Architectural Testing

AAMA 1503-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM

SERIES/MODEL: 7400 PI
TYPE: Projecting (Awning)

Summary of Results	
Thermal Transmittance (U-Factor)	0.48
Condensation Resistance Factor - Frame (CRF_f)	55
Condensation Resistance Factor - Glass (CRF_g)	65

Unit Size	23-5/8" x 59" (600 mm x 1499 mm)
Layer 1	1/4" AFG Comfort Ti-AC36 (e=0.034*, #2)
Gap	0.50" Gap, Super Spacer Standard (OF-S), 100% Air-Filled*
Layer 2	1/4" Clear

Reference must be made to Report No. A4476.02-301-46, dated 12/07/10 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

AAMA 1503-09 THERMAL PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM
200 Singleton Drive
Waxahachie, Texas 75165

Report Number:	A4476.02-301-46
Test Date:	11/26/10
Report Date:	12/07/10
Test Record Retention Date:	11/26/14

Test Sample Identification:

Series/Model: 7400 PI

Type: Projecting (Awning)

Test Sample Submitted by: Client

Test Procedure: The condensation resistance factor (CRF) and thermal transmittance (U) were determined in accordance with AAMA 1503-09, *Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections*

1. Average warm side ambient temperature 69.80 F
2. Average cold side ambient temperature -0.16 F
3. 15 mph dynamic wind applied to test specimen exterior.
4. 0.0" $\pm$0.04" static pressure drop across specimen.

Test Results Summary:

1. Condensation resistance factor - Frame (CRF_f) 55
   Condensation resistance factor - Glass (CRF_g) 65
2. Thermal transmittance due to conduction (U) 0.48
   (U-factors expressed in Btu/hr·ft^2·F)

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

Test Sample Description:

CONSTRUCTION	Frame	Vent
Size (in.) Non-Standard	23-5/8 x 59	19-3/4 x 55-1/8
Daylight Opening (in.)	N/A	16-1/2 x 52
CORNERS	Square Cut	Mitered
Fasteners	Screws	Corner Keys
Sealant	Yes	Yes
MATERIAL	AT (0.36")	AT (0.36")
Color Exterior	Gray	Gray
Finish Exterior	Anodized	Anodized
Color Interior	Gray	Gray
Finish Interior	Anodized	Anodized
GLAZING METHOD	N/A	Interior

Glazing Information:

Layer 1	1/4" AFG Comfort Ti-AC36 (e=0.034*, #2)
Gap	0.50" Gap, Super Spacer Standard (OF-S), 100% Air-Filled*
Layer 2	1/4" Clear
Gas Fill Method	N/A*
Desiccant	Yes - Contained within the spacer

**Stated per Client/Manufacturer*
NA Non-Applicable
See Description Table Abbreviations

Test Sample Description: (Continued)

COMPONENTS		
Type	**Quantity**	**Location**
WEATHERSTRIP		
Foam filled vinyl gasket	2 Rows	Vent perimeter.
HARDWARE		
Lever lock	2	Top rail of the vent.
Keeper	2	Head.
Multi arm hinge	2	Jambs.
Snubber	1	Bottom rail of the vent. Sill.
DRAINAGE		
1" x 3/16" weephole	2	Sill.

Test Duration:

1. The environmental systems were started at 16:14 hours, 11/25/10.

2. The thermal performance test results were derived from 05:22 hours, 11/26/10 to 09:22 hours, 11/26/10.

Condensation Resistance Factor (CRF):

The following information, condensed from the test data, was used to determine the condensation resistance factor:

T_h	=	Warm side ambient air temperature	69.80 F
T_c	=	Cold side ambient air temperature	-0.16 F
FT_p	=	Average of pre-specified frame temperatures (14)	38.76 F
FT_r	=	Average of roving thermocouples (4)	31.77 F
W	=	$[(FT_p - FT_r) / (FT_p - (T_c + 10))] \times 0.40$	0.097
FT	=	$FT_p(1-W) + W (FT_r)$ = Frame Temperature	38.09 F
GT	=	Glass Temperature	45.60 F
CRF_g	=	Condensation resistance factor – Glass	65
		$CRF_g = (GT - T_c) / (T_h - T_c) \times 100$	
CRF_f	=	Condensation resistance factor – Frame	55
		$CRF_f = (FT - T_c) / (T_h - T_c) \times 100$	

The CRF number was determined to be 55 (on the size as reported). When reviewing this test data, it should be noted that the frame temperature (FT) was colder than the glass temperature (GT) therefore controlling the CRF number. Refer to the 'CRF Report' page and the 'Thermocouple Location Diagram' page of this report.

Thermal Transmittance (U_c):

T_h	=	Average warm side ambient temperature	69.80	F
T_c	=	Average cold side ambient temperature	-0.16	F
P	=	Static pressure difference across test specimen 15 mph dynamic perpendicular wind at exterior	0.00	psf
Nominal sample area			9.68	ft^2
Total measured input to calorimeter			430.69	Btu/hr
Calorimeter correction			102.59	Btu/hr
Net specimen heat loss			328.09	Btu/hr
U	=	Thermal Transmittance	0.48	$Btu/hr \cdot ft^2 \cdot F$

Glazing Deflection (in.):

	Glazing
Edge Gap Width	0.50
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	0.43

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.

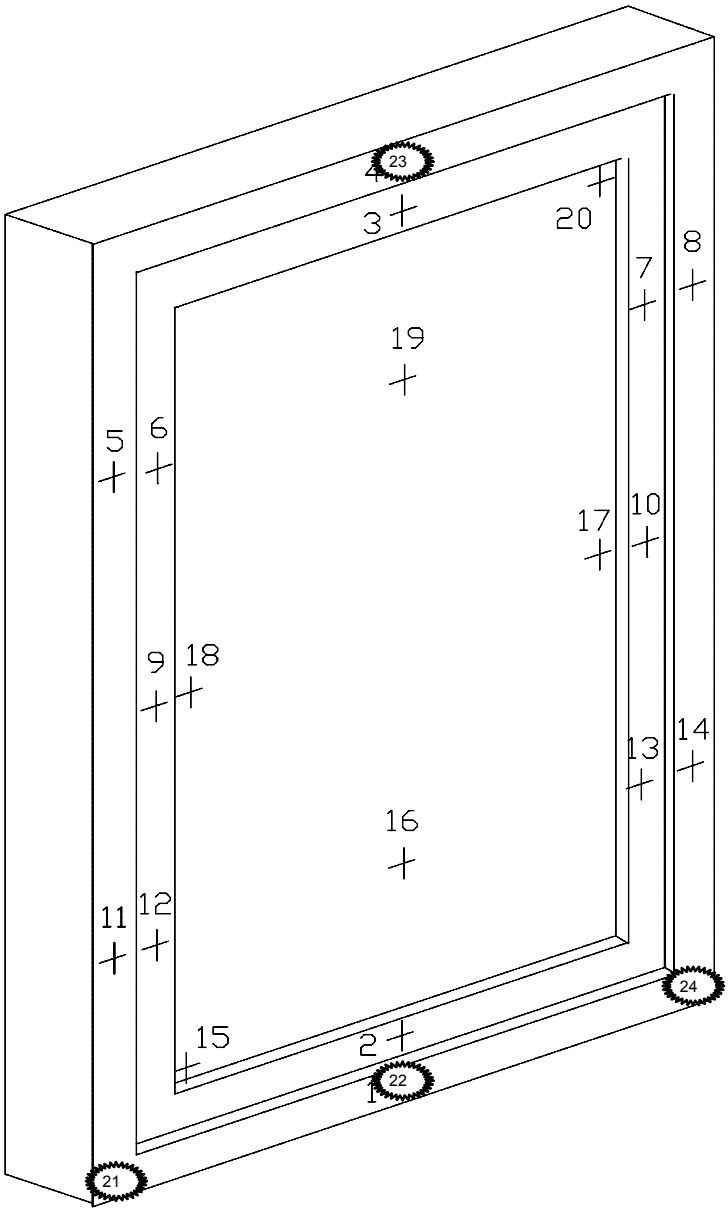
A full calibration of the Architectural Testing Inc. 'thermal test chamber' (ICN 004287) in Fresno, California was conducted in April 2010 in accordance with Architectural Testing Inc. calibration procedure. A calibration check was performed September 2010.

Prior to testing the specimen was sealed with silicone on the interior side and checked for air infiltration per Section 9.3.4.

CRF Report

Time:	07:22	07:52	08:22	08:52	09:22	AVERAGE
Pre-specified Thermocouples - Frame						
1	30.81	30.84	30.82	30.74	30.73	30.79
2	38.77	38.79	38.69	38.62	38.63	38.70
3	43.30	43.33	43.34	43.20	43.18	43.27
4	31.81	31.83	31.80	31.72	31.76	31.78
5	36.77	36.77	36.75	36.71	36.67	36.74
6	44.31	44.28	44.27	44.16	44.18	44.24
7	44.26	44.26	44.22	44.17	44.14	44.21
8	35.72	35.71	35.71	35.63	35.61	35.67
9	42.87	42.85	42.83	42.78	42.76	42.82
10	43.66	43.70	43.65	43.65	43.59	43.65
11	32.89	32.88	32.86	32.84	32.82	32.86
12	41.51	41.54	41.46	41.44	41.42	41.47
13	42.24	42.24	42.17	42.17	42.15	42.20
14	34.30	34.36	34.30	34.31	34.29	34.31
FT_P	38.80	38.81	38.77	38.73	38.71	38.76
Pre-specified Thermocouples - Glass						
15	33.87	33.86	33.77	33.75	33.75	33.80
16	53.06	53.02	53.02	52.93	52.93	52.99
17	43.41	43.46	43.44	43.36	43.35	43.40
18	43.52	43.52	43.44	43.38	43.43	43.46
19	53.35	53.35	53.32	53.24	53.24	53.30
20	46.70	46.67	46.56	46.56	46.62	46.62
GT	45.65	45.65	45.59	45.54	45.55	45.60
Cold Point (Roving) Thermocouples						
21	32.51	32.56	32.54	32.40	32.50	32.50
22	30.81	30.84	30.82	30.74	30.73	30.79
23	31.81	31.83	31.80	31.72	31.76	31.78
24	31.97	32.04	31.98	32.02	32.02	32.00
FT_R	31.77	31.82	31.78	31.72	31.75	31.77
W	0.10	0.10	0.10	0.10	0.10	0.10
FT	38.12	38.14	38.10	38.05	38.04	38.09
Warm Side - Room Ambient Air Temperature						
	69.84	69.83	69.79	69.76	69.74	69.79
Cold Side - Room Ambient Air Temperature						
	-0.16	-0.16	-0.16	-0.16	-0.16	-0.16
CRF_f	55	55	55	55	55	55
CRF_g	65	65	65	65	65	65

Thermocouple Location Diagram



Cold Point Locations

21. 32.50
22. 30.79
23. 31.78
24. 32.00

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. 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.

Digitally Signed by: William Smeds

Simon Smeds
Technician

Digitally Signed by:Kenny C. White

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

WSS:ss
A4476.02-301-46

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Description Table Abbreviations (1)
Appendix-B: Drawings (15)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	12/07/10	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: Drawings

BILL OF MATERIALS

	ITEM	L.E.C. PART NO	PART NO	DESCRIPTION	QTY.	SUPPLIER	PART NO	COMMENTS	UNITS
FRAME	1	T-60923	WN 409	PROJECT-IN FRAME HEAD/SILL INSIDE	2	INTEX-TX			LBS.
	2	T-60922	WN 407	PROJECT-IN FRAME HEAD/SILL OUTSIDE	2	INTEX-TX			LBS.
	3	T-60925	WN 410	PROJECT-IN FRAME JAMB INSIDE	2	INTEX-TX			LBS.
	4	T-60924	WN 409	PROJECT-IN FRAME JAMB OUTSIDE	2	INTEX-TX			LBS.
	5	XXXX	(B) TB146	14.6 mm THERMOBAR	8		2280		LBS.
SASH	6	T-60927	WN 412	PROJECT-IN INSIDE SASH	4	INTEX-TX			LBS.
	7	T-60926	WN 411	PROJECT-IN OUTSIDE SASH	4	INTEX-TX			LBS.
	8	T-60939	WN 429	ONE INCH GLASS STOP	4	INTEX-TX			LBS.
	9	T-30972	CC245	CORNER ANGLE FOR INSIDE SASH	4	INTEX-TX			LBS.
	10	T-30972	CC245	CORNER ANGLE FOR OUTSIDE SASH	4	INTEX-TX			LBS.
	11	XXXX	(B) TB146	14.6 mm THERMOBAR	8		2280		LBS.
FASTENERS	12	XXXX	(B) ST252	#10 AB x 1" PH PAN HD SMS S.S.	8			FRAME SCREWS	PCS.
GLAZING	13	XXXX	XXXX	1" GLASS	1				SQ. FT.
	14	XXXX	(E) GT416	1/8" x 1/2" PRESHIM TAPE	A/R				FT.
	15	XXXX	XXXX	SILICONE CAP BEAD	A/R	TREMCO	SPEC 11		FT.
	16	XXXX	SB 222	SETTING BLOCK (.250 x 1" x 4")	2				FT.
	17	XXXX	(D)						FT.
VINYLS AND GASKETS	18	XXXX	WH 344	WEDGE GASKET	A/R				FT.
		XXXX	(D)						
	20	XXXX	WH342	BULB GASKET	A/R	AMESBURY			FT.

Architectural Testing, Inc.
Test comply with these test and these details
A4476
DEC 03 2010
Report # Date
Tech

D	REVISED AS NOTED	08.27.10	BCK	
C	REVISED LOCATION OF J-BAR TO CONNECT POSITION	10/7/04 GP	MCC	
B	REVISED AS NOTED	05/17 GP	MCC	

UNITED STATES ALUMINUM CORP.

Milton C. 05/09/02

BILL OF MATERIALS FOR PROJECT-IN WINDOW (SERIES 7400)

7400-003D
1 of 4

BILL OF MATERIALS

	ITEM	U.S.C. PART NO.	PART NO.	DESCRIPTION	QTY.	SUPPLIER	PART NO.	COMMENTS	UNITS
HARDWARE	21			LOCK ASSEMBLY	1	TRUTH HARDWARE	-		PCS.
				CAM HANDLE	1	TRUTH HARDWARE	27-13		PCS.
				CUSTODIAL LOCK		TRUTH HARDWARE	28-23		PCS.
			WH474	STRIKE	1	-	-		PCS.
				#10 x 1/2" PH FLAT HD STAINLESS STEEL SMS	2	TRUTH HARDWARE		FOR CAM HANDLE	PCS.
				#8 x 1/2" PH PAN HD STAINLESS STEEL SMS	#	TRUTH HARDWARE	-	FOR STRIKE	PCS.
									PCS.
									PCS.
	22			4-BAR HINGES (SEE CHART BELOW FOR HINGE LENGTH AND PART NO.)	2	(B) ANC			PCS.
		4015	(B) BR134	SHIM (1 x .200)	2	INTEX	4.315		PCS.
				#10 X 3/4" PH PAN HD TEK	4	TRUTH HARDWARE		FOR SHIM	PCS.
				#10-24 X 1/4 MS	14	TRUTH HARDWARE		FOR HINGES	PCS.

A4476

DEC 03 2010

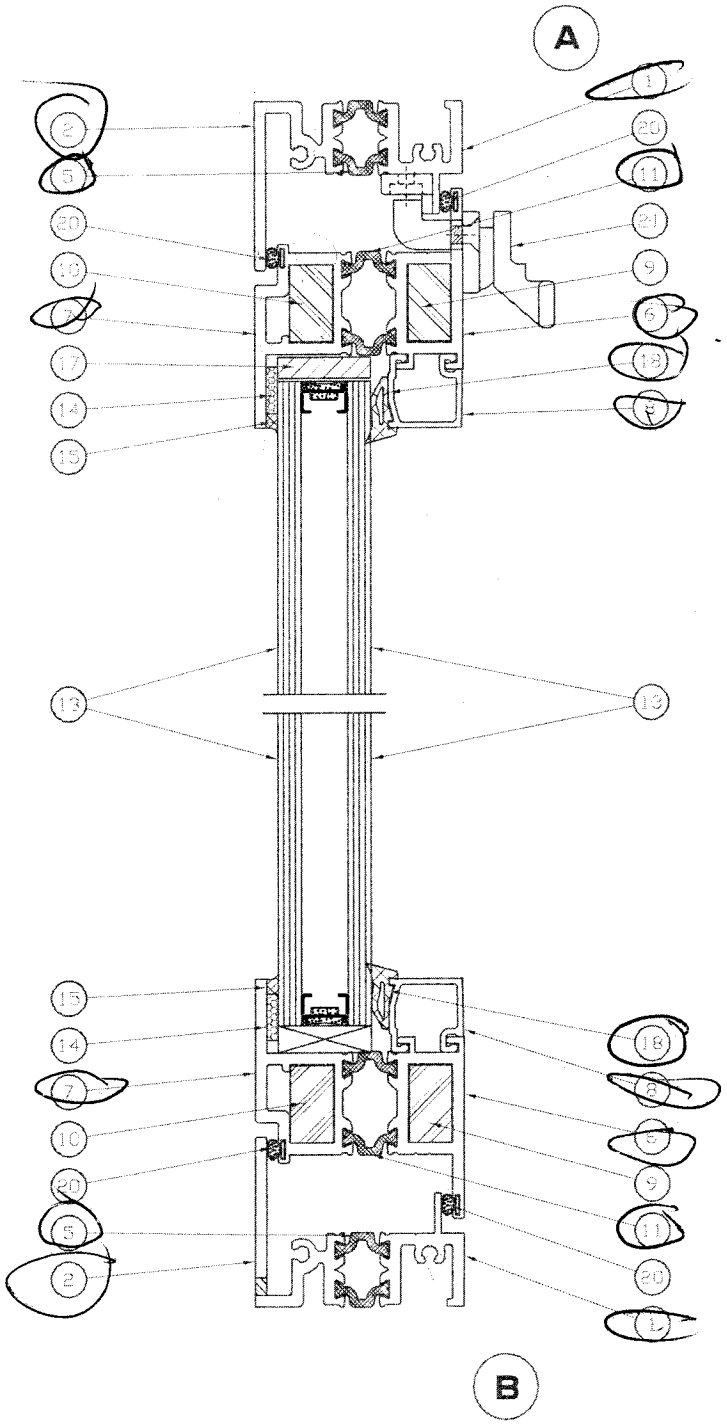
Report # Date

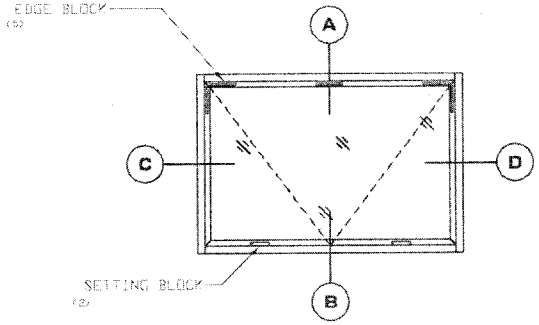
Tech

4-BAR HINGE CHARTS

HINGE LENGTH	STAINLESS STEEL PART NO. (B)
10"	
12"	
14"	
16"	
18"	
20"	
24"	
28"	

				UNITED STATES ALUMINUM CORP.
(A)	REVISED AS NOTED	DR 07/10/02		
(C)	REVISED LOCATION OF 4-BAR TO CORRECT POSITION	10/04/02 MB	WLC	Milled 05/10/02
(B)	REVISED AS NOTED	09/19/02 MB	WLC	BILL OF MATERIALS FOR PROJECT-IN WINDOW (SERIES 7400)
				7400-0030 2 of 4





ELEVATION

NO SCALE

Architectural Testing, Inc.
Test sample complies with these details
Conditions and notes

A4476

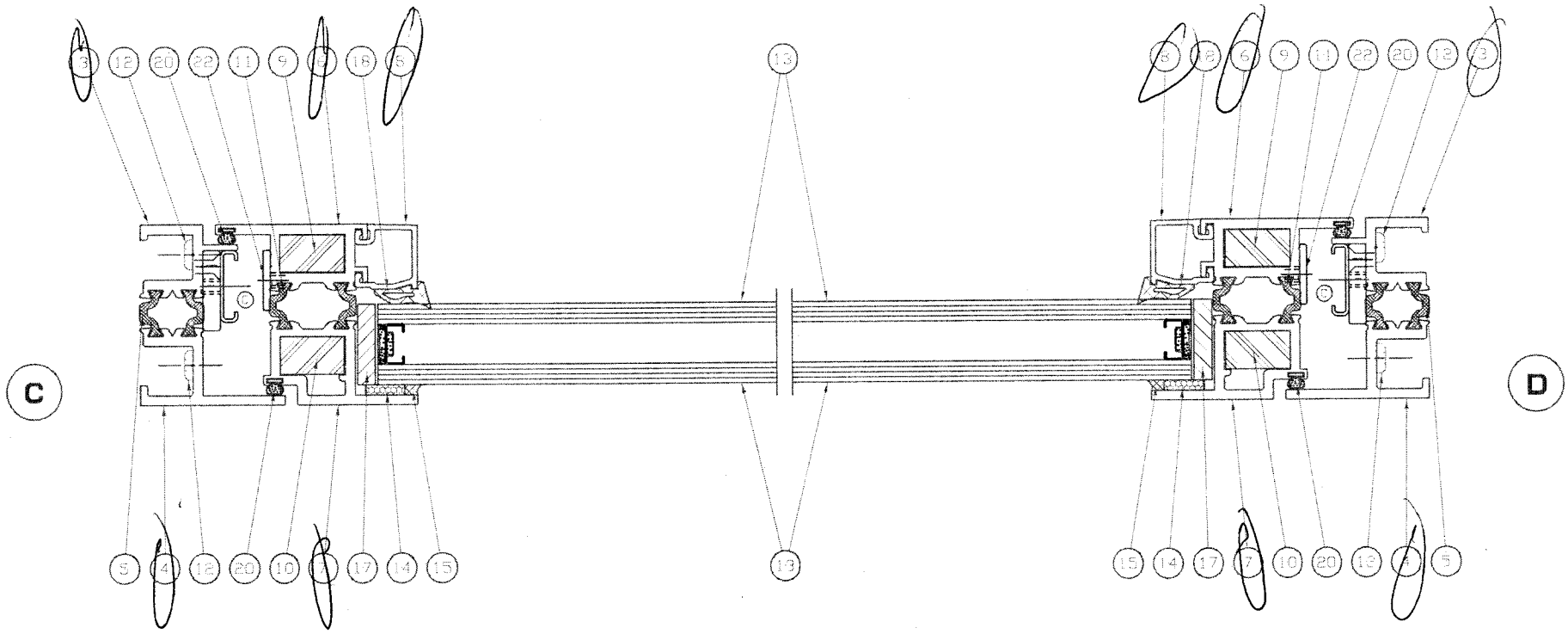
DEC 03 2010

Report # Date

Tech

				UNITED STATES ALUMINUM CORP.	
1	REVISED AS NOTED	08 27 10	BCK		
C	REVISED LOCATION OF 4-BAY TO CORRECT POSITION	10/04 08	WCO		
B	REVISED AS NOTED	09/15 08	WCO	05/09/08	PROJECT-IN WINDOW LAYOUT
				FULL SIZE	(SERIES 7400)

7400-0033
3 of 4



A 4 4 7 6 DEC 03 2010

Report # Date

Tech

D	REVISED AS NOTED	DR 07/18/02	DCW	UNITED STATES ALUMINUM CORP.		
C	REVISED LOCATION OF 4-BAR TO CORRECT POSITION	10/24/02	WCO	Willie C.	PROJECT-IN WINDOW LAYOUT	7400-003D
B	REVISED AS NOTED	08/19/02	WCO	05/09/02	(SERIES 7400)	4 of 4
				FULL SIZE		