Architectural Testing

NFRC 102-2010 THERMAL PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM

SERIES/MODEL: 7400

TYPE: Fixed

Summary of Results	
Standardized Thermal Transmittance (U-Factor)	0.37
Unit Size	47-1/4" x 59-1/8" (1200 mm x 1502 mm) (Model Size)
Layer 1	1/4" AFG Comfort Ti-AC36 (e=0.034*, #2)
Gap	0.50" Gap, Super Spacer Premium (ZF-D), 100% Air-Filled*
Layer 2	1/4" Clear

Reference must be made to Report No. A3935.01-301-46, dated 10/28/10 for complete test specimen description and data.

2524 E. Jensen Ave
Fresno, CA 93706
phone: 559-233-8705
fax: 559-233-8360
www.archtest.com

Architectural Testing

NFRC 102-2010 THERMAL PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM
200 Singleton Drive
Waxahachie, Texas 75165

Report Number:	A3935.01-301-46
Test Date:	10/21/10
Report Date:	10/28/10
Test Record Retention Date:	10/21/14

Test Sample Identification:

Series/Model: 7400

Type: Fixed

Overall Size: 47-1/4" x 59-1/8" (1200 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}): 0.37 Btu/hr·ft^2·F CTS Method

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Fresno, CA 93706
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Test Sample Description:

CONSTRUCTION	**Frame**
Size (in.)	47-1/4 x 59-1/8
Daylight Opening (in.)	43-5/8 x 55-1/2
CORNERS	Coped
Fasteners	Screws
Sealant	Yes
MATERIAL	AT (0.36")
Color Exterior	Gray
Finish Exterior	Paint
Color Interior	Gray
Finish Interior	Paint
GLAZING METHOD	Interior

Glazing Information:

Layer 1	1/4" AFG Comfort Ti-AC36 (e=0.034*, #2)
Gap	0.50" Gap, Super Spacer Premium (ZF-D), 100% Air-Filled*
Layer 2	1/4" 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			
	None		
HARDWARE			
	None		
DRAINAGE			
	None		

Thermal Transmittance (U-factor)

Measured Test Data

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	614.37	Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	49.67	Btu/hr
3. Surround Panel Thickness	4.00	inches
4. Surround Panel Conductance	0.0437	Btu/hr·ft^2·F
5. Metering Box Wall Heat Flow (Q_{mb})	23.86	Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0243*EMF + -1.349	
7. Flanking Loss Heat Flow (Q_{fl})	14.07	Btu/hr
8. Net Specimen Heat Loss (Q_s)	526.77	Btu/hr

Areas

1. Test Specimen Projected Area (A_s)	19.40	ft^2
2. Test Specimen Interior Total (3-D) Surface Area (A_h)	21.09	ft^2
3. Test Specimen Exterior Total (3-D) Surface Area (A_c)	20.20	ft^2
4. Metering Box Opening Area (A_{mb})	36.47	ft^2
5. Metering Box Baffle Area (A_{bl})	32.13	ft^2
6. Surround Panel Interior Exposed Area (A_{sp})	17.07	ft^2

Test Conditions

1. Average Metering Room Air Temperature (t_h)	69.79	F
2. Average Cold Side Air Temperature (t_c)	-0.65	F
3. Average Guard/Environmental Air Temperature	71.99	F
4. Metering Room Average Relative Humidity	8.56	%
5. Metering Room Maximum Relative Humidity	8.89	%
6. Metering Room Minimum Relative Humidity	8.22	%
7. Measured Cold Side Wind Velocity (Perpendicular Flow)	15.09	mph
8. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"	H_2O

Results

1. Thermal Transmittance of Test Specimen (U_s)	0.39	Btu/hr·ft^2·F
2. Standardized Thermal Transmittance of Test Specimen (U_{st})	0.37	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	51.07	F
9. Equivalent Cold Side Surface Temperature	4.69	F
10. Warm Side Baffle Surface Temperature	69.64	F
11. Measured Warm Side Surface Conductance (h_h)	1.45	Btu/hr·ft^2·F
12. Measured Cold Side Surface Conductance (h_c)	5.08	Btu/hr·ft^2·F
13. Test Specimen Thermal Conductance (C_s)	0.59	Btu/hr·ft^2·F
14. Convection Coefficient (K_c)	0.34	Btu/(hr·ft^2·F$^{1.25}$)
15. Radiative Test Specimen Heat Flow (Q_{r1})	271.76	Btu/hr
16. Conductive Test Specimen Heat Flow (Q_{c1})	255.02	Btu/hr
17. Radiative Heat Flux of Test Specimen (q_{r1})	14.01	Btu/hr·ft^2·F
18. Convective Heat Flux of Test Specimen (q_{c1})	13.14	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})	0.37	Btu/hr·ft^2·F

Test Duration

1. The environmental systems were started at 10:23 hours, 10/20/10.
2. The test parameters were considered stable for two consecutive four hour test periods from 00:10 hours, 10/21/10 to 08:10 hours, 10/21/10.
3. The thermal performance test results were derived from 04:10 hours, 10/21/10 to 08:10 hours, 10/21/10.

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

Glazing Deflection (in):

	Glazing
Edge Gap Width	0.50
Estimated center gap width upon receipt of specimen in laboratory (after stabilization)	0.25
Center gap width at laboratory ambient conditions on day of testing	0.50
Center gap width at test conditions	0.32

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 1.91%.

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:

Digitally Signed by: William Smeds

Simon Smeds
Technician

Reviewed By:

Digitally Signed by:Kenny C. White

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

WSS:ss
A3935.01-301-46

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 (12)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	10/28/10	All	Original Report Issue. Work requested by Mr. Don Willard of United States Aluminum

Appendix A: Description Table Abbreviations

CODE	Frame / Sash Types
AI	Aluminum w/ Vinyl Inserts (Caps)
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	Spacer Types (See sealant)
A1	Aluminum
A2	Aluminum (Thermally-broken)
A3	Aluminum-reinforced Polymer
A4	Aluminum / Wood
A5	Aluminum-reinforced Butyl (Swiggle)
A6	Aluminum / Foam / Aluminum
A7	Aluminum U-shaped
A8	Aluminum-Butyl (Corrugated) (Duraseal)
ER	EPDM Reinforced Butyl
FG	Fiberglass
GL	Glass
OF	Organic Foam
P1	Duralite
PU	Polyurethane Foam
SU	Stainless Steel, U-shaped
CU	Coated Steel, U-shaped (Intercept)
S2	Steel (Thermally-broken)
S3	Steel / Foam / Steel
S5	Steel-reinforced Butyl
S6	Steel U-channel w/ Thermal Cap
SS	Stainless Steel
CS	Coated Steel
TP	Thermo-plastic
WD	Wood
ZE	Elastomeric Silicone Foam
ZF	Silicone Foam
ZS	Silicone / Steel
N	Not Applicable
TS	Thermo-plastic w/ stainless steel substrate

CODE	Tint Codes
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	Gap Fill Codes
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

DOOR DETAILS	
N	Not Applicable
CODE	Door Type
EM	Embossed
FL	Flush
LF	Full Lite
LH	1/2 - Lite
LQ	1/4 - Lite
LT	3/4 - Lite
RP	Raised Panel
CODE	Skin
AL	Aluminum
FG	Fiberglass
GS	Galvanized Steel
ST	Steel
WD	Wood
VY	Vinyl
CODE	Panel
FG	Fiberglass
PL	Plastic
WP	Wood - Plywood
WS	Wood - Solid
CODE	Sub-Structure
GS	Galvanized Steel
ST	Steel
WD	Wood
VY	Vinyl
CODE	Core Fill
CH	Cellular - Honeycomb
EP	Expanded Polystyrene
PI	Polyisocyanurate
PU	Polyurethane
WP	Wood - Plywood
WS	Wood - Solid
XP	Extruded Polystyrene

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

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

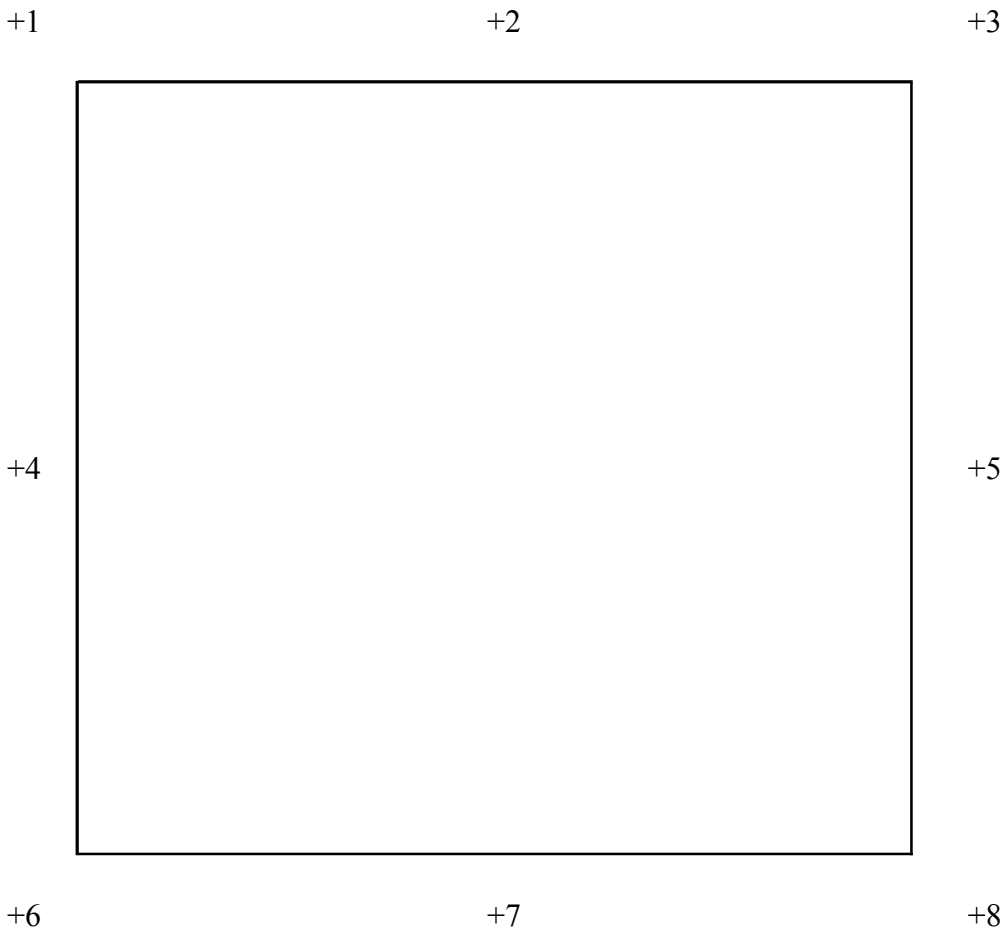
CODE	Grid Size Codes
	Blank for no grids
0.75	Grids < 1"
1.5	Grids >= 1"

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

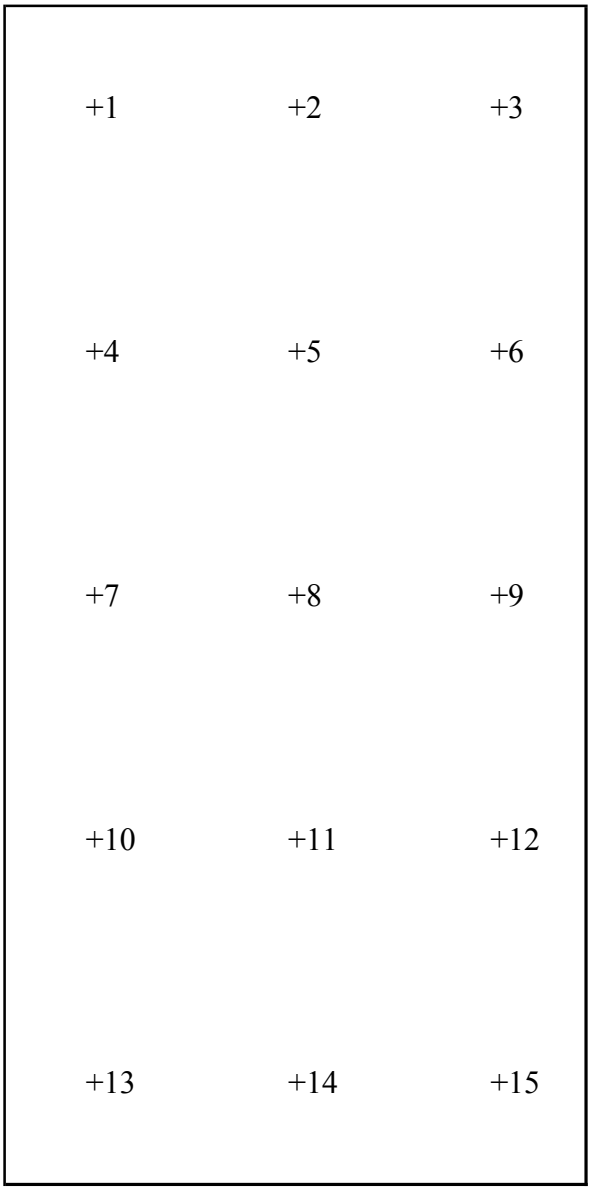
Appendix B: CTS Calibration Data

1.	CTS Test Date	02/23/10	
2.	CTS Size	24.00	ft^2
3.	Glass Conductance	57.78	$Btu/hr \cdot ft^2 \cdot F$
4.	CTS Core Conductance	0.33	$Btu/hr \cdot ft^2 \cdot F$
5.	Warm Side Air Temperature	69.80	F
6.	Cold Side Air Temperature	-0.33	F
7.	Warm Side Average Surface Temperature	56.80	F
8.	Cold Side Average Surface Temperature	3.41	F
9.	Convection Coefficient (K_c)	0.34	$Btu/(hr \cdot ft^2 \cdot F^{1.25})$
10.	Measured Cold Side Surface Conductance (h_c)	5.08	$Btu/hr \cdot ft^2 \cdot F$
11.	Measured Thermal Transmittance	0.26	$Btu/hr \cdot ft^2 \cdot F$

Appendix C: Surround Panel Wiring Diagram



Appendix D: Baffle Wiring Diagram



BILL OF MATERIALS

	ITEM	I. E. C. PART NO	PART NO	DESCRIPTION	QTY.	SUPPLIER	PART NO	COMMENTS	UNITS
FRAME	1	T-60929	WN 414	FRAME HEAD/SILL INSIDE	2	INTEX-TX			LBS.
	2	T-60928	WN 413	FRAME HEAD/SILL OUTSIDE	2	INTEX-TX			LBS.
	3	T-60930	WN 416	FRAME JAMB INSIDE	2	INTEX-TX			LBS.
	4	T-60960	WN 415	FRAME JAMB OUTSIDE	2	INTEX-TX			LBS.
	5	T-60939	WN 429	ONE INCH GLASS STOP	4	INTEX-TX			LBS.
	6		(B) TB146	14.6 mm THERMOBAR	8	ENSINGER	2280		LBS.
FASTENERS	7		(B) ST252	#10 AB x 1" PH PAN HD SMS S.S.	8			FRAME SCREWS	PCS.
GLAZING	8			1" GLASS	1				SQ. FT.
	9		(C) GT416	1/8" x 1/2" PRESHIM TAPE	A/R				FT.
	10			SILICONE CAP BEAD	A/R	TREMCO	SPEC II		FT.
	11		SB-222	SETTING BLOCK (.250 x 1" x 4")	2	RYKO			FT.
	12		(C)						FT.
VINYLS AND GASKETS	13		WH 344	WEDGE GASKET	A/R				FT.

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

A3935 OCT 28 2010

Report # Date

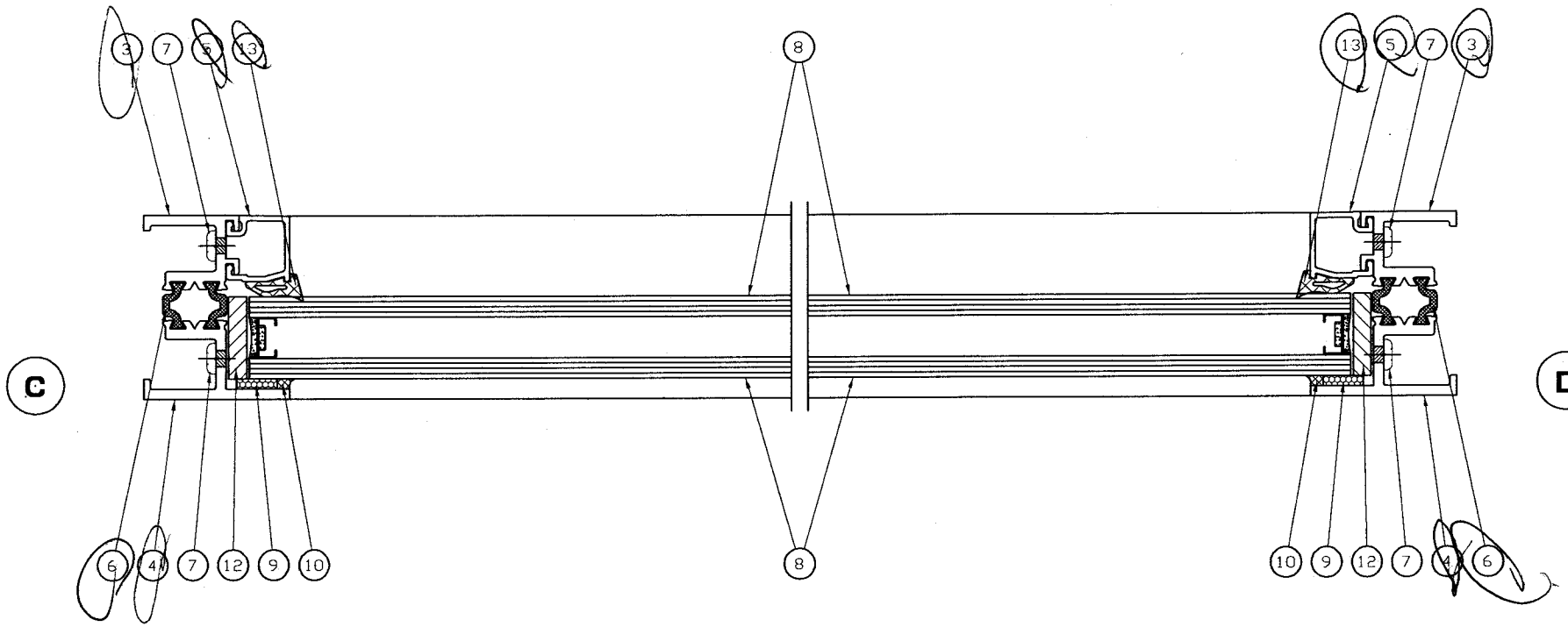
Tech

(C)	REVISED AS NOTED	08/27/10	DCW	Willie C.
(B)	REVISED AS NOTED	08/19/02	WCC	04/13/02

UNITED STATES ALUMINUM

BILL OF MATERIALS
FOR FIXED WINDOW
(SERIES 7400)

7400-004C
1 of 3



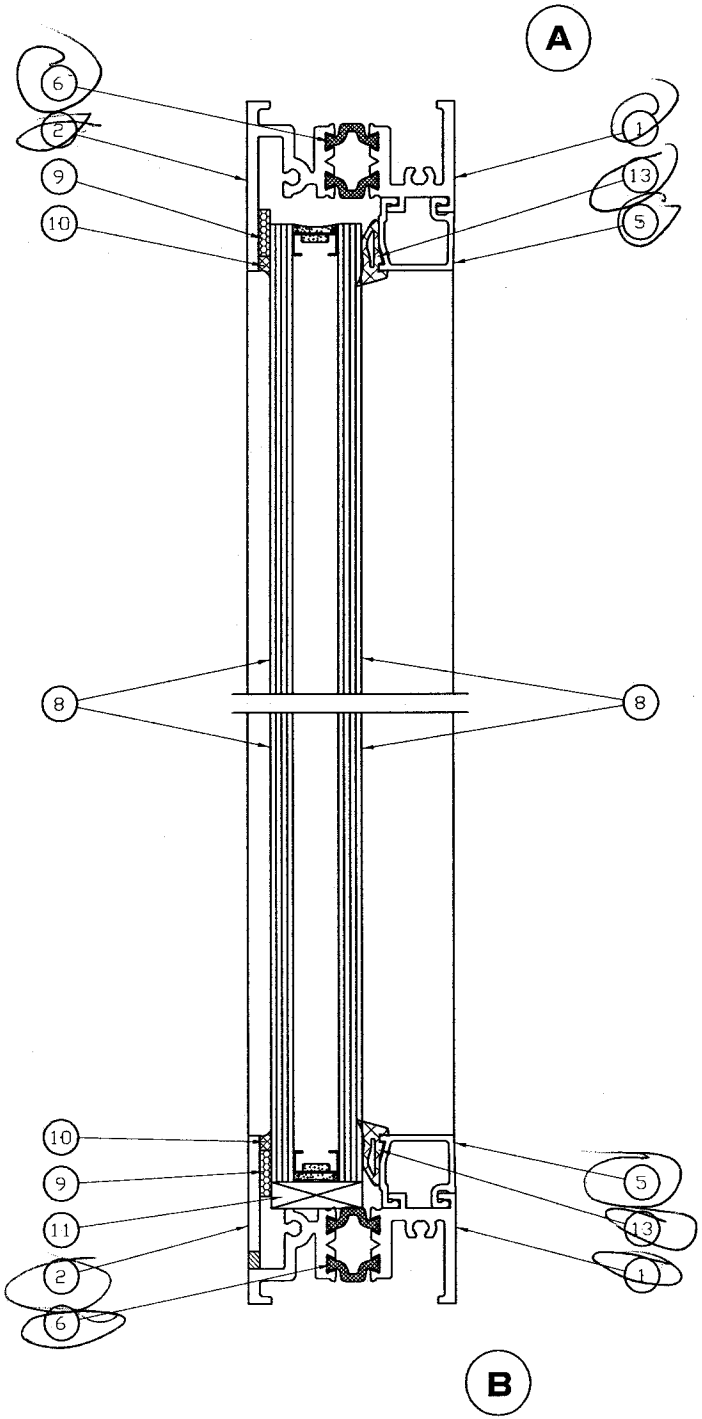
Architectural Testing, Inc.
Test sample complies with these details
deviations are noted

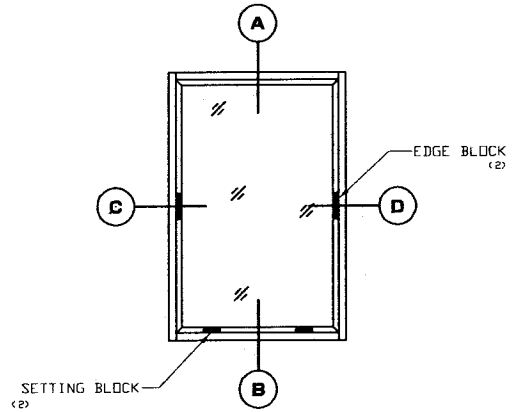
A 3 9 3 5 OCT 28 2010

Report # Date

Tech

				UNITED STATES ALUMINUM		
C	REVISED AS NOTED	08/27/10	DCW	Willie C.	FIXED WINDOW LAYOUT	
B	REVISED AS NOTED	08/19/02	WCC	05/13/02		7400-004C 3 of 3
				FULL SIZE	(SERIES 7400)	





ELEVATION

NO SCALE

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

A 3 9 3 5 OCT 28 2010

Report # Date

Tech

				UNITED STATES ALUMINUM		
C	REVISED AS NOTED	08/27/10	DCW	Willie C.	FIXED WINDOW LAYOUT	7400-004C 2 of 3
B	REVISED AS NOTED	08/19 02	WCC	05/13/02		
				FULL SIZE	(SERIES 7400)	