NFRC 102-2010 THERMAL PERFORMANCE
TEST REPORT

Rendered to:

CR LAURENCE CO., INC.

SERIES/MODEL: 900 Terrace Door
TYPE: Swinging Door with Frame

Summary of Results			
Standardized Thermal Transmittance (U-Factor)			0.42
Unit Size:		37-5/8" x 82-3/8" (956 mm x 2092 mm) (Model Size)	
Layer 1:	1/4"	Clear	
Gap:	0.52"	A1-D: Aluminum Spacer	100% Air*
Layer 2:	1/4"	PPG Solarban 70XL (e=0.018*, #3)	

Reference must be made to Report No. D7556.01-301-46, dated 09/18/14 for complete test specimen description and data.

NFRC 102-2010 THERMAL PERFORMANCE TEST REPORT

Rendered to:

CR LAURENCE CO., INC.
2100 East 38th Street
Vernon, California 90058

Report Number:	D7556.01-301-46
Test Date:	08/15/14
Report Date:	09/18/14

Test Sample Identification:

Series/Model: 900 Terrace Door

Type: Swinging Door with Frame

Overall Size: 37-5/8" x 82-3/8" (956 mm x 2092 mm) (Model Size)
NFRC Standard Size: 37.8" x 82.3" (960 mm wide x 2090 mm high)

Test Sample Submitted by: Client

Test Sample Submitted for: Validation for Initial Certification (Production Line Unit) & Plant Qualification

Test Procedure: U-factor tests were performed in a Guarded Hot Box in accordance with NFRC 102-2010, *Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems*.

Test Results Summary:

Standardized U-factor (U_{st}): 0.42 Btu/hr·ft^2·F (CTS Method)

Test Sample Description:

Frame:

Material:	AT (0.53"): Aluminum with Thermal Breaks - All Members		
Size:	37-5/8" x 82-3/8" (Model Size)		
Daylight Opening:	N/A	**Glazing Method:**	N/A
Exterior Color:	Grey	**Exterior Finish:**	Anodized
Interior Color:	Grey	**Interior Finish:**	Anodized
Corner Joinery:	Square Cut / Screws / Sealed		

Panel:

Material:	AT (0.53"): Aluminum with Thermal Breaks - All Members		
Size:	36-3/8" x 79-1/4"		
Daylight Opening:	28-1/2" x 71-1/2"	**Glazing Method:**	Interior
Exterior Color:	Grey	**Exterior Finish:**	Anodized
Interior Color:	Grey	**Interior Finish:**	Anodized
Corner Joinery:	Mitered / Corner Keys / Sealed		

Glazing Information:

Layer 1:	1/4"	Clear	
Gap:	0.52"	A1-D: Aluminum Spacer	100% Air*
Layer 2:	1/4"	PPG Solarban 70XL (e=0.018*, #3)	
Gas Fill Method:		N/A*	

**Stated per Client/Manufacturer*
N/A Non-Applicable

Test Sample Description: (Continued)

Weatherstripping:

Description	Quantity	Location
Hollow vinyl bulb gasket	1 Row	All members of the frame.
Foam-filled vinyl bulb gasket	1 Row	All members of the panel.

Hardware:

Description	Quantity	Location
Hinge	3	Hinge jamb/stile.

Drainage:

Drainage Method	Size	Quantity	Location
Weephole	1-3/4" x 1/4"	2	Center sill leg.
Weephole	1-3/4" x 1/4"	1	Sill face.

Thermal Transmittance (U-factor)

Measured Test Data

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	762.48	Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	35.70	Btu/hr
3. Surround Panel Thickness	5.00	inches
4. Surround Panel Conductance	0.0359	Btu/hr·ft^2·F
5. Metering Box Wall Heat Flow (Q_{mb})	37.85	Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0243*EMF + 0.000	
7. Flanking Loss Heat Flow (Q_{fl})	15.72	Btu/hr
8. Net Specimen Heat Loss (Q_s)	673.21	Btu/hr

Areas

1. Test Specimen Projected Area (A_s)	21.52	ft^2
2. Test Specimen Interior Total (3-D) Surface Area (A_h)	22.46	ft^2
3. Test Specimen Exterior Total (3-D) Surface Area (A_c)	23.58	ft^2
4. Metering Box Opening Area (A_{mb})	36.47	ft^2
5. Metering Box Baffle Area (A_{b1})	32.13	ft^2
6. Surround Panel Interior Exposed Area (A_{sp})	14.95	ft^2

Test Conditions

1. Average Metering Room Air Temperature (t_h)	69.78	F
2. Average Cold Side Air Temperature (t_c)	0.03	F
3. Average Guard/Environmental Air Temperature	71.99	F
4. Metering Room Average Relative Humidity	13.69	%
5. Metering Room Maximum Relative Humidity	14.01	%
6. Metering Room Minimum Relative Humidity	13.43	%
7. Measured Cold Side Wind Velocity (Perpendicular Flow)	12.66	mph
8. Measured Warm Side Wind Velocity (Parallel Flow)	0.04	mph
9. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"H_2O	

Average Surface Temperatures

1. Metering Room Surround Panel	67.42	F
2. Cold Side Surround Panel	0.96	F

Results

1. Thermal Transmittance of Test Specimen (U_s)	0.45	Btu/hr·ft^2·F
2. Standardized Thermal Transmittance of Test Specimen (U_{st})	0.42	Btu/hr·ft^2·F

Thermal Transmittance (U-factor)

Calculated Test Data

CTS Method

1.	Warm Side Emittance of Glass (e_1)	0.84	
2.	Cold Side Emittance of Glass	0.84	
3.	Warm Side Frame Emittance*	0.80	
4.	Cold Side Frame Emittance*	0.80	
5.	Warm Side Sash/Panel/Vent Emittance*	0.80	
6.	Cold Side Sash/Panel/Vent Emittance*	0.80	
7.	Warm Side Baffle Emittance (e_{b1})	0.92	
8.	Cold Side Baffle Emittance (e_{b2})	N/A	
9.	Equivalent Warm Side Surface Temperature	48.55	F
10.	Equivalent Cold Side Surface Temperature	6.18	F
11.	Warm Side Baffle Surface Temperature	70.24	F
12.	Cold Side Baffle Surface Temperature	N/A	F
13.	Measured Warm Side Surface Conductance (h_h)	1.47	Btu/hr·ft^2·F
14.	Measured Cold Side Surface Conductance (h_c)	5.09	Btu/hr·ft^2·F
15.	Test Specimen Thermal Conductance (C_s)	0.74	Btu/hr·ft^2·F
16.	Convection Coefficient (K_c)	0.33	Btu/(hr·ft^2·F$^{1.25}$)
17.	Radiative Test Specimen Heat Flow (Q_{r1})	350.19	Btu/hr
18.	Conductive Test Specimen Heat Flow (Q_{c1})	323.02	Btu/hr
19.	Radiative Heat Flux of Test Specimen (q_{r1})	16.27	Btu/hr·ft^2·F
20.	Convective Heat Flux of Test Specimen (q_{c1})	15.01	Btu/hr·ft^2·F
21.	Standardized Warm Side Surface Conductance (h_{sth})	1.20	Btu/hr·ft^2·F
22.	Standardized Cold Side Surface Conductance (h_{stc})	5.28	Btu/hr·ft^2·F
23.	Standardized Thermal Transmittance (U_{st})	0.42	Btu/hr·ft^2·F

Test Duration

1. The environmental systems were started at 14:03 hours, 08/14/14.
2. The test parameters were considered stable for two consecutive four hour test periods from 23:04 hours, 08/14/14 to 07:04 hours, 08/15/14.
3. The thermal performance test results were derived from 03:04 hours, 08/15/14 to 07:04 hours, 08/15/14.

The reported Standardized Thermal Transmittance (Ust) was determined using CTS Method, per Section 8.2(A) of NFRC 102.

**Stated per NFRC 101*

Glazing Deflection:

	Panel
Edge Gap Width	0.52"
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.48"
Center gap width at laboratory ambient conditions on day of testing	0.48"
Center gap width at test conditions	0.38"

Glass collapse determined using a digital glass and air space meter

The sample was inspected for the formation of frost or condensation, which may influence the surface temperature measurements. At the conclusion of the test, a layer of condensation was present on the sill, bottom half of each jamb, and the bottom rail of the panel.

"This test method does not include procedures to determine the heat flow due to either air movement through the specimen or solar radiation effects. As a consequence, the thermal transmittance results obtained do not reflect performances which are expected from field installations due to not accounting for solar radiation, air leakage effects, and the thermal bridge effects that have the potential to occur due to the specific design and construction of the fenestration system opening. The latter can only be determined by in-situ measurements. Therefore, it is important to recognize that the thermal transmittance results obtained from this test method are for ideal laboratory conditions and should only be used for fenestration product comparisons and as input to thermal performance analyses which also include solar, air leakage and thermal bridge effects."

The test sample was installed in a vertical orientation, the exterior of the specimen was exposed to the cold side. The direction of heat transfer was from the interior (warm side) to the exterior (cold side) of the specimen. The ratings were rounded in accordance to NFRC 601, NFRC Unit and Measurement Policy. The data acquisition frequency is 5 minutes.

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 1.74%.

Required annual calibrations for the Architectural Testing Inc. 'thermal test chamber' (ICN 004287) in Fresno, California were last conducted in April 2014 in accordance with Architectural Testing Inc. calibration procedure. A CTS Calibration verification was performed May 2014. A Metering Box Wall Transducer and Surround Panel Flanking Loss Characterization was performed June 2014.

"Ratings included in this report are for submittal to an NFRC licensed IA for certification purposes and are not meant to be used for labeling purposes. Only those values identified on a valid Certification Authorization Report (CAR) are to be used for labeling purposes."

Architectural Testing, Inc. 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 August 15, 2018.

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 specimen tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Tested By:

Digitally Signed by: William Smeds

William Simon Smeds
Technician

Reviewed By:

Digitally Signed by:Kenny C. White

Kenny C. White
Laboratory Manager
Individual-In-Responsible-Charge

WSS:ss
D7556.01-301-46

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

- Appendix-A: CTS Calibration Data (1)
- Appendix-B: Surround Panel Wiring Diagram (1)
- Appendix-C: Baffle Wiring Diagram (1)
- Appendix-D: Submittal Form and Drawings (18)

ACCREDITED

Architectural Testing, Inc. is accredited by the International Accreditation Service (IAS) under the specific test methods listed under lab code TL-144, in accordance with the recognized International Standard ISO/IEC 17025:2005. The laboratory's accreditation or test report in no way constitutes or implies product certification, approval, or endorsement by IAS.

Revision Log

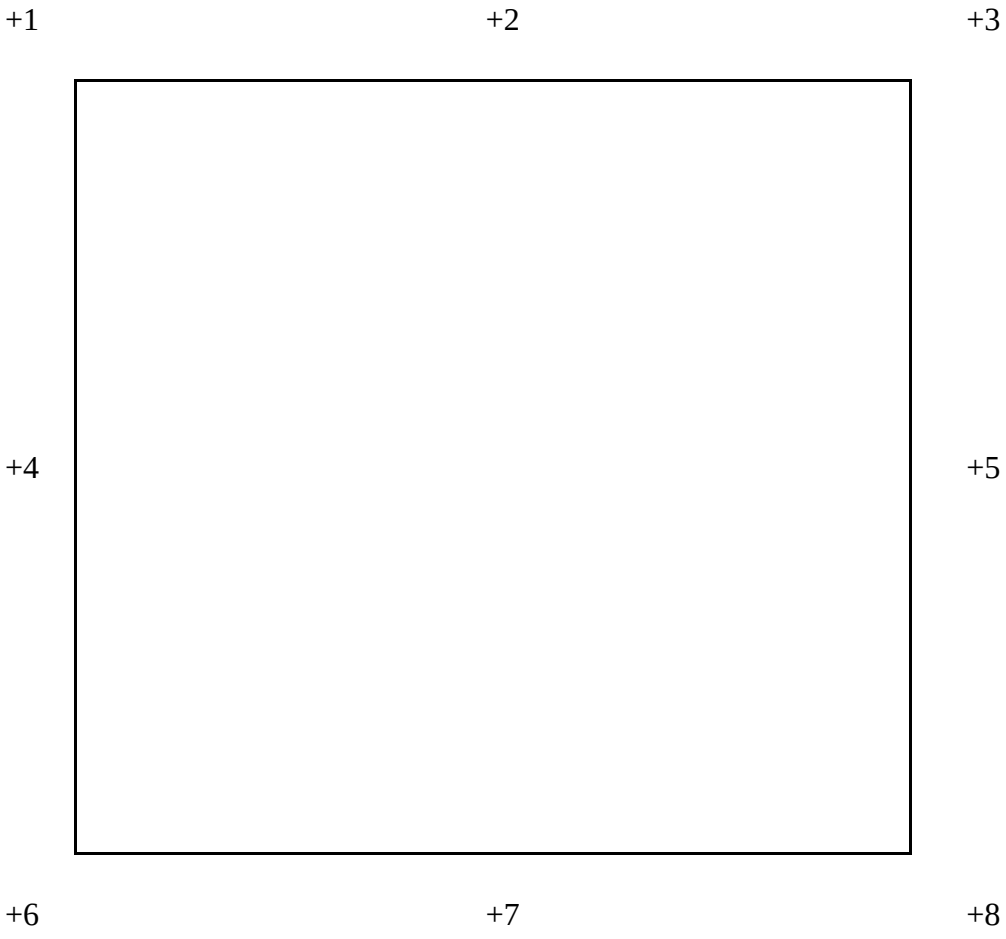
Rev. #	Date	Page(s)	Revision(s)
0	09/18/14	All	Original Report Issue. Work requested by Mr. Ronald Wooten of CR Laurence Co., Inc.

This report produced from controlled document template ATI 00025(a), revised 03/14/2013.

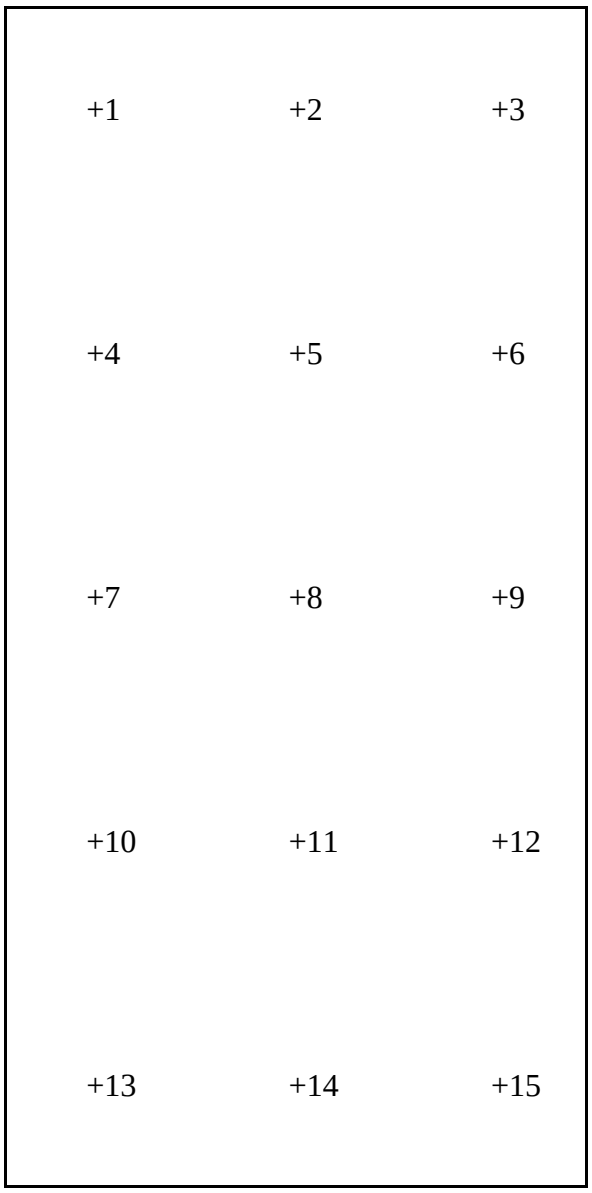
Appendix A: CTS Calibration Data

1.	CTS Test Date	06/22/13	
2.	CTS Size	21.53	ft^2
3.	CTS Glass/Core Conductance	0.40	$Btu/hr \cdot ft^2 \cdot F$
4.	Warm Side Air Temperature	69.80	F
5.	Cold Side Air Temperature	-0.11	F
6.	Warm Side Average Surface Temperature	54.89	F
7.	Cold Side Average Surface Temperature	3.83	F
8.	Convection Coefficient (K_c)	0.33	$Btu/(hr \cdot ft^2 \cdot F^{1.25})$
9.	Measured Cold Side Surface Conductance (h_c)	5.09	$Btu/hr \cdot ft^2 \cdot F$
10.	Measured Thermal Transmittance	0.30	$Btu/hr \cdot ft^2 \cdot F$

Appendix B: Surround Panel Wiring Diagram



Appendix C: Baffle Wiring Diagram



Appendix D: Submittal Form and Drawings

NFRC PRODUCT CERTIFICATION PROGRAM

Submittal Form for Test Samples

For use by manufacturers, lineal suppliers and fabricators

National Fenestration Rating Council®

1. Information on Production of the Test Sample (complete ALL fields):

Manufacturer: CRL – US Aluminum Date of sample manufacture: 7/16/2014

Plant Address where manufactured: 2100 E 38th St

City: Los Angeles State: CA Zip Code: 90085-1617

Name of IA: Associated Laboratories, Inc. Phone: (214) 565-0593 Fax: (214) 565-1094

2. Product Information (complete ALL fields):

Product Line ID (CPD) No.: Product/Operator Type (Table 4-3 of NFRC 100): Swing Door with Frame

Series/Model: 900 Terrace Door

3. Test sample is being submitted for (select ONE):

a. ☐ Validation for Initial Certification (prototype only) no plant qualification

b. ☒ Validation for Initial Certification (production line unit) & plant qualification

c. ☐ Validation for Recertification (production line unit) & plant qualification

d. ☐ Plant Qualification Only (production line unit)

I, Gyu Hyeon Kim, as the designated agent for CRL – US Aluminum do hereby attest that the foregoing information is true to the best of my information, knowledge, and belief. Further, if the unit is identified in Section 3 as a production line unit, I hereby authorize the NFRC-accredited testing laboratory to send a copy of the test report to the IA identified above for plant qualification purposes pursuant to the NFRC Product Certification Program..

Signature: Date: 8/18/2014

FOR LABORATORY USE ONLY

1. Laboratory: Architectural Testing, Inc
2. Date Sample Received: 8/7/14 File number ID: 07556.01.01-46
3. Date Sample Tested: 8/15/14 By: William Smeds
4. Modifications made: NONE
5. Reason for non-testing of sample unit: N/A

[*Note*: If the sample submitted can not be tested due to damage prior to testing, a new sample and new form shall be submitted to the testing laboratory. Both forms shall be submitted to the IA when the testing is completed.]

900 Terrace Door

Part Name	Part Number
Sash-Exterior	HE300
Sash-Interior	HI300
Bottom Rail-Exterior	BE030
Head-Exterior	HE450
Head-Interior	HI450
Threshold-Exterior	HE454
Threshold-Interior	HI454
Jamb-Exterior	JE450
Jamb-Interior	JI450
Glass Stop	WN429
Wedge Gasket	NP-127
Bulb Gasket	NP-257
Bulb Gasket	WH342

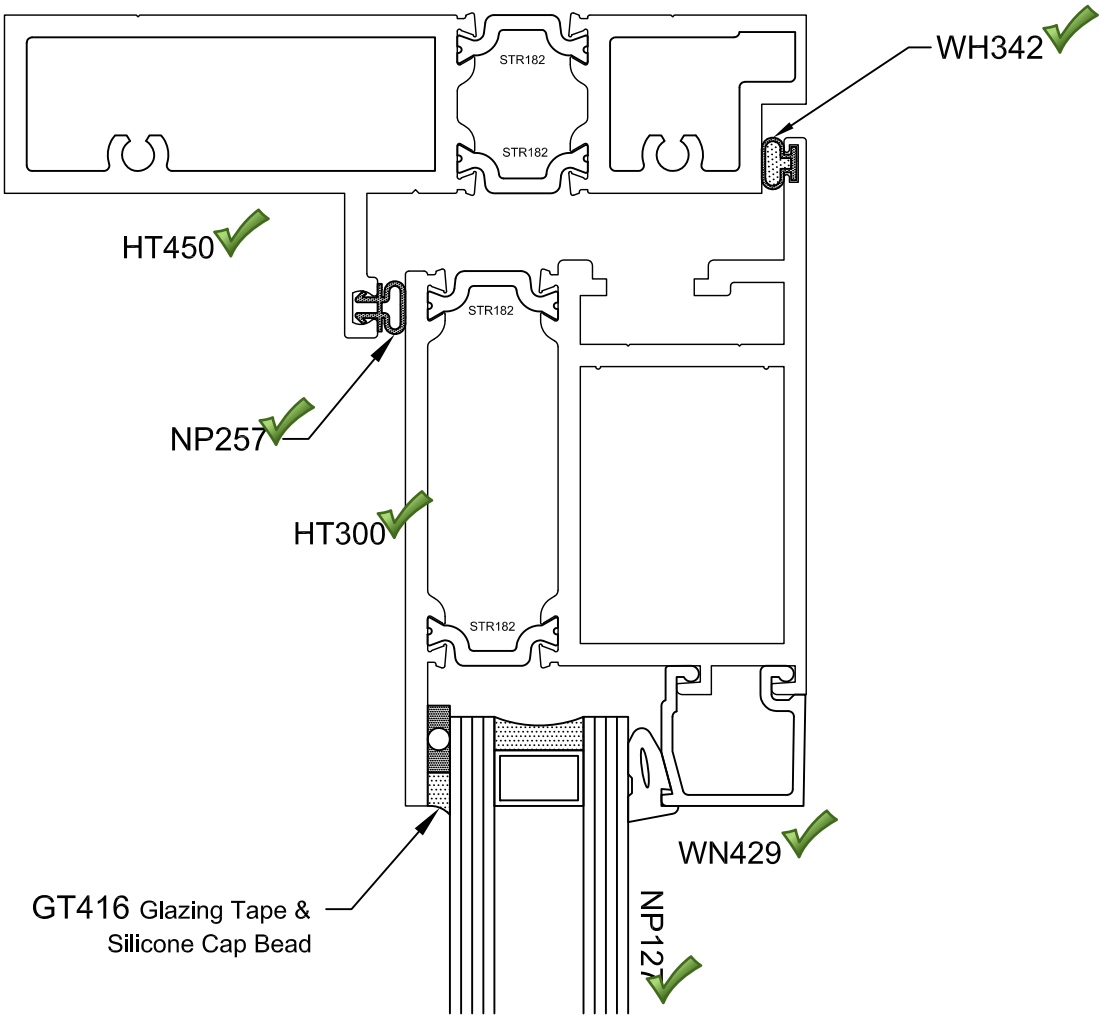
Architectural Testing

Report #: D7556.01

Date: 09/17/2014

Verified by:

Architectural Testing	Report #:	D7556.01
	Date:	09/17/2014
	Verified by:	

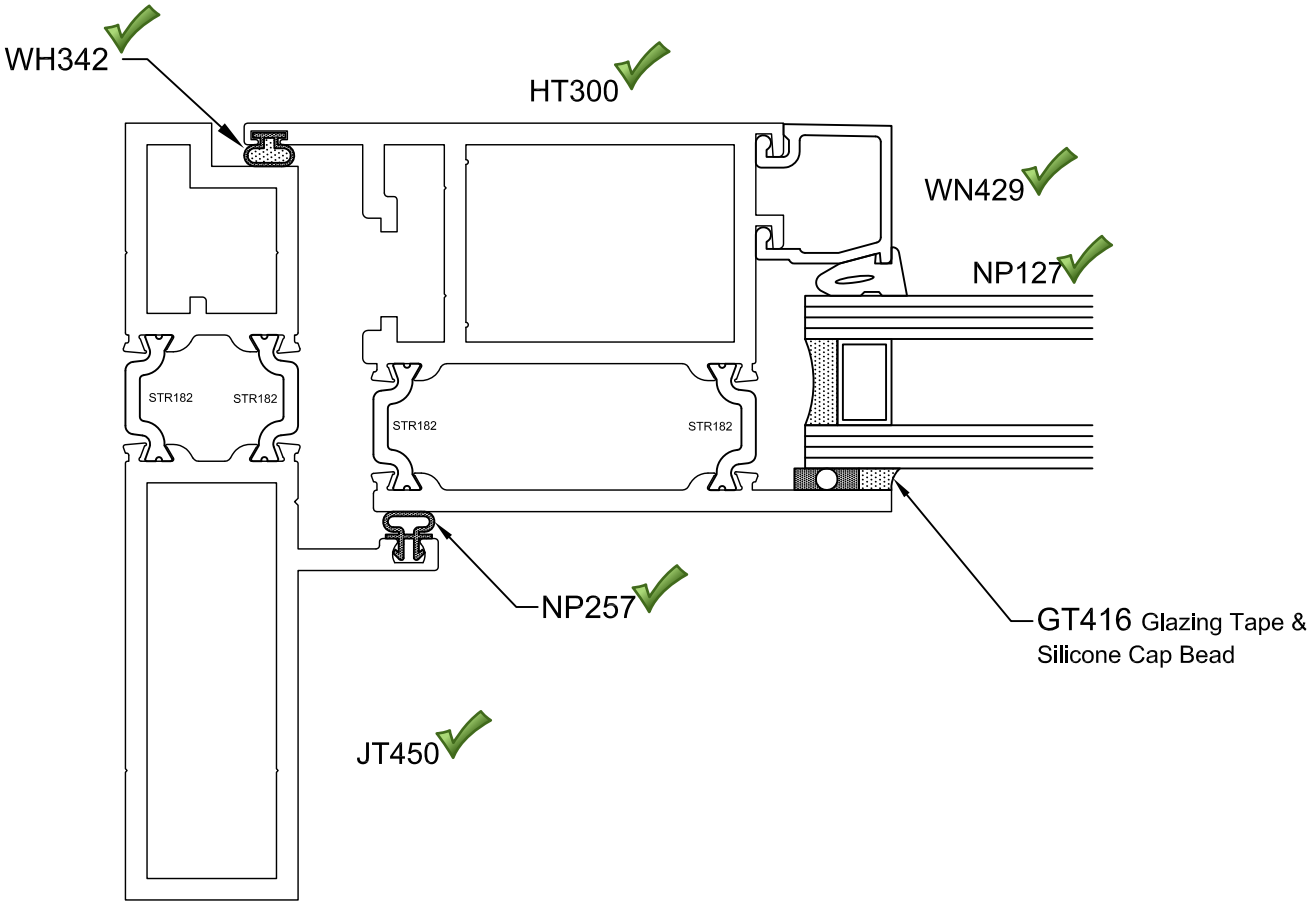


900 TERRACE DOOR
HEAD
IN SWING

HT450 / HT300 / WN429

Architectural Testing

Report #:	D7556.01
Date:	09/17/2014
Verified by:	

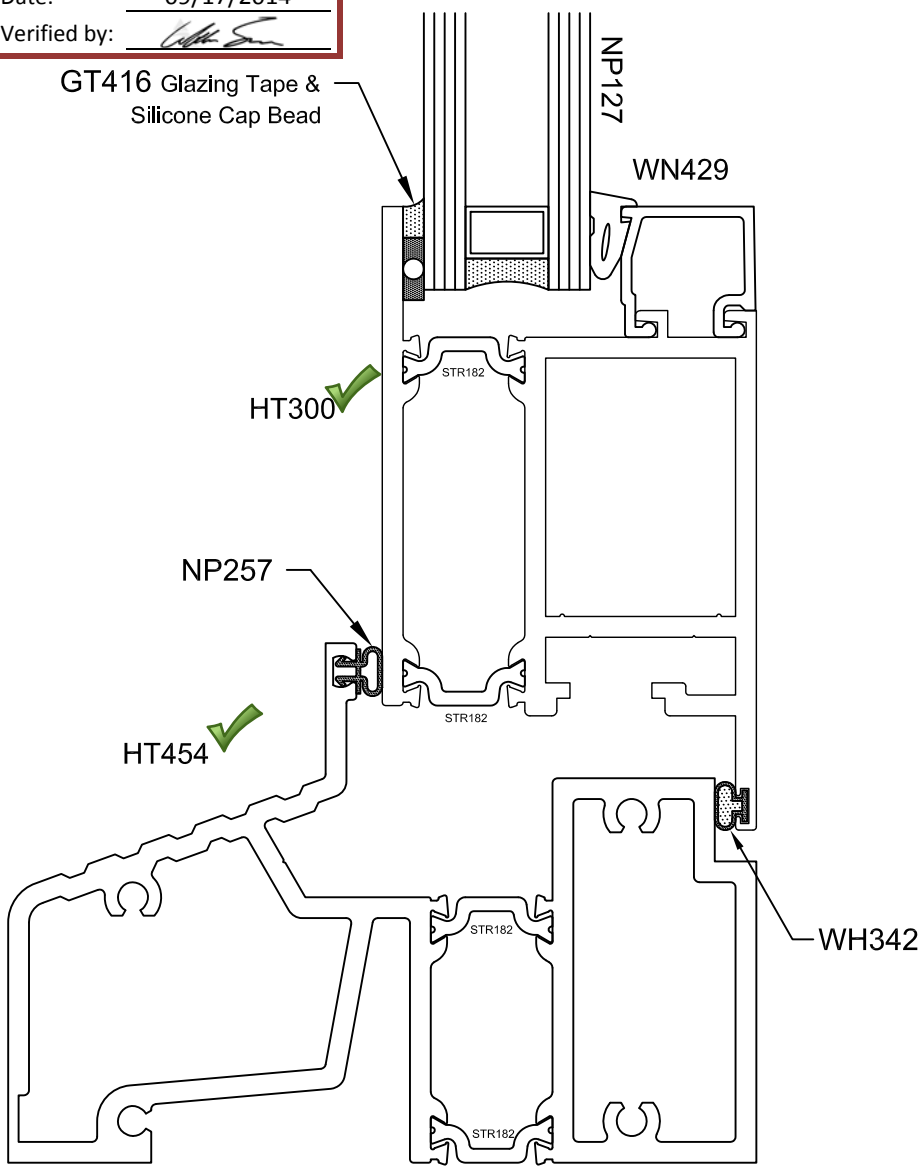


900 TERRACE DOOR
JAMB
IN SWING

JT450 / HT300 / WN429

Architectural Testing

Report #:	D7556.01
Date:	09/17/2014
Verified by:	



900 TERRACE DOOR
SILL
IN SWING

HT454 / HT300 / WN429

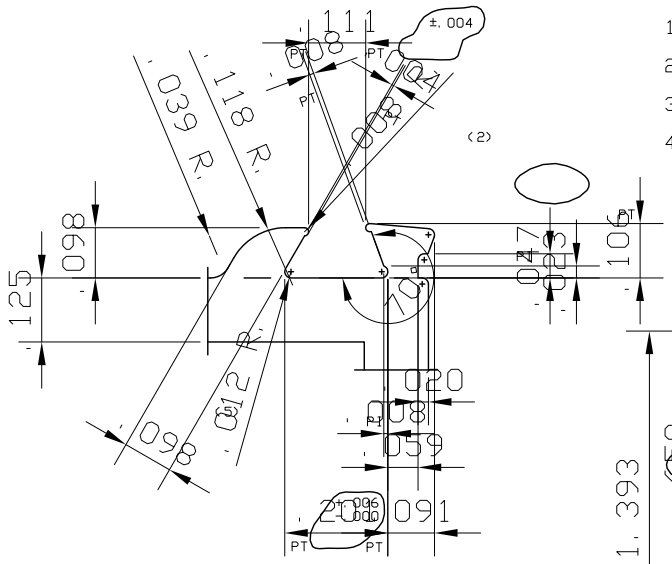
Report #:	D7556.01
Date:	09/17/2014
Verified by:	

Architectural Testing

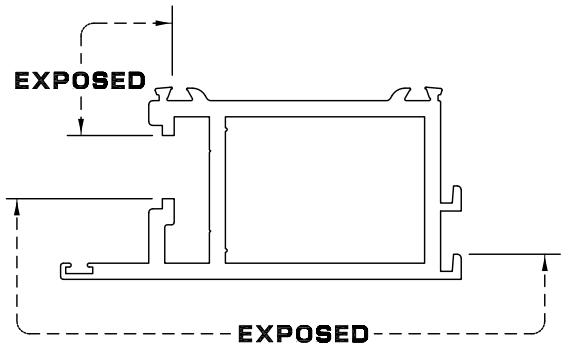
U.S. ALUMINUM CORP.		H-61273
SASH-EXTERIOR	TER MEER	06/13/05
HE300	2 X SIZE	

NOTES:

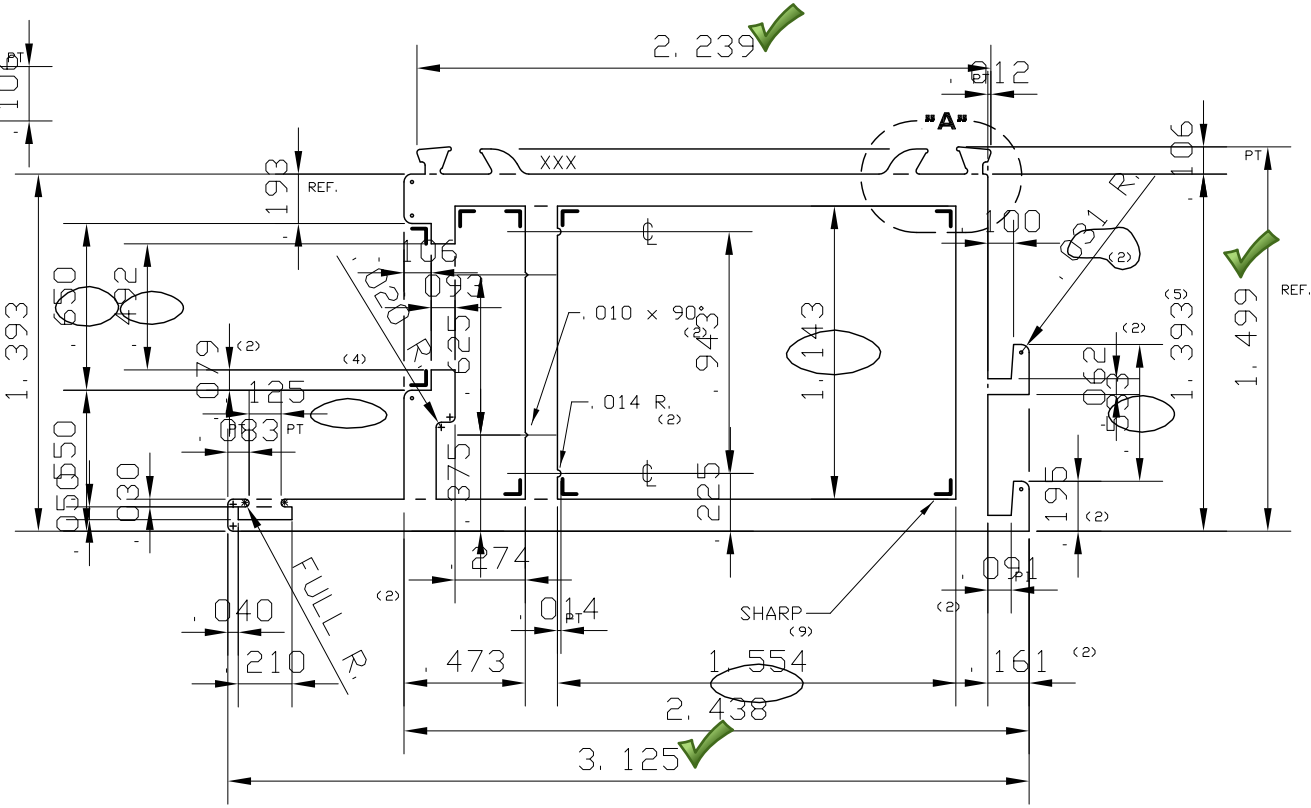
1. 6063-T5 ALLOY AND TEMPER.
2. OUTSIDE PERIMETER: 13.456"
3. PAINT PERIMETER: 5.563"
4. XXX INDICATES I.D. MARK FOR IEC-TX.



DETAIL "A"
4 X SIZE
(2 PLACES)



ACTUAL SIZE



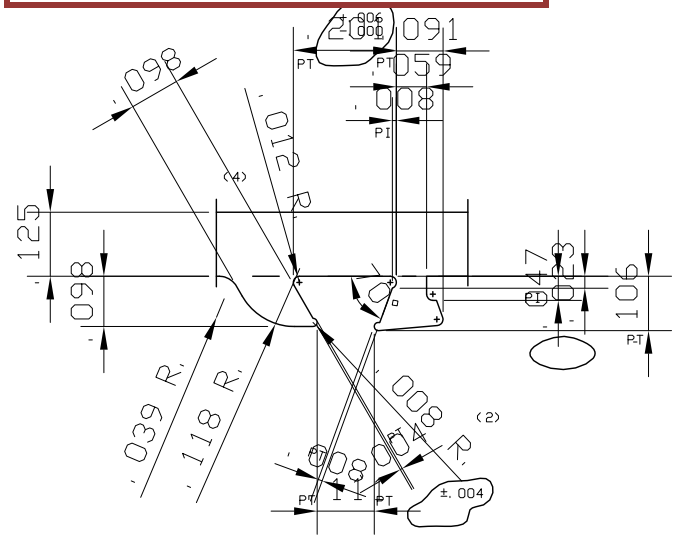
Material: Painted or Anodized Aluminum

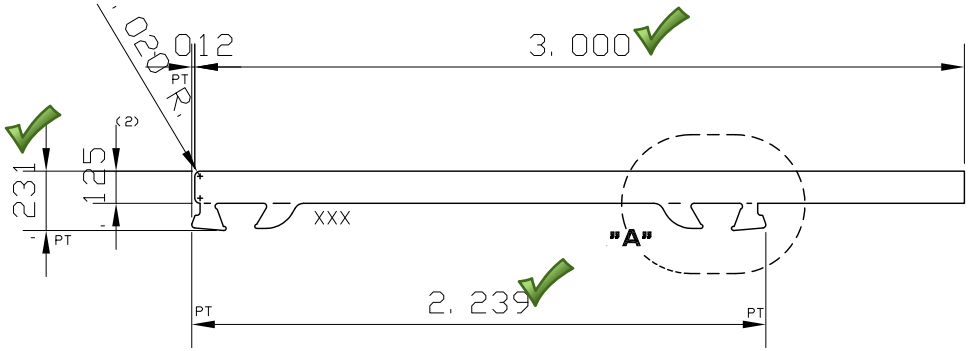
		.125
1.093	C-1257	1
1.313	3.335	PORTHOLE 9X5.5
18.882	HOLLOW II	41974
14	8 49/SHIRLEY	H-61273

Architectural Testing

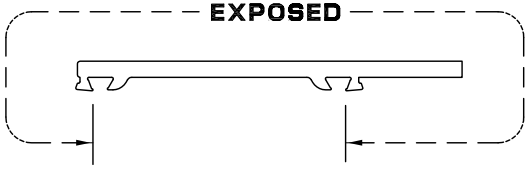
Report #: D7556.01
Date: 09/17/2014
Verified by:

U.S. ALUMINUM CORP.			T-61272
SASH-INTERIOR	TER MEER		06/13/05
HI300	2 X SIZE		





DETAIL "A"
4 X SIZE
(2 PLACES)



ACTUAL SIZE

NOTES:

1. 6063-T5 ALLOY AND TEMPER.
2. PAINT PERIMETER: 3.732"
3. XXX INDICATES I.D. MARK FOR IEC-TX.

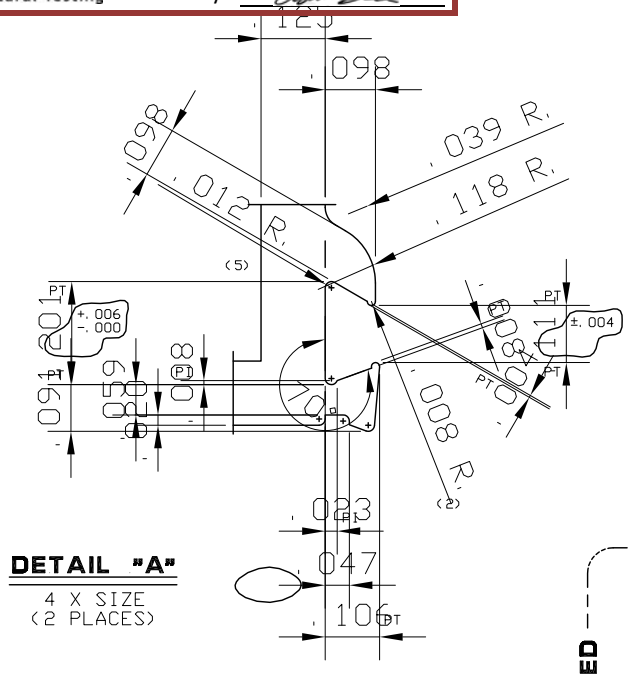
Material: Painted or Anodized Aluminum

			.125
	.415	C-1256	2
	.498	3.021	9 X 44061
	7.208	SOLID	3606
	15	7 49/LOIS	T-61272

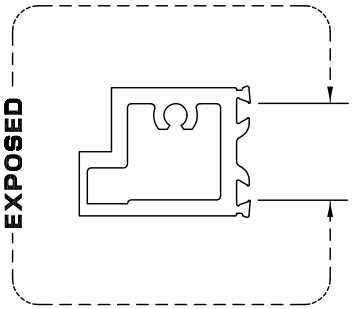
Architectural Testing

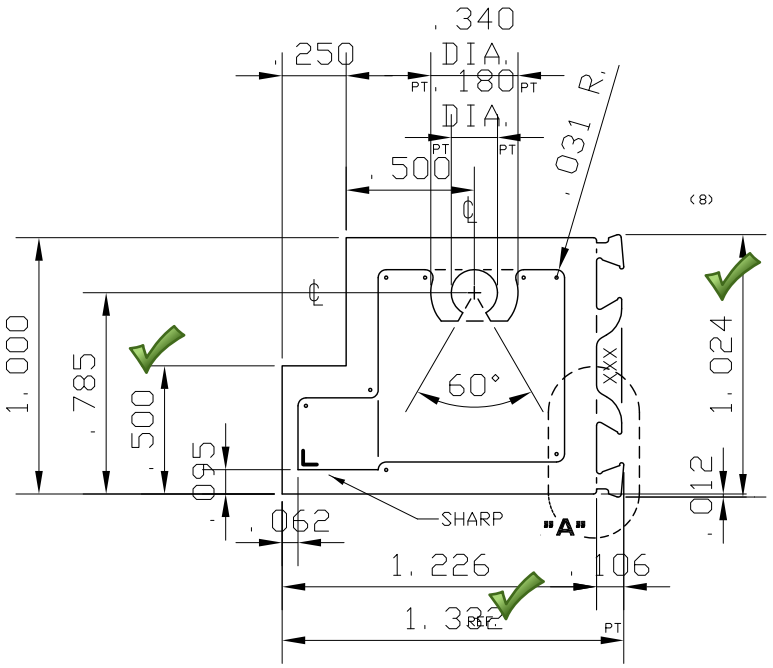
Report #: D7556.01
Date: 09/17/2014
Verified by:

U.S. ALUMINUM CORP.			H-61266
HEAD AND SILL EXTERIOR		TER MEER	06/13/05
HE450		2 X SIZE	



DETAIL "A"
4 X SIZE
(2 PLACES)





NOTES:

1. 6063-T5 ALLOY AND TEMPER.
2. OUTSIDE PERIMETER: 5.415"
3. PAINT PERIMETER: 3.934"
4. XXX INDICATES I.D. MARK FOR IEC-TX.

ACTUAL SIZE

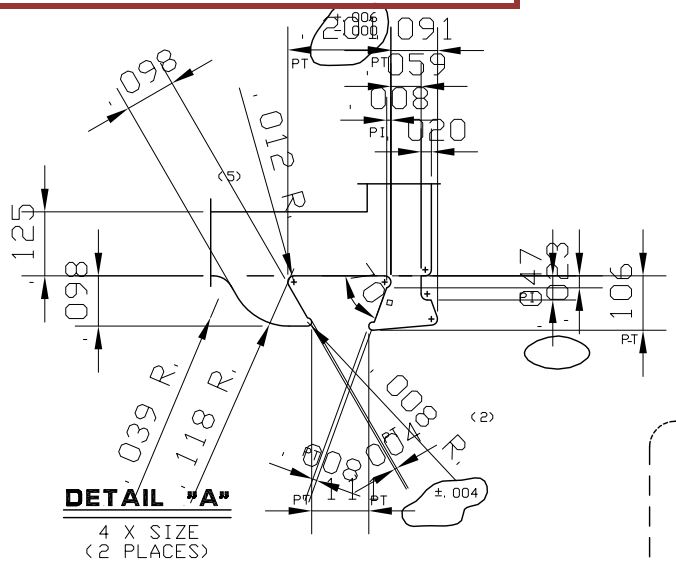
Material: Painted or Anodized Aluminum

			.125
	.545	C-1259	2
	.654	1.660	PORTHOLE 10X5.5
	9.726	HOLLOW II	STD-2
	15	8 49/SHIRLEY	H-61266

Architectural Testing

Report #: D7556.01
Date: 09/17/2014
Verified by:

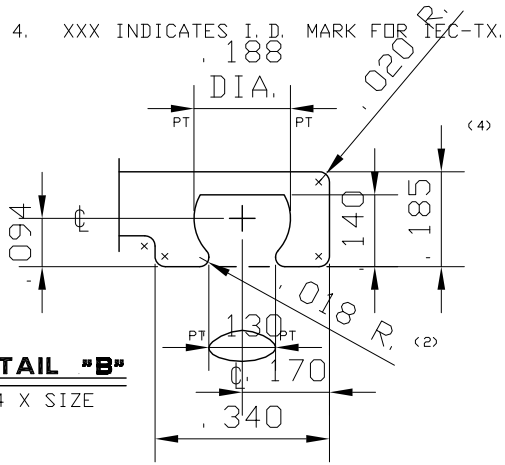
A1	1.196 WT/FT WAS 1.198	RT	7/20 05	U.S. ALUMINUM CORP.	H-61265 A1
				HEAD-INTERIOR / TER MEER	06/13/05
				HI450 / 2 X SIZE	



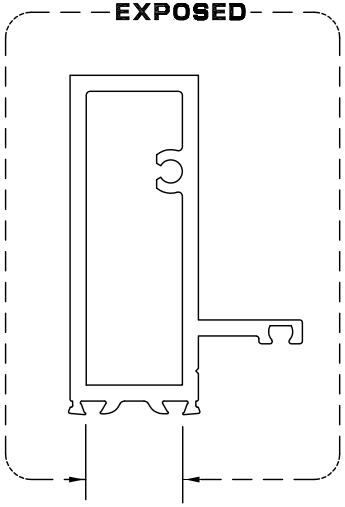
DETAIL "A"
4 X SIZE
(2 PLACES)

NOTES:

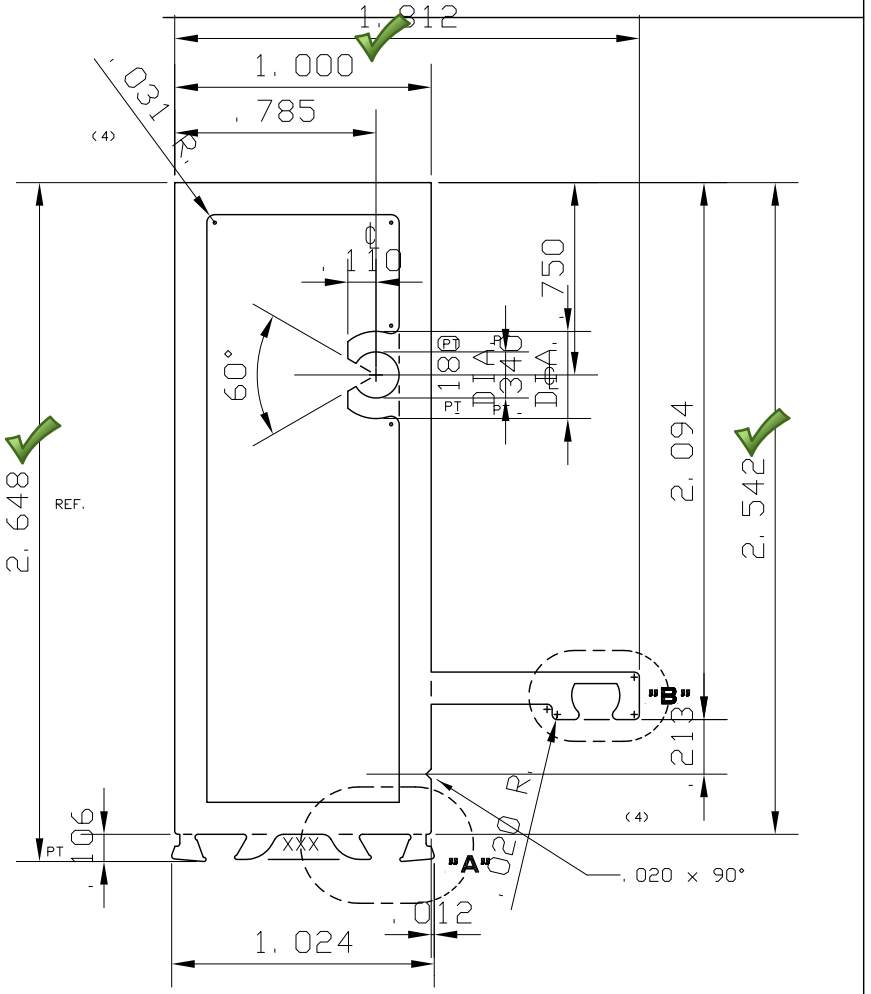
1. 6063-T5 ALLOY AND TEMPER.
2. OUTSIDE PERIMETER: 10.089"
3. PAINT PERIMETER: 6.540"
4. XXX INDICATES I.D. MARK FOR TEC-TX.



DETAIL "B"
4 X SIZE



ACTUAL SIZE



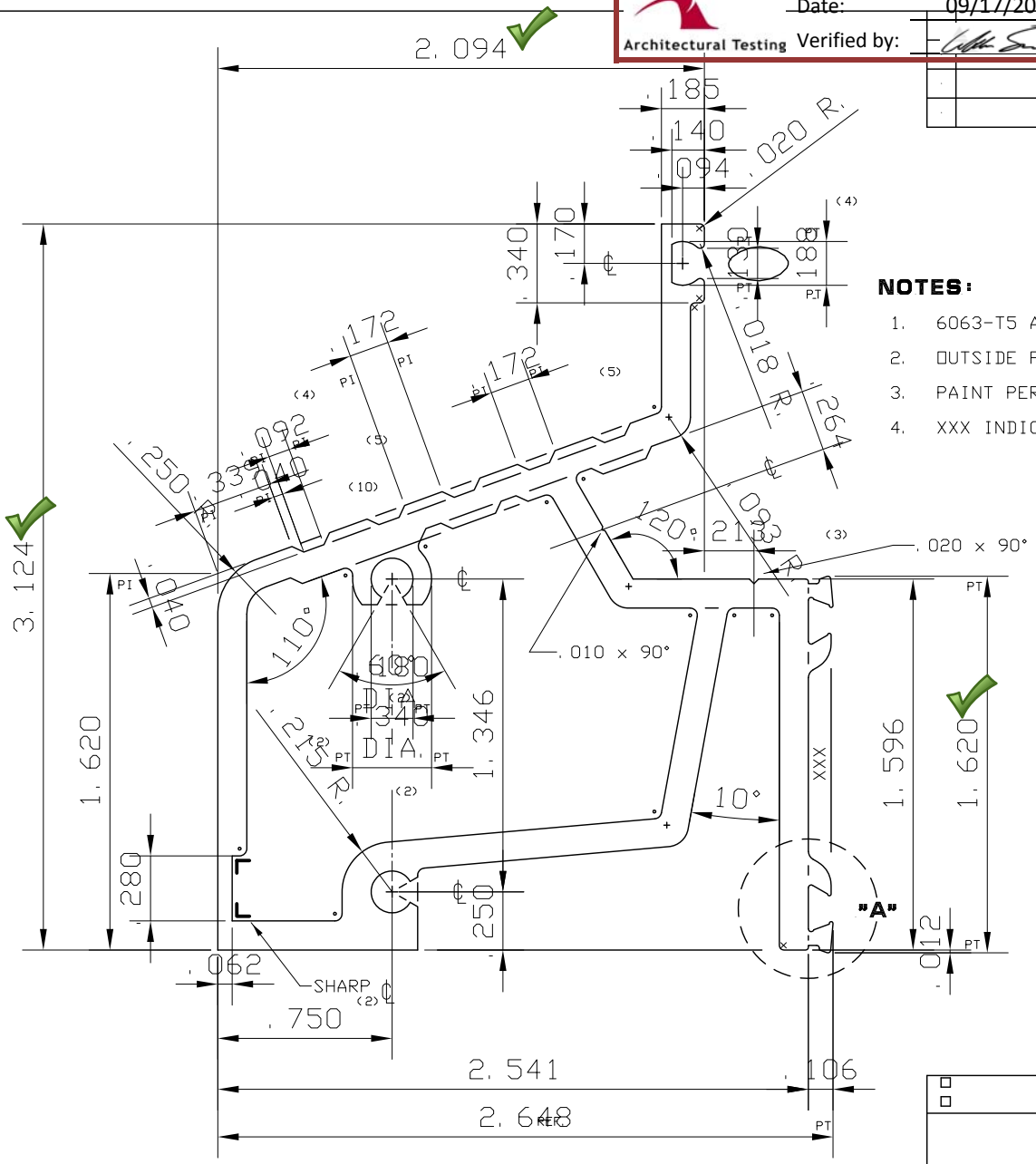
Material: Painted or Anodized Aluminum

			.125
	.997	C-1258	1
	1.196 (A1)	2.961	PORTHOLE 9X5.5
	16.895	HOLLOW II	1-4
	14	8 54/SUE	H-61265 A1

Architectural Testing

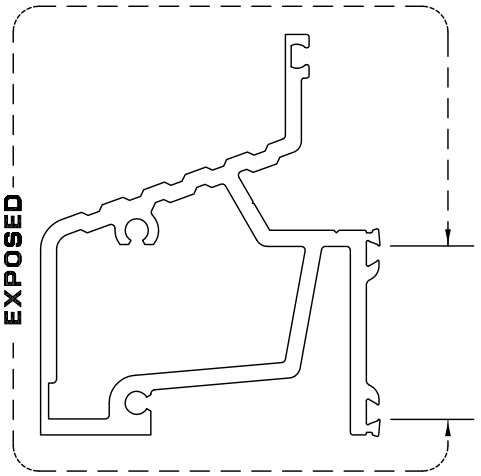
Report #: D7556.01
Date: 09/17/2014
Verified by:

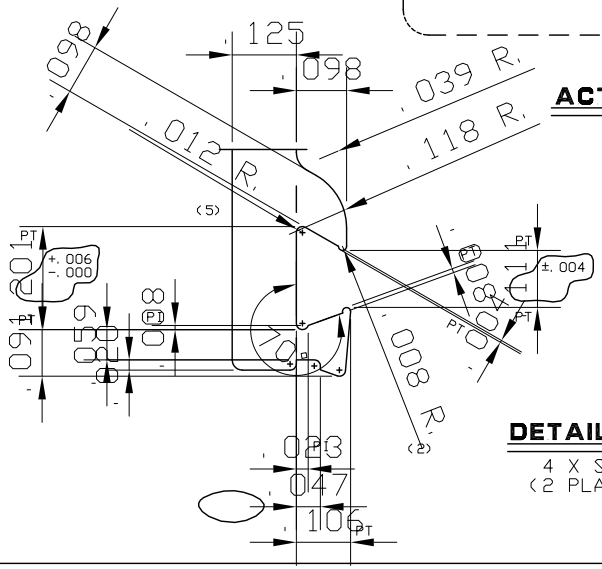
U.S. ALUMINUM CORP.		H-61269
INSWING THRESHOLD EXTERIOR	TER MEER	06/13/05
HE454	2 X SIZE	



NOTES:

1. 6063-T5 ALLOY AND TEMPER.
2. OUTSIDE PERIMETER: 15.974″
3. PAINT PERIMETER: 14.605″
4. XXX INDICATES I.D. MARK FOR IEC-TX.





ACTUAL SIZE

DETAIL "A"
4 X SIZE
(2 PLACES)

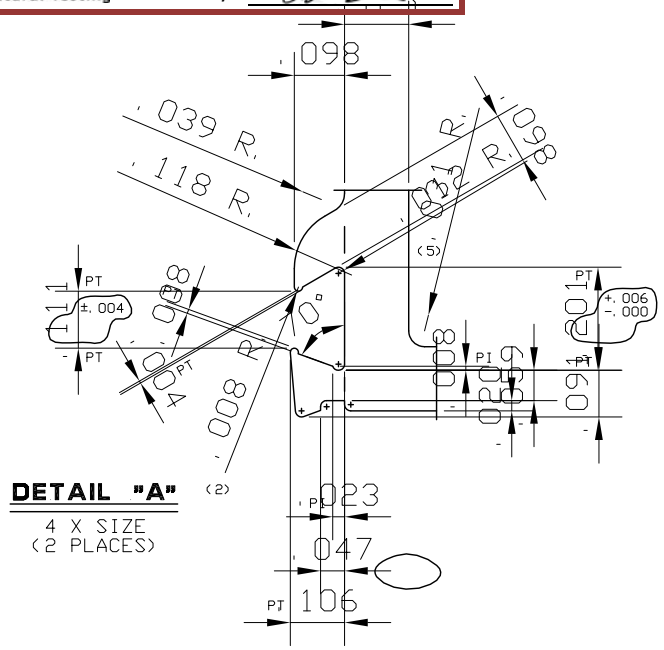
		.125
1.413	C-1262	1
1.696	3.813	PORTHOLE 9X5.5
23.566	HOLLOW II	60763
14	8 38/SHIRLEY	H-61269

Material: Painted or Anodized Aluminum

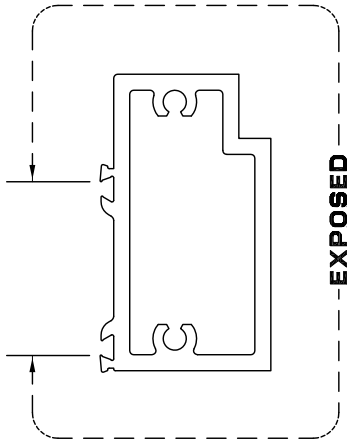
Architectural Testing

Report #: D7556.01
Date: 09/17/2014
Verified by:

U.S. ALUMINUM CORP.		H-61268
INSWING THRESHOLD INTERIOR	TER MEER	06/13/05
HI454	2 X SIZE	



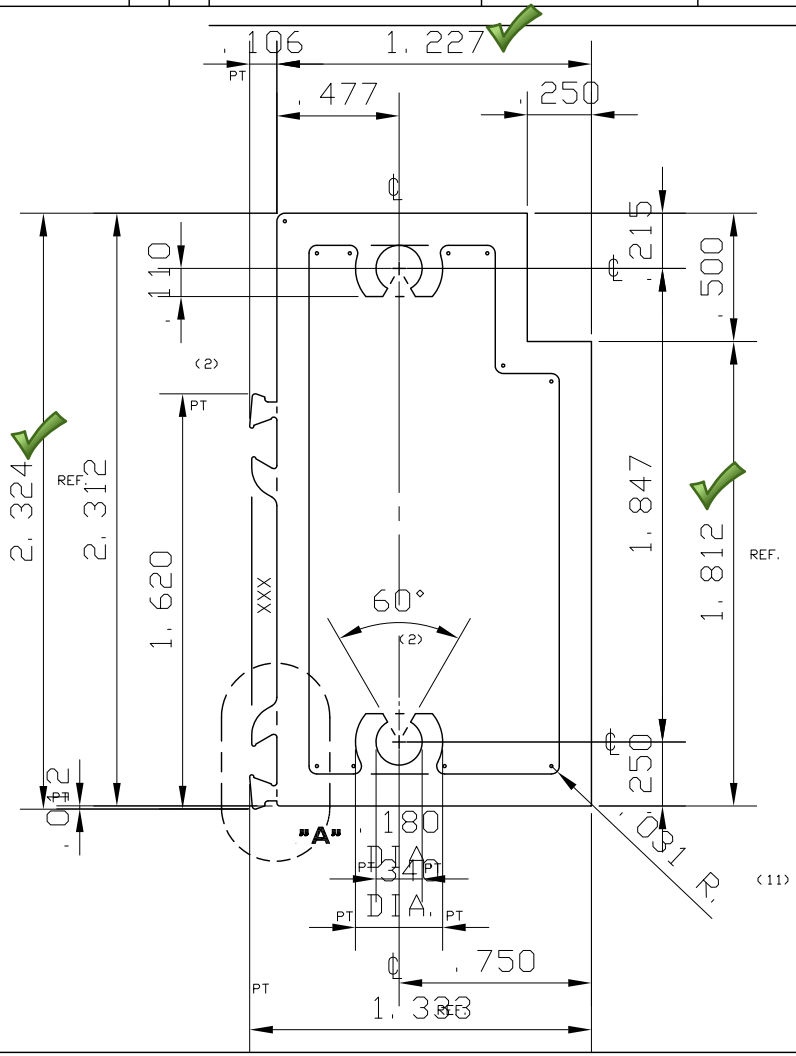
DETAIL "A" (2)
4 X SIZE
(2 PLACES)



ACTUAL SIZE

NOTES:

1. 6063-T5 ALLOY AND TEMPER.
2. OUTSIDE PERIMETER: 8.031"
3. PAINT PERIMETER: 5.951"
4. XXX INDICATES I.D. MARK FOR IEC-TX.



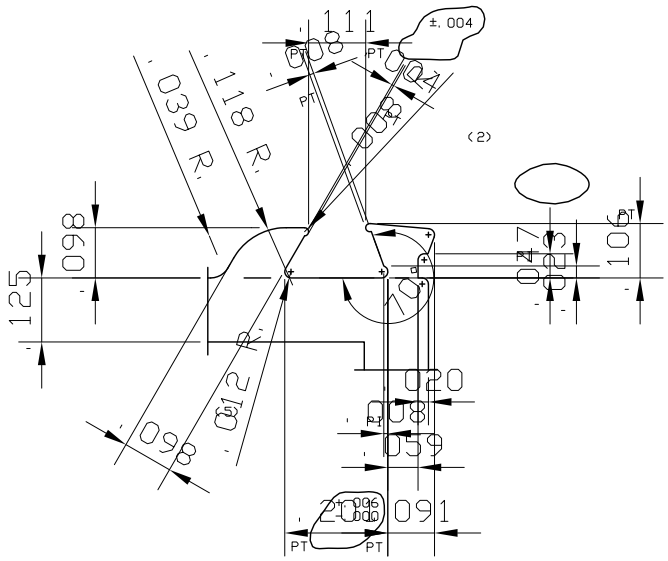
		.125
.945	C-1261	1
1.134	2.610	PORTHOLE 9X5.5
15.633	HOLLOW II	1-15
14	8 56/SUE	H-61268

Material: Painted or Anodized Aluminum

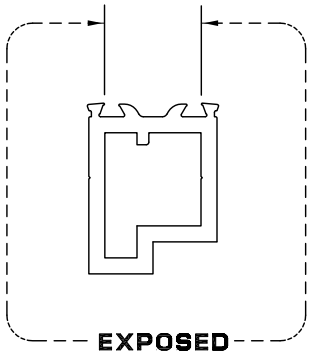
Architectural Testing

Report #: D7556.01
Date: 09/17/2014
Verified by:

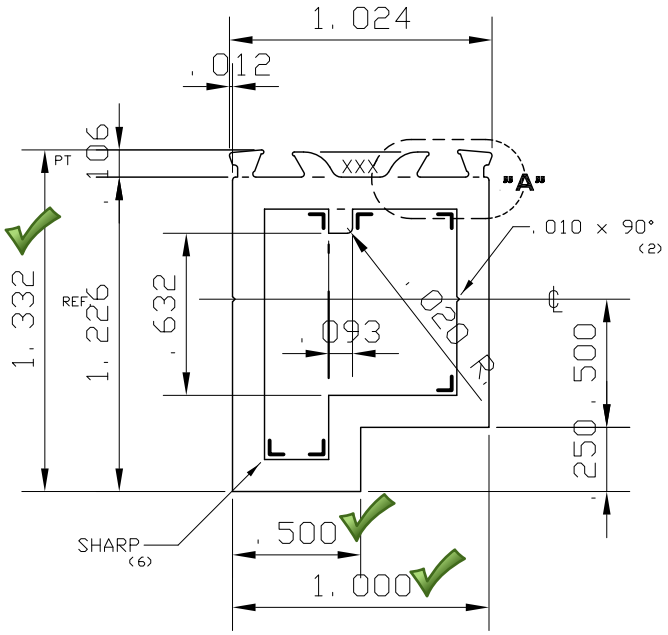
U.S. ALUMINUM CORP.		H-61264
JAMB-EXTERIOR	TER MEER	06/13/05
JE450	2 X SIZE	



DETAIL "A"
4 X SIZE
(2 PLACES)



ACTUAL SIZE



NOTES:

1. 6063-T5 ALLOY AND TEMPER.
2. OUTSIDE PERIMETER: 5.415"
3. PAINT PERIMETER: 3.934"
4. XXX INDICATES I.D. MARK FOR IEC-TX.

Material: Painted or Anodized Aluminum

			.125
	.542	C-1255	2
	.650	1.659	PORTHOLE 10X5.5
	9.056	HOLLOW II	STD-2
	14	8 49/SHIRLEY	H-61264

Architectural Testing

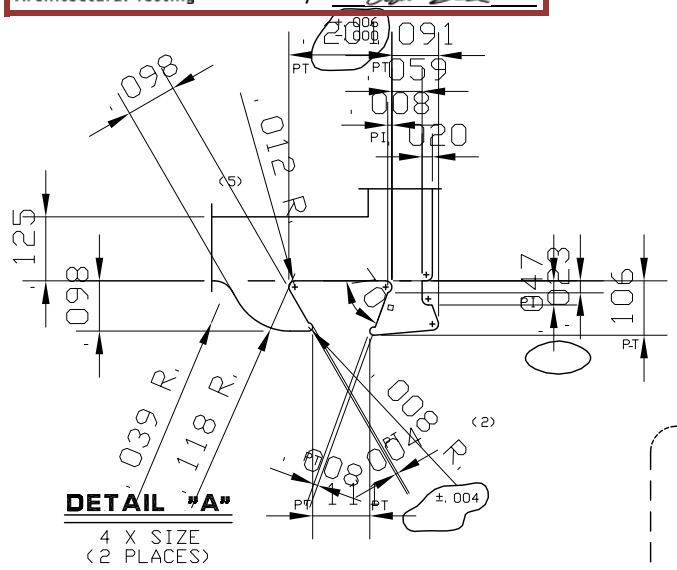
Report #: D7556.01
Date: 09/17/2014
Verified by:

A1	1.152 WT/FT WAS 1.153	RT	7/20 05	

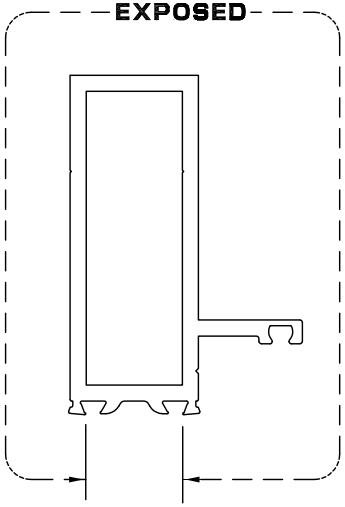
U.S. ALUMINUM CORP.

H-61263 A1

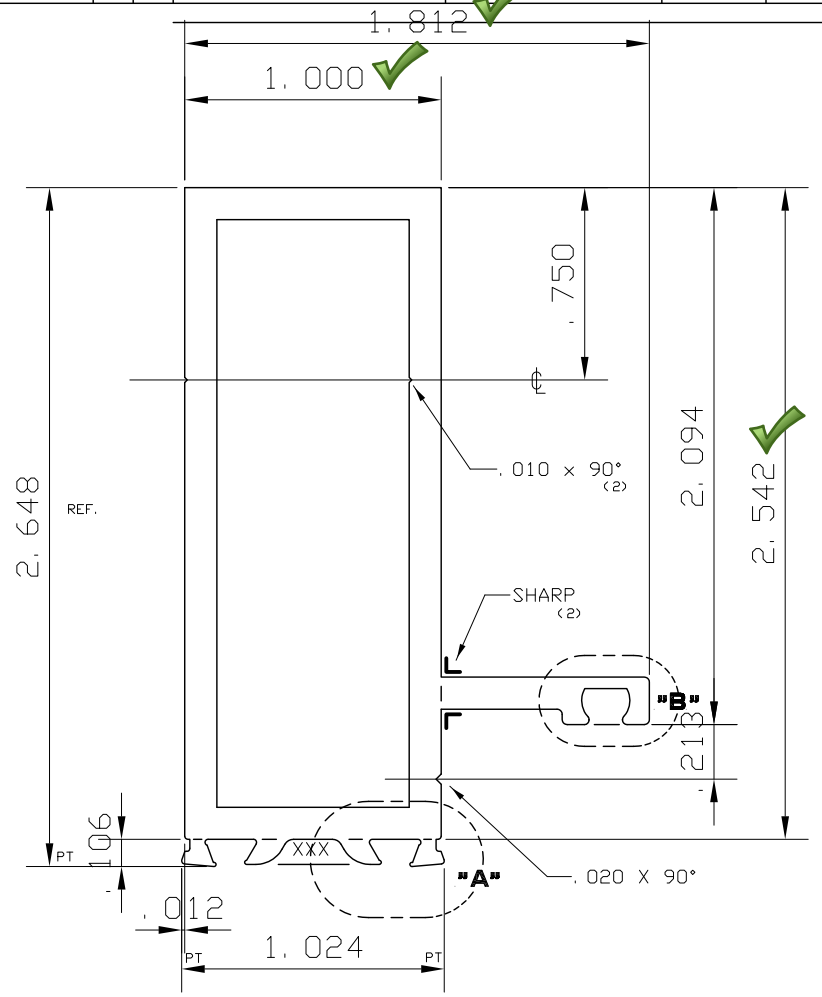
JAMB-INTERIOR	TER MEER	06/13/05
JI450	4 X SIZE	



DETAIL "A"
4 X SIZE
(2 PLACES)

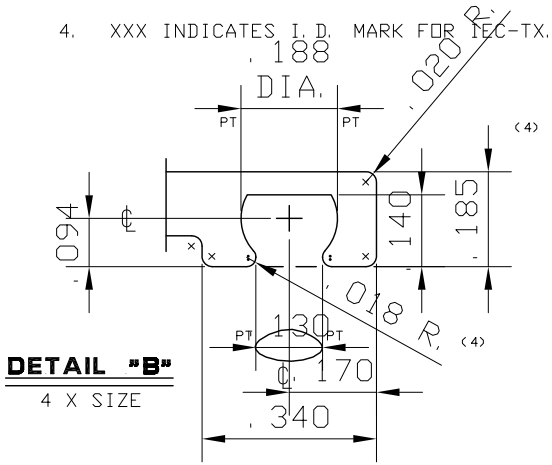


ACTUAL SIZE



NOTES:

1. 6063-T5 ALLOY AND TEMPER.
2. OUTSIDE PERIMETER: 10.097"
3. PAINT PERIMETER: 6.540"
4. XXX INDICATES I.D. MARK FOR TEC-TX.



DETAIL "B"
4 X SIZE

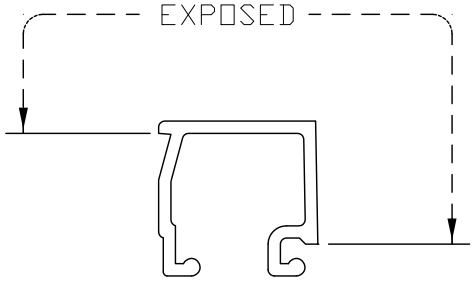
Material: Painted or Anodized Aluminum

			.125
	.960	C-1254	1
	1.152 (A1)	2.961	PORTHOLE 9X5.5
	16.188	HOLLOW II	1-4
	14	8 56/SUE	H-61263 A1

U. S. ALUMINUM CORP.		60939
1" GLASS STOP	Willie C.	04/01/02
WN 429	2 X SIZE	

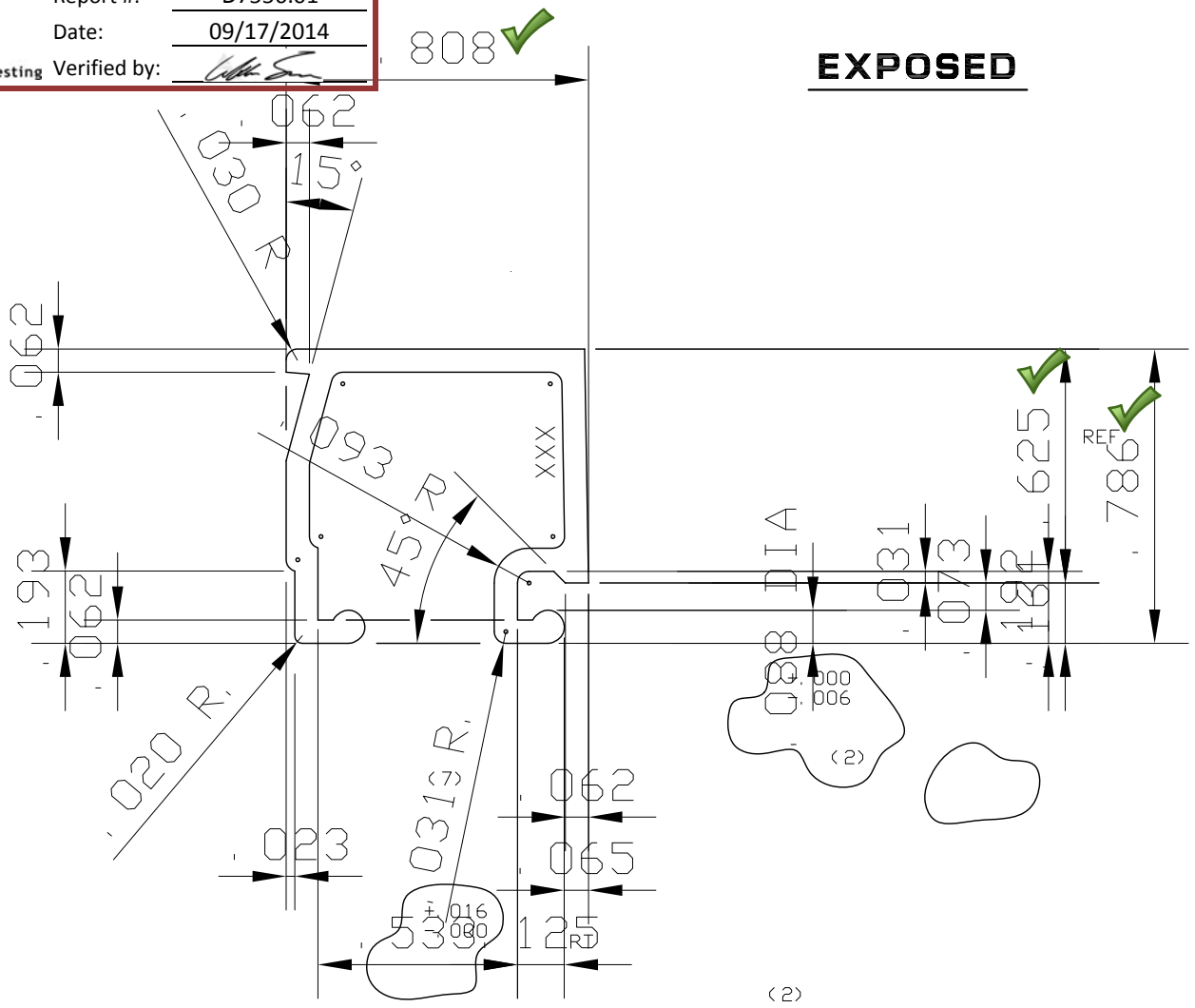
NOTES:

1. 6063-T5 ALLOY AND TEMPER.
2. XXX INDICATES I. D. MARK.
3. PAINT PERIMETER: 1.471".
4. ASSEMBLES WITH C-540, DIE#



Architectural Testing
Report #: D7556.01
Date: 09/17/2014
Verified by:

EXPOSED



Material: Painted or Anodized Aluminum

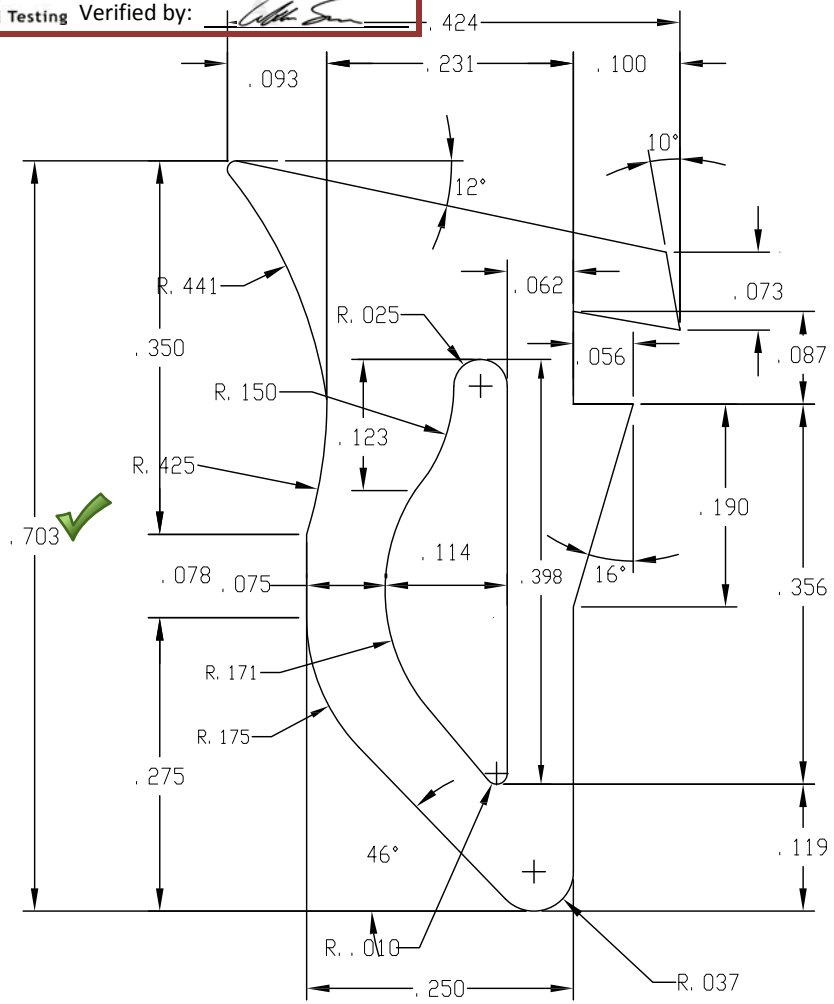
.062

.171	C-539	
.205	1.100	
5.443	SOLID	
27		60939

Architectural Testing

Report #: D7556.01
Date: 09/17/2014
Verified by:

USA- 2962



FULL SCALE

Notes
1) Made from EPDM
2) Vendor part # TR-0127E
3) By Tremco
4) .250" Face clearanc

Material: EPDM

#	Date	Description	Initals

NAME TLH
DATE 5/19/06
SCALE

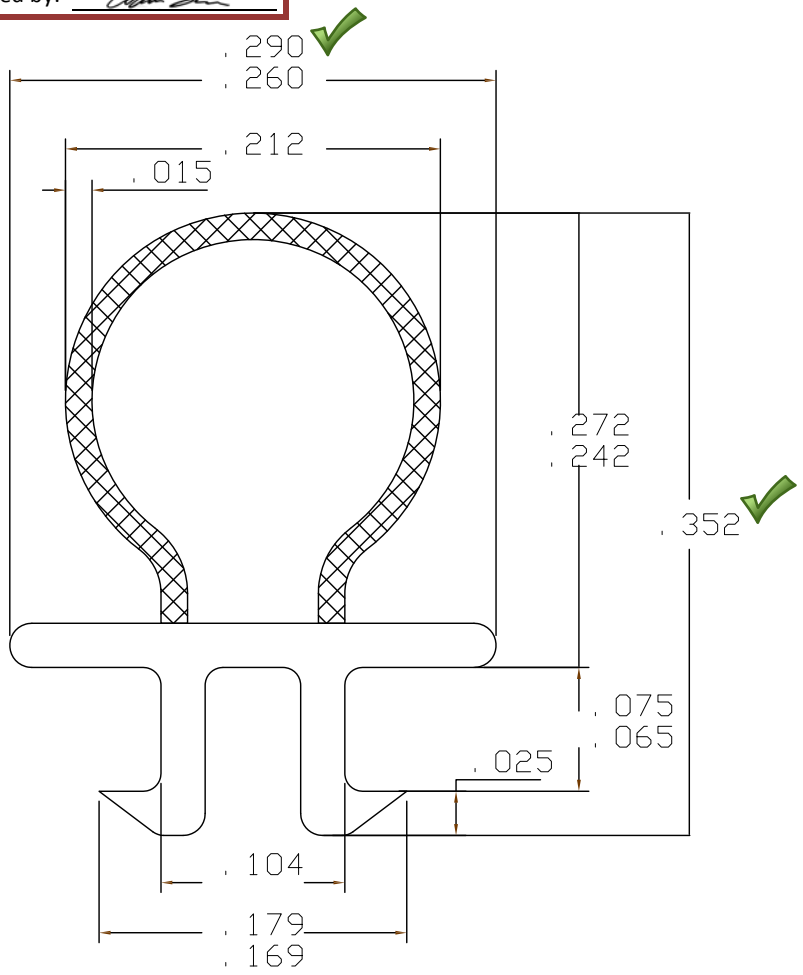
DESCRIPTION
Wedge Gasket
NP- 127
Used on Terrace Doors

NUMBER
USA- 2962

Architectural Testing

Report #: D7556.01
Date: 09/17/2014
Verified by:

USA- 2964



Notes

1) Material = Polypropylene & Santopr
(This is soft material on bulb)
2) By AMESBURY
3) Vendor Part # PP1380

Material: Polypropylene/EPDM

Rigid Walls : .025 (+.005 −.005)
Except as noted)
Flex Wall : .015 (+.005 −.005)

#	Date	Description	Initials

NAME TLH/meb
DATE 5/23/06
SCALE

DESCRIPTION Bulb Gasket
Used on Terrace Doors

United States ALUMINUM
Commercial Products Group

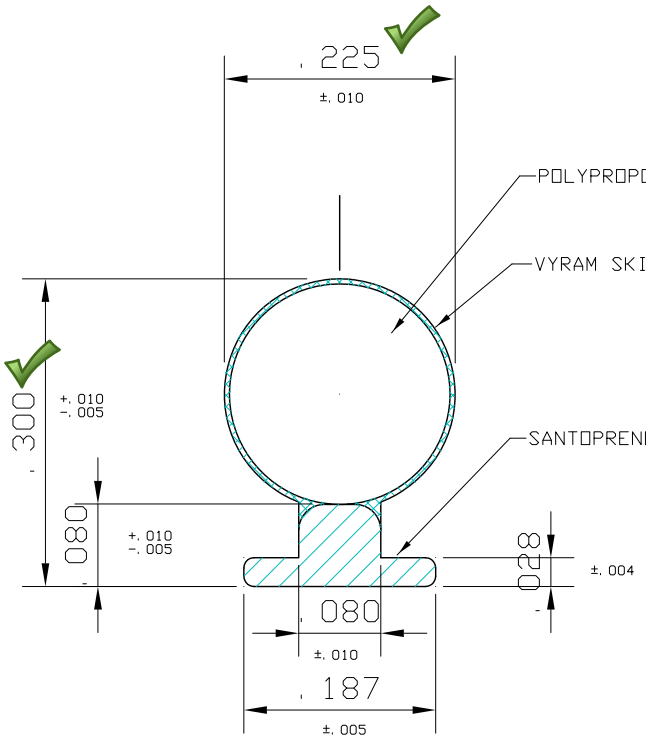
NUMBER USA- 2964

USA-1820

Architectural Testing

Report #: D7556.01
Date: 09/17/2014
Verified by:

ACTUAL SIZE



NOTE:

1. FACE CLEARANCE = .125
2. MATERIALS: POLYPROPOLENE
   SANTOPRENE ™
   VYRAM ™
3. AMESBURY 32007 or EQUAL

Material: EPDM

SYM	REVISION	DATE	BY

CRL

2100 E. 38TH STREET VERNON, CA. 90058
PHONE: (323) 588-1281 FAX: (323) 232-2523

DIVISION **UNITED STATES ALUMINUM**

DRWN BY: GLH
DATE: 7/20/99
SCALE: 8 X SIZE

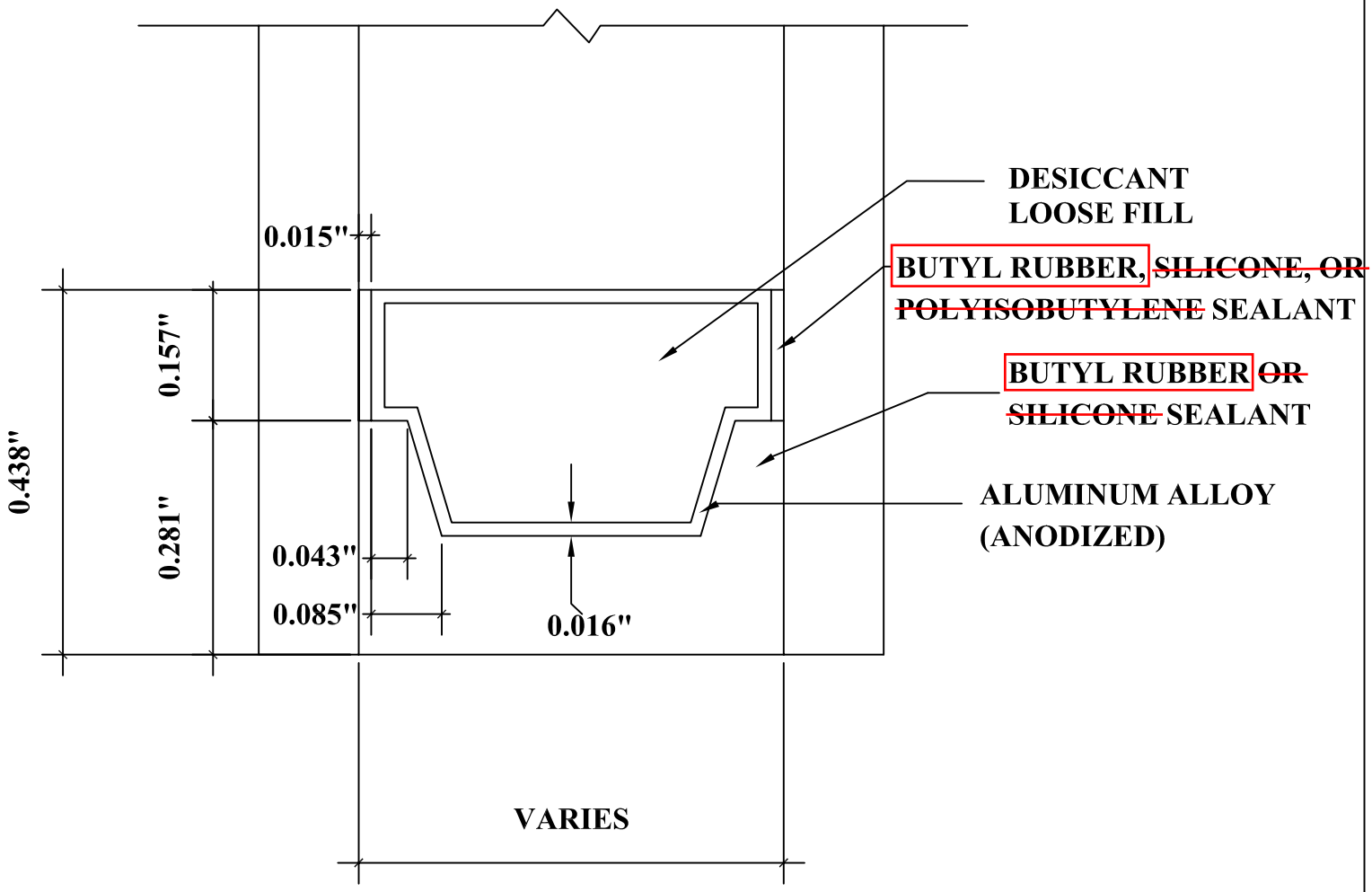
PART NO. WH342
BULB GASKET for
7200 WINDOWS

DWG NO.
USA-1820

VALIDATION SPACER

Architectural Testing

Report #:	D7556.01
Date:	09/17/2014
Verified by:	



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