Architectural Testing

NFRC U-FACTOR & SHGC / VT
COMPONENT MODELING APPROACH (CMA)
COMPUTER SIMULATION REPORT

Rendered to:
Tubelite, Inc.

SERIES/MODEL:
T14000 Inside Set / Inboard Plane System

Report No.: **B6917.01-116-45**
Report Date: **06/15/12**

130 Derry Court
York, PA 17406-8405
phone: 717-764-7700
fax: 717-764-4129
www.archtest.com

Architectural Testing

COMPONENT MODELING APPROACH (CMA)
TEST REPORT

Rendered to:

TUBELITE, INC.
4878 Mackinaw Trail
Reed City, Michigan 49677

Report No: B6917.01-116-45
Simulation Date: 06/15/12
Report Date: 06/15/12

Project Summary:
Architectural Testing, Inc. was contracted to perform U-Factor, Solar Heat Gain Coefficient, and Visible Transmittance 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.

Standards:

NFRC 100-2010: *Procedure for Determining Fenestration Product U-Factors*
NFRC 200-2010: *Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence*

Software:

Frame and Edge Modeling: THERM 6.3.38
Center-of-Glass Modeling: WINDOW 6.3.54
Total Product Calculations: CMAST 1.2.03
Spectral Data Library: 23.0

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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 were grouped for simulation purposes in accordance with NFRC 100-2010, Section 5.9.5.2.A.iii.2 and Table 5-5. The painted finish was simulated since it is the worst case (highest emissivity). The physical test sample was anodized 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 outline in the NFRC Simulation Manual Section 8.10.1.
4) The T14000 Outside Set/Outboard Plane System and T14000 Inside Set/Inboard Plane System can be within the same validation matrix per, NFRC 100-2010 Section 4.2.3.1.A & D. The T14000 Inside Set/Inboard Plane System was physically tested.
5) Best Spacers, Inc. was used as a generic spacer manufacturer in CMAST for validation since the actual spacer manufacturer was not entered in the database.

Validation Option

Frame/Spacer Component Description

Component Type	*Server ID*	*Component Name*
Product:	P-TUB-11039	TUB-T14000 Inside Set/Inboard Plane System-Validation
Frame Assembly:	FA-TUB-15636	TUB-T14000 Inside Set/Inboard Plane System-Validation
Frame:	F-TUB-10684	TUB-T14000I/I Head w/Thermal Filler - 14310/14314-VAL
	F-TUB-10658	TUB-T14000I/I Sill Screw Spline - 14301/14259-VAL
	F-TUB-10683	TUB-T14000I/I Jamb Screw Spline - 14306/14302-VAL
	F-TUB-10668	TUB-T14000I/I Intermed Vert Screw Spline - 14306/14302-VAL
Spacer Assembly:	SA-BSP-3288	Validation: Azon Warm Light Spacer (0.530" - PIB/Silicone)
COG Assembly:	GA-PPG-4819	Clear/0.530 Air/S500 (6mm)

Test Unit Size: *78.74 inches wide by 78.74 inches high*

0.426	***Total Product U-Factor***

Framing Product Line:	PL-TUB-2998	T14000 Inside Set / Inboard Plane System

Server ID	Frame Component Name	Frame Type	Sash Type	PDF (in.)	Gap Width (in.)	U-Frame (avg) Btu/hr-ft2-F)	U-Edge (avg) Btu/hr-ft2-F)
F-TUB-10620	TUB-T14000I/I Head - 14310/14314	AT	N	2.085	1.000	1.086	0.407
F-TUB-10638	TUB-T14000I/I Head w/ Head Receptor - 14310/14314/14129/14130	AT	N	3.036	1.000	0.931	0.399
F-TUB-10621	TUB-T14000I/I Head w/Thermal Filler - 14310/14314	AT	N	2.085	1.000	0.963	0.400
F-TUB-10624	TUB-T14000I/I Intermed Horz Head - 14313/14314	AT	N	1.085	1.000	0.823	0.386
F-TUB-10617	TUB-T14000I/I Intermed Horz Sill - 14313/14314	AT	N	1.085	1.000	0.846	0.384
F-TUB-10643	TUB-T14000I/I Intermed Vert Expansion - 14336/14346	AU	N	2.413	1.000	1.053	0.388
F-TUB-10614	TUB-T14000I/I Intermed Vert Expansion Left Jamb - 14336/14346	AU	N	1.204	1.000	1.032	0.394
F-TUB-10629	TUB-T14000I/I Intermed Vert Expansion Right Jamb - 14336/14346	AU	N	1.209	1.000	1.074	0.382
F-TUB-10628	TUB-T14000I/I Intermed Vert Screw Spline - 14306/14302	AT	N	2.171	1.000	0.887	0.388
F-TUB-10612	TUB-T14000I/I Intermed Vert Screw Spline Left Jamb - 14306/14302	AT	N	1.085	1.000	0.887	0.388
F-TUB-10613	TUB-T14000I/I Intermed Vert Screw Spline Right Jamb - 14306/14302	AT	N	1.085	1.000	0.887	0.387
F-TUB-10639	TUB-T14000I/I Sill Screw Spline - 14301/14259	AT	N	2.445	1.000	1.024	0.403

Component 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 approved and identifed on a valid CMA Label Certificate are to be used for labeling purposes. The ratings values were rounded in accordance to NFRC 601, NFRC Unit and Measurement Policy.

Architectural Testing 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.

Detailed drawings, simulation data files, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, until 06/15/16 . At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire. 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:

Kristen L. Livelsberger
Digitally Signed by: Kristen L. Livelsberger

Kristen L. Livelsberger
Senior Simulation Technician
NFRC Certified Simulator

REVIEWED BY:

Michael J. Thoman
Digitally Signed by: Michael J. Thoman

Michael J. Thoman
Director - Simulations & Thermal Testing
Simulator In Responsible Charge

KLL:kll
B6917.01-116-45

Attachments (pages): This report is complete only when all attachments listed are included.

Appendix A: Drawings and Bills of Material (25)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
.01R0	06/15/12	All	Original Report Issued to Tubelite, Inc.

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

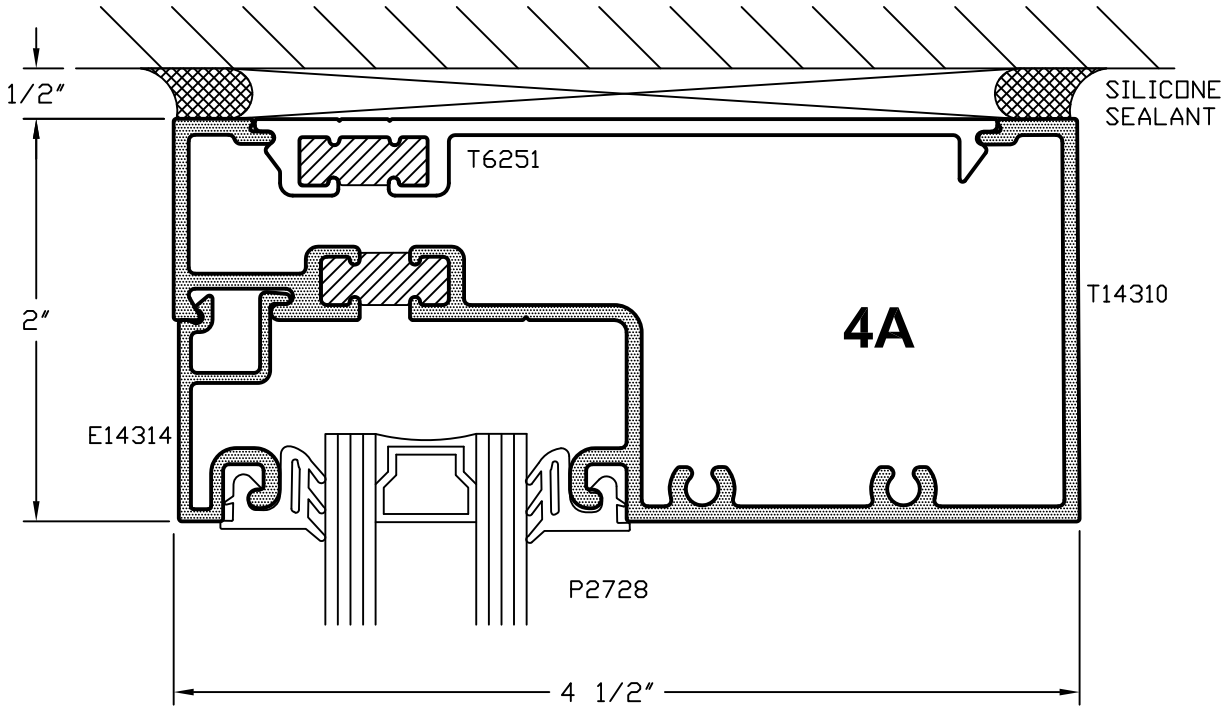
Appendix A

B6917.01-116-45

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L. Kreidsberger

T914-4A



TUBELITE®
STOREFRONT, CURTAINWALL
& ENTRANCE SYSTEMS
DEPENDABLE

T14000 I/O SERIES - OUTBOARD
THERMAL SIMULATION TEST
HEAD DETAILS

DRAWN BY TT	DRWG DATE 11/29/11	APPV,D BY	DATE APPV'D
DRWG SCALE 1″=1″	PRODUCT CODE 180	T914-4A	REV

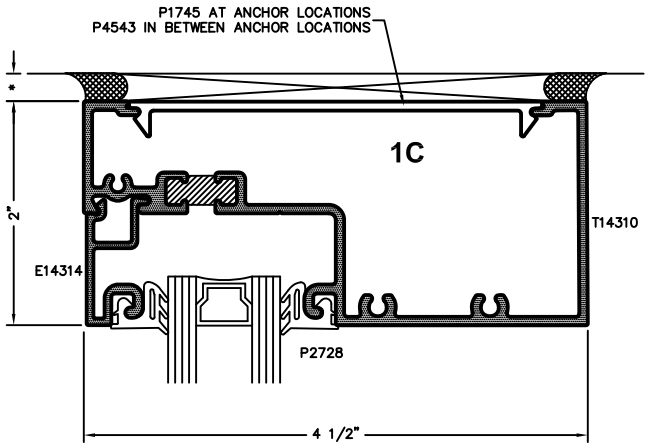
Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L. Friedsberger

15.10
14000 Series Flush Glaze - I/O Plane
Screw Spline Head - Outside Set/Outboard Plane

CAD DETAIL FILE NO.
180HEAD12

* 1/2" WHEN USING E-14259 FLASHING
* 1/4" WHEN USING E-45159 FLASHING



SUBSTITUTE E14310 FOR T14310, IF THERMAL BREAK IS NOT REQD.

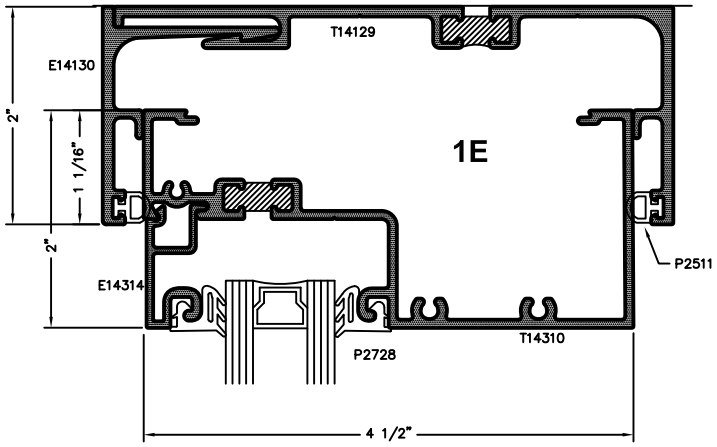
180HEAD12

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Riedsberger

15.12
14000 Series Flush Glaze - I/O Plane
Head Receptor - Outside Set

CAD DETAIL FILE NO.
180HEAD14



SUBSTITUTE E14129 & E14310 FOR T14129 & T14310, IF THERMAL BREAK IS NOT REQD.

180HEAD14

Architectural Testing

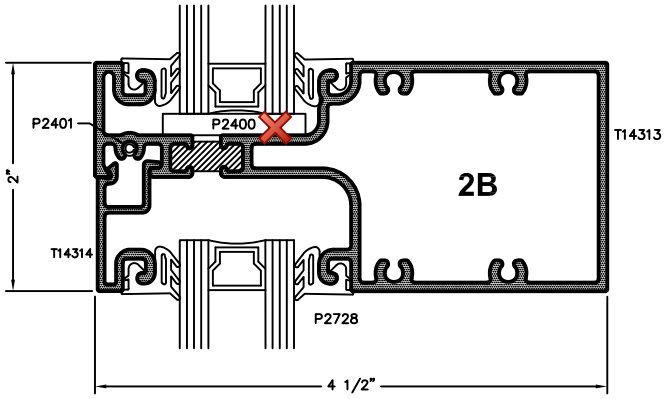
Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen A. Riedsberger

15.15

14000 Series Flush Glaze - I/O Plane

Screw Spline Intermediate Horizontal - Outboard Set/Outboard Plane

CAD DETAIL FILE NO.
180HORZ12



SUBSTITUTE E14313 FOR T14313, IF THERMAL BREAK IS NOT REQD.

180HORZ12

Architectural Testing

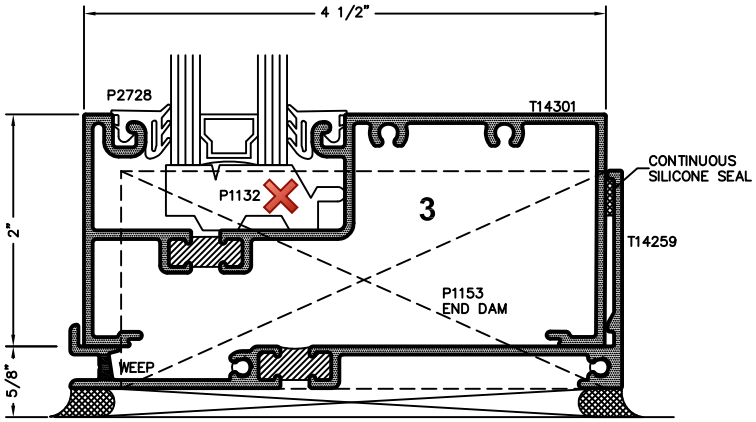
Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L. Luedsberger

15.17

14000 Series Flush Glaze - I/O Plane

Screw Spline Sill - Outboard Plane

CAD DETAIL FILE NO.
180SILL8



SUBSTITUTE E14301 & E14059 FOR T14301 & T14259, IF THERMAL BREAK IS NOT REQD.

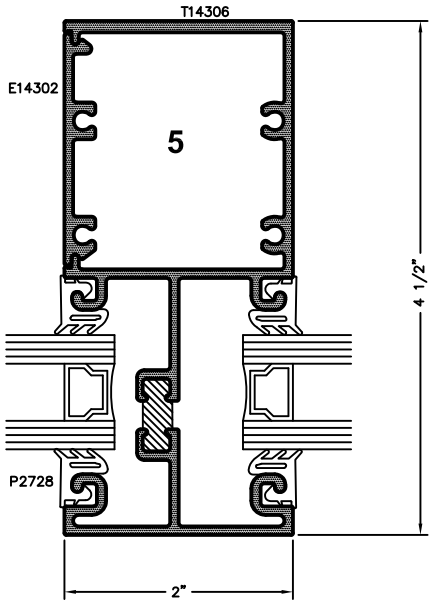
180SILL8

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Friedsteger

15.20
14000 Series Flush Glaze - I/O Plane
Screw Spline Intermediate Vertical - Outboard Plane

CAD DETAIL FILE NO.
180VERT8



SUBSTITUTE E14306 FOR T14306, IF THERMAL BREAK IS NOT REQD.

180VERT8

Architectural Testing

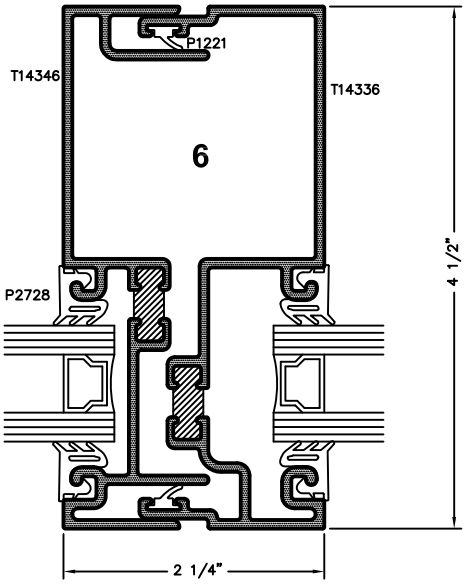
Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Riedsberger

15.23

14000 Series Flush Glaze - I/O Plane

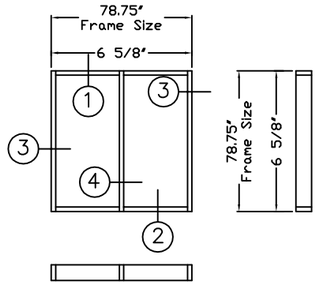
Expansion Vertical - Outboard Plane

CAD DETAIL FILE NO.
180VERT11



SUBSTITUTE E14336 & E14346 FOR T14336 & T14346, IF THERMAL BREAK IS NOT REQD.

180VERT11



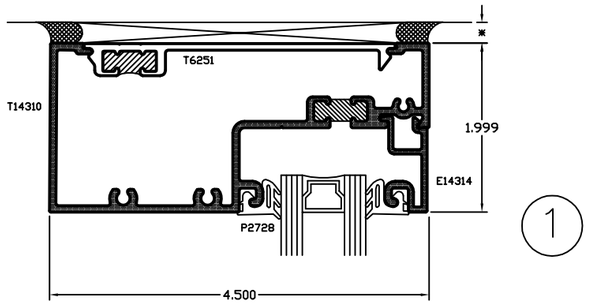
T-14000: Inside Set/ Inboard Glaze Series Thermal Mock Up #3

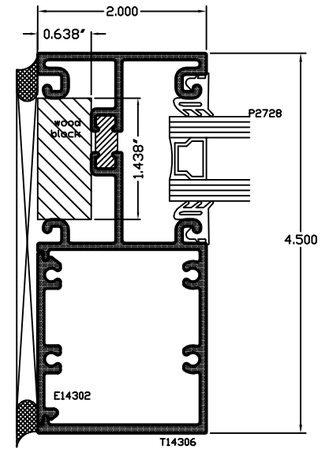
VALIDATION OPTION

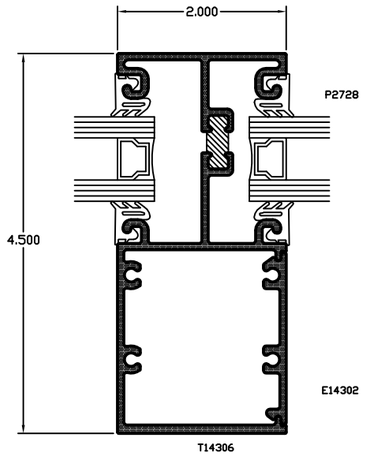
SCALE: 1/4" = 1'-0"

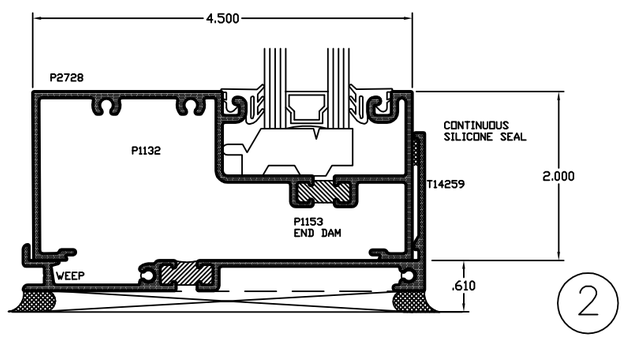
Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Breedlove







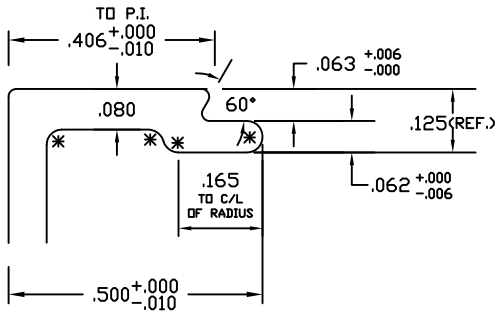


02/07/2012

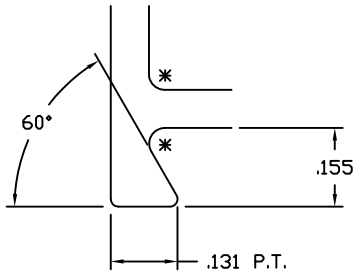
TUBELITE

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L. Riedsteger



DET 'A'
FOUR TIMES SCALE



DET 'D'
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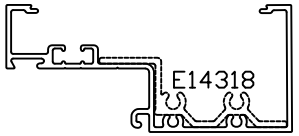
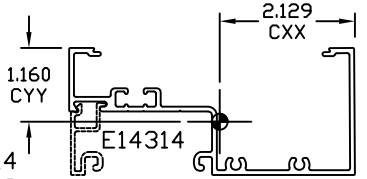
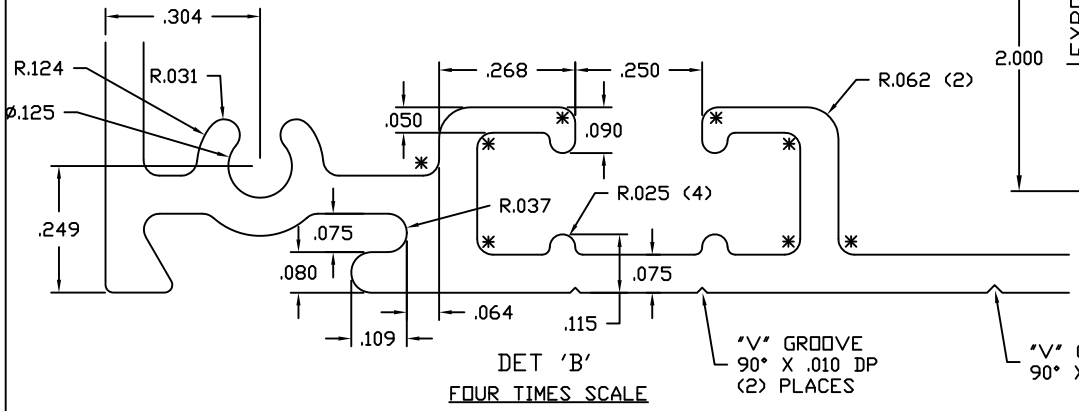


HALF SCALE ASSEMBLY

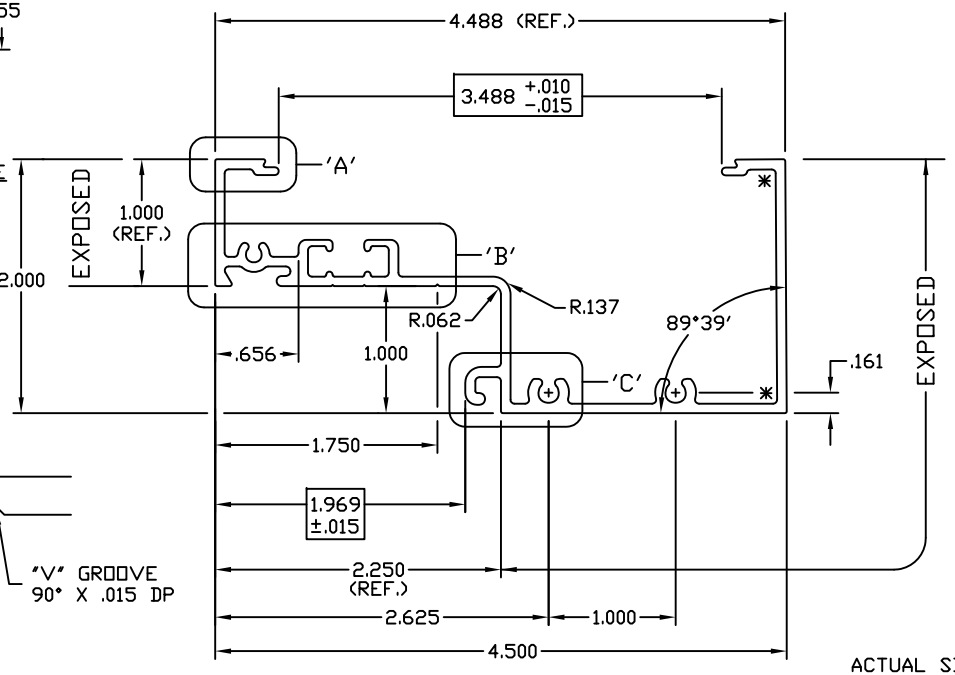
NOTES:
FULLY DEBRIDGE
MATES WITH E14314
MATES WITH E14318



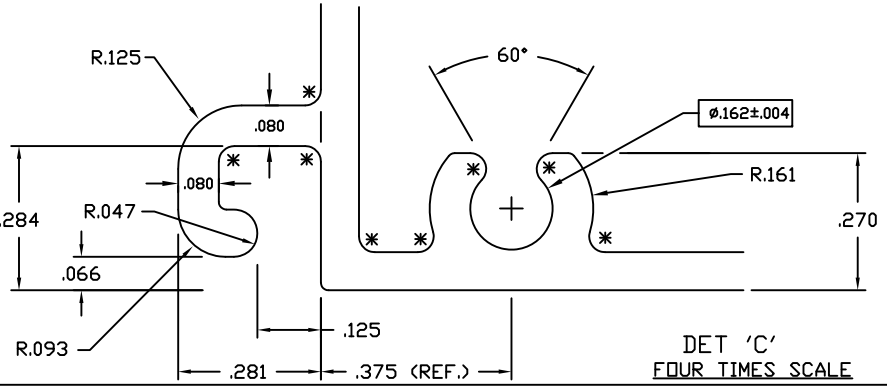
HALF SCALE ASSEMBLY



DET 'B'
FOUR TIMES SCALE



ACTUAL SIZE



DET 'C'
FOUR TIMES SCALE

B 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	REVISED SHAPE - ADDED SCREW BOSS FOR ROLL PIN	LDO
	06/26/06	RELEASED FOR PRODUCTION	JEM
B	08/31/09	ADDED LANCED NOTE	CRH

WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 61:1
PERIMETER OUT (TOTAL) 23.422		AREA .914	WGT/FT 1.076
FACTOR 22	CIRCLE SIZE 4.925		INFILL VOLUME .158

RXX 1.550	SXX 1.008	IXX 2.194	CXX 2.324
RYY .636	SYY .436	IYY .369	CYY 1.153

OS 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	E14310		REV B

E14310 B

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
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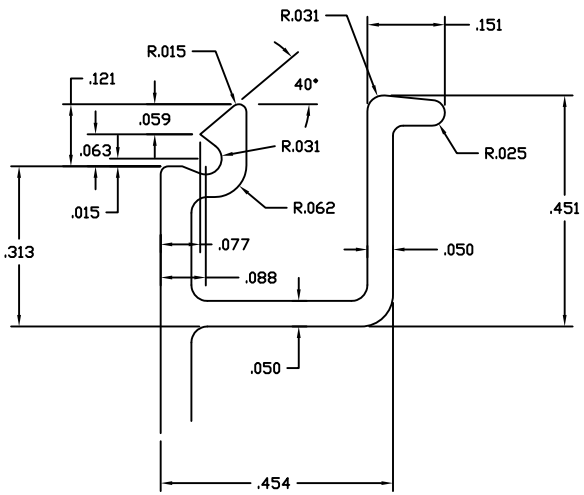
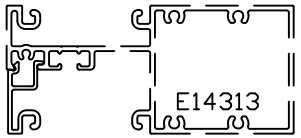
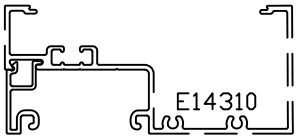
E14314 B



DETAIL 'A'
FOUR TIMES SCALE

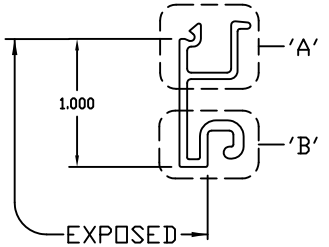


HALF SCALE ASSEMBLY

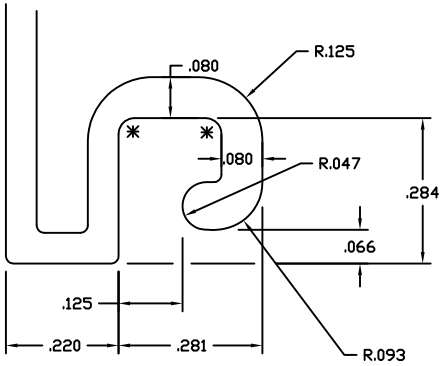


HALF SCALE ASSEMBLY

NOTES:
FULLY DEBRIDGE
MATES WITH E14310
MATES WITH E14313



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	03/30/01	REVISED AND REDRAWN	CRH
B	04/18/01	REVISED AND REDRAWN	CRH

WALL THK.	.060	SECTION CLASS	S	MAT'L	6063-T5	RATIO	301:1
PERIMETER OUT (TOTAL)	6.055			AREA	.182	WGT/FT	.214
FACTOR	27	CIRCLE SIZE	1.254	INFILL VOLUME	N/A		

RXX	.172	SXX	.016	IXX	.005	CXX	.338
RYY	.347	SYY	.035	IYY	.022	CYY	.627

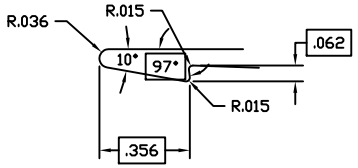
OS GLASS STOP (14000 I/O) FOR 1" GLASS
E14000 NON THERMAL STOREFRONT

DRAWN BY	CDS	DRWG DATE	12/29/00	APPV'D BY	DATE APPV'D
DWG SCALE	NOTED	PRODUCT CODE	190	E14314	REV B

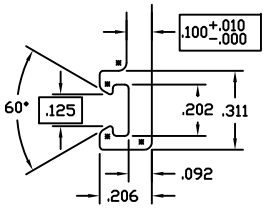
Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Luedsteger

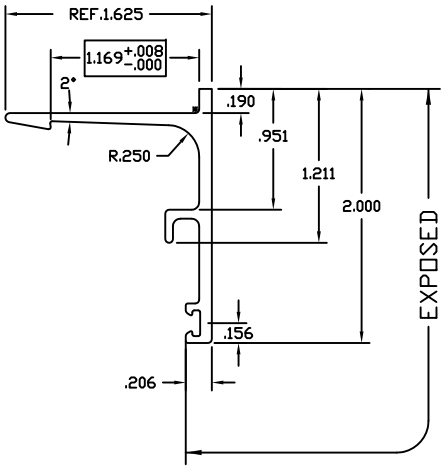
E14130 A

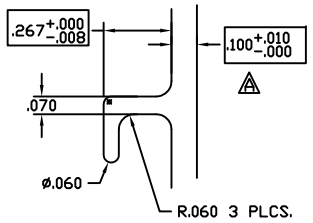


VIEW 'B' 2X SIZE

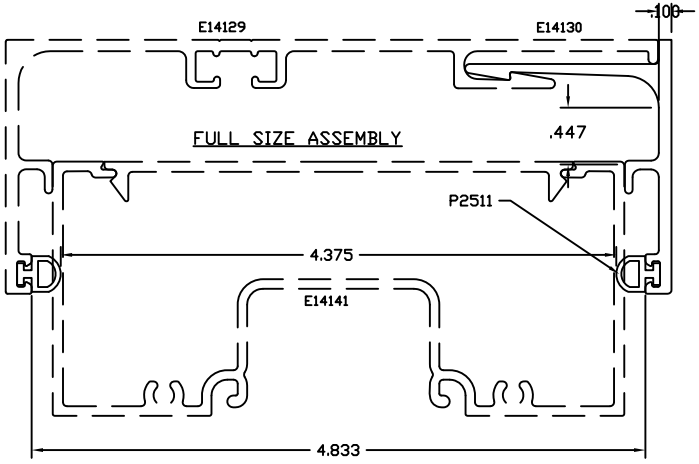


RADII ARE .015 UNLESS NOTED
VIEW 'A' 2X SIZE





VIEW 'C' 2X SIZE



WAS E912G02

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
	12/13/06	RELEASE TO TOOLING	NIK
A	02/14/07	ADDED .010 TOWARD OUTER WALL THICKNESS AND TOLERANCE	NIK
	02/14/07	RELEASED FOR PRODUCTION	NIK

WALL THK.	NOTED	SECTION CLASS	S	MAT'L	6063-T5	RATIO	142
PERIMETER OUT (TOTAL)	8.413			AREA	.389	WGT/FT	.458
FACTOR	19	CIRCLE SIZE	2.500			INFILL VOLUME	N/A

RXX	.457	SXX	.061	IXX	.079	CXX	.625
RYY	.588	SYY	.108	IYY	.135	CYY	.641

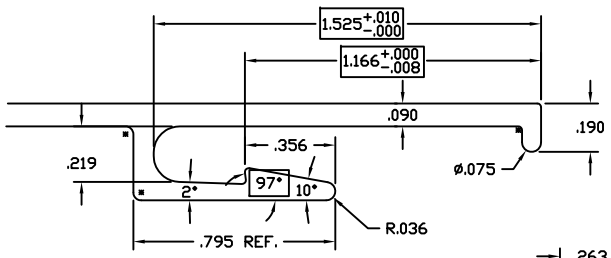
THERMAL HEAD RECEPTOR STOP 2"
T14000 THERMAL STOREFRONT

DRAWN BY	DRVG DATE	APPV'D BY	DATE APPV'D	REV
NIK	12/13/06			
DWG SCALE: NOTED	PRODUCT CODE: 180	E14130		A

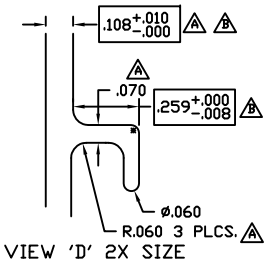
Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Kreutzberger

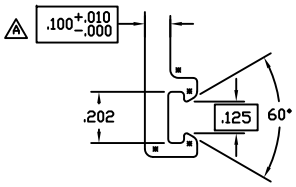
E14129 C



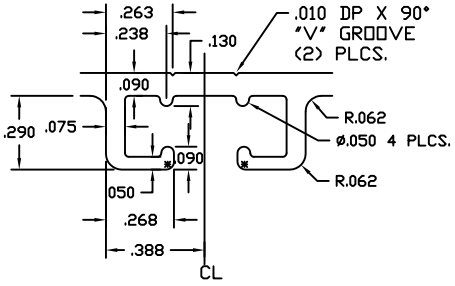
RADII ARE .015 UNLESS NOTED
VIEW 'B' 2X SIZE



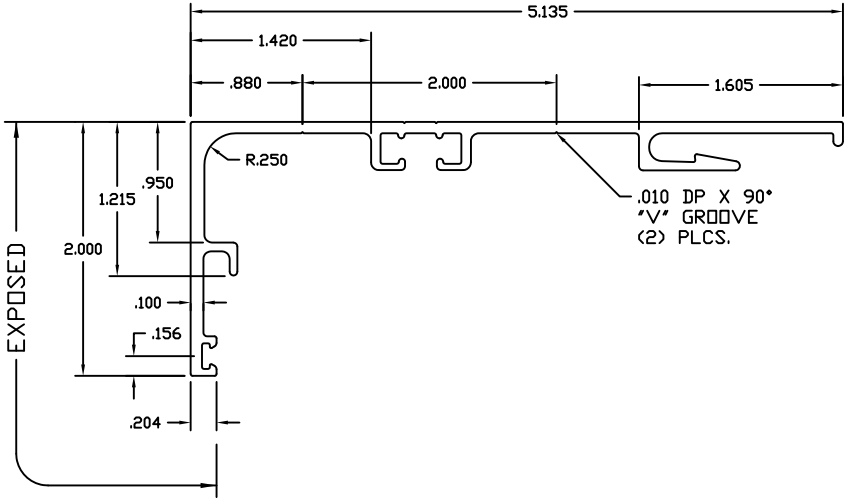
VIEW 'D' 2X SIZE

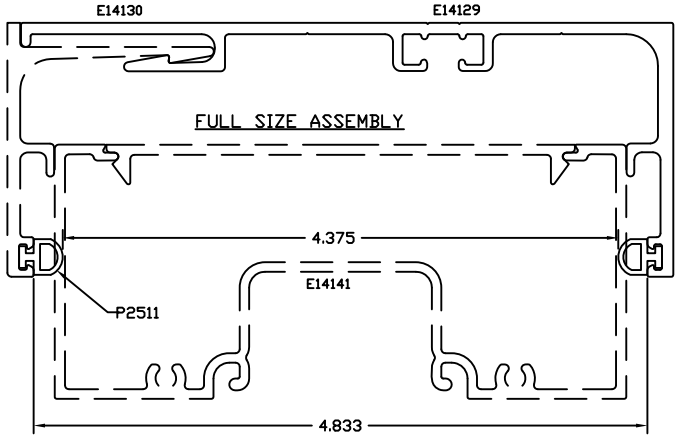


RADII ARE .015 UNLESS NOTED
VIEW 'A' 2X SIZE



RADII ARE .015 UNLESS NOTED
SYMETRICAL ABOUT CENTER LINE
VIEW 'C' 2X SIZE





WAS E912G01

A 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
	12/13/06	RELEASE TO TOOLING	NIK
A	02/14/07	.100 WAS .090, .070 WAS .060, INCREASED RADII TO .030 (3)PLCS	NIK
	04/03/07	RELEASE FOR PRODUCTION	NIK
B	05/26/08	INCREASED WALL THICKNESS .108 WAS .100, .259 WAS .251	NIK
C	08/31/09	ADDED LANCED NOTE	CRH

WALL THK.	NOTED	SECTION CLASS	S	MAT'L	6063-T5	RATIO	64
PERIMETER OUT (TOTAL)	19.503			AREA	.881	WGT/FT	1.038
FACTOR	19	CIRCLE SIZE	5.500			INFILL VOLUME	N/A

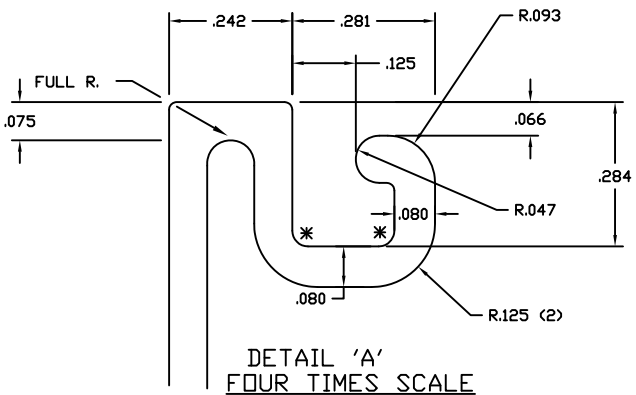
RXX	1.676	SXX	.774	IXX	2.475	CXX	1.599
RYY	.521	SYY	.147	IYY	.239	CYY	.815

THERMAL HEAD RECEPTOR 2"
T14000 THERMAL STOREFRONT

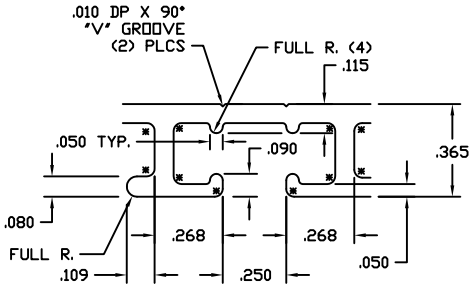
DRAWN BY	NIK	DRVG DATE	12/13/06	APPV'D BY	DATE APPV'D
DWG SCALE	NOTED	PRODUCT CODE	180	E14129	REV C

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L. Riedsteger

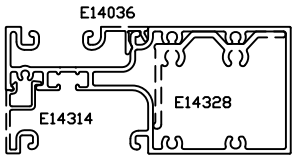


DETAIL 'A'
FOUR TIMES SCALE

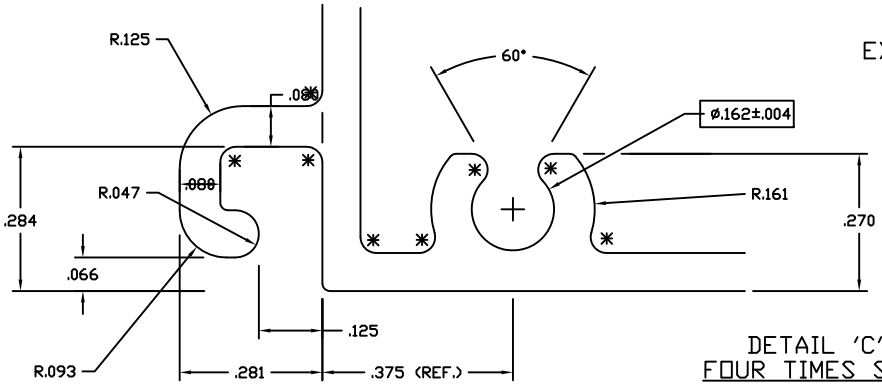


DETAIL 'B'
TWO TIMES SCALE

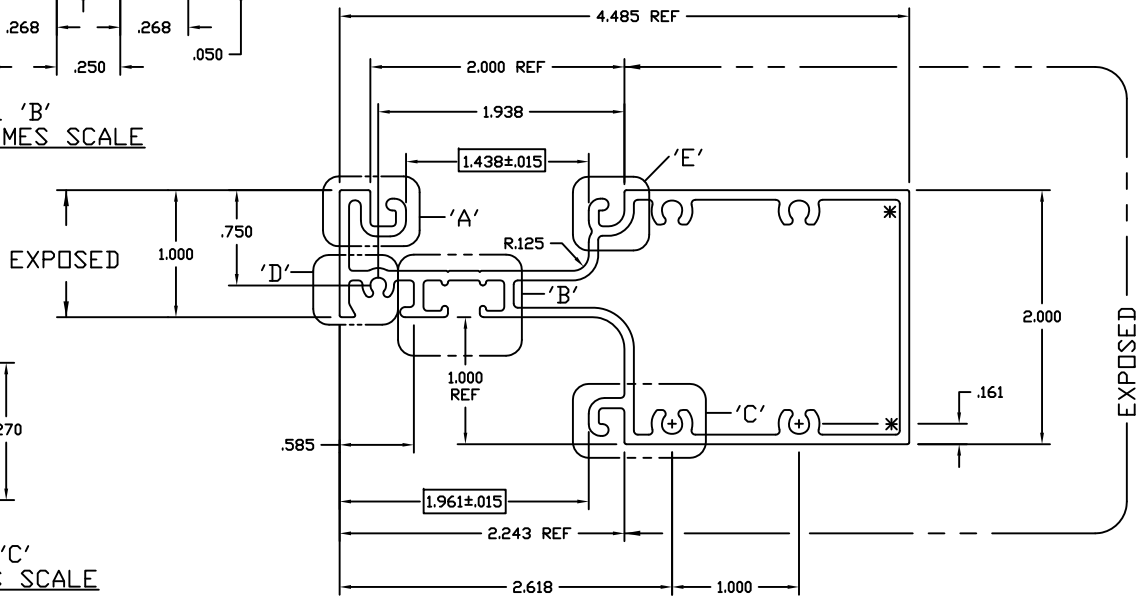
NOTES:
FULLY DEBRIDGE
MATES WITH E14314
MATES WITH E14328
MATES WITH E14036



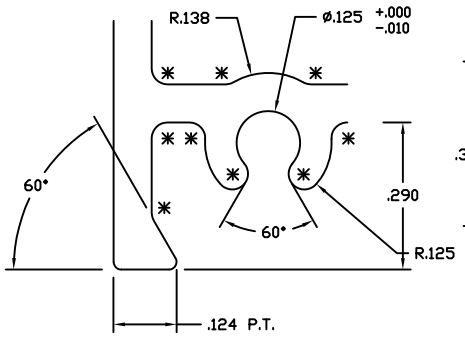
HALF SCALE ASSEMBLY



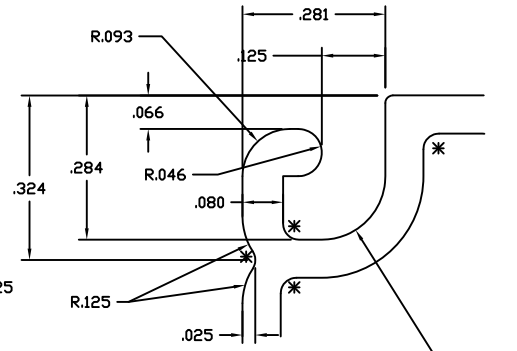
DETAIL 'C'
FOUR TIMES SCALE



ACTUAL SIZE



DETAIL 'D'
FOUR TIMES SCALE



DETAIL 'E'
FOUR TIMES SCALE

F/R PLANE

⚠B 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	05/17/04	EXTENDED HOLLOW TO P&D CAVITY	SRD
B	08/31/09	ADDED LANCED NOTE	CRH

WALL THK.	.075	SECTION CLASS	H	MAT'L	6063-T5	RATIO	44:1
PERIMETER OUT (TOTAL)	19.969(32.062)			AREA	1.257	WGT/FT	1.479
FACTOR	22	CIRCLE SIZE	4.901			INFILL VOLUME	.158

RXX	1.413	SXX	1.068	IXX	2.509	CXX	2.350
RYY	.696	SYY	.544	IYY	.609	CYY	1.119

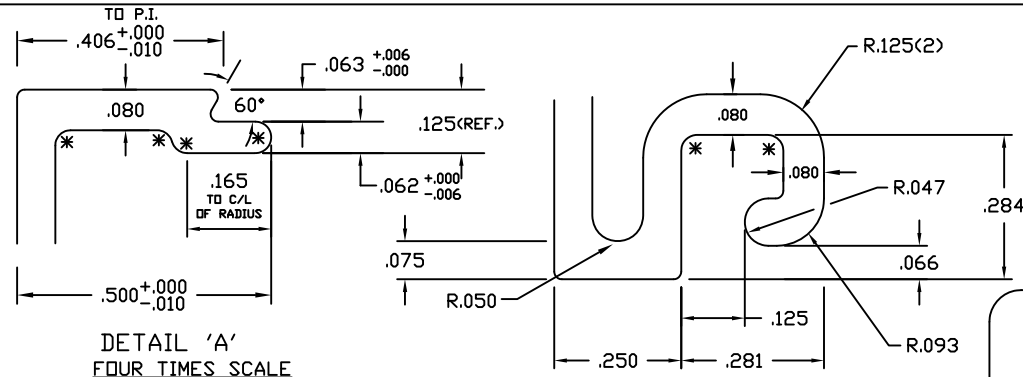
OS INT. HOR. (14000 I/O) 2" X 4 1/2"
E14000 NON THERMAL STOREFRONT

DRAWN BY	CDS	DRWG DATE	12/29/00	APPV'D BY	MJC
DATE APPV'D	02/09/01				
DWG SCALE	NOTED	PRODUCT CODE	190	E14313	REV B

E14313 B

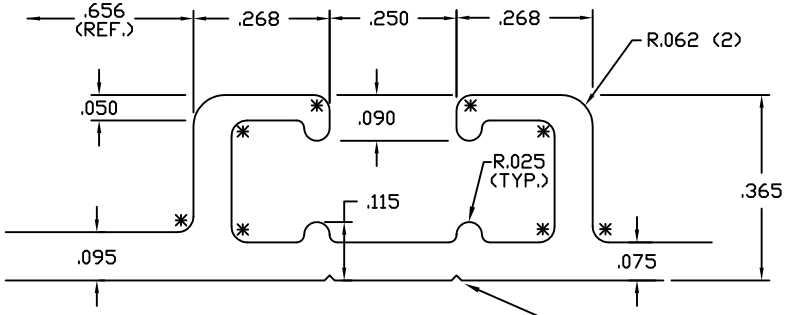
Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Riedsteger



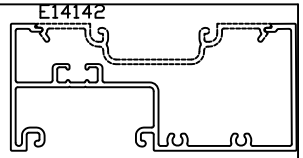
DETAIL 'A'
FOUR TIMES SCALE

DETAIL 'D'
FOUR TIMES SCALE



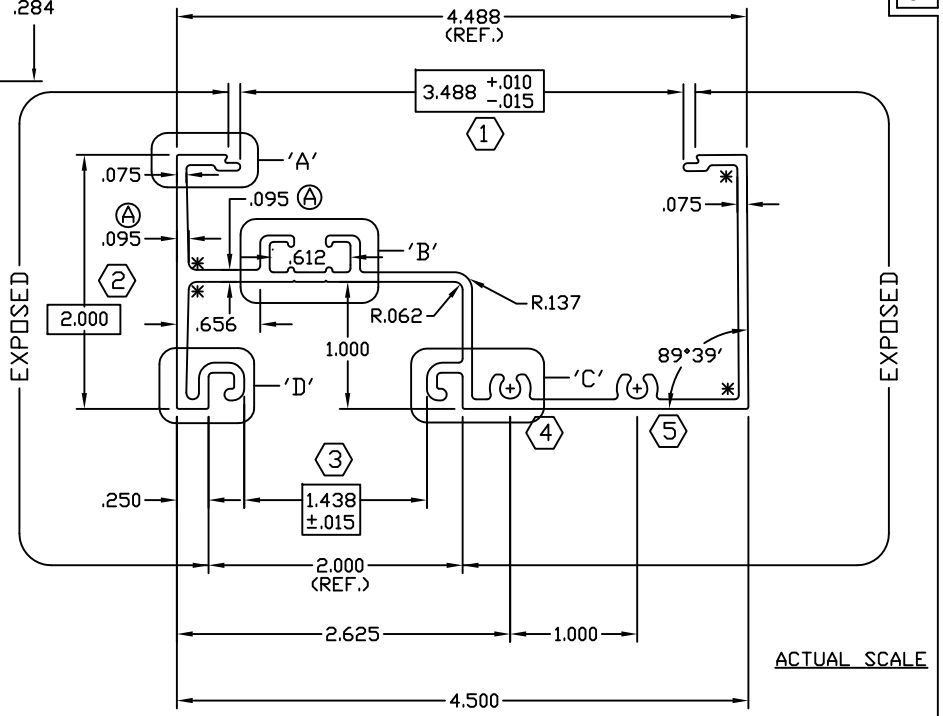
DETAIL 'B'
FOUR TIMES SCALE

NOTES:
FULLY DEBRIDGE
MATES WITH E14242

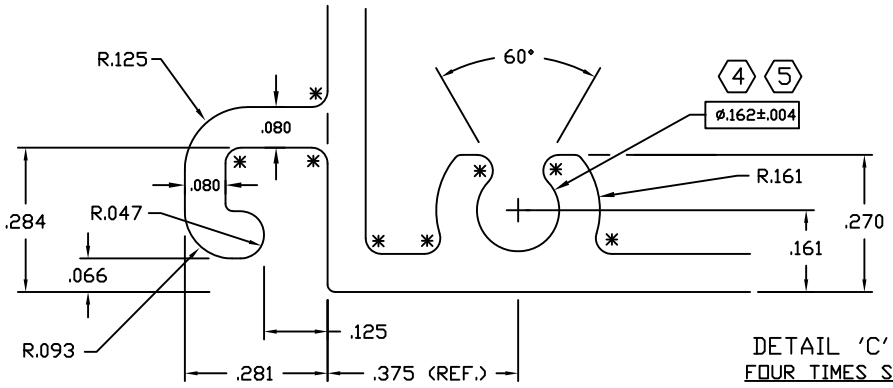


HALF SCALE ASSEMBLY

E14301
B



ACTUAL SCALE



DETAIL 'C'
FOUR TIMES SCALE

B 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	REVISED SHAPE - ADDED TAPER TO LEGS	LDO
	05/23/06	RELEASE FOR PRODUCTION	JEM
B	08/31/09	ADDED LANCED NOTE	

WALL THK.	NOTED	SECTION CLASS	S	MAT'L	6063-T5	RATIO	52:1
PERIMETER OUT (TOTAL)	26.458			AREA	1.054	WGT/FT	1.239
FACTOR	22	CIRCLE SIZE	4.924			INFILL VOLUME	.158

RXX	1.626	SXX	1.372	IXX	2.787	CXX	2.469
RYY	.621	SYY	.531	IYY	.407	CYY	1.235

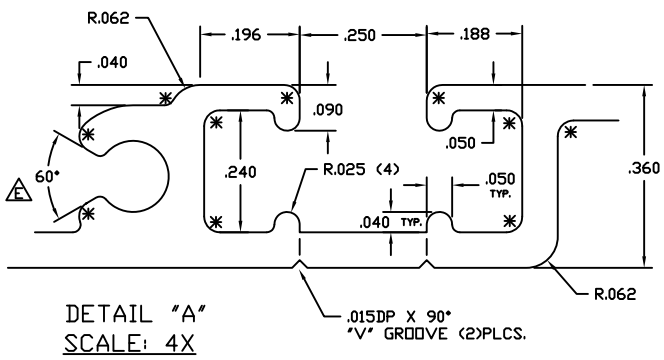
HEAD/JAMB/SILL 14000 I/O 2" X 4 1/2"
E14000 NON THERMAL STOREFRONT

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

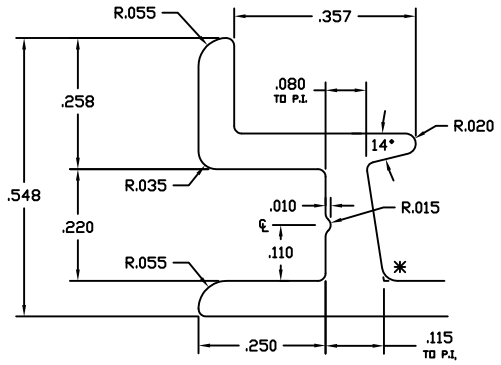
Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L. Riedsteger

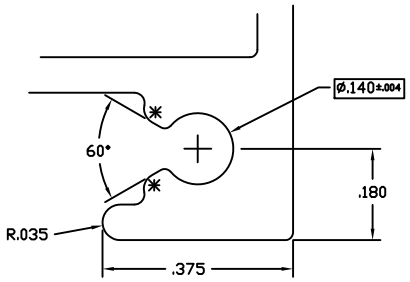
E14259 E



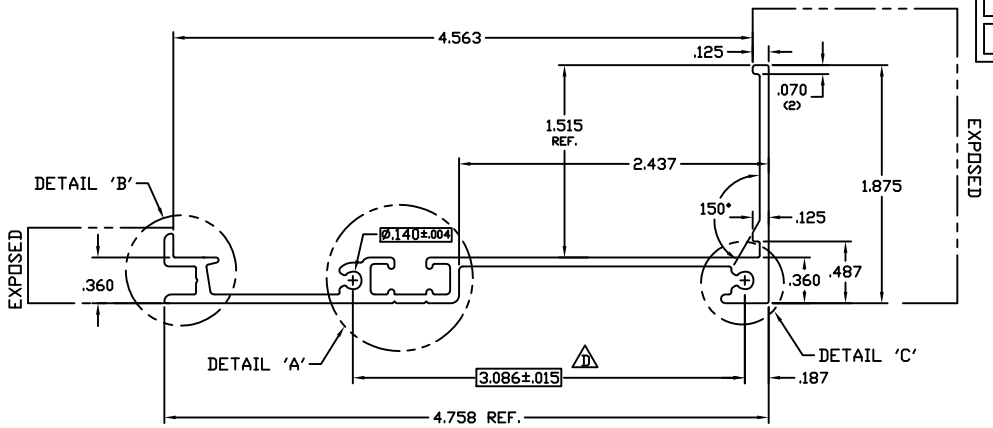
DETAIL "A"
SCALE: 4X



E DETAIL "B"
SCALE: 4X



DETAIL "C"
SCALE: 4X



FULL SIZE

INDICATES CRITICAL DIMENSION

1 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
	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

REV	DATE	DESCRIPTION	INTL
E	10/02/09	REVISED DETAIL "B", ROTATED SCREW BOSS, WAS E908.J06	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

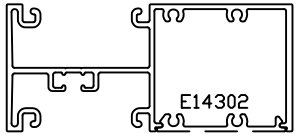
DRAWN BY KMH	DRWG DATE 03/11/93	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 190	E14259	REV E

Architectural Testing

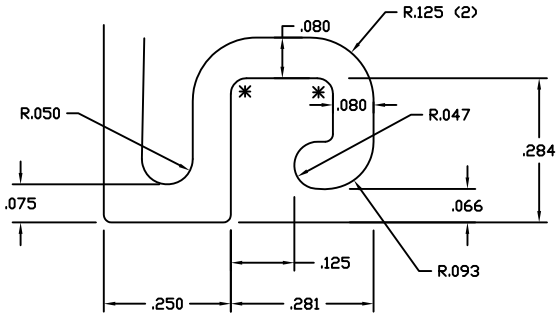
Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Riedsberger

E14306 A

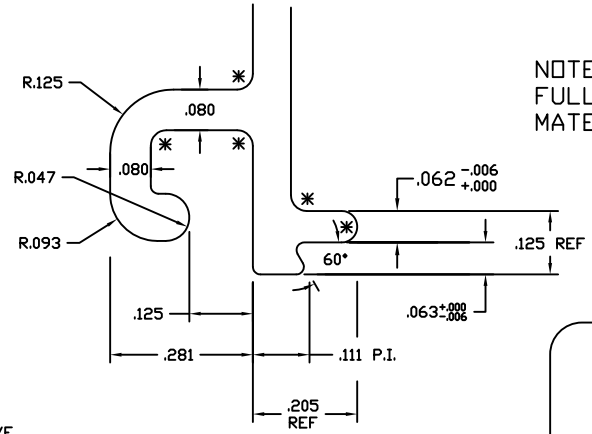
NOTES:
FULLY DEBRIDGE
MATES WITH E14302



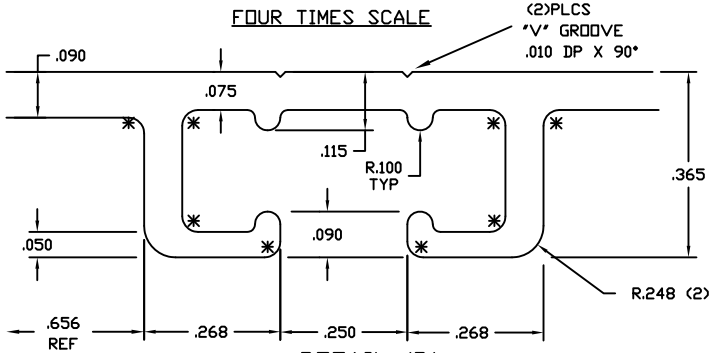
HALF TIMES SCALE



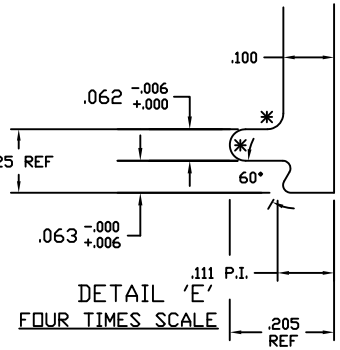
DETAIL 'A'
FOUR TIMES SCALE



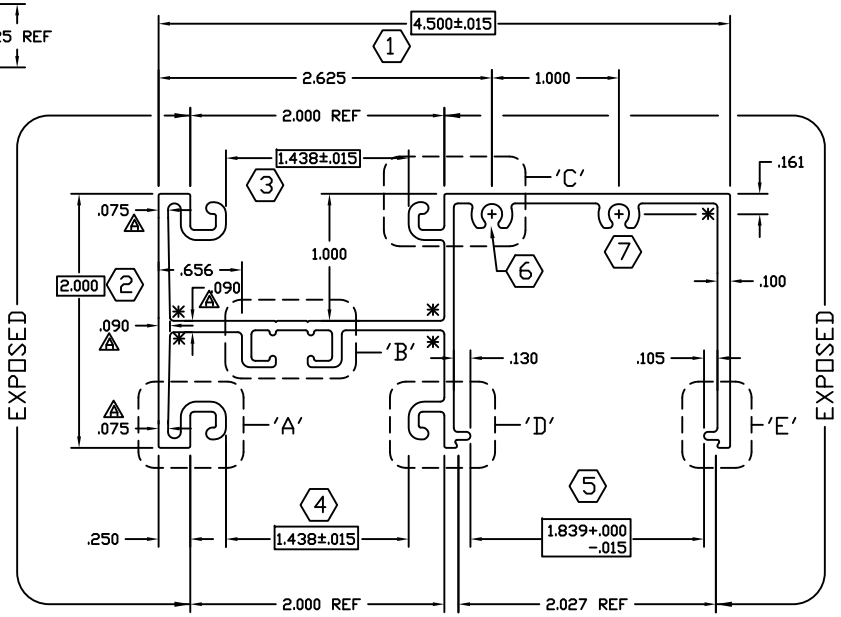
DETAIL 'D'
FOUR TIMES SCALE



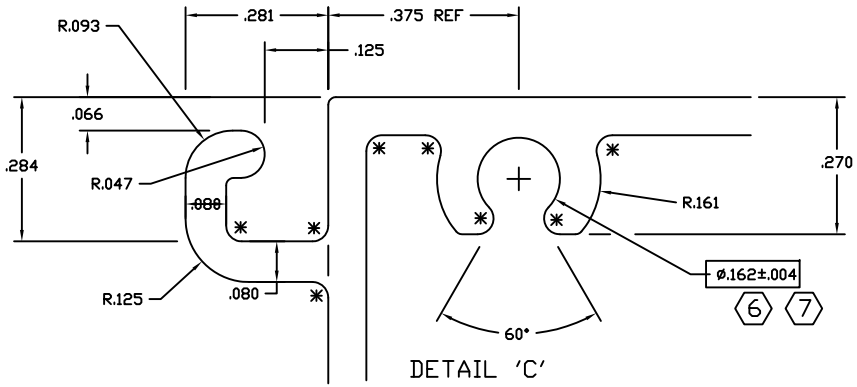
DETAIL 'B'
FOUR TIMES SCALE



DETAIL 'E'
FOUR TIMES SCALE



EXPOSED
ACTUAL SIZE



DETAIL 'C'
FOUR TIMES SCALE

F/R PLANE

Ⓑ 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	12-18-07	ADD TAPER TO WALL	CRH
B	08/31/09	ADDED LANCED NOTE	CRH

WALL THK.	.075	SECTION CLASS	S	MAT'L	6063-T5	RATIO	46:1
PERIMETER OUT (TOTAL)	29.883			AREA	1.204	WGT/FT	1.416
FACTOR	22	CIRCLE SIZE	4.924			INFILL VOLUME	.158

RXX	1.582	SXX	1.217	IXX	2.937	CXX	2.414
RYY	.644	SYY	.438	IYY	.500	CYY	1.143

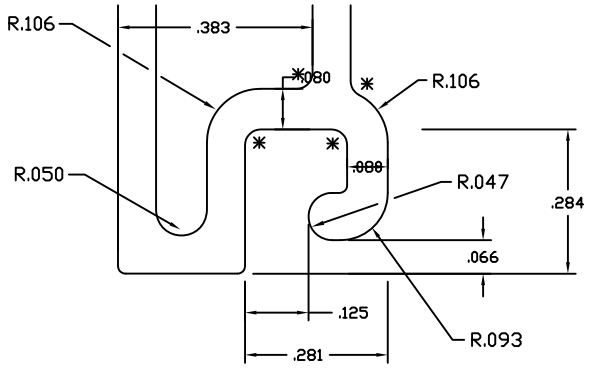
VERTICAL 14000 I/O 2" X 4 1/2"
E14000 NON THERMAL STOREFRONT

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

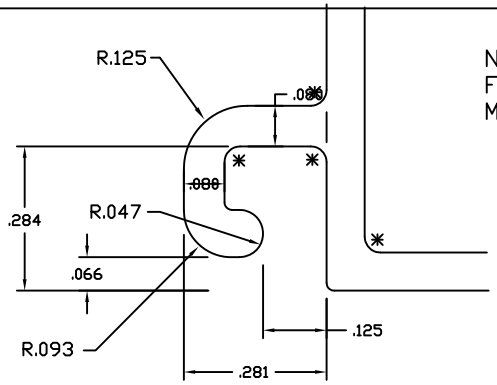
Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Luedsteger

E14346

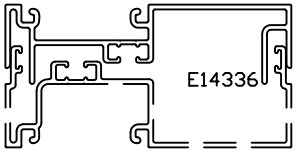


DETAIL 'A'
FOUR TIMES SCALE

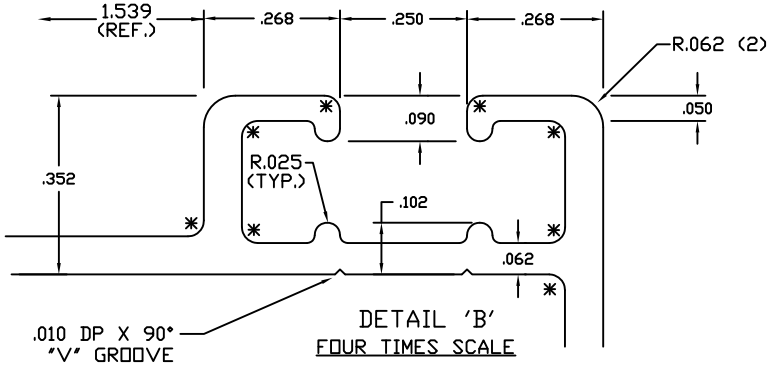


DETAIL 'D'
FOUR TIMES SCALE

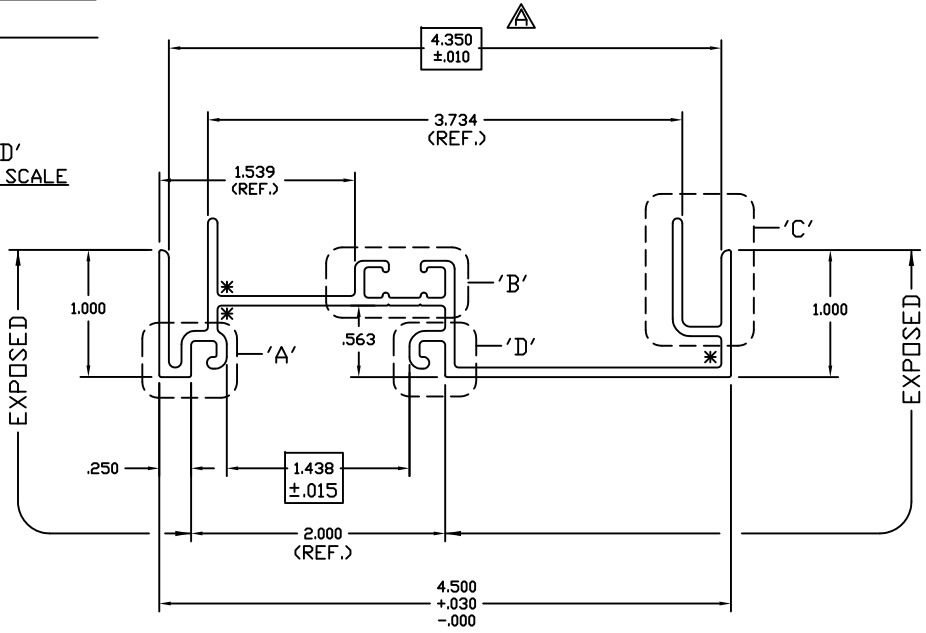
NOTES:
FULLY DEBRIDGE
MATES WITH E14336



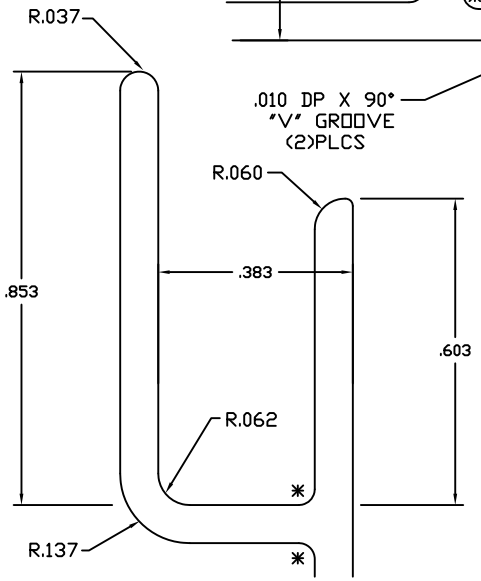
HALF SCALE ASSEMBLY



DETAIL 'B'
FOUR TIMES SCALE



ACTUAL SIZE



DETAIL 'C'
FOUR TIMES SCALE

14000 I/O

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	07/06/01	ADDED CRITICAL DIMENSION	SRD

WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 21:1
PERIMETER OUT (TOTAL) 21.879		AREA .820	WGT/FT .964
FACTOR 23	CIRCLE SIZE 4.605		INFILL VOLUME .158

RXX 1.546	SXX .840	IXX 1.959	CXX 2.332
RYY .325	SYY .107	IYY .086	CYY .808

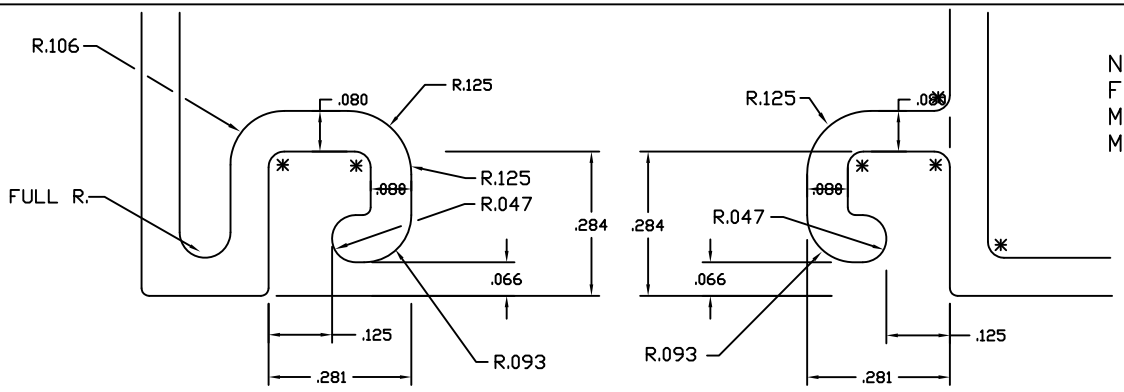
FEM. EXP MULLION (14000 I/O) 1" X 4 1/2"
E14000 NON THERMAL STOREFRONT

DRAWN BY CDS	DRWG DATE 12/29/00	APPV'D BY	DATE APPV'D	
DWG SCALE NOTED	PRODUCT CODE 190	E14346		REV

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L Riedsberger

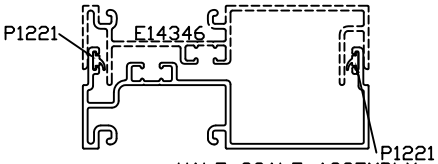
E14336 C



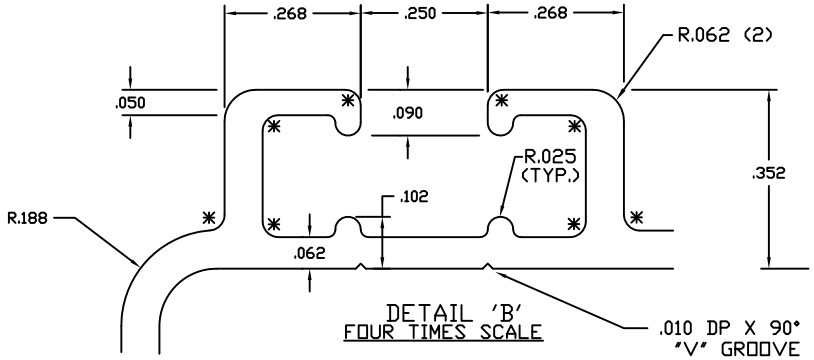
DETAIL 'A'
FOUR TIMES SCALE

DETAIL 'D'
FOUR TIMES SCALE

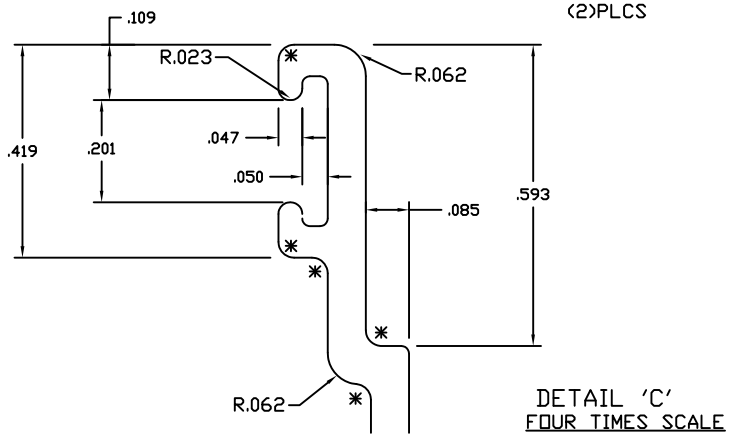
NOTES:
FULLY DEBRIDGE
MATES WITH E14346
MATES WITH P1221



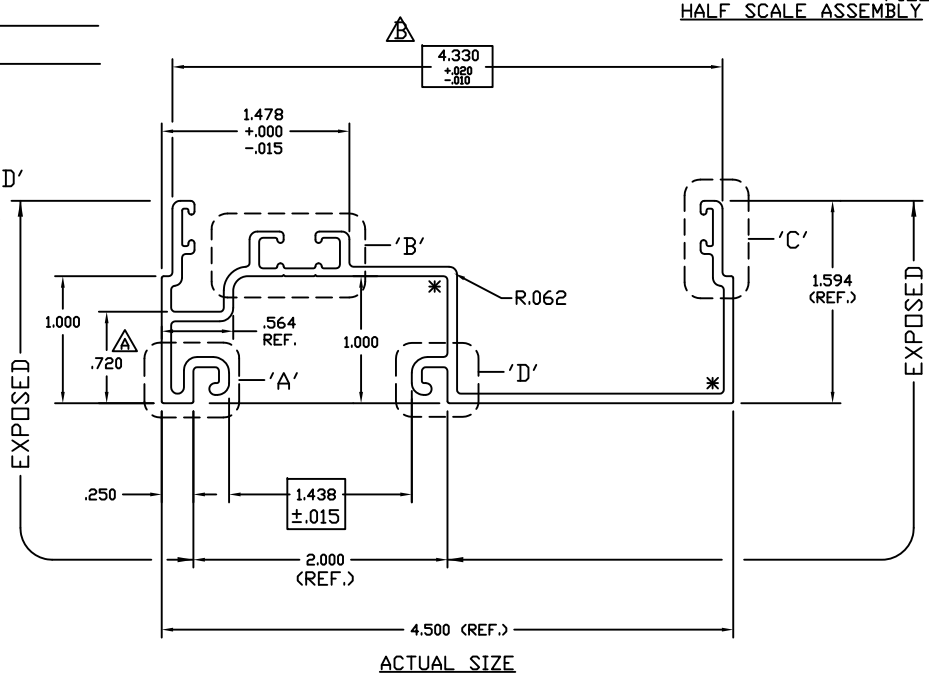
HALF SCALE ASSEMBLY



DETAIL 'B'
FOUR TIMES SCALE



DETAIL 'C'
FOUR TIMES SCALE



ACTUAL SIZE

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	03/14/01	REVISED PROFILE, ADDED .720 DIM	CRH
B	07/06/01	REVISED TOLERANCE	SRD
C	08/31/09	ADDED LANCED NOTE	CRH

WALL THK.	.075	SECTION CLASS	S	MAT'L	6063-T5	RATIO	63:1
PERIMETER OUT (TOTAL)	23.493			AREA	.878	WGT/FT	1.032
FACTOR	23	CIRCLE SIZE	4.685			INFILL VOLUME	.182

RXX	1.579	SXX	.863	IXX	2.189	CXX	2.537
RYY	.487	SYY	.219	IYY	.208	CYY	.950

MALE EXP. VERT (14000 I/O) 1" X 4 1/2"
E14000 NON THERMAL STOREFRONT

DRAWN BY	CDS	DRWG DATE	12/29/00	APPV'D BY	CRH
DATE APPV'D	03/15/01				
DWG SCALE	NOTED	PRODUCT CODE	190	E14336	REV C

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Luedsburger

P1745 A

PART No.	CUT LENGTH
P-1745	6"

OPERATION:

1. CUT TO LENGTH FROM E-4543

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

☐ DENOTES CRITICAL DIMENSION

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

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
	07/21/94	Release to Production per ED 1929	TPB
	12/01/94	Revise from 4" to 6" and Release to production per ED 1977	KMH
A	12/12/02	Updated to P-Part Titleblock	DMT

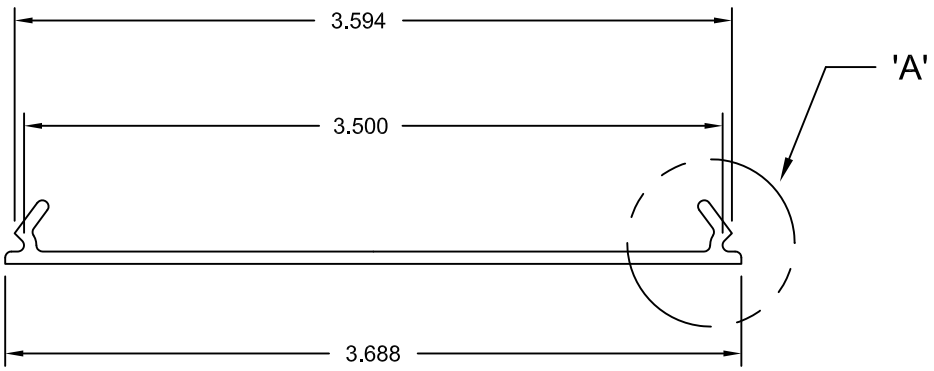
Snap In Anchor Support

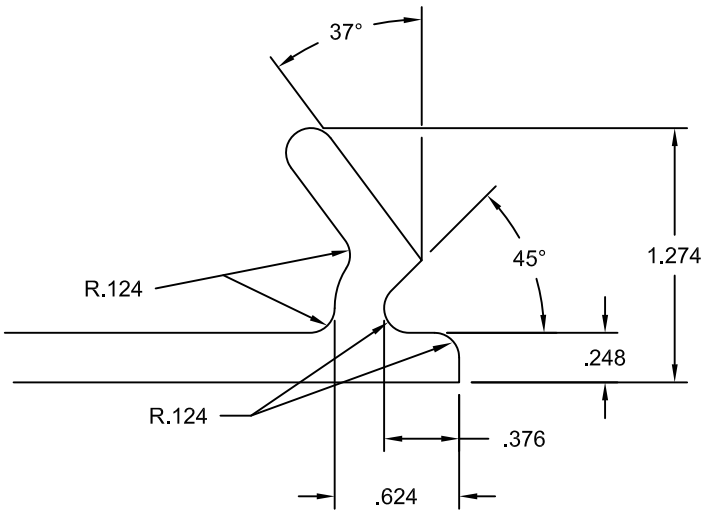
DRAWN BY	DRWG DATE	APPV,D BY	DATE APPV'D	
TB	07/21/94			
DRWG SCALE	PRODUCT CODE			REV
None	110	P1745		A

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L. Riedsberger

P4543





DETAIL 'A'
4X SIZE

TYPICAL WALL THICKNESS = .062
10' LENGTHS
PURCHASED FROM CENTRAL PLASTICS, INC.

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

☐ DENOTES CRITICAL DIMENSION

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

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
	05/29/02	RELEASE FOR PRODUCTION - ER060201	SRD
	06/11/08	MADE OBSOLETE PER - ER060802	NIK
	10/21/09	REINSTATED PER ER -	JEM

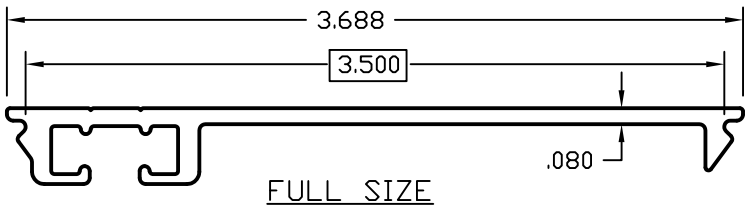
FLAT SNAP IN FILLER
RIGID PVC
PERIMETER CAULK BACKER

DRAWN BY	DRWG DATE	APPV,D BY	DATE APPV'D	REV
SRD	04/05/02			
DRWG SCALE: NOTED	PRODUCT CODE: 160	P4543		

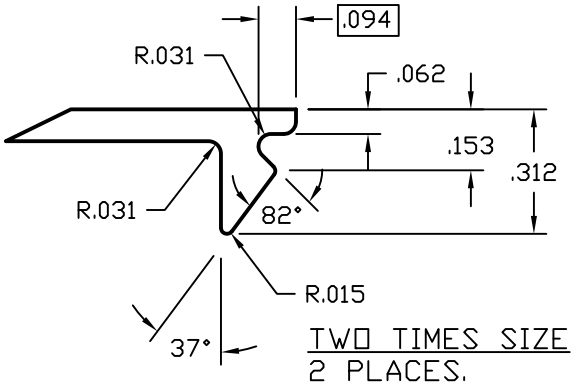
Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Kirchberger

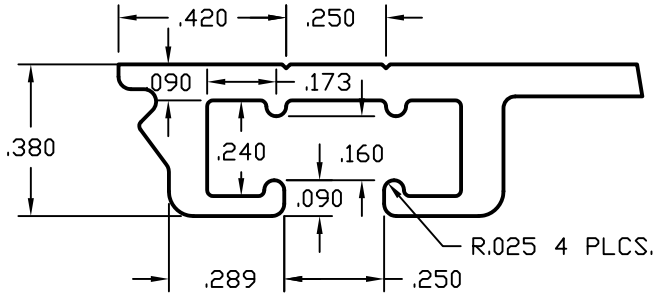
E6251 A



FULL SIZE



TWO TIMES SIZE
2 PLACES.



2 PLACES TYP.

TWO TIMES SIZE

POURED AND DEBRIDGE - FULL
THERE ARE NO EXPOSED SURFACES

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
	~~02/06/08~~	~~RELEASED FOR COOLING~~	NIK
	04-01-08	RELEASE FOR PRODUCTION	NIK
A	04-28-08	REMOVED AZOBRADED NOTE	NIK

WALL THK. .080	SECTION CLASS S	MAT'L 6063-T5	RATIO 134
PERIMETER OUT (TOTAL) 9.982		AREA .412	WGT/FT .484
FACTOR 21	CIRCLE SIZE 4.5		INFILL VOLUME .158

RXX 1.153	SXX .264	IXX .548	CXX 2.075
RYY .101	SYY .015	IYY .004	CYY .286

THERMALLY BROKEN FLAT CLOSER PLATE
THERMAL DOOR

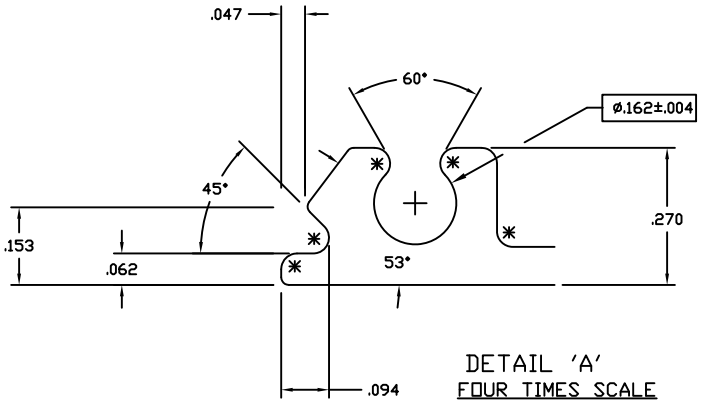
DRAWN BY NIK	DRWG DATE 02/18/08	APPV'D BY	DATE APPV'D
DWG SCALE NOTED	PRODUCT CODE 111	E6251	REV A

Architectural Testing

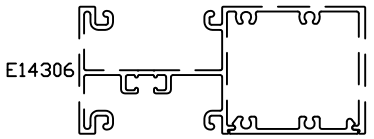
Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen K. Riedsberger

E14302 C

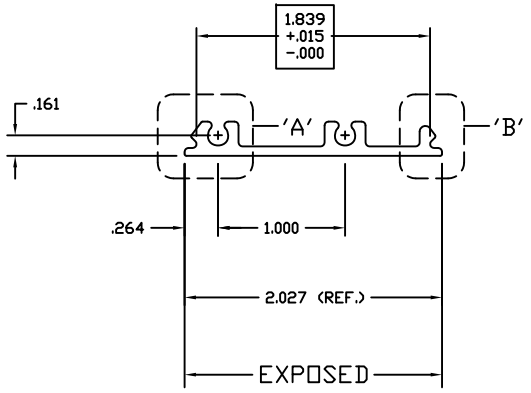
NOTES:
MATES WITH E14306



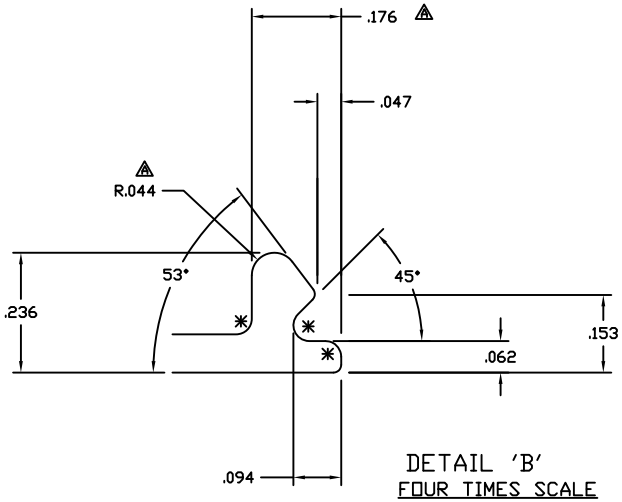
DETAIL 'A'
FOUR TIMES SCALE



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

WALL THK. .075	SECTION CLASS S	MAT'L 6063-T5	RATIO 225:1
PERIMETER OUT (TOTAL) 5.871		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

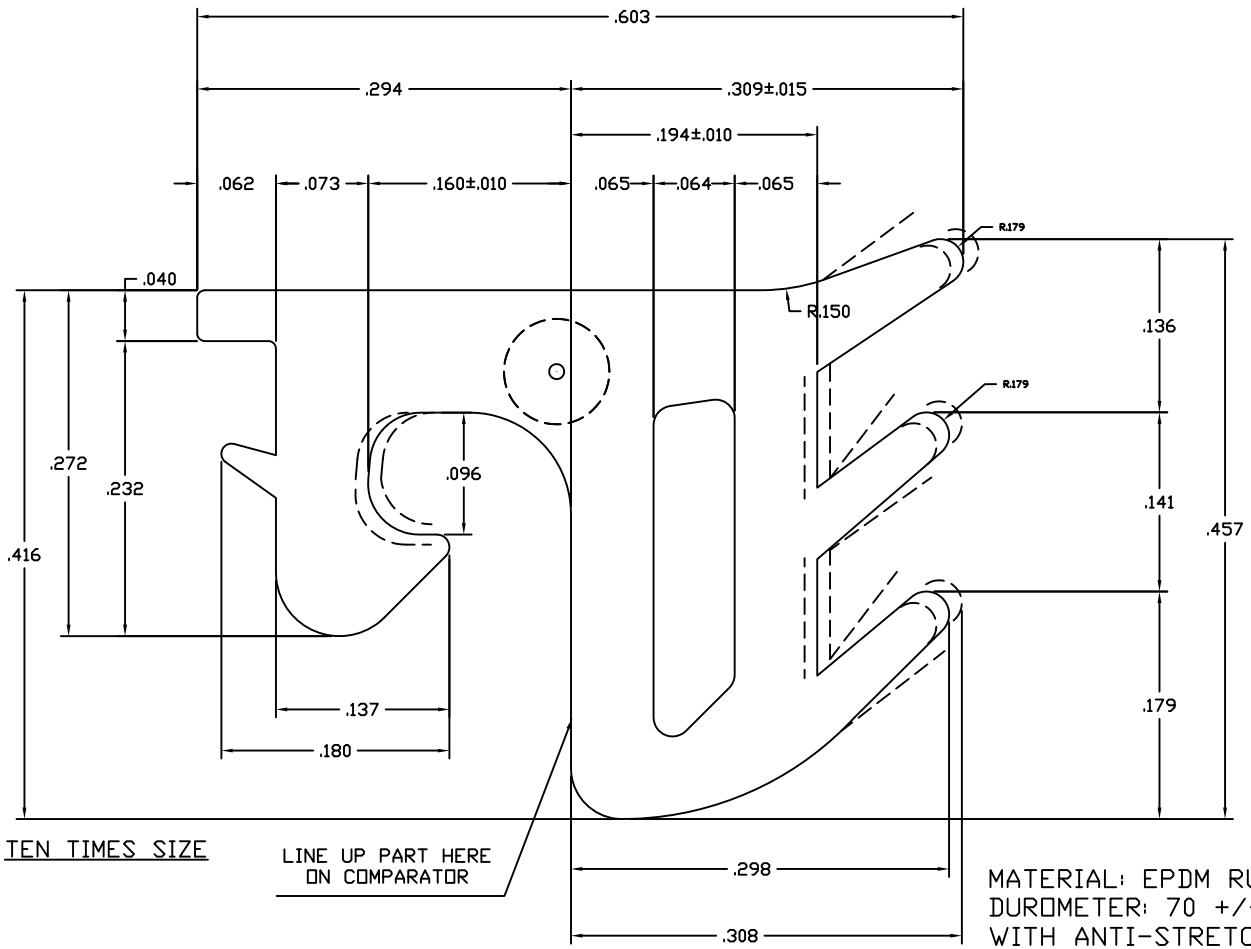
VERTICAL FILLER 14000 I/O
E14000 NON THERMAL STOREFRONT

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

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L. Riedsberger

P2728



TEN TIMES SIZE

LINE UP PART HERE ON COMPARATOR

MATERIAL: EPDM RUBBER WITH ANTI-STRETCH CORD
DUROMETER: 70 +/- 5
WITH ANTI-STRETCH CORD
WITH LUBRICANT

ACTUAL SIZE

ACCEPTABLE STRING LOCATION

ALL TOLERANCES ARE RMA CLASS II UNLESS OTHERWISE NOTED

ALL UNSPECIFIED RADII .015
* INDICATES .031 RADIUS
DENOTES CRITICAL DIMENSION

REV	DATE	DESCRIPTION	INTL
	08/20/09	RELEASE FOR PRODUCTION	NSJ

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

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

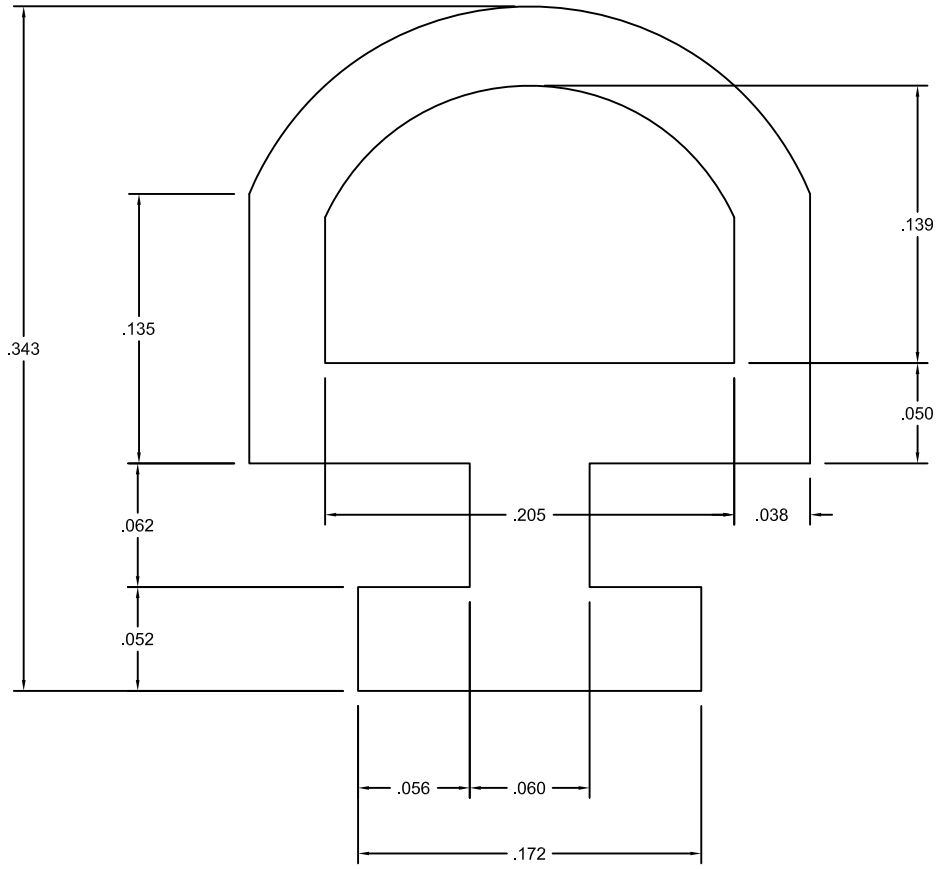
ROLL-IN GLAZING GASKET
14000 AND 4500 STOREFRONT SYSTEMS

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D	REV
JEM	08/14/09			
DRWG SCALE: NOTED	PRODUCT CODE: 190	P2728		

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen L. Kindsberger

P2511



TEN TIMES SIZE

ACTUAL SIZE

70 DUROMETER BLACK EPDM W/SILICONE EMULSION

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

DENOTES CRITICAL DIMENSION

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

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
	03/01/07	RELEASED FOR PRODUCTION	NIK

RECEPTOR BULB GASKET

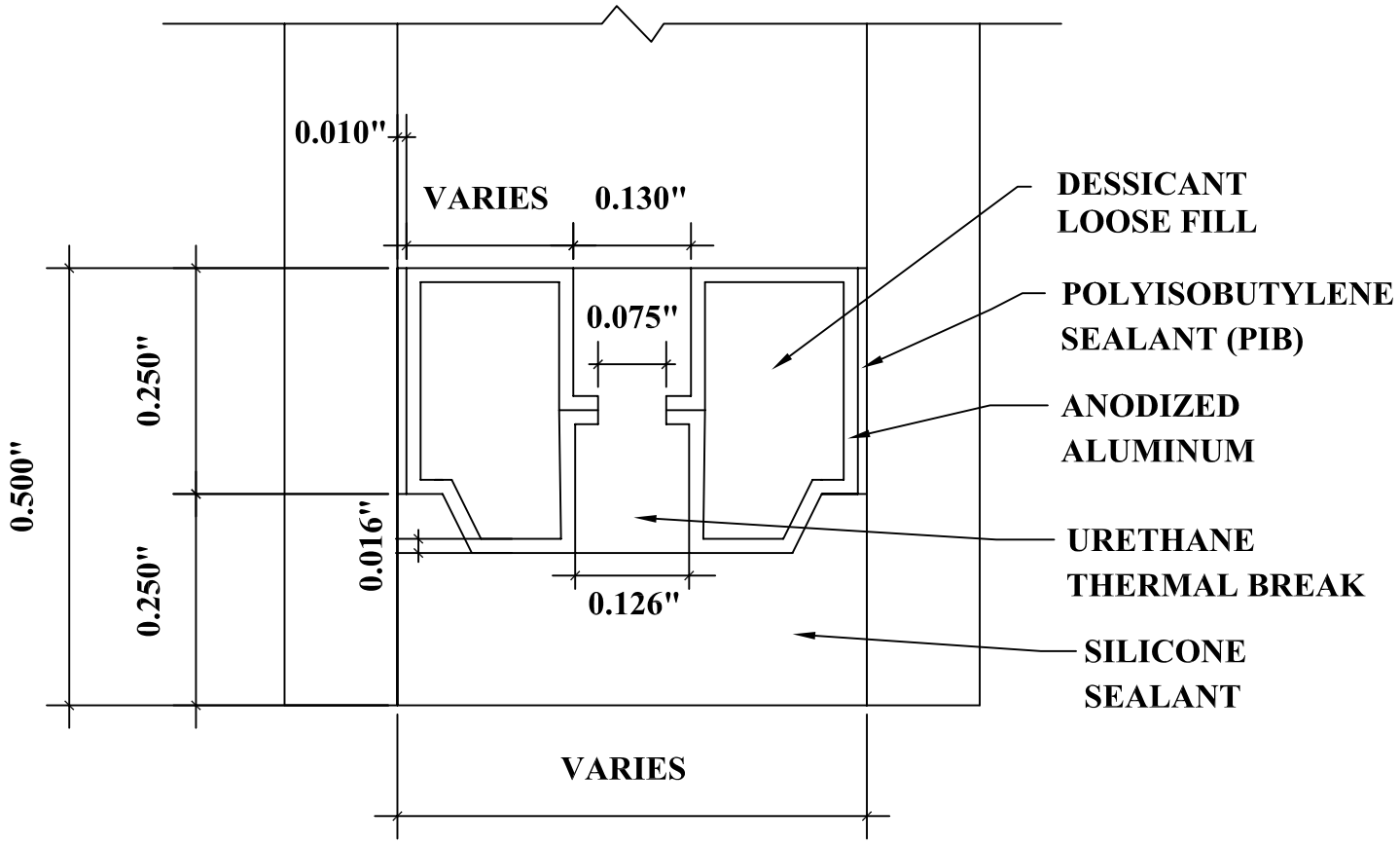
500 FT/ROLL

DRAWN BY	DRWG DATE	APPV,D BY	DATE APPV'D	REV
NIK	03/01/07			
DRWG SCALE 10X	PRODUCT CODE 180	P2511		

Architectural Testing

Report #: B6917-116-45
Date: 6/12/12
Verified by: Kristen A. Bielsberger

VALIDATION SPACER



DETAIL FOR THERMAL MODELING OF
AZON WARM-LIGHT SPACER (A2-D)