



**NFRC 102-2010 THERMAL PERFORMANCE
TEST REPORT**

Rendered to:

UNITED STATES ALUMINUM

SERIES/MODEL: 8100

TYPE: Fixed

Summary of Results	
Standardized Thermal Transmittance (U-Factor)	0.35
Unit Size	47-3/8" x 59-1/8" (1203 mm x 1502 mm) (Model Size)
Layer 1	DS AFG Comfort Ti-AC36 (e=0.034*, #2)
Gap 1	0.50" Gap, Super Spacer Standard (OF-S), 100% Air-Filled*
Layer 2	DS Clear
Gap 2	0.37" Gap, Super Spacer Standard (OF-S), 100% Air-Filled*
Layer 3	DS Clear

Reference must be made to Report No. A1443.01-301-46, dated 01/27/11 for complete test specimen description and data.



NFRC 102-2010 THERMAL PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM
200 Singleton Drive
Waxahachie, Texas 75165

Report Number:	A1443.01-301-46
Test Date:	11/30/10
Report Date:	01/27/11
Test Record Retention Date:	11/30/14

Test Sample Identification:

Series/Model: 8100

Type: Fixed

Overall Size: 47-3/8" x 59-1/8" (1203 mm x 1502 mm) (Model Size)

NFRC Standard Size: 47.2" x 59.1" (1200 mm wide x 1500 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}): 0.35 Btu/hr·ft²·F CTS Method

Test Sample Description:

CONSTRUCTION	Frame
Size (in.)	47-3/8 x 59-1/8
Daylight Opening (in.)	43-1/8 x 53-7/8
CORNERS	Coped
Fasteners	Screws
Sealant	Yes
MATERIAL	AT (0.31")
Color Exterior	White
Finish Exterior	Paint
Color Interior	White
Finish Interior	Paint
GLAZING METHOD	Exterior

Glazing Information:

Layer 1	DS AFG Comfort Ti-AC36 (e=0.034*, #2)
Gap 1	0.50" Gap, Super Spacer Standard (OF-S), 100% Air-Filled*
Layer 2	DS Clear
Gap 2	0.37" Gap, Super Spacer Standard (OF-S), 100% Air-Filled*
Layer 3	DS Clear
Gas Fill Method	N/A*

**Stated per Client/Manufacturer*

N/A Non-Applicable

See Description Table Abbreviations

Test Sample Description: (Continued)

COMPONENTS			
	Type	Quantity	Location
WEATHERSTRIP			
	No weatherstrip		
HARDWARE			
	No hardware		
DRAINAGE			
	No visible weeps		

Thermal Transmittance (U-factor)

Measured Test Data

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	581.49 Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	75.97 Btu/hr
3. Surround Panel Thickness	5.00 inches
4. Surround Panel Conductance	0.0328 Btu/hr·ft ² ·F
5. Metering Box Wall Heat Flow (Q_{mb})	-5.59 Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0244*EMF + -1.036
7. Flanking Loss Heat Flow (Q_{fl})	16.16 Btu/hr
8. Net Specimen Heat Loss (Q_s)	494.95 Btu/hr

Areas

1. Test Specimen Projected Area (A_s)	19.45 ft ²
2. Test Specimen Interior Total (3-D) Surface Area (A_h)	23.55 ft ²
3. Test Specimen Exterior Total (3-D) Surface Area (A_c)	19.99 ft ²
4. Metering Box Opening Area (A_{mb})	53.48 ft ²
5. Metering Box Baffle Area (A_{b1})	52.23 ft ²
6. Surround Panel Interior Exposed Area (A_{sp})	34.03 ft ²

Test Conditions

1. Average Metering Room Air Temperature (t_h)	69.80 F
2. Average Cold Side Air Temperature (t_c)	-0.66 F
3. Average Guard/Environmental Air Temperature	72.01 F
4. Metering Room Average Relative Humidity	7.17 %
5. Metering Room Maximum Relative Humidity	7.52 %
6. Metering Room Minimum Relative Humidity	6.84 %
7. Measured Cold Side Wind Velocity (Perpendicular Flow)	15.09 mph
8. Measured Static Pressure Difference Across Test Specimen	0.00" \pm 0.04" H ₂ O

Results

1. Thermal Transmittance of Test Specimen (U_s)	0.36 Btu/hr·ft ² ·F
2. Standardized Thermal Transmittance of Test Specimen (U_{st})	0.35 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	0.90
4. Cold Side Frame Emittance	0.90
5. Warm Side Sash/Panel/Vent Emittance	N/A
6. Cold Side Sash/Panel/Vent Emittance	N/A
7. Warm Side Baffle Emittance (e_{b1})	0.92
8. Equivalent Warm Side Surface Temperature	51.77 F
9. Equivalent Cold Side Surface Temperature	4.15 F
10. Warm Side Baffle Surface Temperature	69.58 F
11. Measured Warm Side Surface Conductance (h_h)	1.41 Btu/hr·ft ² ·F
12. Measured Cold Side Surface Conductance (h_c)	5.29 Btu/hr·ft ² ·F
13. Test Specimen Thermal Conductance (C_s)	0.53 Btu/hr·ft ² ·F
14. Convection Coefficient (K_c)	0.32 Btu/(hr·ft ² ·F ^{1.25})
15. Radiative Test Specimen Heat Flow (Q_{rl})	261.72 Btu/hr
16. Conductive Test Specimen Heat Flow (Q_{cl})	233.23 Btu/hr
17. Radiative Heat Flux of Test Specimen (q_{rl})	13.46 Btu/hr·ft ² ·F
18. Convective Heat Flux of Test Specimen (q_{cl})	11.99 Btu/hr·ft ² ·F
19. Standardized Warm Side Surface Conductance (h_{sth})	1.23 Btu/hr·ft ² ·F
20. Standardized Cold Side Surface Conductance (h_{stc})	5.28 Btu/hr·ft ² ·F
21. Standardized Thermal Transmittance (U_{st})	0.35 Btu/hr·ft ² ·F

Test Duration

1. The environmental systems were started at 16:06 hours, 11/29/10.
2. The test parameters were considered stable for two consecutive four hour test periods from 23:58 hours, 11/29/10 to 07:58 hours, 11/30/10.
3. The thermal performance test results were derived from 03:58 hours, 11/30/10 to 07:58 hours, 11/30/10.

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

Glazing Deflection (in):

	Gap 1	Gap 2
Edge Gap Width	0.50	0.37
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.50	0.00
Center gap width at laboratory ambient conditions on day of testing	0.50	0.40
Center gap width at test conditions	0.50	0.40

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. The sample showed no evidence of condensation/frost at the conclusion of the test.

A full calibration of the Architectural Testing Inc. 'thermal test chamber' (ICN 004287) in Fresno, California was conducted in April 2010 in accordance with Architectural Testing Inc. calibration procedure. A calibration check was performed September 2010.

"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 may be expected from field installations due to not accounting for solar radiation, air leakage effects, and the thermal bridge effects that may occur due to the specific design and construction of the fenestration system opening. Therefore, it should be recognized 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."

"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."

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.

ANSI/NCSL Z540-2-1997 type B uncertainty for this test was 2.25%.

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period such materials shall be discarded without notice and the service life of this report by Architectural Testing will expire. Results obtained are tested 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. 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. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Tested By:

Reviewed By:

Simon Smeds
Technician

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

WSS:ss
A1443.01-301-46

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

- Appendix-A: Description Table Abbreviations (1)
- Appendix-B: CTS Calibration Data (1)
- Appendix-C: Surround Panel Wiring Diagram (1)
- Appendix-D: Baffle Wiring Diagram (1)
- Appendix-E: Submittal Form and Drawings (11)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	01/27/11	All	Original Report Issue. Work requested by Mr. Terry Hopgood of United States Aluminum

Appendix A: Description Table Abbreviations

CODE	Frame / Sash Types	DOOR DETAILS
A1	Aluminum w/ Vinyl Inserts (Caps)	N Not Applicable
AL	Aluminum	
AP	Aluminum w/ Thermal Breaks - Partial	
AS	Aluminum w/ Steel Reinforcement	
AT	Aluminum w/ Thermal Breaks - All Members (> 0.21")	
AU	Aluminum Thermally Improved - All Members (0.062" - 0.209")	
AV	Aluminum / Vinyl Composite	
AW	Aluminum-clad Wood	
FG	Fiberglass	
PA	ABS Plastic w/ All Members Reinforced	
PC	ABS Plastic-clad Aluminum	
PF	ABS Plastic w/ Foam-filled Insulation	
PH	ABS Plastic w/ Horizontal Members Reinforced	
PI	ABS Plastic w/ Reinforcement - Interlock	
PL	ABS Plastic	
PP	ABS Plastic w/ Reinforcement - Partial	
PV	ABS Plastic w/ Vertical Members Reinforced	
PW	ABS Plastic-clad Wood	
ST	Steel	
VA	Vinyl w/ All Members Reinforced	
VC	Vinyl-clad Aluminum	
VF	Vinyl w/ Foam-filled Insulation	
VH	Vinyl w/ Horizontal Members Reinforced	
VI	Vinyl w/ Reinforcement - Interlock	
VP	Vinyl w/ Reinforcement - Partial	
VV	Vinyl w/ Vertical Members Reinforced	
VW	Vinyl-clad Wood	
VY	Vinyl	
WA	Aluminum / Wood composite	
WD	Wood	
WV	Vinyl / Wood composite	
WF	Fiberglass/Wood Combination	
WC	Composite/Wood Composite (Shaped vinyl/wood composite members)	
CW	Copper Clad Wood	
CO	Vinyl/Wood Composite Material	

CODE	Tint Codes	DOOR DETAILS
AZ	Azurlite	
BL	Blue	
BZ	Bronze	
CL	Clear	
EV	Evergreen	
GD	Gold	
GR	Green	
GY	Gray	
LE	Low 'e' Coating	
OT	Other (use comment field)	
RC	Solar or Reflective Coating	
RG	Roller Shades between glazing	
RS	Silver (reflective coating)	
SF	Suspended Polyester Film	
SR	Silver	
BG	Blinds between the Glazing	
DV	Dynamic Glazing-Variable	
DY	Dynamic Glazing-NonVariable	

CODE	Spacer Sealant	DOOR DETAILS
D	Dual Seal Spacer System	
S	Single Seal Spacer System	

CODE	Grid Description	DOOR DETAILS
N	No Muntins	
G	Grids between glass	
S	Simulated Divided Lites	
T	True Muntins	

CODE	Grid Size Codes	DOOR DETAILS
	Blank for no grids	
0.75	Grids < 1"	
1.5	Grids >= 1"	

CODE	Gap Fill Codes	DOOR DETAILS
AIR	Air	
AR2	Argon/Krypton Mixture	
AR3	Argon / Krypton / Air	
ARG	Argon/Air	
CO2	Carbon Dioxide	
KRY	Krypton/Air	
SF6	Sulfur Hexaflouride	
XE2	Xenon/Krypton/Air	
XE3	Xenon/Argon/Air	
XEN	Xenon/Air	
N	Not Applicable	

CODE	Thermal Breaks	DOOR DETAILS
F	Foam	
U	Urethane	
V	Vinyl	
FB	Fiberglass	
O	Other	
AB	ABS	
NE	Neoprene	
AI	Air	
N	Not Applicable	
P	Polyamide	

Appendix B: CTS Calibration Data

1. CTS Test Date	03/09/10
2. CTS Size	24.00 ft ²
3. Glass Conductance	57.78 Btu/hr·ft ² ·F
4. CTS Core Conductance	0.33 Btu/hr·ft ² ·F
5. Warm Side Air Temperature	69.85 F
6. Cold Side Air Temperature	-0.67 F
7. Warm Side Average Surface Temperature	56.55 F
8. Cold Side Average Surface Temperature	2.95 F
9. Convection Coefficient (K _c)	0.31 Btu/(hr·ft ² ·F ^{1.25})
10. Measured Cold Side Surface Conductance (h _c)	5.29 Btu/hr·ft ² ·F
11. Measured Thermal Transmittance	0.25 Btu/hr·ft ² ·F

Appendix C: Surround Panel Wiring Diagram

+1

+2

+3

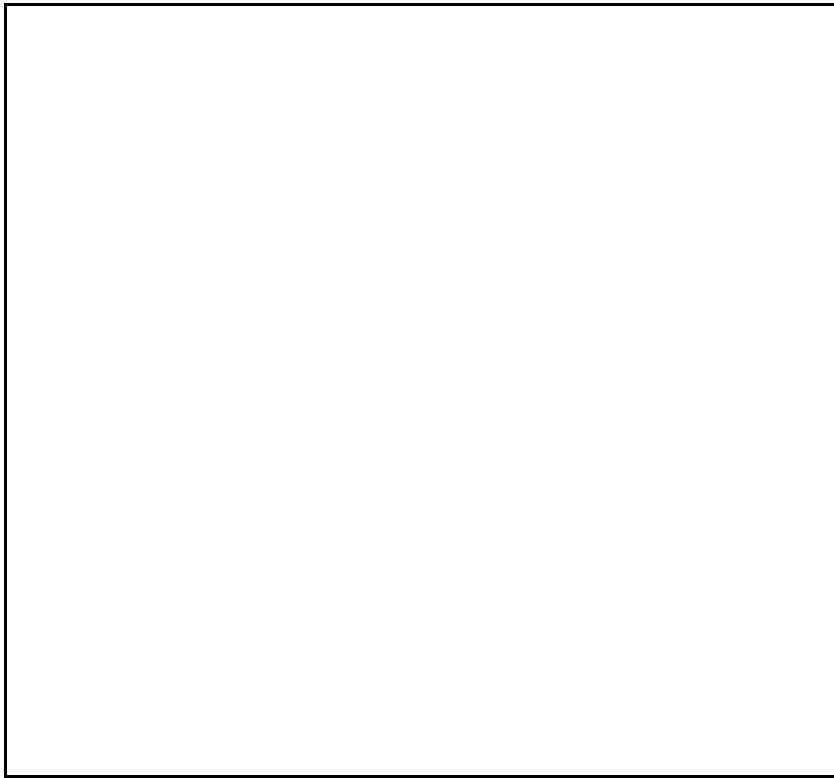
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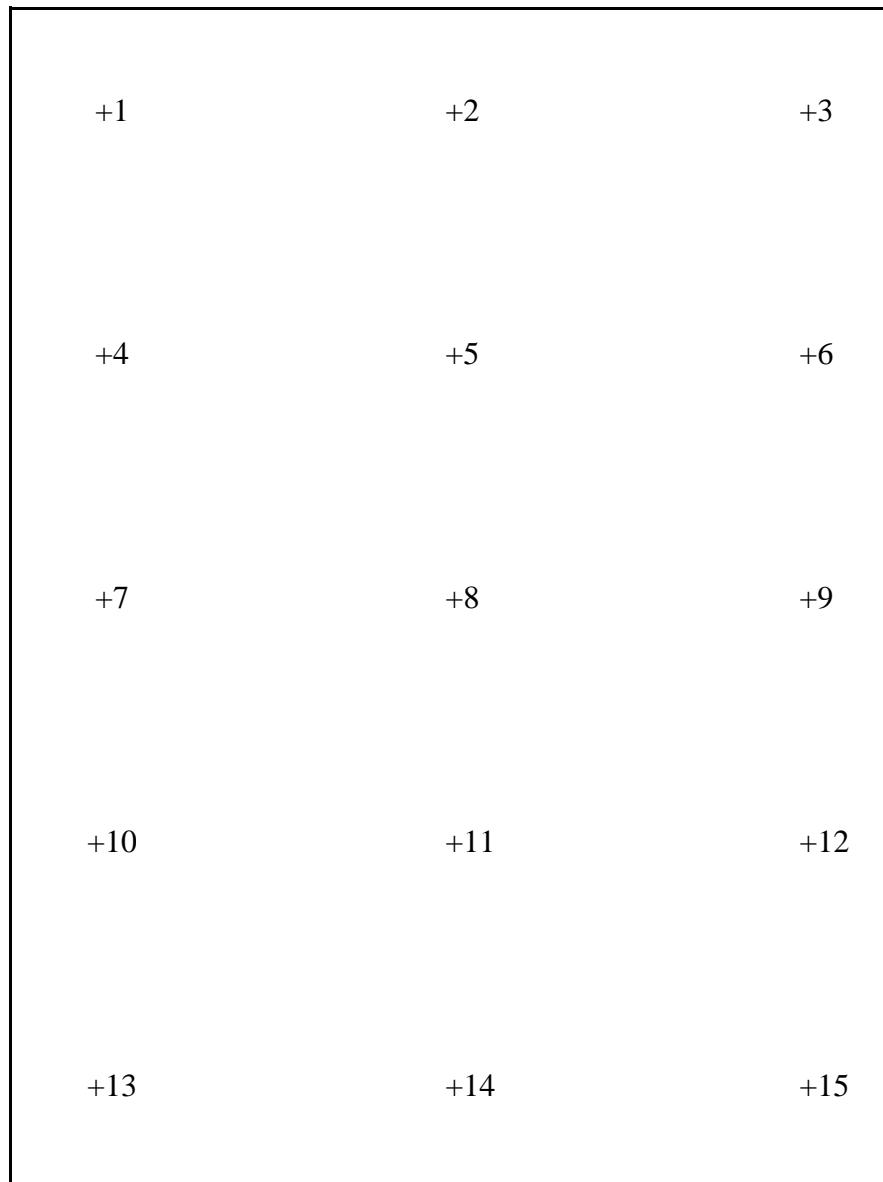
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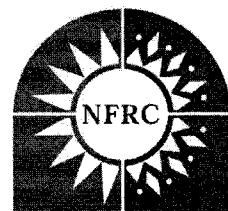
Appendix D: Baffle Wiring Diagram

Appendix E: 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: U.S. Aluminum

Date of sample manufacture: 11/1/10

Plant Address where manufactured: 200 Singleton Drive

City: Waxahachie

State: Texas

Zip Code: 75165

Name of IA: ALI

Phone: 972-937-9651

Fax: 972-937-5467

2. Product Information (complete ALL fields):

Product Line ID (CPD) No.:

Product/Operator Type
(Table 4-3 of NFRC 100):

Series/Model: 8100 Fixed Window

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, Terry Hopgood, as the designated agent for U.S. 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: 1/26/10

FOR LABORATORY USE ONLY

1. Laboratory Architectural Testing, Inc
2. Date Sample Received: 11/17/10 File number ID: A1443.01-301-46
3. Date Sample Tested: 11/25/10 By: William Smeds
4. Modifications made: IGU Drilled prior to testing. Initial center of flexure exceeded allowable
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.]

BILL OF MATERIALS FOR 8000 SERIES SINGLE HUNG WINDOW

ITEM #	EXTRUSION	PART NO	DESCRIPTION	COMMENTS	VENDOR	VENDOR PART NUMBER	QTY..	FINISHES	
								CLASS I CLEAR	BRONZE
F1		PW801	4-1/2" FRAME HEAD	COLOR TO MATCH P. O.	INTEX		1		
F2		PW801	4-1/2" FRAME SILL	COLOR TO MATCH P. O.	INTEX		1		
F3		PW802	4-1/2" FRAME JAMB	COLOR TO MATCH P. O.	INTEX		2		
F4		SH865	GLAZING BEAD <BLAST>	COLOR TO MATCH P. O.	INTEX	61595	4		
F5		PW804	SILL INSERT	COLOR TO MATCH P. O.	INTEX		4		
F6		PW803	PICTURE WINDOW COVER	COLOR TO MATCH P. O.	INTEX		4		
F7		NP881	INTERIOR GLAZING GASKET	BLACK	TREMCO	TX1805BE	4	BLACK	
F8		NP825	EXTERIOR GLAZING GASKET	BLACK	TREMCO	TR-14677E	4	BLACK	
F9		WH809	HEAD PVC ISOLATOR	GRAY H-81414 42 "C" (SEE NOTE# 3)	TEK PARTS/BANDLOCK		1	GRAY H-81414 42 "C" (SEE NOTE# 3)	BLACK #C10385
F10		WH809	SILL PVC ISOLATOR	GRAY H-81414 42 "C" (SEE NOTE# 3)	TEK PARTS/BANDLOCK		1	GRAY H-81414 42 "C" (SEE NOTE# 3)	BLACK #C10385
F11		WH809	JAMB PVC ISOLATOR	GRAY H-81414 42 "C" (SEE NOTE# 3)	TEK PARTS/BANDLOCK		2	GRAY H-81414 42 "C" (SEE NOTE# 3)	BLACK #C10385
SP1		WH276	WEEP HOLE COVER	MEDIUM GRAY (NOTE 2)	ASTND EJECTION MOLDING		2		
SP2		SB881	FIXED SETTING BLOCK	BLACK	TREMCO	TX18060E	2		
SP3		WB507	EDGE BLOCK	FIXED PANEL	TREMCO	TR-1870E	8		
G1			1/8" INSULATED BLAST GLASS (.050 + 1/8" + 1/8" + .050 PVB + 1/8")	FIXED GLASS			1		
FA1		ST196(42)	#8 x 1" PHIL HEX WASHER HD SMS TYPE AB SS	FRAME (10)			10		
LB1		LU801	USAC LOGO WITH INSTRUCTIONS		USAC PRINTER		1		
LB2		LU901	AAMA LABEL	AAMA CERT. + SECURITY TAB + NFRC TAP	ALI		1		
LB3		LU911	NFRC TEMPORARY LABEL		USAC/SC		1		
LB4		LU921	NFRC PERMIT LABEL		USAC PRINTER		1		
LB5		LB006	THIS SIDE UP LABEL		USAC PRINTER		1		

NOTE:

1. ALL PARTS MUST BE U.S. MADE.
2. ALL NYLON MOLDED PARTS TO MATCH WITH CLEAR ANODIZING TO BE GR21
(PRESSURE CHIP IS CSBK75EN FROM:

COLOR SCIENCE
1230 GLENWOOD PLACE
SANTA ANA, CA 92707-3000
714/434-1030

3. COLOR: L = +71.60

UNITED STATES ALUMINUM

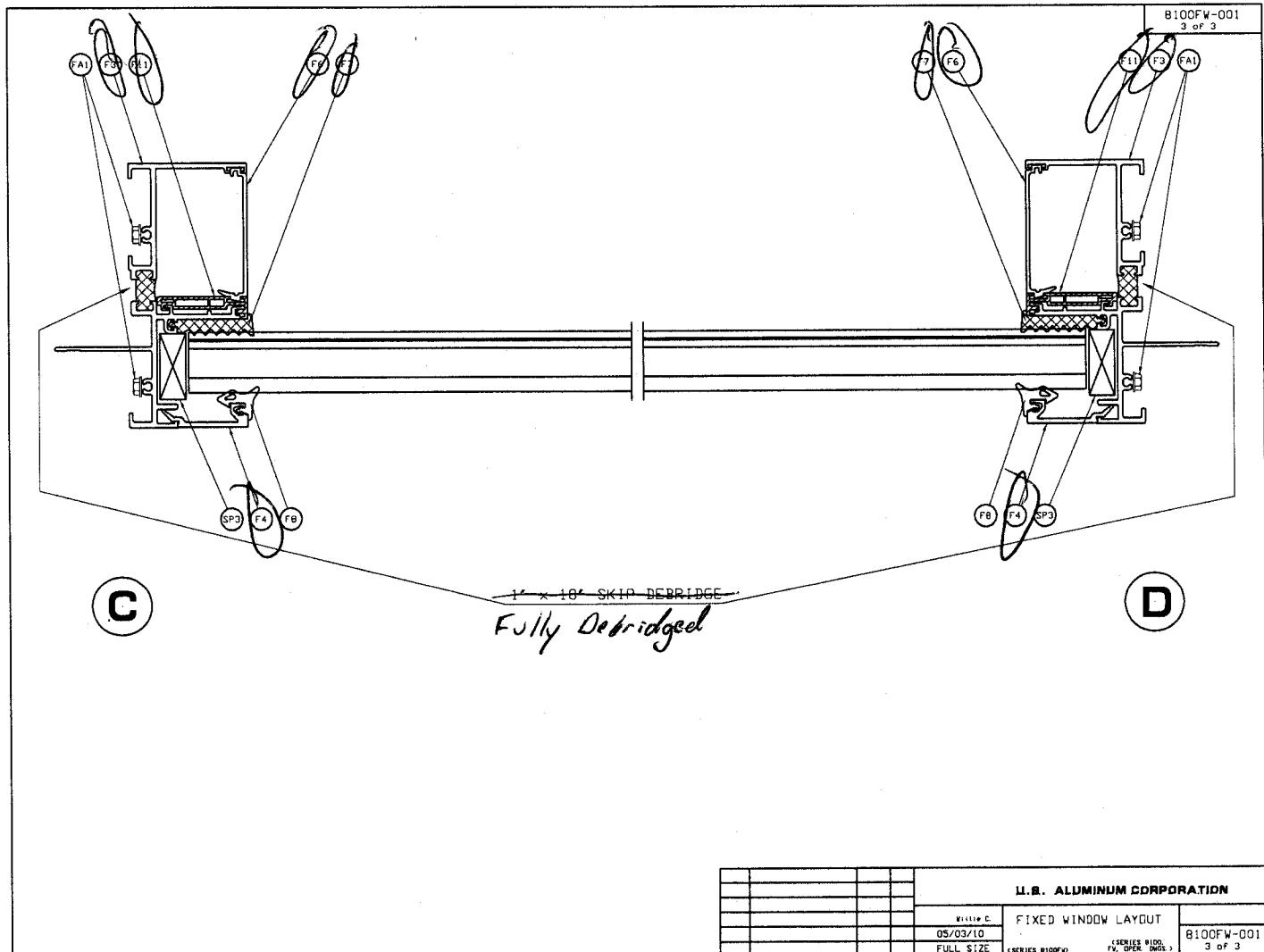
Architectural Testing, Inc.
Test sample complies with these details
deviations are noted

A 1 4 4 3

DEC 29 2010

Report #
Tech

Date



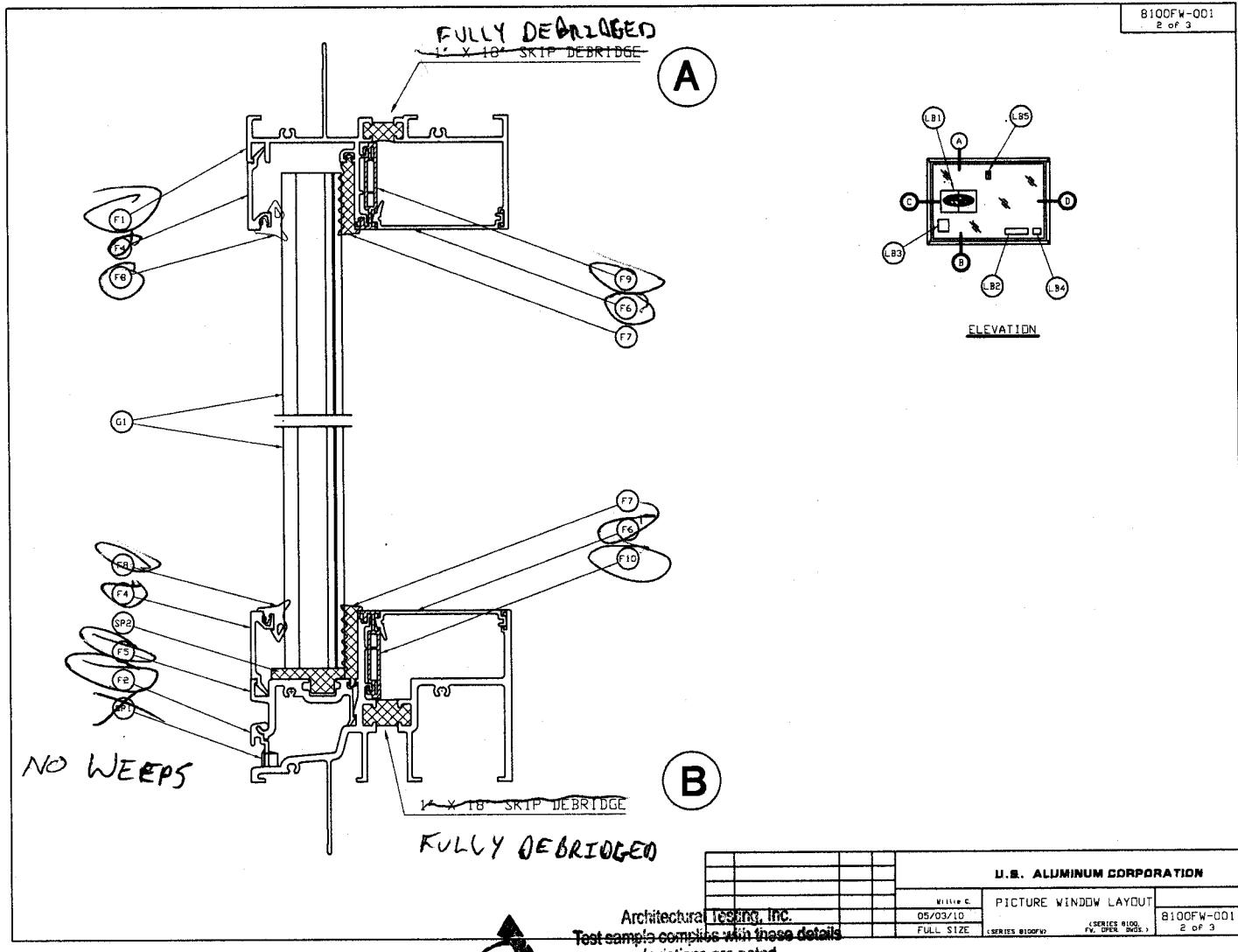
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DEC 29 2010

Report #
Tech

Date



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Date



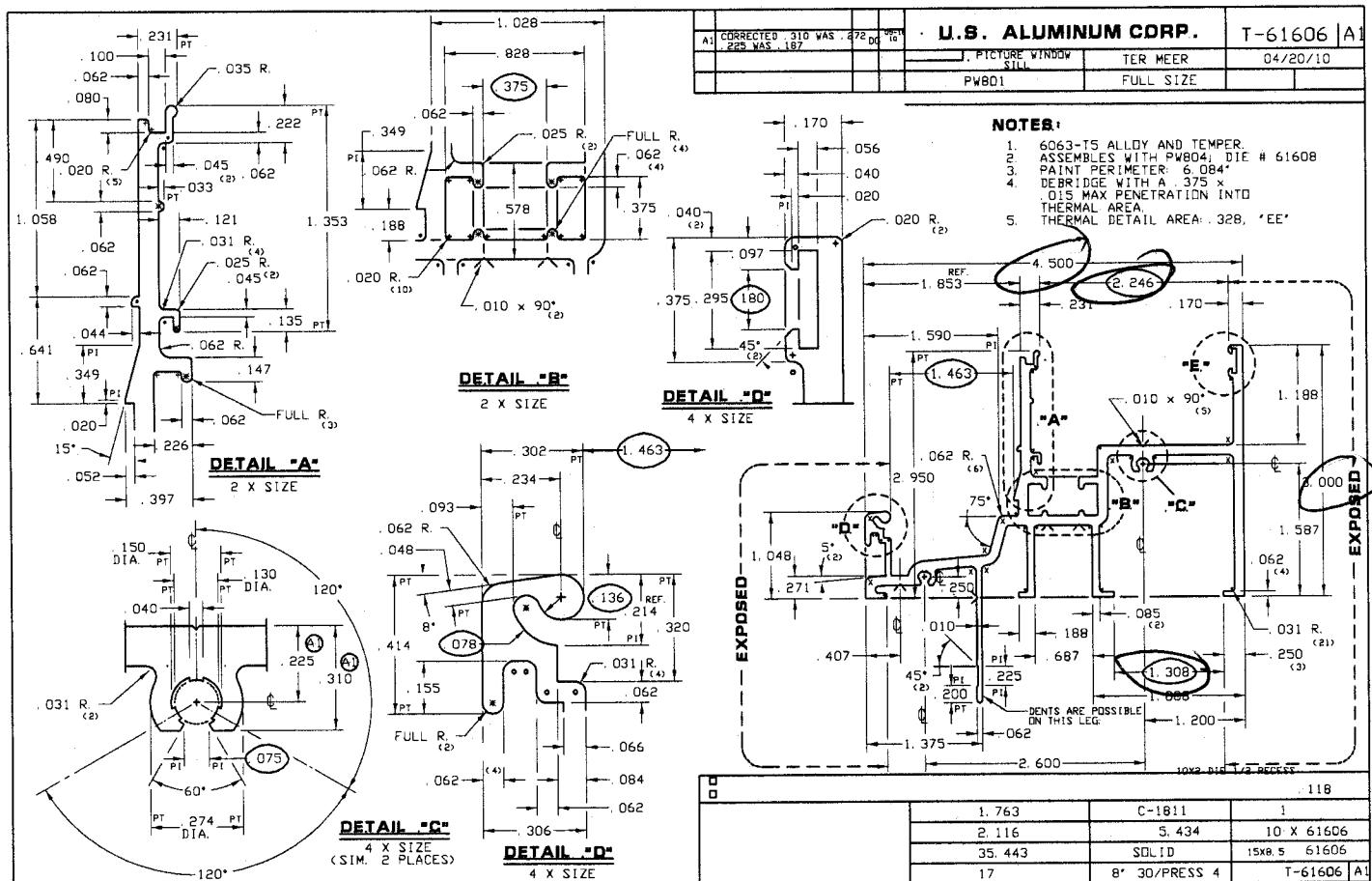
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Tech

Date





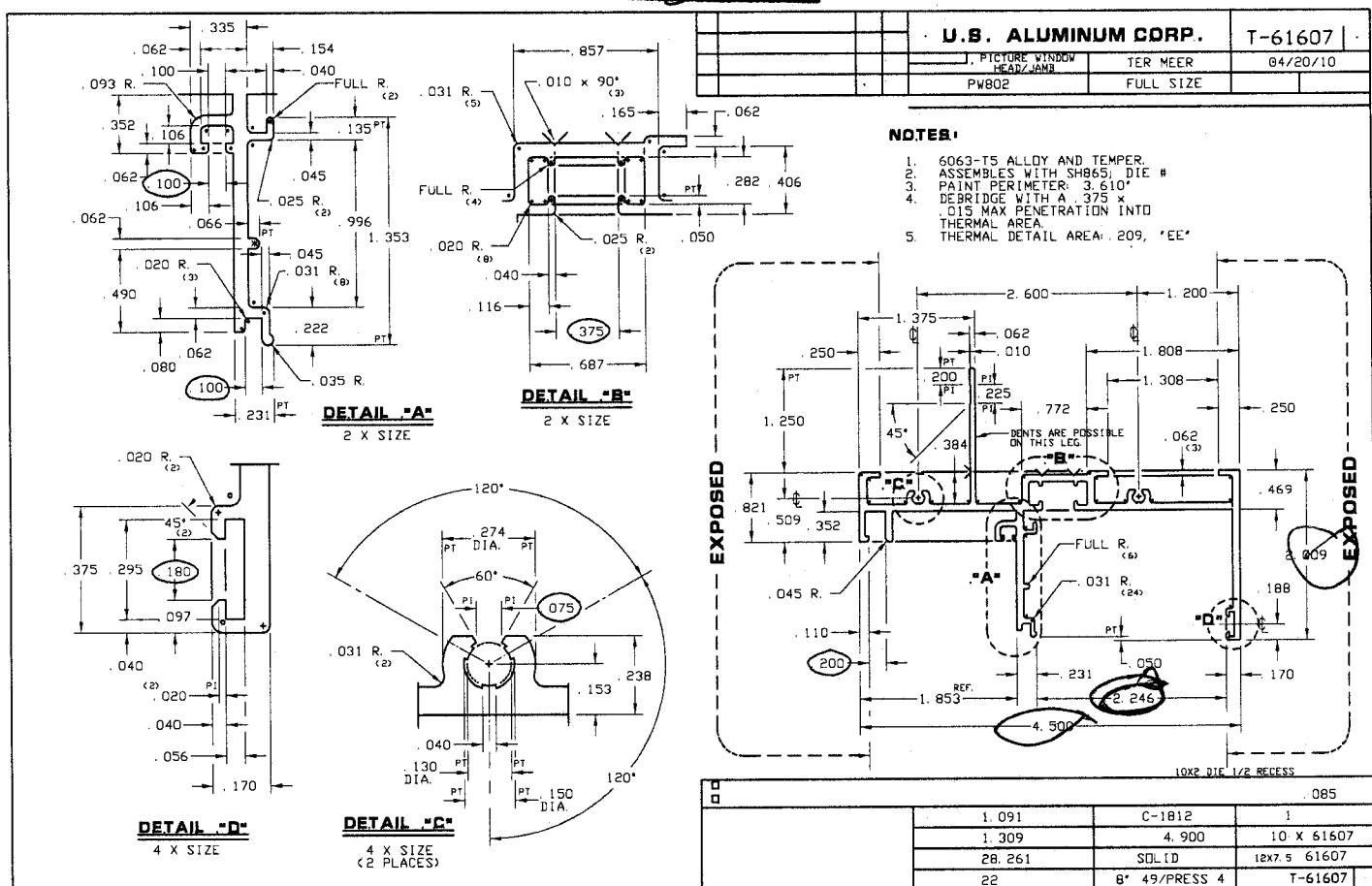
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Date



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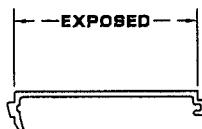
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DEC 22 2010

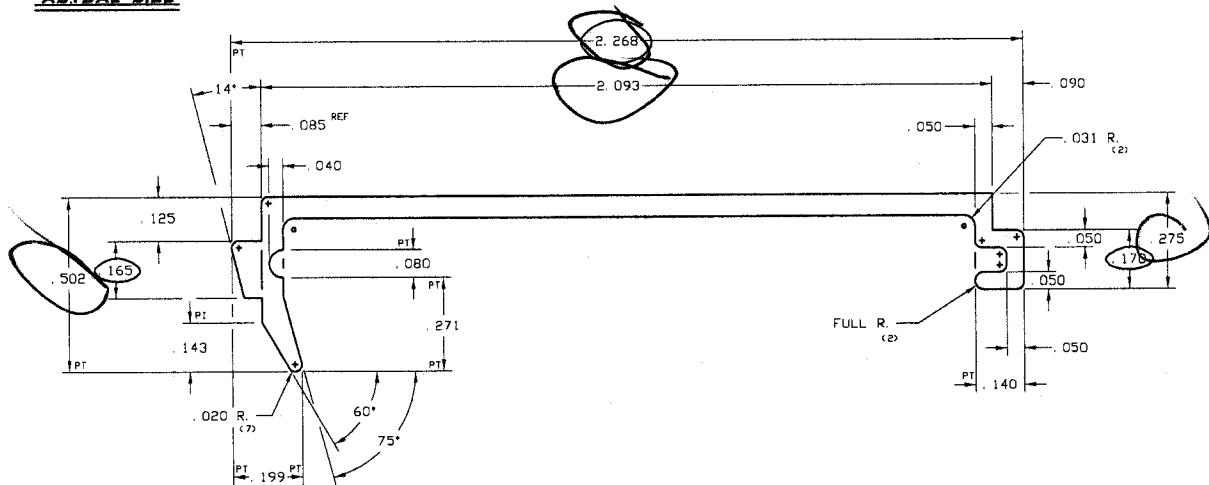
Report #
Tech

Date _____



U.S. ALUMINUM CORP..		T-61608
PICTURE WINDOW COVER	TER MEER	4/20/10
PW803	4 X SIZE	

ACTUAL SIZE



NOTES.

1. 6063-T5 ALLOY AND TEMPER.
2. PAINT PERIMETER: 2.093"
3. ASSEMBLES WITH PW801; DIE # 61606
WH809; DIE #

10X2 PIE 1/2 RECESS

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	062
	.186	C-1810
	.223	2.271
	6.042	SDL ID
	27	7" 73/PRESS 3
		STD-3
		T-61608



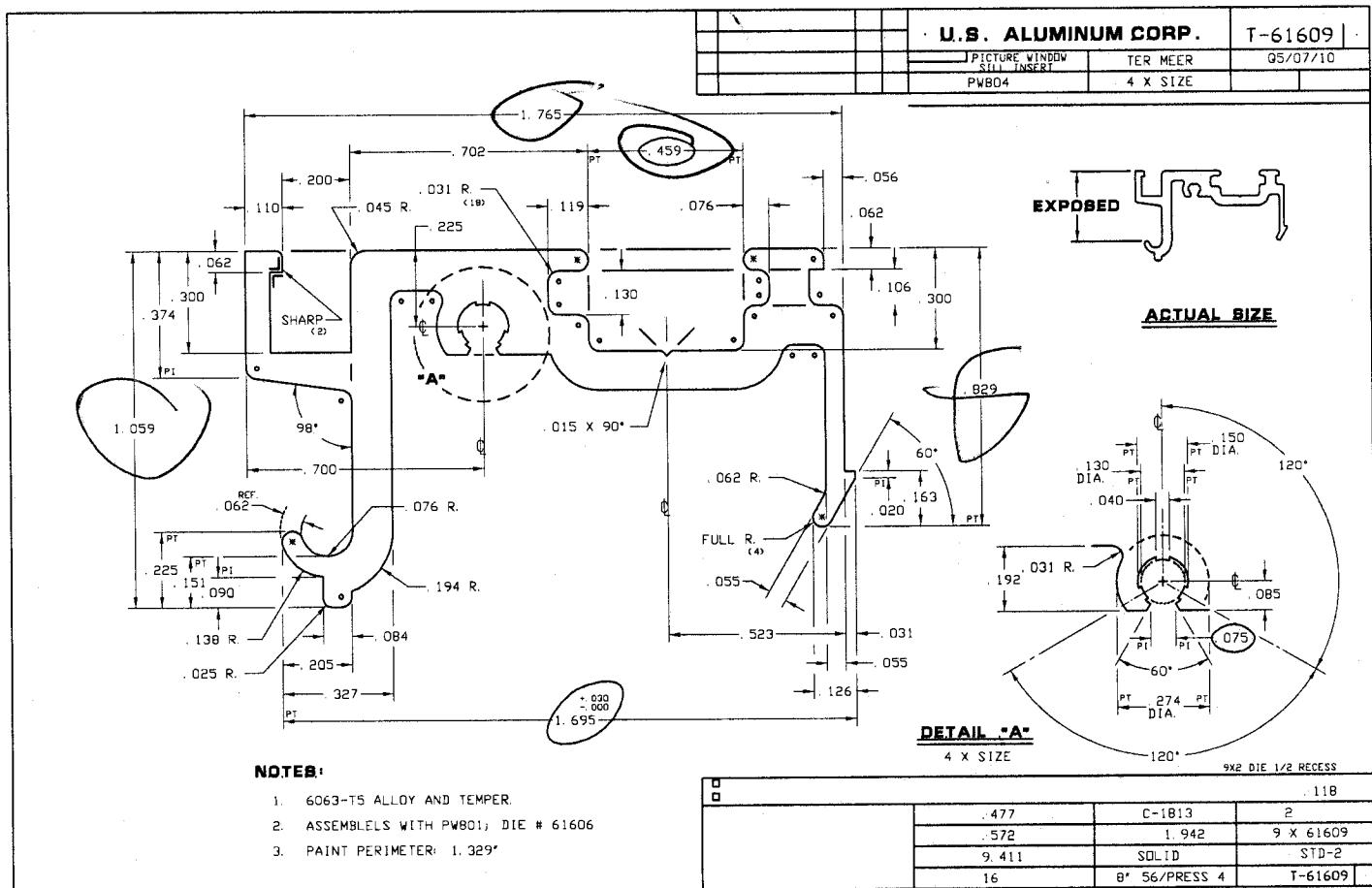
Architectural Testing, Inc.
Test sample complies with these details
deviations are noted

A 1 4 4 3

DEC 22 2010

Report #
Tech

Date





Architectural Testing, Inc.
Test sample complies with these details
deviations are noted

A 1443 DEC 22 2010

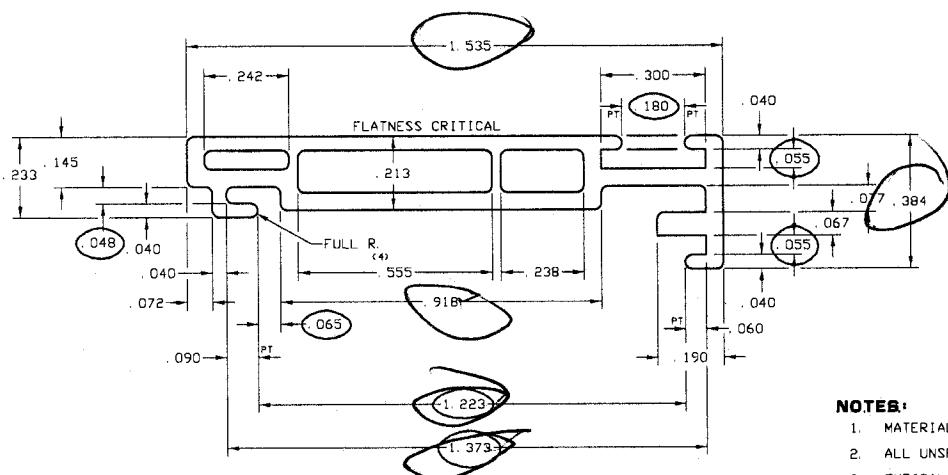
Report # 12345 Date 10/10/10
Tech John Doe

8000SH-038B

REF. DRAWING: IW1841



ACTUAL SIZE



RADIUS SCHEDULE

s	-	SHARP
a	-	.006 R.
b	-	.012 R.
c	-	.015 R.
d	-	.020 R.
e	-	.030 R.
f	-	.045 R.
g	-	.060 R.

NOTES:

1. MATERIAL: RIGID PVC TO MEET AAMA 303-07
2. ALL UNSPECIFIED RADII = .020
3. TYPICAL EXTERIOR WALL THICKNESS: .050
TYPICAL INTERIOR WALL THICKNESS: .025
4. AREA: .181
5. MINIMUM SHEEN ALLOWED 56.0 USING A
GARDNER MICRO-GLOSS 60° GLOSS METER.
6. TOLERANCE UNLESS OTHERWISE NOTED $\pm .012$
7. WALL THICKNESS TOLERANCE TO BE $\pm .006$

RELEASE FOR PRODUCTION
DATE: MARCH 9, 2010
APPRV'D BY JOHN FREY

© 2009 COPYRIGHT. ALL RIGHTS RESERVED.

AMT 30: SOURCE: FDP. THIS ENCLOSED SHAPES APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE.

INTERNATIONAL WINDOW CORP.

 INTERNATIONAL WINDOW CORP.			
 JAMB THERMO ISOLATOR			
Willie C.		02/05/08	
ADDED NOTES 6 & 7		03/10/10	
RT		02/05/08	
4 x \$125		SERIES 8900 (WH809)	
(B)		8000SH-0308	

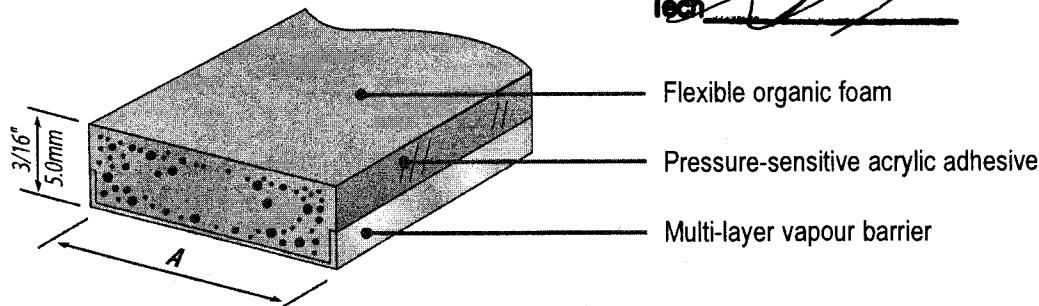
Super Spacer®

A 1443

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Report #
Tech

Date



(A) Width mm	(A) Width inches	Meter/ Reel 3.281	Feet/ Reel	Meter/ Auto Reel	Feet/ Auto Reel
4.8	3/16	610	2000	N/A	N/A
6.4	1/4	457	1500	1372	4500
7.9	5/16	335	1100	1006	3300
9.5	3/8	305	1000	914	3000
11.1	7/16	274	900	823	2700
11.9	15/32	244	800	731	2400
12.7	1/2	244	800	731	2400
14.3	9/16	213	700	640	2100
15.9	5/8	206	675	617	2025
17.5	11/16	183	600	549	1800
19.1	3/4	175	575	526	1725
20	0.798	152	500	457	1500

Spacer Sizes

Super Spacer Standard is available in a standard 5mm (3/16") thickness and a full range of spacer widths from 4.8mm (3/16") to 20mm (.798").

Continuous Packaged Length

For regular insulating-glass production, Super Spacer Standard is supplied on reels with the continuous packaged length varying depending on the spacer width.

Protective Packaging

To provide desiccant protection, the reels are sealed in moisture-proof foil bags and then packaged in high-density polyethylene bags. These double-packaged reels are then shipped in recyclable cardboard boxes.

Desiccant Systems

Over 40% by spacer weight is desiccant material, and the low-deflection blend primarily consists of 3A molecular-sieve material.