Intertek | Architectural Testing

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

Rendered to:
TUBELITE, INC.

SERIES/MODEL:
T14000 I/O Series Inside Set / Outboard Plane

Report Number: **B6918.03-116-45**
Report Date: **9/25/2015**

130 Derry Court
York, PA 17406

www.archtest.com . www.intertek.com/building

p. 717.764.7700
f. 717.764.4129

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

Rendered to:
TUBELITE, INC.
4878 Mackinaw Trail
Reed City, Michigan 49677

Report Number:	B6918.03-116-45
Simulation Date:	9/25/2015
Report Date:	9/25/2015

Project Summary:
Architectural Testing, Inc., an Intertek Company (Intertek-ATI) 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

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

Standards:

ANSI/NFRC 100-2014:	*Procedure for Determining Fenestration Product U-Factors*
ANSI/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:	T14000 I/O Series Inside Set / Outboard Plane
Type:	Glazed Wall System, Window Wall
Frame Material:	AT Aluminum w/ Thermal Breaks - All Members
Sash Material:	NA Not Applicable
Standard Size:	2000mm x 2000mm

Modeling Assumptions/Technical Interpretations:

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 can be grouped in accordance with ANSI/NFRC 100-2014, Section 4.2.1.L. The painted finish was simulated since it is the worst case (highest emissivity). The test sample was painted aluminum.
3) The center-line modeling approach was conducted using the horizontal intermediate for the head and sill models, and the vertical intermediate for the jambs. This procedure is outlined in the NFRC Simulation Manual, Section 8.9.

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.

	No Dividers	Dividers < 1	Dividers > 1
SHGC0	0.005904	0.009330	0.012542
SHGC1	0.898999	0.797673	0.702666
VT0	0.000000	0.000000	0.000000
VT1	0.893095	0.788343	0.690124

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.

Product Line	*Report Number*
None	-

Spacer Option Description

	Sealant		
Spacer Type	*Primary*	*Secondary*	*Code*
Quanex S2 Premium Super Spacer	Butyl Rubber		ZF-S

Gas Filling Technique Description

Fill Type	*Method*
84.48% Xenon	Single Probe Timed
76.14% Argon	Single Probe Timed
88.47% Argon	Single Probe Timed
78.55% Argon	Single Probe Timed
78.10% Krypton	Single Probe Timed
96.76% Argon	Single Probe Timed
64.98% Argon	Single Probe Timed
74.70% Argon	Single Probe Timed
60.78% Argon	Single Probe Timed
62.43% Argon	Single Probe Timed
86.02% Argon	Single Probe Timed
81.60% Xenon	Single Probe Timed
94.54% Xenon	Evacuated Chamber
76.87% Krypton	Single Probe Timed
71.53% Xenon	Single Probe Timed
76.42% Krypton	Single Probe Timed
66.65% Xenon	Single Probe Timed
82.13% Xenon	Single Probe Timed

Edge-of-Glass Construction

Interior Condition	EPDM Gasket Between Aluminum Frame and Glass
Exterior Condition	EPDM Gasket Between Aluminum Frame and Glass

Weatherstripping

Type	*Quantity*	*Location*
None	-	-

Frame/Sash Materials Finish

Interior	Painted Aluminum
Exterior	Painted Aluminum

NFRC 100/200/500 Summary Sheet
T14000 I/O Series Inside Set / Outboard Plane

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	
1	COG=0.4400											
	0.222	0.500	0.225					XEN84		CL	ZF-S	N
	U-Factor		**0.50**	**SHGC (N)**				**0.62**	**VT (N)**	**0.66**	**CR**	**48**
2	COG=0.4200											
	0.236	0.500	0.225					ARG76	0.654(#2)	RC	ZF-S	N
	U-Factor		**0.48**	**SHGC (N)**				**0.31**	**VT (N)**	**0.29**	**CR**	**48**
3	COG=0.4000											
	0.223	0.500	0.225					ARG88	0.571(#2)	CL	ZF-S	N
	U-Factor		**0.47**	**SHGC (N)**				**0.22**	**VT (N)**	**0.15**	**CR**	**49**
4	COG=0.3800											
	0.236	0.500	0.225					ARG79	0.465(#2)	RC	ZF-S	N
	U-Factor		**0.45**	**SHGC (N)**				**0.19**	**VT (N)**	**0.13**	**CR**	**50**
5	COG=0.3600											
	0.221	0.500	0.225					KRY78	0.406(#2)	SR	ZF-S	N
	U-Factor		**0.43**	**SHGC (N)**				**0.19**	**VT (N)**	**0.16**	**CR**	**52**
6	COG=0.3400											
	0.230	0.500	0.225					ARG97	0.331(#2)	CL	ZF-S	N
	U-Factor		**0.42**	**SHGC (N)**				**0.16**	**VT (N)**	**0.11**	**CR**	**53**
7	COG=0.3200											
	0.223	0.500	0.225					ARG65	0.215(#2)	CL	ZF-S	N
	U-Factor		**0.40**	**SHGC (N)**				**0.56**	**VT (N)**	**0.66**	**CR**	**53**
8	COG=0.3000											
	0.233	0.500	0.225					ARG75	0.166(#2)	CL	ZF-S	N
	U-Factor		**0.38**	**SHGC (N)**				**0.40**	**VT (N)**	**0.48**	**CR**	**54**
9	COG=0.2800											
	0.223	0.500	0.225					ARG61	0.087(#2)	CL	ZF-S	N
	U-Factor		**0.37**	**SHGC (N)**				**0.49**	**VT (N)**	**0.68**	**CR**	**54**
10	COG=0.2600											
	0.223	0.500	0.225					ARG62	0.035(#2)	CL	ZF-S	N
	U-Factor		**0.35**	**SHGC (N)**				**0.35**	**VT (N)**	**0.63**	**CR**	**54**

NFRC 100/200/500 Summary Sheet
T14000 I/O Series Inside Set / Outboard Plane

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	COG=0.2400											
	0.223	0.500	0.223					ARG86	0.035(#2) / 0.035(#3)	CL	ZF-S	N
	U-Factor		**0.33**	**SHGC (N)**				**0.33**	**VT (N)**	**0.56**	**CR**	**54**
12	COG=0.2200											
	0.223	0.500	0.223					XEN82	0.018(#2) / 0.018(#3)	CL	ZF-S	N
	U-Factor		**0.32**	**SHGC (N)**				**0.23**	**VT (N)**	**0.46**	**CR**	**55**
13	COG=0.2000											
	0.223	0.500	0.223					XEN95	0.018(#2) / 0.018(#3)	CL	ZF-S	N
	U-Factor		**0.30**	**SHGC (N)**				**0.23**	**VT (N)**	**0.46**	**CR**	**55**
14	COG=0.1800											
	0.223	0.250	0.003	0.250	0.221			KRY77/AIR	0.018(#2) / 0.76(#3) / 0.11(#4) / 0.028(#5)	CL	ZF-S	N
	U-Factor		**0.28**	**SHGC (N)**				**0.22**	**VT (N)**	**0.39**	**CR**	**55**
15	COG=0.1600											
	0.223	0.250	0.003	0.250	0.223			XEN72/AIR	0.018(#2) / 0.76(#3) / 0.11(#4) / 0.018(#5)	CL	ZF-S	N
	U-Factor		**0.27**	**SHGC (N)**				**0.22**	**VT (N)**	**0.41**	**CR**	**56**
16	COG=0.1400											
	0.223	0.250	0.003	0.250	0.223			KRY76	0.018(#2) / 0.76(#3) / 0.11(#4) / 0.018(#5)	CL	ZF-S	N
	U-Factor		**0.25**	**SHGC (N)**				**0.21**	**VT (N)**	**0.41**	**CR**	**55**
17	COG=0.1200											
	0.223	0.250	0.003	0.250	0.223			XEN67	0.018(#2) / 0.76(#3) / 0.11(#4) / 0.018(#5)	CL	ZF-S	N
	U-Factor		**0.23**	**SHGC (N)**				**0.21**	**VT (N)**	**0.41**	**CR**	**56**
18	COG=0.1000											
	0.223	0.250	0.003	0.250	0.223			XEN82	0.018(#2) / 0.76(#3) / 0.11(#4) / 0.018(#5)	CL	ZF-S	N
	U-Factor		**0.22**	**SHGC (N)**				**0.21**	**VT (N)**	**0.41**	**CR**	**56**

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.

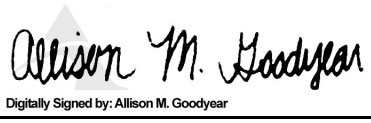
Intertek-ATI is an NFRC accredited simulation laboratory and all simulations were conducted in full compliance with NFRC approved procedures and specifications. The values included in this report are not considered in compliance with ANSI/NFRC 100, ANSI/NFRC 200, and/or NFRC 500 unless the associated validation test requirements have been satisfied, as applicable.

Intertek-ATI 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 Intertek-ATI for the entire test record retention period. The test record retention end date for this report is August 21, 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 Intertek-ATI

For INTERTEK-ATI:

SIMULATED BY:



Allison M. Goodyear
Simulation Technician

REVIEWED BY:

Kristen L. Louder
Senior Simulation Technician
Simulator-In-Responsible-Charge

AMG:amg
B6918.03-116-45

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Drawings and Bills of Material (9)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
.03R0	9/25/2015	All	Original Report Issued to Tubelite, Inc..

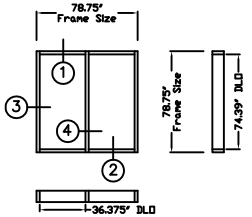
All drawings and Bills of Material used to simulate this product are enclosed in this Appendix

Appendix A

B6918.03-116-45

Intertek Architectural Testing

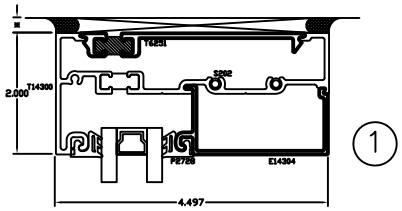
Report #: B6918-116-45
Date: 09/18/15
Verified by: Allison M. Goodyear

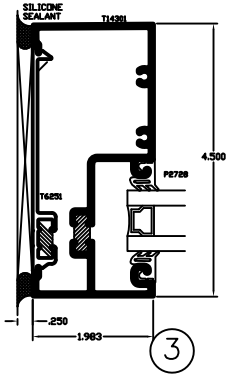


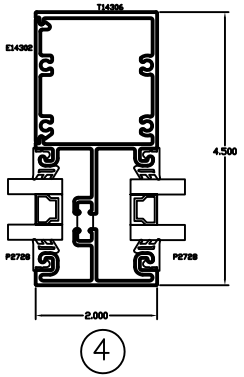
T-14000 I/O Inside Set / Outboard Flush Glaze Series Thermal Mock Up #1 - AAMA 1503

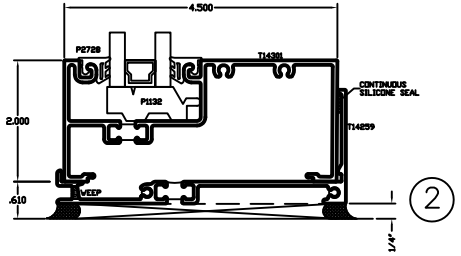
T-14000 I/O Inside Set/ Outboard Mock Up

Glass: 1" overall IG
1/4" PPG Solarban 70 XL with low-e on #2
1/2" gap - 90/10 Argon fill
1/4" Clear









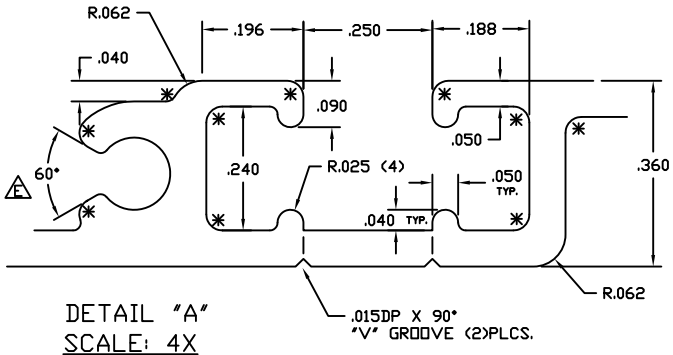
06-2015

TUBELITE

Intertek Architectural Testing

Report #: B6918-116-45
Date: 09/18/15
Verified by: Allison M. Goodyear

E14259 E



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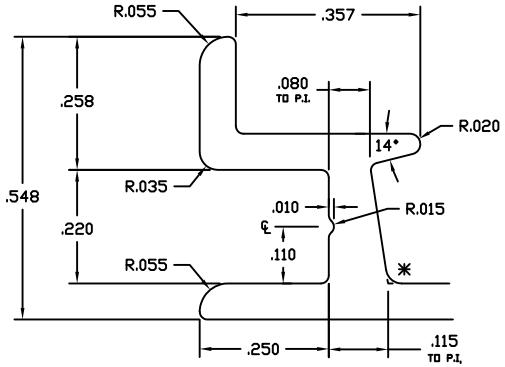

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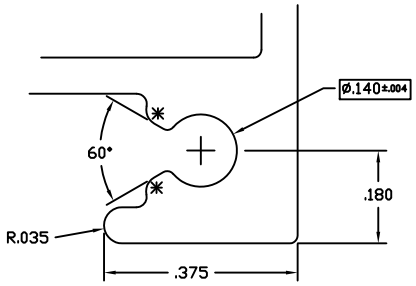

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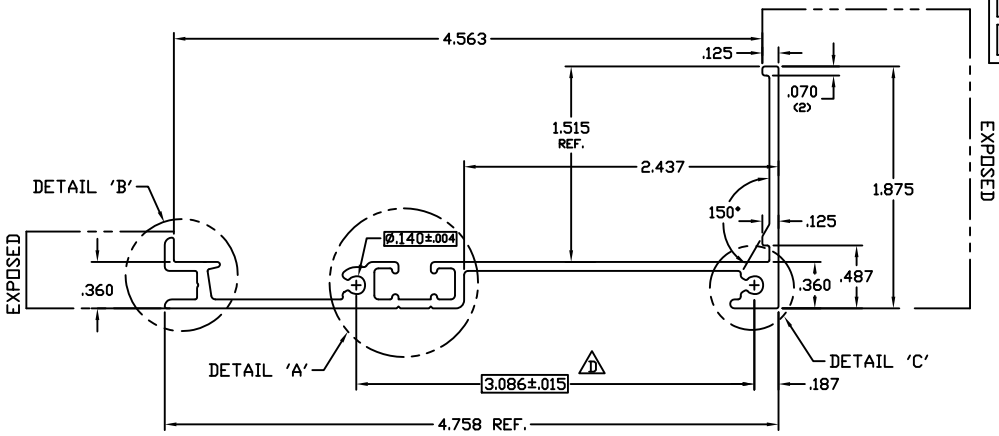

FULL SIZE

INDICATES CRITICAL DIMENSION

LANCED AND FULLY DEBRIDGE

Material: Painted or Anodized Aluminum

REV	DATE	DESCRIPTION	INTL
E	10/02/09	REVISED DETAIL 'B', ROTATED SCREW BOSS, WAS E908J06	CRH

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED
ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
DENOTES CRITICAL DIMENSION
ALL DIES PROPERTY OF TUBELITE

TUBELITE DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
	04/01/93	RELEASE TO TOOLING	REW
	04/09/93	REV'D WALL THK, CALCS & RE-RELEASE TO TOOLING	REW
	5-18-93	RELEASE TO PRODUCTION	KMH
	7-7-93	REVISE EXTR. # WAS E-14046	KMH
A	7-28-93	REVISE SHAPE & RERELEASE TO TOOLING	KMH
	8-26-93	RELEASE TO PRODUCTION	KMH
B	01/03/06	REVISED SHAPE	LDD
C	03/13/06	REVISED P&D CAVITY FOR AZOBRADE	JEM
D	07/30/09	REVISED P&D CAVITY FOR LANCER, ADDED SCREW BOSSES	CRH

WALL THK. 0.070	SECTION CLASS S	MAT'L 6063-T5	RATIO 83:1
PERIMETER OUT (TOTAL) 17.615		AREA .669	WGT/FT .787
FACTOR 23	CIRCLE SIZE 5.105		INFILL VOLUME .155

RXX 1.664	SXX .673	IXX 1.852	CXX 2.750
RYY .414	SYY .075	IYY .114	CYY 1.875

SILL FLASHING
T14000 THERMAL STOREFRONT

DRAWN BY KMH	DRWG DATE 03/11/93	APPV'D BY	DATE APPV'D	
DWG SCALE NOTED	PRODUCT CODE 190	E14259		REV E

Intertek Architectural Testing

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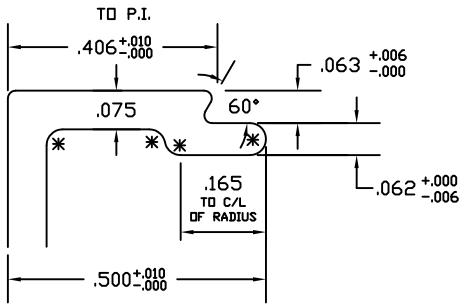
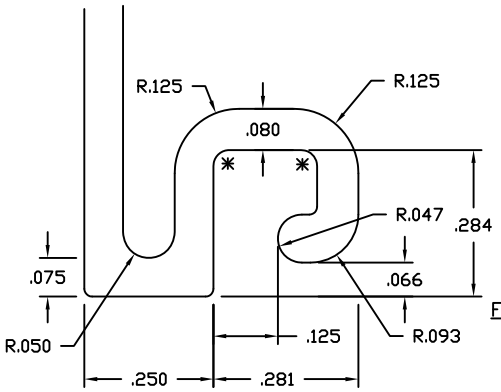


DET 'A'
FOUR TIMES SIZE



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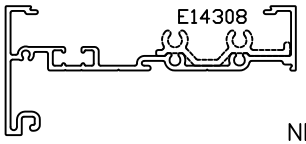
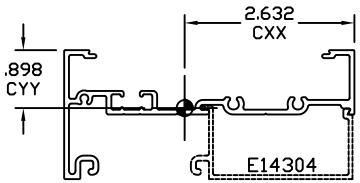


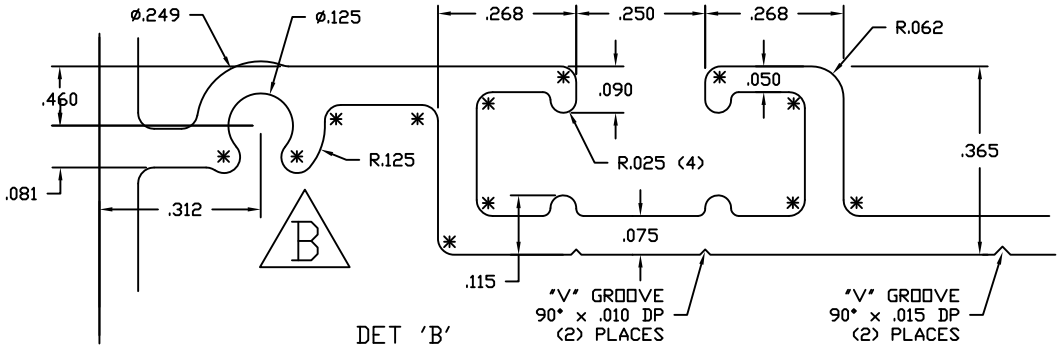
HALF SCALE ASSEMBLY

NOTES:
FULLY DEBRIDGE
MATES WITH E14304
MATES WITH E14308

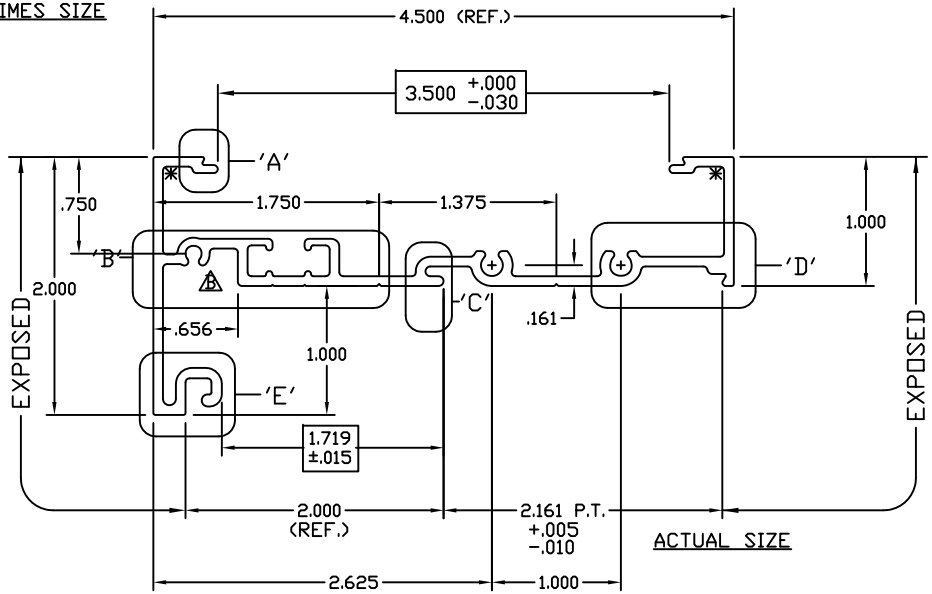


HALF SCALE ASSEMBLY

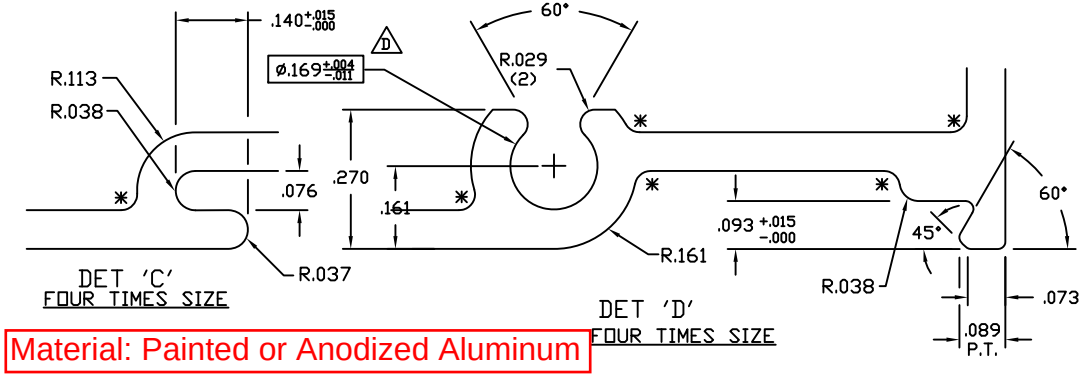
E14300 D



DET 'B'
FOUR TIMES SIZE



ACTUAL SIZE



DET 'C'
FOUR TIMES SIZE

DET 'D'
FOUR TIMES SIZE

Material: Painted or Anodized Aluminum

△C LANCED AND FULLY DEBRIDGE

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED
ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
☐ DENOTES CRITICAL DIMENSION
ALL DIES PROPERTY OF TUBELITE

TUBELITE DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS
3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
A	05/23/06	ADDED SCREW BOSS FOR ROLL PIN	LDD
	06/26/06	RELEASED FOR PRODUCTION	JEM
B	10/10/07	RELOCATED SCREW BOSS FOR ROLL PIN IN REVISION 'A'	NIK
C	08/31/09	ADDED LANCED NOTE	CRH
D	11/17/11	.169 +/-.004 WAS .162+/-.004	CRH

WALL THK.	.075	SECTION CLASS	S	MAT'L	6063-T5	RATIO	64:1
PERIMETER OUT (TOTAL)	22.535			AREA	.862	WGT/FT	1.014
FACTOR	23	CIRCLE SIZE	5.242			INFILL VOLUME	.158

RXX	1.618	SXX	.851	IXX	2.265	CXX	2.664
RYY	.465	SYY	.165	IYY	.186	CYY	1.129

IS HEAD (F/R PLANE)
E14000 NON THERMAL STOREFRONT

DRAWN BY	CDS	DRWG DATE	12/29/00	APPV'D BY	DATE APPV'D
DWG SCALE	NOTED	PRODUCT CODE	190	E14300	REV D

Intertek Architectural Testing

Report #: B6918-116-45
Date: 09/18/15
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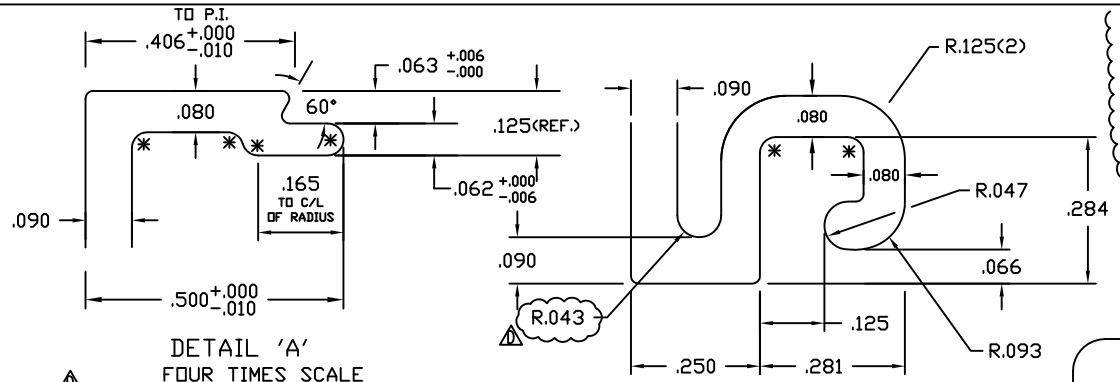
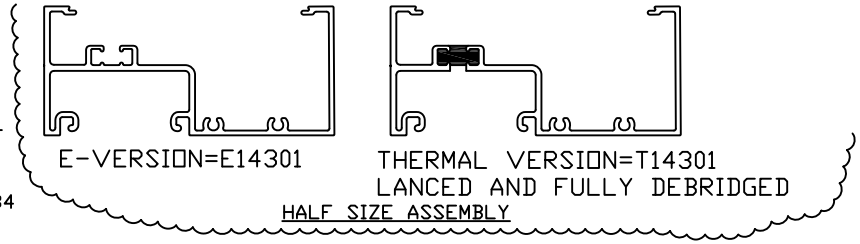
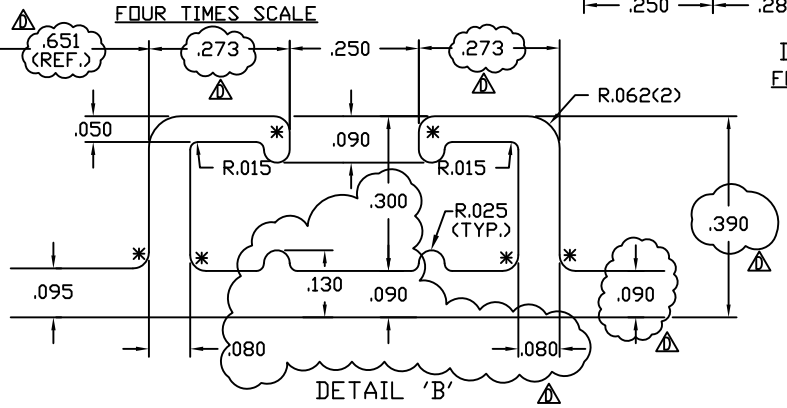
E14301 E



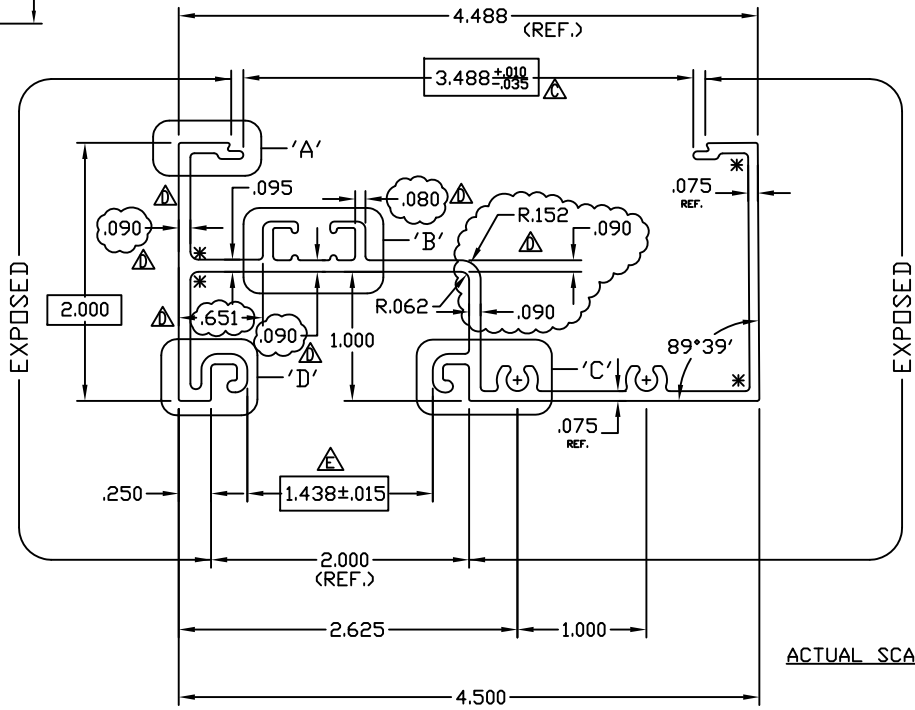
DETAIL 'A'
FOUR TIMES SCALE

DETAIL 'D'
FOUR TIMES SCALE

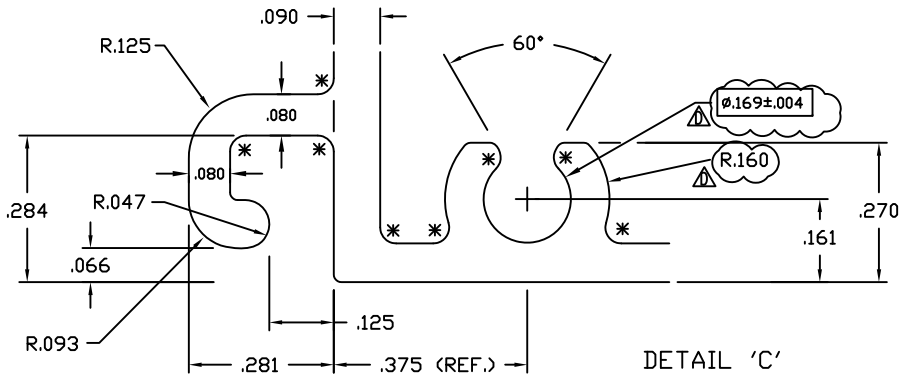




DETAIL 'B'
FOUR TIMES SCALE



ACTUAL SCALE



DETAIL 'C'
FOUR TIMES SCALE

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED
ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
DENOTES CRITICAL DIMENSION
ALL DIES PROPERTY OF TUBELITE

TUBELITE DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
A	05/23/06	REVISED SHAPE - ADDED TAPER TO LEGS	LDD
	05/23/06	RELEASE FOR PRODUCTION	JEM
B	08/31/09	ADDED LANCED NOTE	CRH
C	03/11/13	REVISED TOLERANCE, WAS +.010/-.015	CRH
D	03/13/13	REVISED SCREW BOSSES AND P&D FEATURE	CRH
E	06-05-13	1.438+/-.015 WAS +/-.012	CRH

WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 50:1
PERIMETER OUT (TOTAL) 26.498		AREA 1.104	WGT/FT 1.298
FACTOR 20	CIRCLE SIZE 4.924		INFILL VOLUME .158

RXX 1.604	SXX 1.134	IXX 2.839	CXX 2.504
RYY .615	SYY .341	IYY .418	CYY 1.224

HEAD/JAMB/SILL 14000 I/O 2" X 4 1/2"
E14000 NON THERMAL STOREFRONT

DRAWN BY CDS	DWG DATE 12/29/00	APPV'D BY MJC	DATE APPV'D 01/19/01	
DWG SCALE NOTED	PRODUCT CODE 190	E14301		REV E

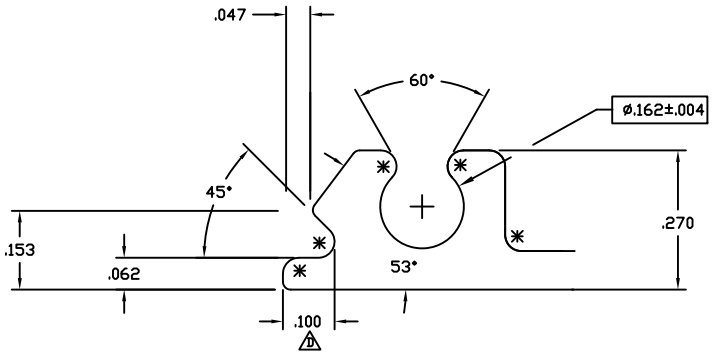
Material: Painted or Anodized Aluminum

Intertek Architectural Testing

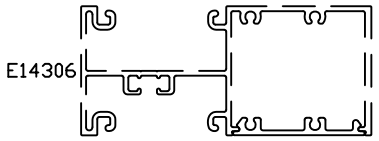
Report #: B6918-116-45
Date: 09/18/15
Verified by: Allison M. Goodyear

E14302 D

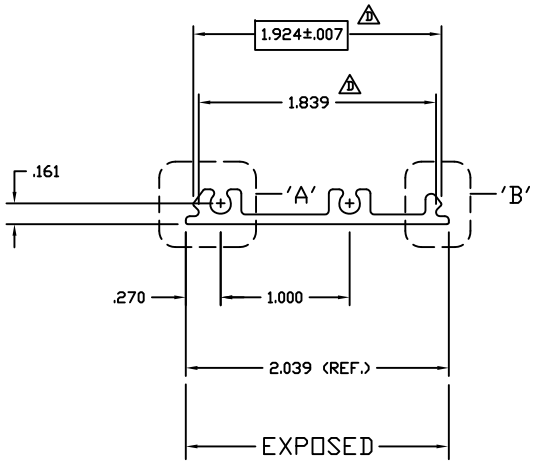
NOTES:
MATES WITH E14306



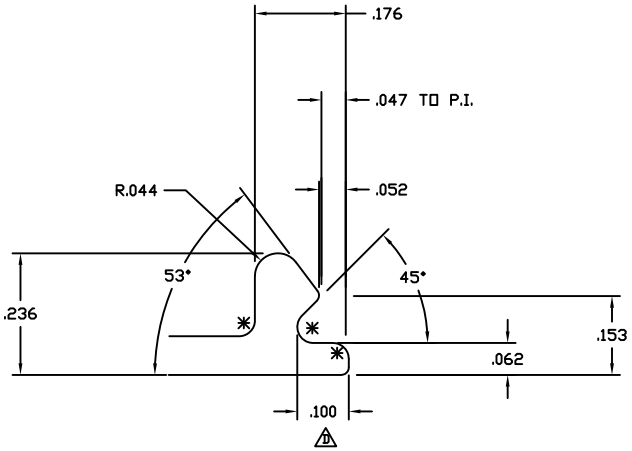
DETAIL 'A'
FOUR TIMES SCALE



HALF SIZE ASSEMBLY



ACTUAL SIZE



DETAIL 'B'
FOUR TIMES SCALE

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED
ALL UNSPECIFIED RADII .015
✱ INDICATES .031 RADIUS
▭ DENOTES CRITICAL DIMENSION
ALL DIES PROPERTY OF TUBELITE

TUBELITE® DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
A	06/15/01	TURNED SCREW SPLINE 45°	SRD
	07/20/01	RELEASED REVISED SHAPE FOR PRODUCTION	SRD
B	06/21/02	TURNED SECOND SCREW SPLINE 45°	CRH
C	02/23/04	TURNED SPLINES BACK, INCREASED THICKNESS	SRD
D	07/14/14	.100 WAS .094, 1.839 WAS CRITICAL, TOL WAS +/-.015	CRH

WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 225:1
PERIMETER OUT (TOTAL) 5.895		AREA .245	WGT/FT .288
FACTOR 20	CIRCLE SIZE 2.027		INFILL VOLUME N/A

RXX .599	SXX .082	IXX .087	CXX 1.059
RYY .074	SYY .007	IYY .001	CYY .184

VERTICAL FILLER 14000 I/O
E14000 NON THERMAL STOREFRONT

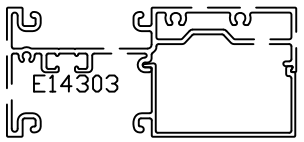
DRAWN BY SRD	DRWG DATE 12/18/03	APPV'D BY	DATE APPV'D	
DWG SCALE NOTED	PRODUCT CODE 190	E14302		REV D

Material: Painted or Anodized Aluminum

Intertek Architectural Testing

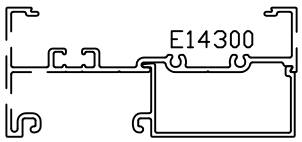
Report #: B6918-116-45
Date: 09/18/15
Verified by: Allison M. Goodyear

E14304

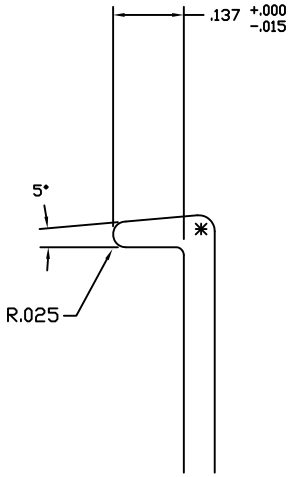


NOTES:
MATES WITH E14300
MATES WITH E14303

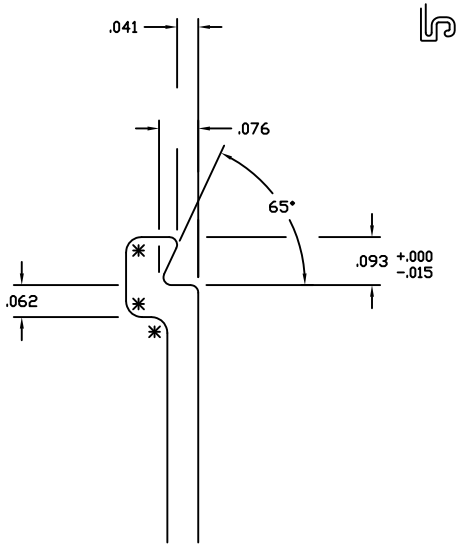
HALF SCALE ASSEMBLY



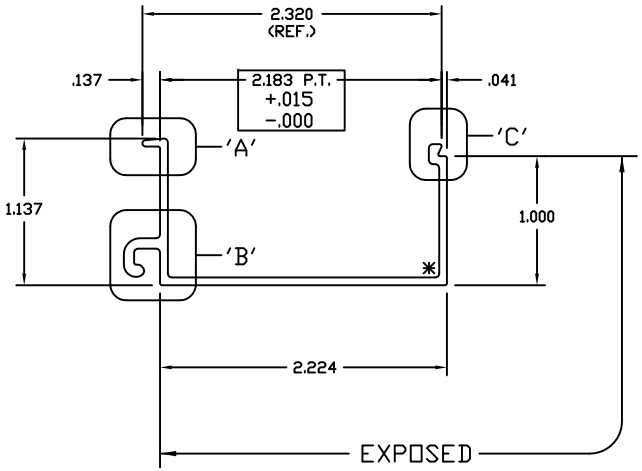
HALF SCALE ASSEMBLY



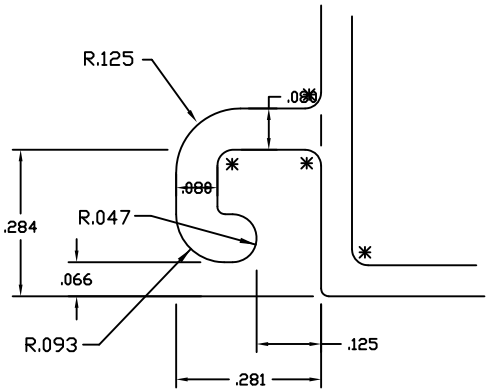
DETAIL 'A'
FOUR TIMES SCALE



DETAIL 'C'
FOUR TIMES SCALE



ACTUAL SIZE



DETAIL 'B'
FOUR TIMES SCALE

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

▭ DENOTES CRITICAL DIMENSION

ALL DIES PROPERTY OF TUBELITE

TUBELITE® DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
X	XX/XX/XX	XXXXXXXX	XXX

WALL THK. .060	SECTION CLASS S	MAT'L 6063-T5	RATIO 18:1
PERIMETER OUT (TOTAL) 10.073		AREA .316	WGT/FT .371
FACTOR 28	CIRCLE SIZE 2.650		INFILL VOLUME N/A

RXX .938	SXX .215	IXX .278	CXX 1.294
RYY .357	SYY .050	IYY .040	CYY .811

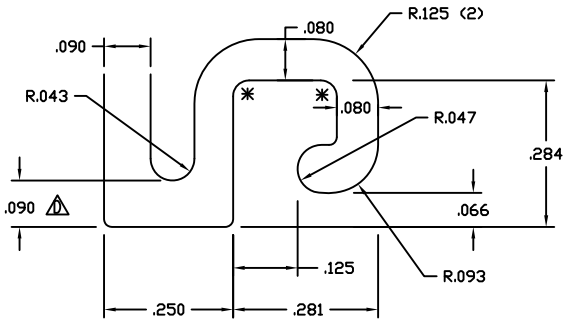
IS GLASS STOP (14000 I/O) FOR 1" GLASS
E14000 NON THERMAL STOREFRONT

DRAWN BY CDS	DRWG DATE 12/29/00	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 190	E14304	REV

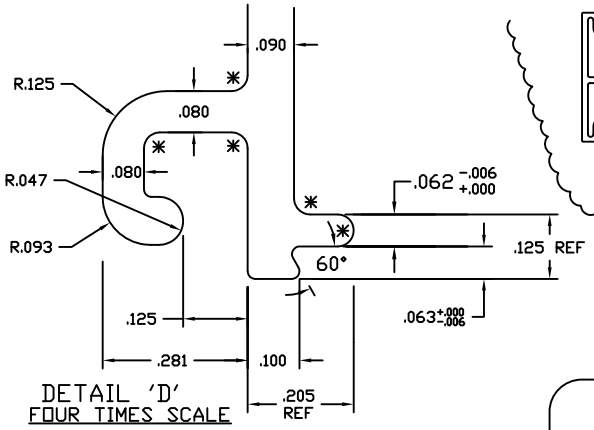
Material: Painted or Anodized Aluminum

Intertek Architectural Testing

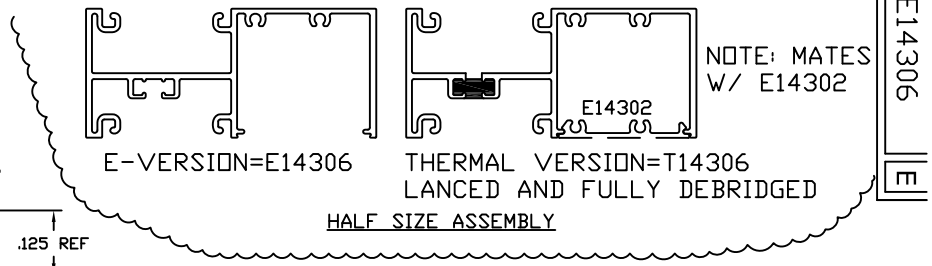
Report #: B6918-116-45
Date: 09/18/15
Verified by: Allison M. Goodyear

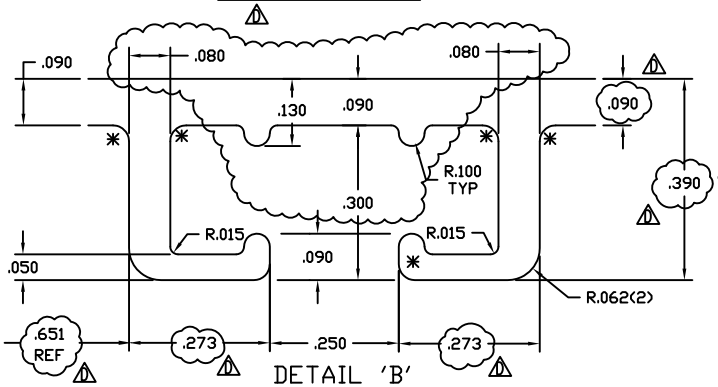


DETAIL 'A'
FOUR TIMES SCALE

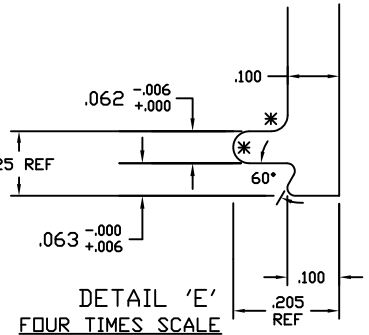


DETAIL 'D'
FOUR TIMES SCALE

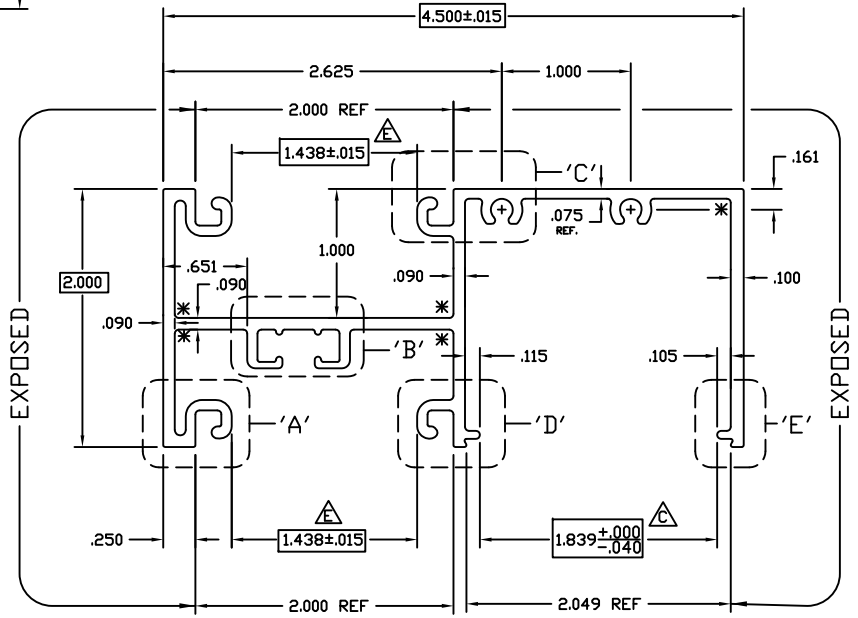




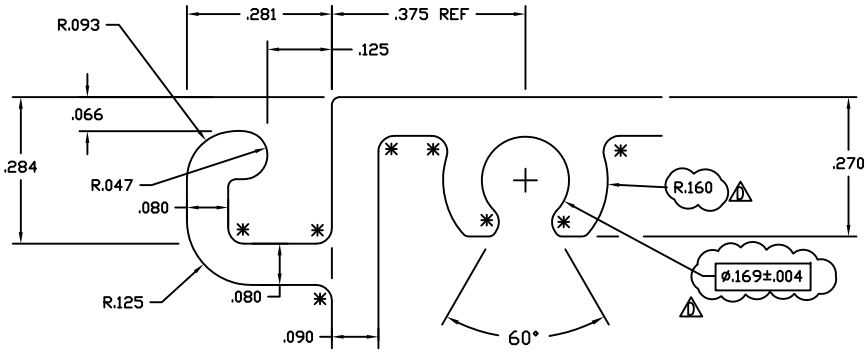
DETAIL 'B'
FOUR TIMES SCALE



DETAIL 'E'
FOUR TIMES SCALE



EXPOSED
ACTUAL SIZE



DETAIL 'C'
FOUR TIMES SCALE

F/R PLANE

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED
ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
DENOTES CRITICAL DIMENSION
ALL DIES PROPERTY OF TUBELITE

TUBELITE® DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
A	12-18-07	ADD TAPER TO WALL	CRH
B	08/31/09	ADDED LANCED NOTE	CRH
C	02/22/13	TOLERANCE WAS +.000/-.015	CRH
D	03-13-13	REVISED SCREW BOSSES AND P&D FEATURE	HLP
E	06-05-13	1.438+/-.015 WAS +/-.012	CRH

WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 43:1
PERIMETER OUT (TOTAL) 29.780		AREA 1.293	WGT/FT 1.520
FACTOR 20	CIRCLE SIZE 4.924		INFILL VOLUME .158

RXX 1.545	SXX 1.243	IXX 3.086	CXX 2.483
RYY .634	SYY .460	IYY .519	CYY 1.127

VERTICAL 14000 I/O 2" X 4 1/2"
E14000 NON THERMAL STOREFRONT

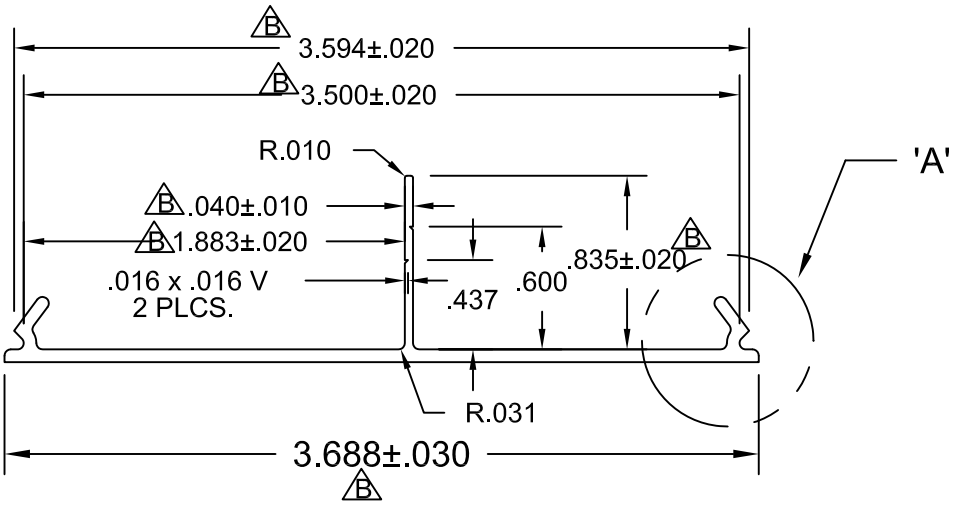
DRAWN BY CDS	DRWG DATE 12/29/00	APPV'D BY MJC	DATE APPV'D 01/19/01	
DWG SCALE NOTED	PRODUCT CODE 190	E14306		REV E

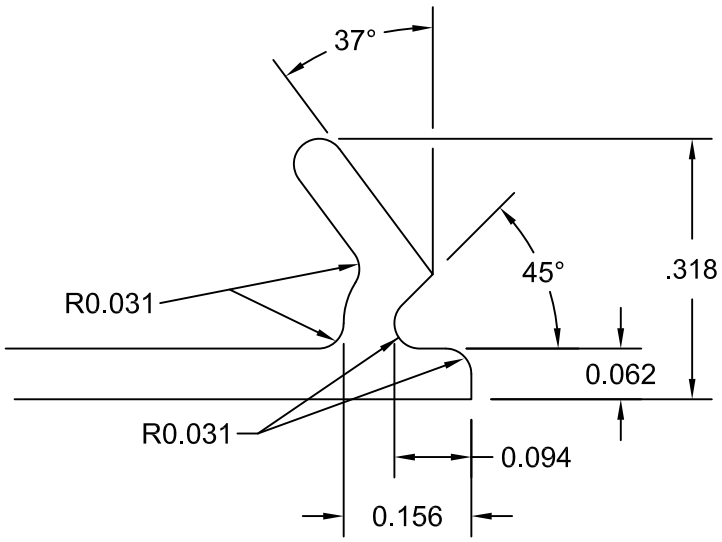
Material: Painted or Anodized Aluminum

Intertek Architectural Testing

Report #: B6918-116-45
Date: 09/18/15
Verified by: Allison M. Goodyear

P4543A
B





DETAIL 'A'
4X SIZE

TYPICAL WALL THICKNESS = .062
10' LENGTHS
B PURCHASED FROM AMESBURY - Q8924

Material: Rigid PVC

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

▭ DENOTES CRITICAL DIMENSION

REV	DATE	DESCRIPTION	INTL
	05/29/02	RELEASE FOR PRODUCTION - ER060201	SRD
	03/18/08	ADDED CENTER LEG STOP	NIK
	03/18/08	RELEASE FOR TOOLING	NIK
B	09/09/13	Added tolerance for new supplier - Amesbury	TT

TUBELITE
DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

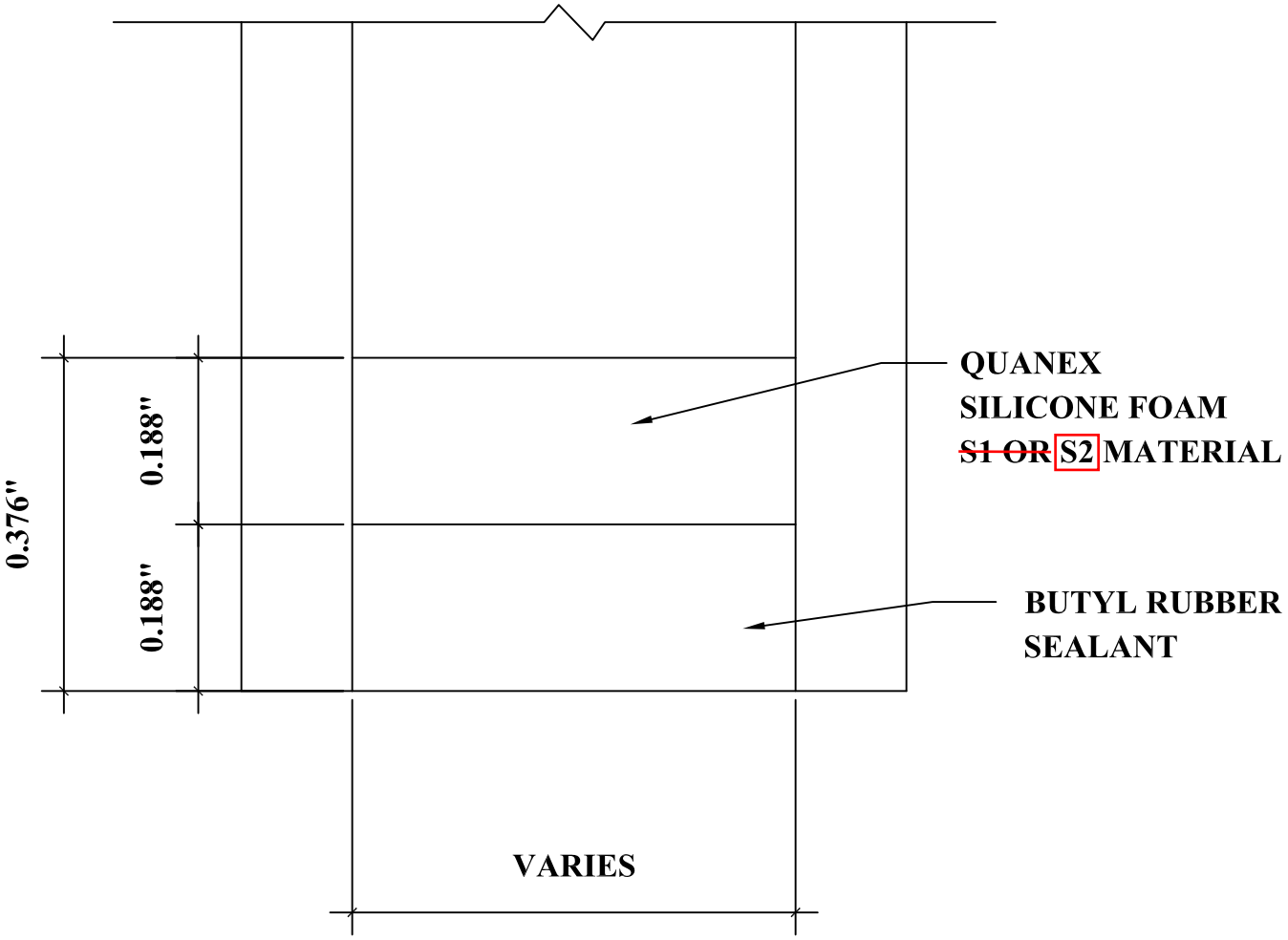
3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

FLAT LEG SNAP IN FILLER
RIGID PVC
PERIMETER CAULK BACKER

DRAWN BY	DRWG DATE	APPV,D BY	DATE APPV'D	REV
SRD	4/5/02			
DRWG SCALE NOTED	PRODUCT CODE 160	P4543A		B

Intertek Architectural Testing

Report #: B6918-116-45
Date: 09/18/15
Verified by: Allison M. Goodyear



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