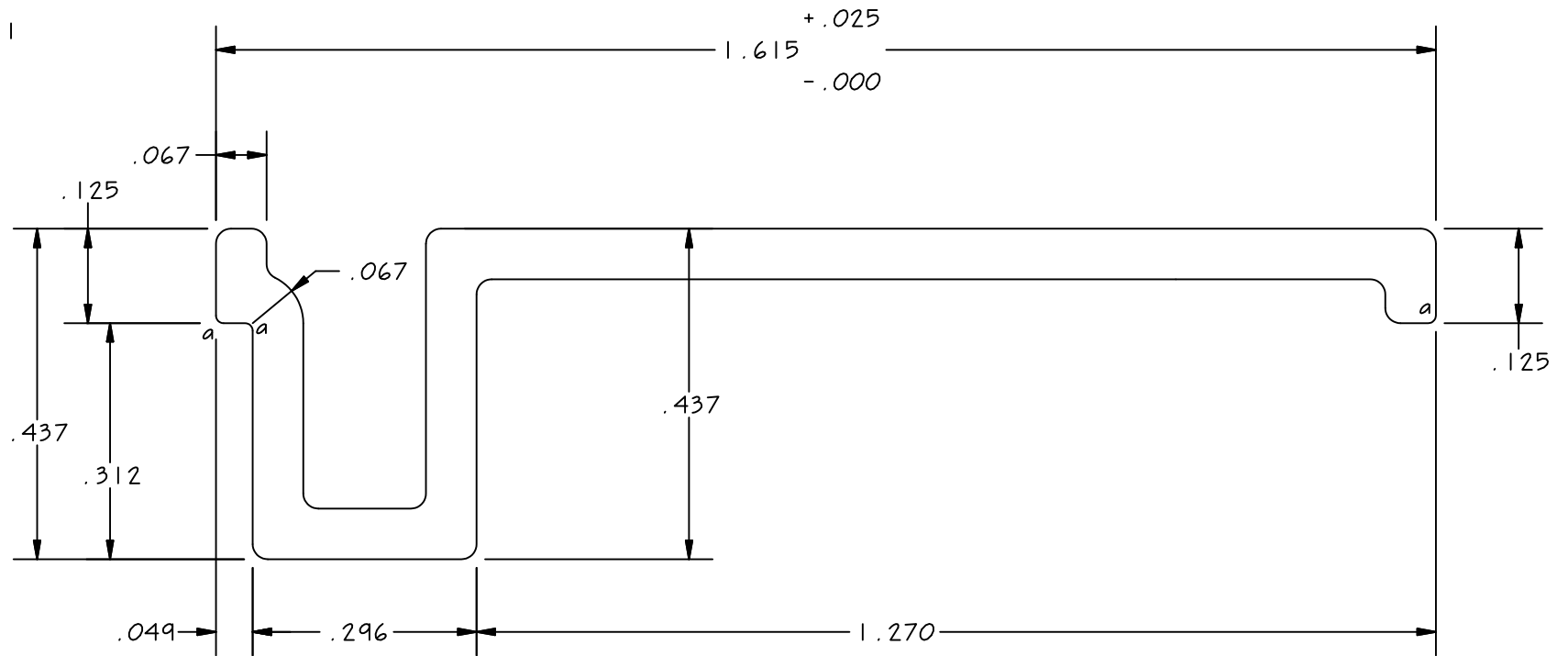
© 1998 COPYRIGHT
ROYAL SIERRA INC
SPARKS, NEVADA
ALL RIGHTS RESERVED

FIT TO	308-D1	308-D16	
	308-D17		

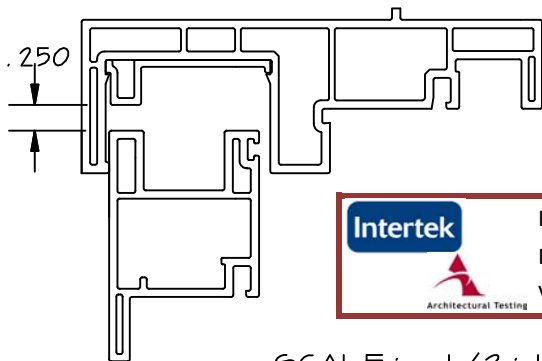
EXTERNAL WALL: 0.070
INTERNAL WALL: 0.XXX
CORNER TYP: 0.020R
WEIGHT: 0.163 LB/FT

SCALE: 4:1

a = 0.010R

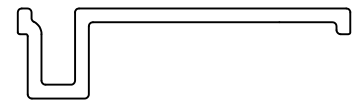


KE1631



Intertek Report #: E8393.01-201-45
 Date: 06/10/15
 Verified by: *[Signature]*
 Architectural Testing

APPROVED
 28-OCT-95
CYCLOID DESIGNS



ACTUAL SIZE

SCALE: 1/2:1

FAB REF				FIT TO	308-D1	308-D16	
XXX-XXX				308-D17			

CYCLOID DESIGNS

DWG: 181-D15

DATE: 27-OCT-95

© 1995 COPYRIGHT
 KING EXTRUSIONS LTD
 WOODINVILLE, WASH

EXTERNAL WALL: 0.067
 INTERNAL WALL: X.XXX
 CORNER TYP. 0.020R

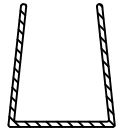
TITLE: PATIO DOOR ANIT-LIFT

RS1076

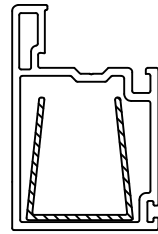
ALL RIGHTS RESERVED

WEIGHT: 0.101 LB/FT

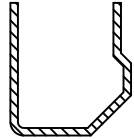
SCALE: 1/2:1



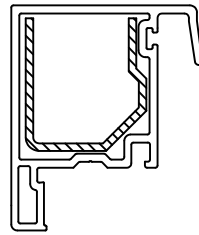
NS788/PUNCHED



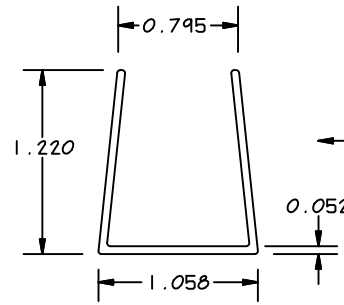
308-D11



NS1011-2

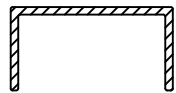
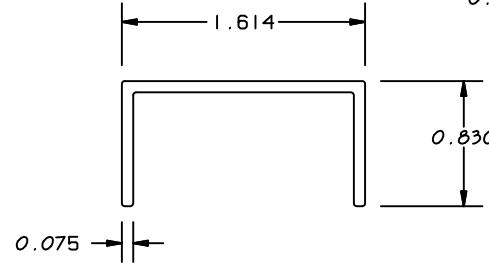
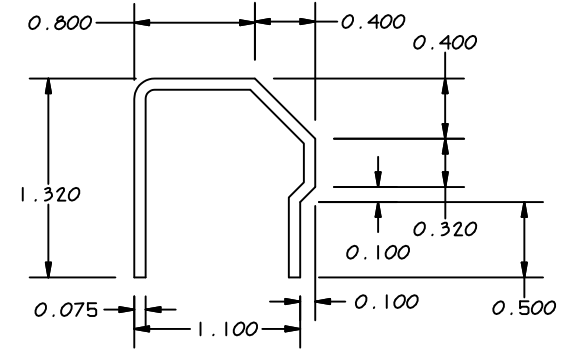


308-D12

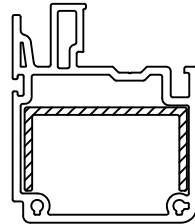


SCALE: 3/4:1

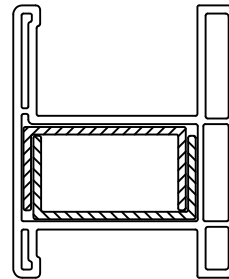
← PROCESS FOR MOTRISE AND HANDLE HOLES



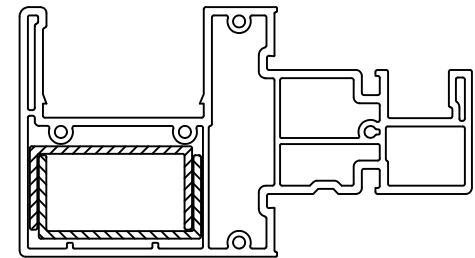
NS1041



308-D14



308-D2



308-D17

NS: NORTHSTAR

	Report #: E8393.01-201-45
	Date: 06/10/15
	Verified by:

Steel (rolled, ground)

CYCLOID
DESIGNS

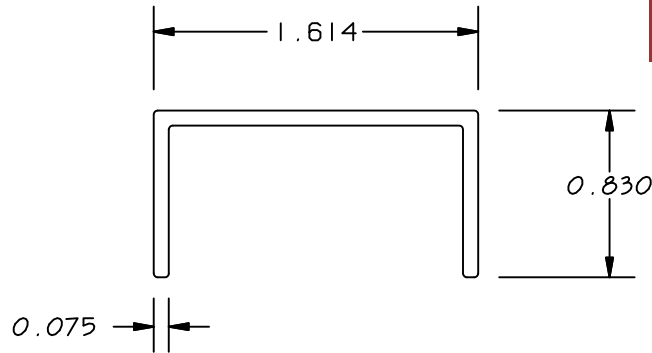
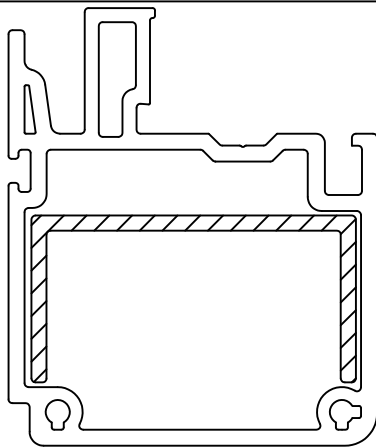
DWG: 308-S0

DATE: 10-DEC-98

TITLE: REINFORCING SCHEDULE FOR SPD

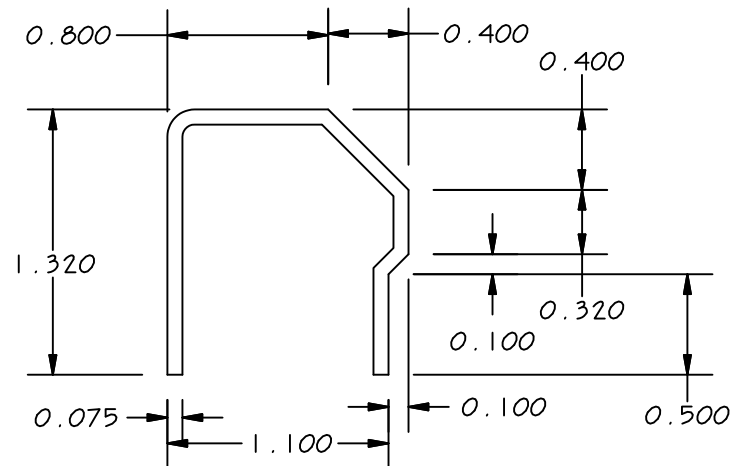
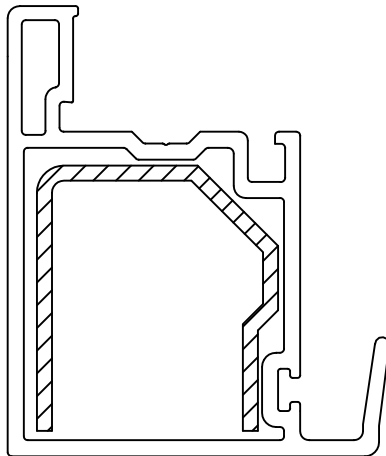
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EXTERNAL WALL: 0.XXX
INTERNAL WALL: 0.XXX
CORNER TYP: 0.XXXR
WEIGHT: 0.XXX LB/FT



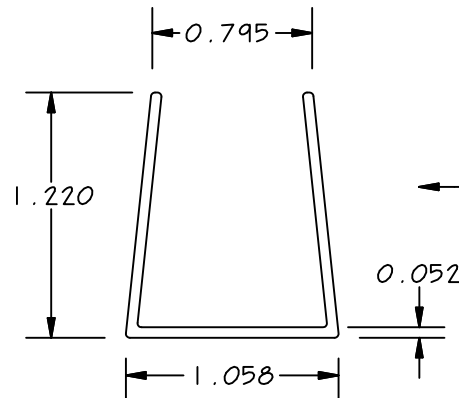
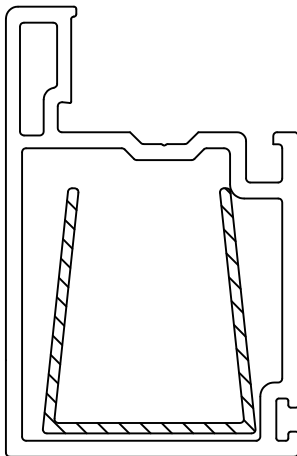
$I_{y-y} = 0.093 \text{ in}^4$

NS1042



$I_{y-y} = 0.058 \text{ in}^4$

NS1011-2



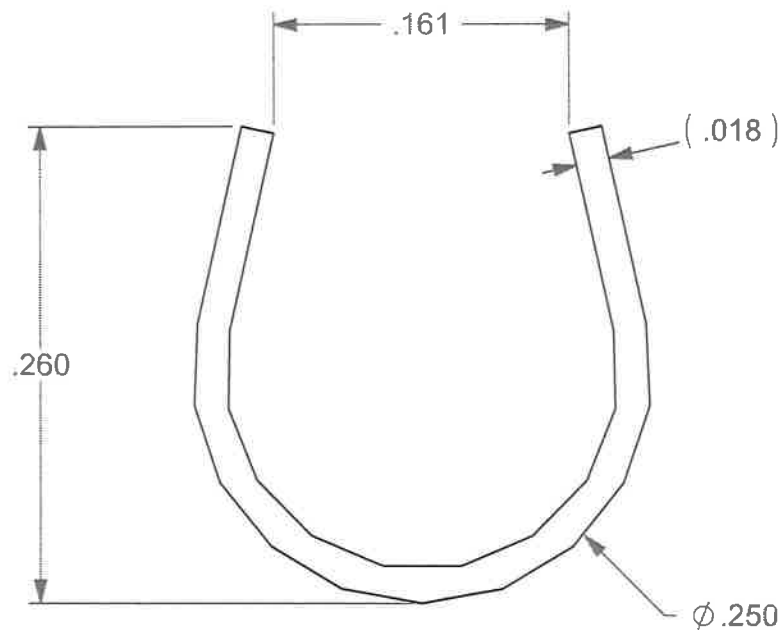
NOTE: STEEL FOR
AAMA STRUCTURAL TEST
AND NFRC SIMULATIONS

← PROCESS FOR MOTRISE AND HANDLE HOLES

NS788 PUNCHED

$I_{y-y} = 0.029 \text{ in}^4$

Steel (rolled, ground)



Steel - Stainless [Oxidized]

03	AB	OCT 29/10	DRAWING UPDATE
02	DS	JAN 12/10	MATERIAL TYPE UPDATED
01	EK	JULY 14/09	CHANGED OPENING WIDTH FROM .171 TO .161
REV	INITIALS	DATE	DESCRIPTION

DRAWN	AB	OCT 29/10
-------	----	-----------

UNLESS OTHERWISE SPECIFIED ALL UNITS ARE IN INCHES.	
UNLESS OTHERWISE SPECIFIED TOLERANCES	
HOLE SIZE	± .005"
HOLE LOCATION	± .005"
BEND ANGLE	± 1°
FORMING (BEHIND BRIND)	± .016"
HOLE TO HOLE	± .010"
FRACTION (1/16)	± .002"
ANGULAR (FACED)	± 0.1°
1/10 DECIMAL	± .030"
DECIMAL (.001)	± .015"
DECIMAL (.0001)	± .010"

U-7800		
26GA SS PATIO TRACK		
SIZE	DWG. NO.	REV.
A	F082-001	03
SCALE	WEIGHT	SHEET
10:1		1 OF 1

Intertek Report #: E8393.01-201-45
 Date: 06/10/15
 Verified by: [Signature]

HELTON INDUSTRIES LTD.
 30840 Peardonville Road
 Abbotsford, BC V2T 6K2
 PH 604.854.3660 / FAX 604.854.3576

COIL STRAND
CS-018-0064SS

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ULTRA FIN[®]

Our most popular fin product provides an excellent seal with low opening force and friction

Ultrafab's unique ultrasonic welding assembles the fin, fibers, and backing into an integrated, unified assembly that won't break apart during fabrication or while in use



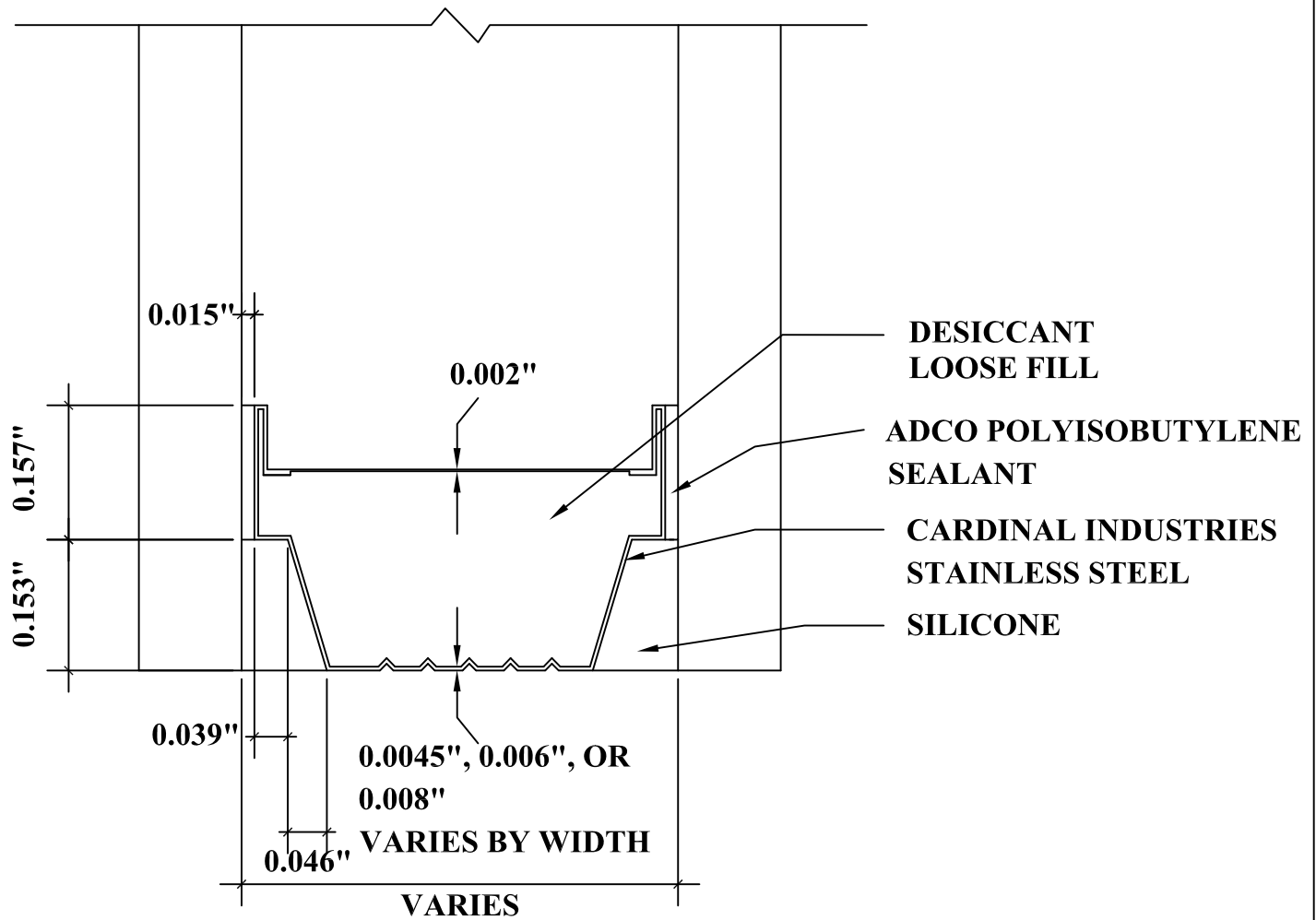
ULTRA FIN WEATHERSEAL FEATURES:

- Ultra Fin weatherseals have a structural integrity and consistency which assures a tight seal and barrier against air and water infiltration
- No possibility of off-center pile that binds, breaks or stretches in an extrusion
- Pile height and backing widths are always uniform because of Ultrafab's unique ultrasonically welded manufacturing system
- **Pile Heights:** .130" (3.30mm) to .750" (19.05mm)
- **Pile Densities:** Light, medium, high or very high
- **Backing Widths:** .180" (4.57mm), .187" (4.75mm), .200" (5.08mm), .210" (5.33mm), .229" (5.82mm), .250" (6.35mm), .270" (6.86mm), .310" (7.87mm)
- **Backing Options:**

Standard:	all backing widths
Ultra-Loc [®] :	S7 – .180" (4.57mm), .187" (4.75mm), .200" (5.08mm), .210" (5.33mm), .270" (6.86mm), .310" (7.87mm)
	S9 – .180" (4.57mm), .187" (4.75mm), .200" (5.08mm), .210" (5.33mm), .229" (5.82mm), .270" (6.86mm), .310" (7.87mm)
Ultra Grip [®] :	.180" (4.57mm), .187" (4.75mm), .200" (5.08mm), .229" (5.82mm), .255" (6.48mm), .270" (6.86mm)
- **Adhesive:** Available on .187", .270" and .310"
- **Colors:** Black, white, grey, beige, and brown

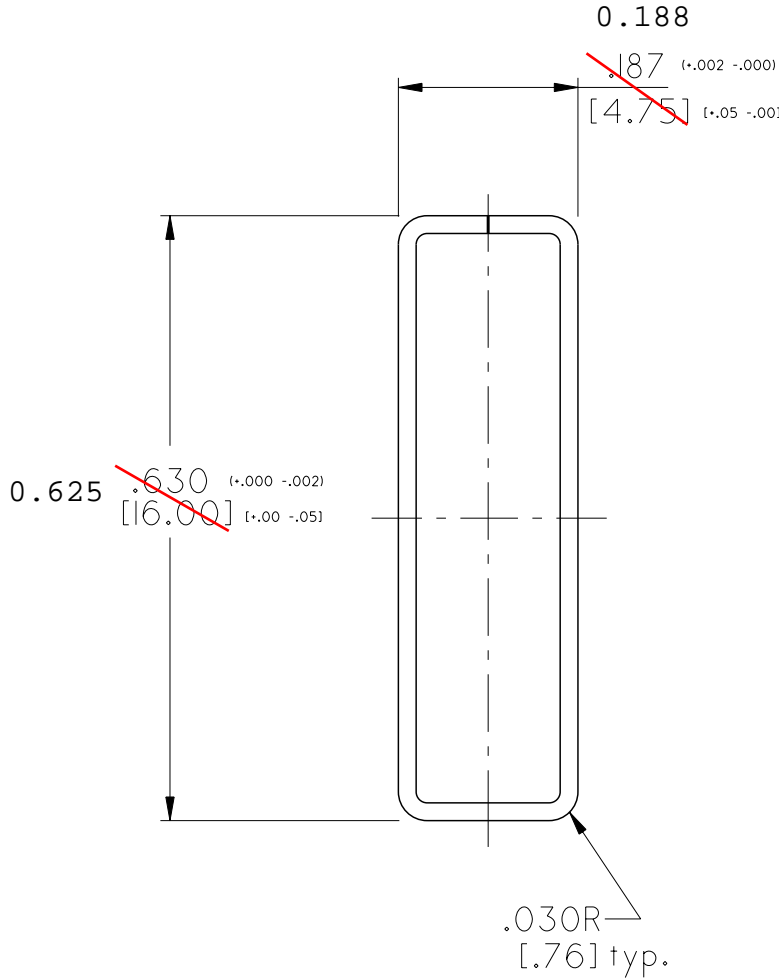
	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	

Need more fins or a softer fin? Ask about our Soft Touch Fin[®], Tri-Fin[®], Ultra Reach[®] Fin or Multi-Fin[®]



DETAIL FOR THERMAL MODELING OF
CARDINAL ENDUR SPACER (SS-D)

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME:.. \MB\0185\316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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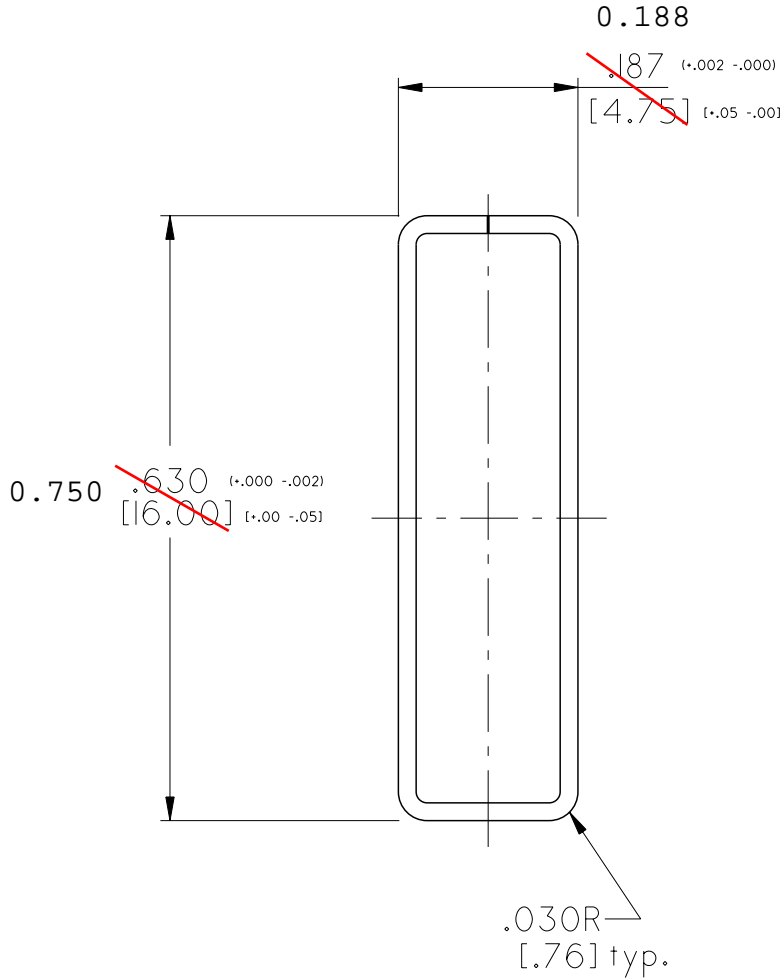


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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
MATL. .0185 [.47mm] 3105-H24 Aluminum		FINISH ALL BUT ANODIZED			
SCALE 5:1		DATE 6/15/99		DWG. NO. 1020101018XX140	

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME:.. \MB\0185\316X58

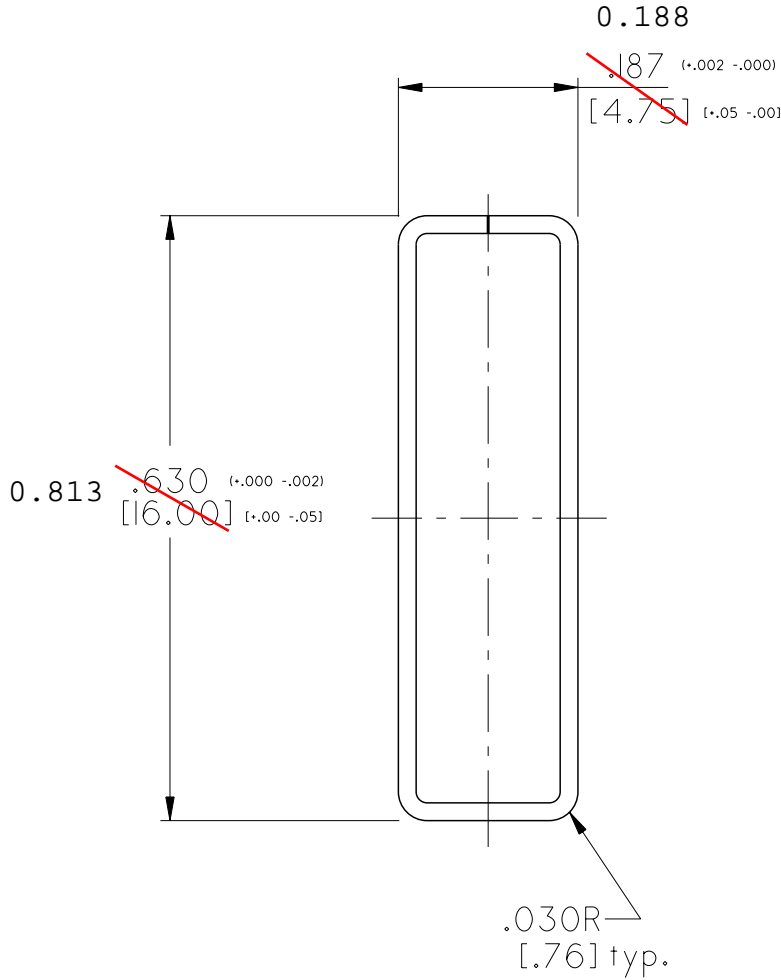
DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
MATL. .0185 [.47mm] 3105-H24 Aluminum		FINISH ALL BUT ANODIZED		SCALE: 5:1 DATE: 6/15/99 DWG. NO.: 1020101018XX140	

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME: \\MB\0185\316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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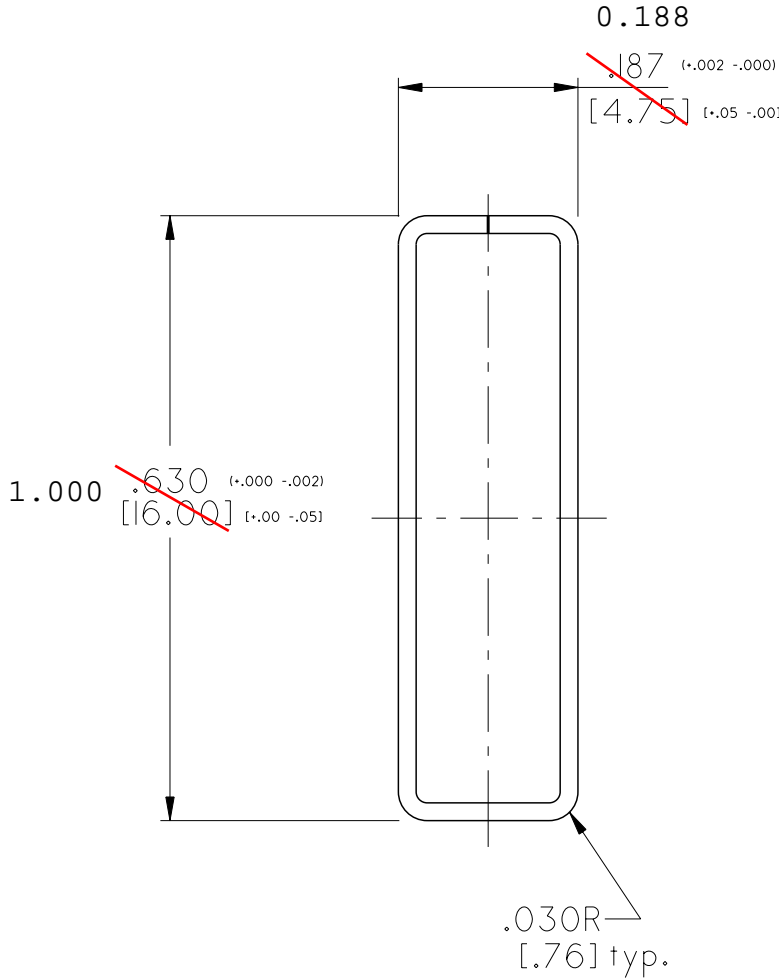


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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
		MATL. .0185 [.47mm] 3105-H24 Aluminum	FINISH ALL BUT ANODIZED		
SCALE 5:1	DATE 6/15/99	DWG. NO. 1020101018XX140			

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART
 SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME:.. \MB\0185\316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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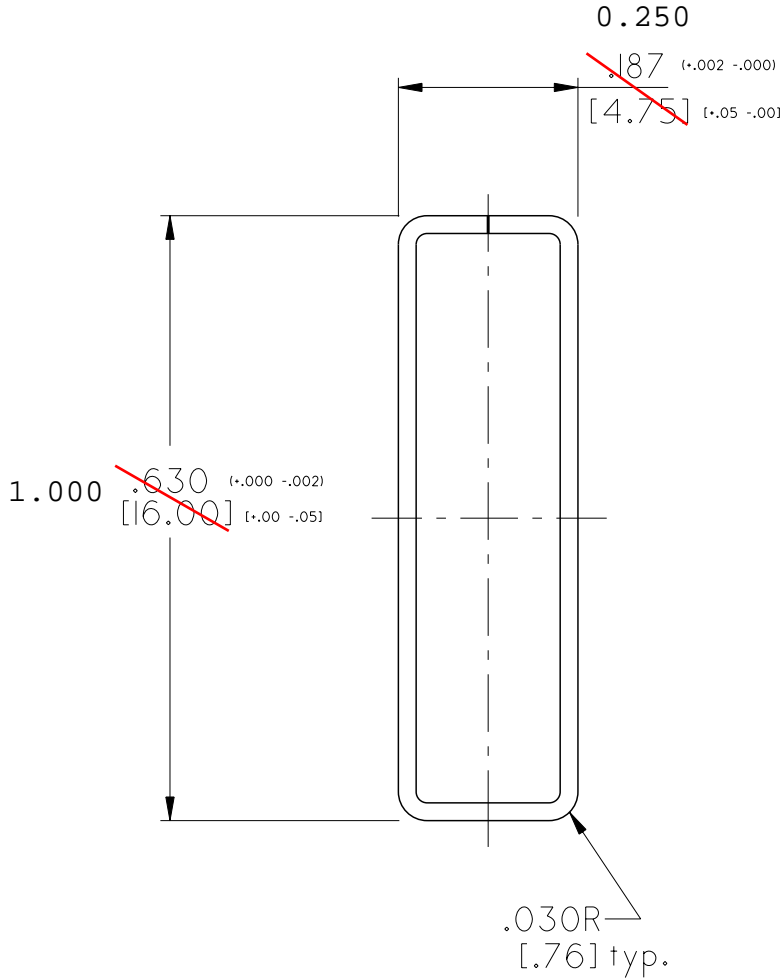


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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
MATL. .0185 [.47mm] 3105-H24 Aluminum		FINISH ALL BUT ANODIZED			
SCALE	DATE	DWG. NO.			
5:1	6/15/99	1020101018XX140			

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME:.. \MB \0185 \316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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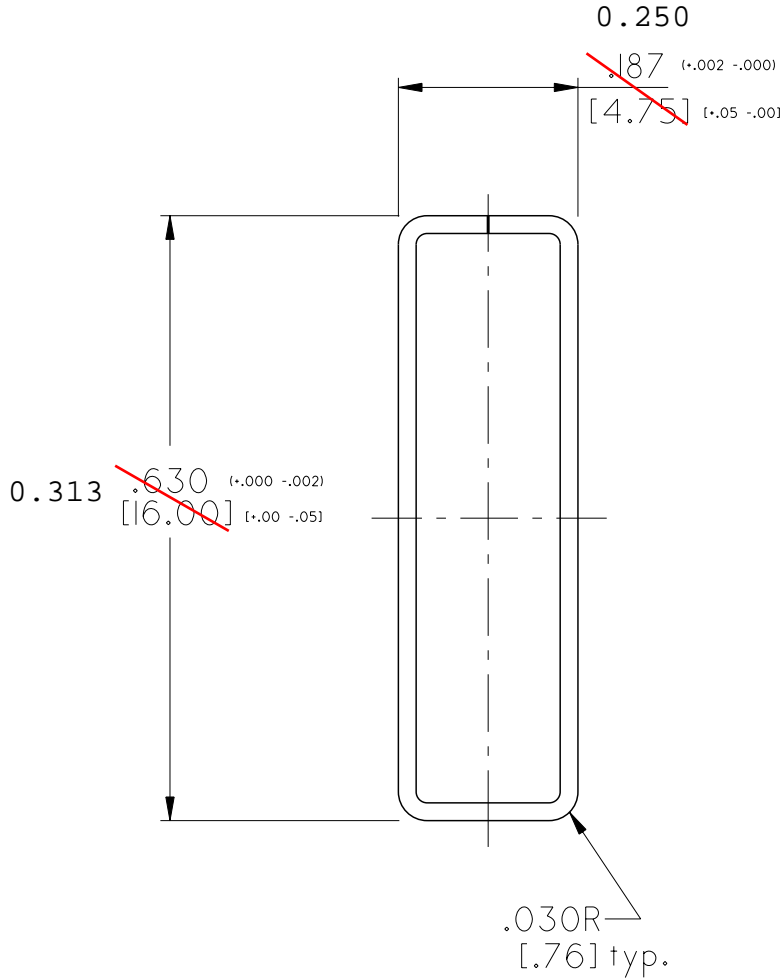


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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
		MATL. .0185 [.47mm] 3105-H24 Aluminum	FINISH ALL BUT ANODIZED		
SCALE 5:1	DATE 6/15/99	DWG. NO. 1020101018XX140			

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME: \\MB\0185\316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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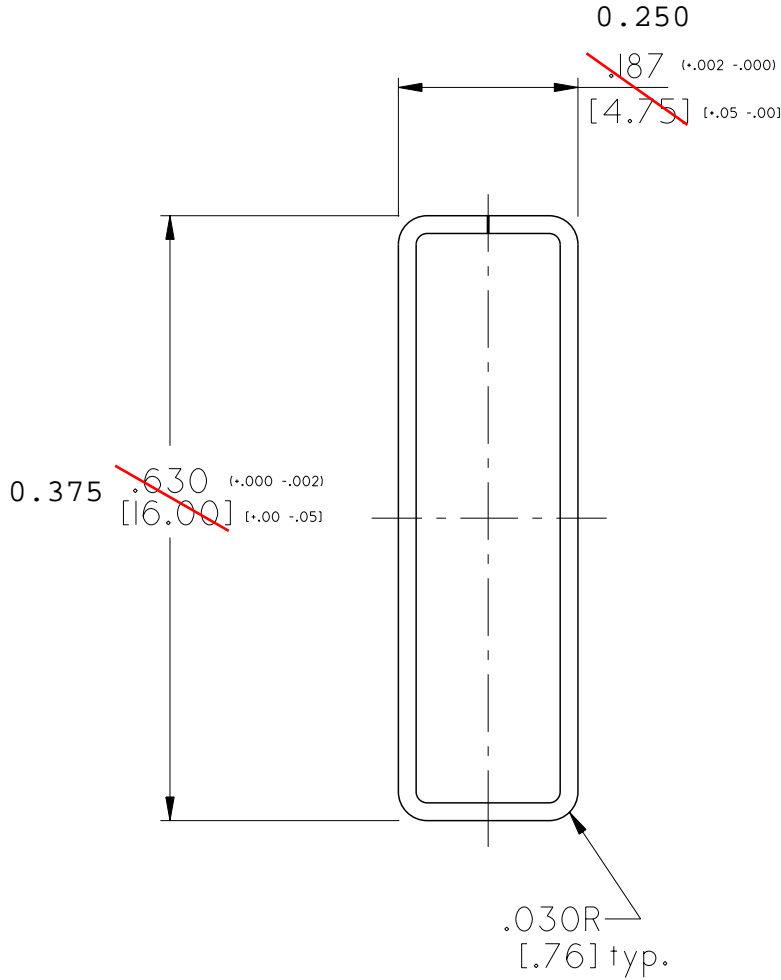


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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
MATL. .0185 [.47mm] 3105-H24 Aluminum		FINISH ALL BUT ANODIZED			
SCALE 5:1		DATE 6/15/99		DWG. NO. 1020101018XX140	

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME: \\MB\0185\316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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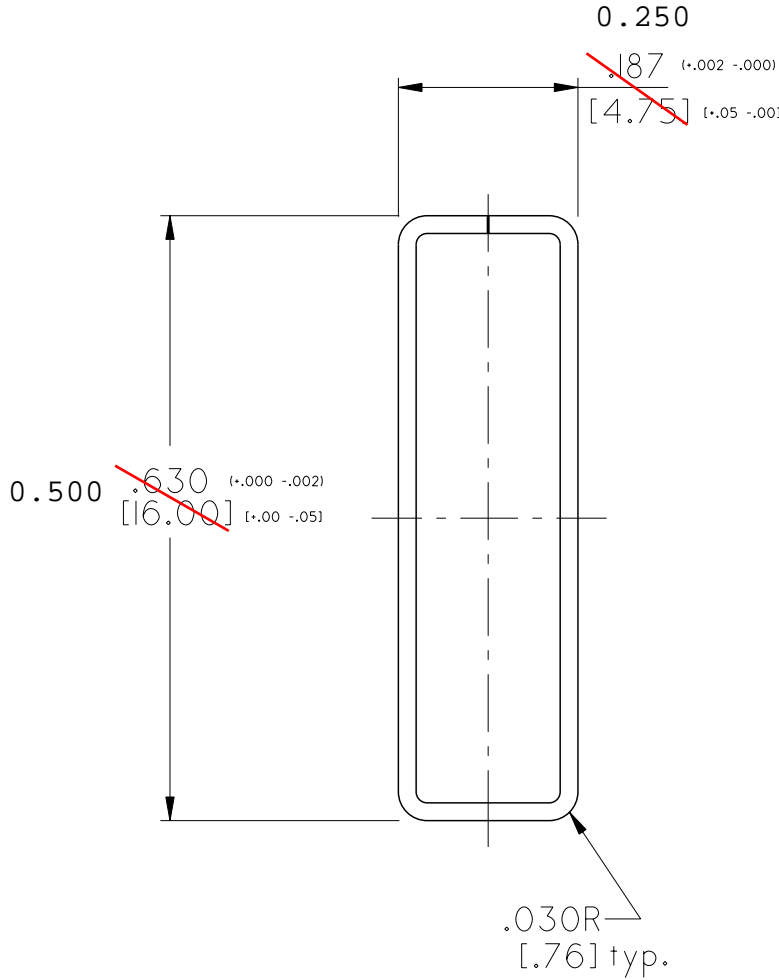


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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
MATL. .0185 [.47mm] 3105-H24 Aluminum		FINISH ALL BUT ANODIZED		SCALE: 5:1 DATE: 6/15/99 DWG. NO.: 1020101018XX140	

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART
SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME:.. \MB \0185 \316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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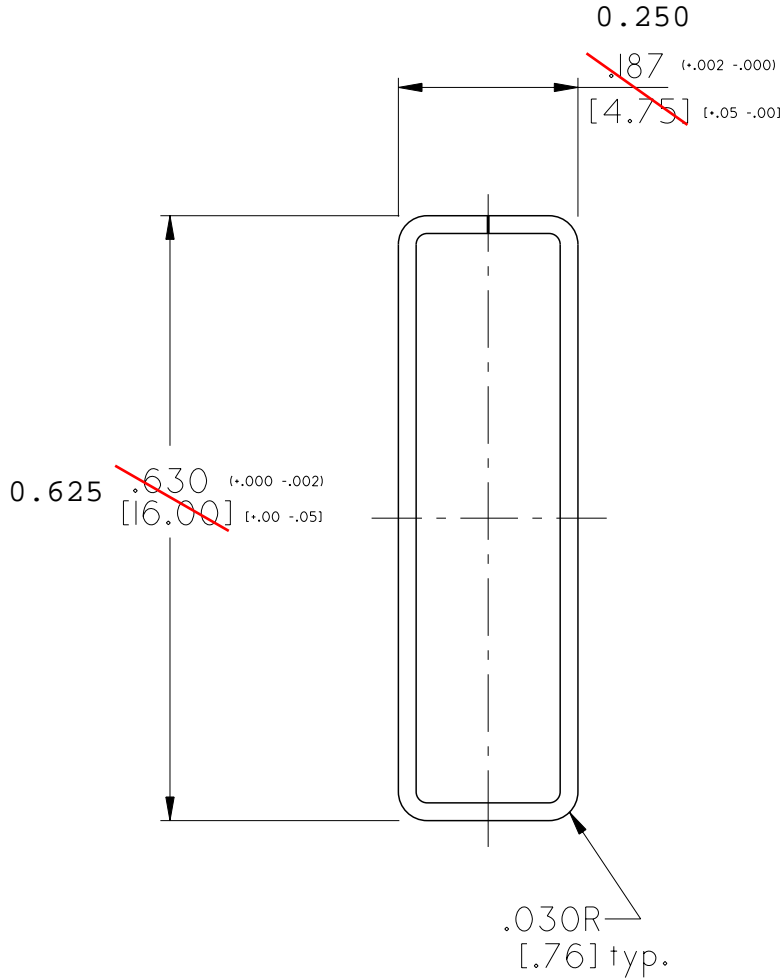


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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE <h3>3/16 x 5/8 MB (Muntin Bar)</h3>		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
MATL. .0185 [.47mm] 3105-H24 Aluminum		FINISH ALL BUT ANODIZED			
SCALE 5:1		DATE 6/15/99		DWG. NO. 1020101018XX140	

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

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	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME:.. \MB\0185\316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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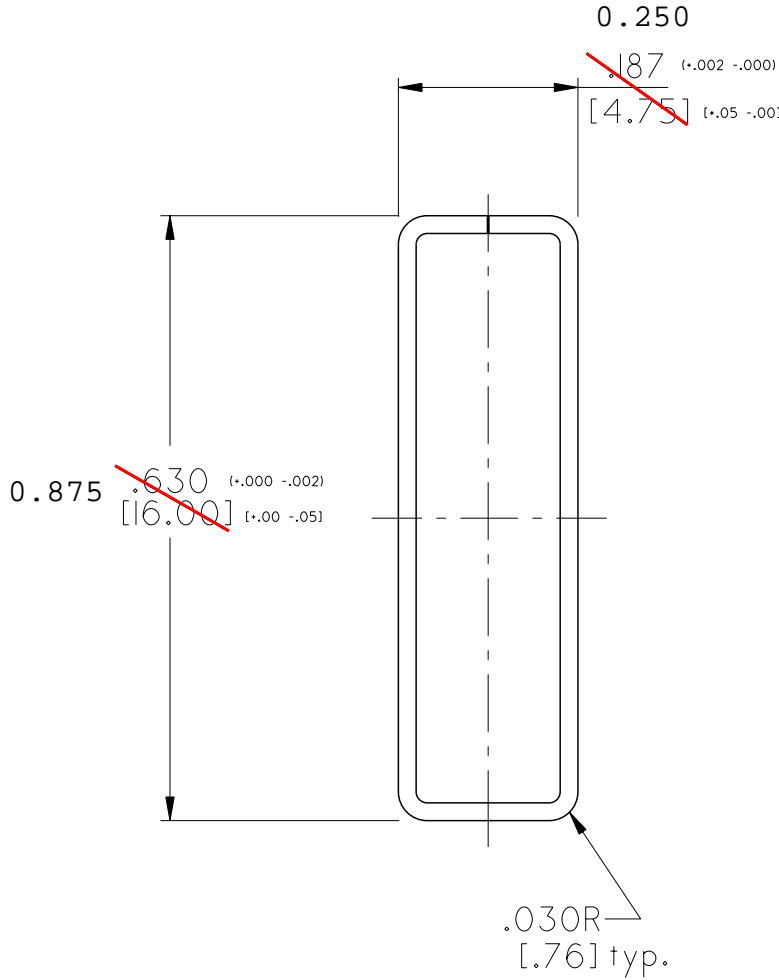


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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
MATL. .0185 [.47mm] 3105-H24 Aluminum		FINISH ALL BUT ANODIZED		SCALE: 5:1 DATE: 6/15/99 DWG. NO.: 1020101018XX140	

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME:.. \MB\0185\316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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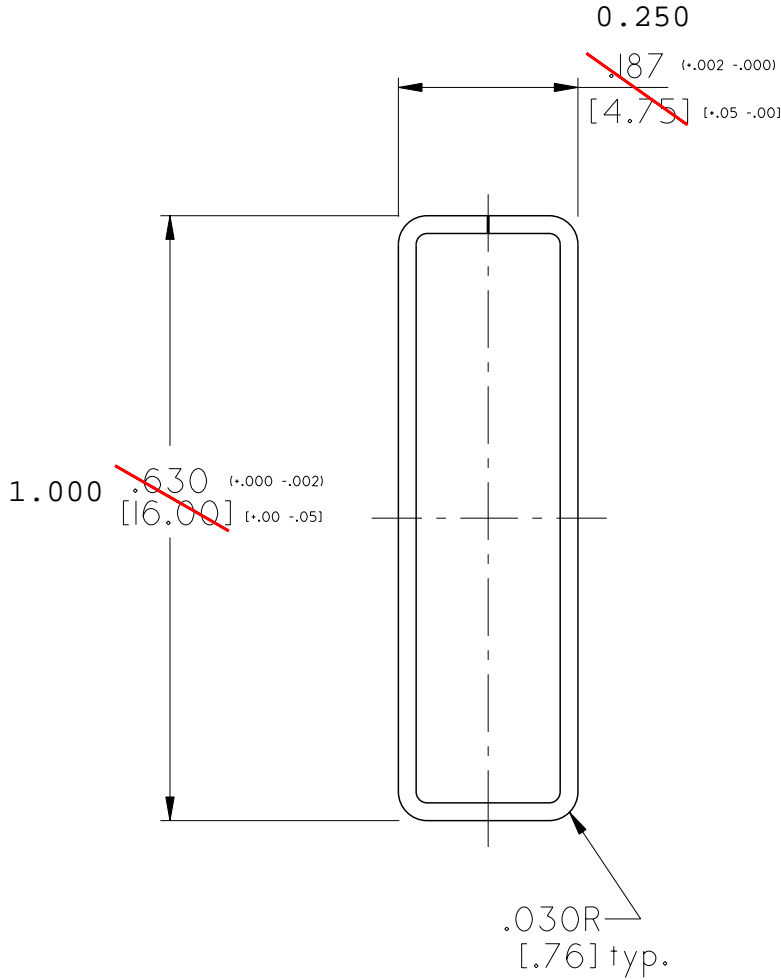


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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
MATL. .0185 [.47mm] 3105-H24 Aluminum		FINISH ALL BUT ANODIZED			
SCALE 5:1		DATE 6/15/99		DWG. NO. 1020101018XX140	

NOTE: ALL DIMENSIONS IN [] BRACKETS ARE MM UNLESS NOTED



ACTUAL PART SIZE

	Report #:	E8393.01-201-45
	Date:	06/10/15
	Verified by:	<i>[Signature]</i>

FILENAME: \\MB\0185\316X58

DATE	SYM.	REVISION	AUTH.	DRN.	CK.
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TOLERANCES EXCEPT AS NOTED DECIMAL INCHES .XX .XXX .XXXX ± .01 .005 .0002 DECIMAL MM .XX .XXX ± .13 .06 ANGULAR ± 1°		TITLE 3/16 x 5/8 MB (Muntin Bar)		DRN. BY <i>G. Matthews</i> CK. BY APPR. BY S.O. NO.	
MATL. .0185 [.47mm] 3105-H24 Aluminum		FINISH ALL BUT ANODIZED			
SCALE 5:1		DATE 6/15/99		DWG. NO. 1020101018XX140	