Architectural Testing

CSA-A440 THERMAL PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM

SERIES/MODEL: 4500

TYPE: Glazed Wall Systems (Site-built)

Summary of Results	
Temperature Index	41
Glazing Description:	1/4" Clear Tempered, 0.50" Gap, Aluminum Spacer (A1), Air-Filled*, 1/4" Clear Tempered

Reference should be made to ATI Report No. 76380.03-301-46 for complete test specimen description and data.

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

Architectural Testing

CSA-A440 THERMAL PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM
200 Singleton Drive
Waxahachie, Texas 75165

Report No:	76380.03-301-46
Test Date:	08/31/07
Report Date:	09/21/07
Expiration Date:	08/31/11

Test Sample Identification:

Series/Model: 4500

Type: Glazed Wall Systems (Site-built)

Overall Size: 78 7/8" x 79 1/8"

Test Procedure: U-factor tests were performed in a Guarded Hot Box in accordance with CSA-A440, *Test Procedure for Measuring the Steady-State Temperature Index of Fenestration Systems.*

Test Results Summary:

Temperature Index	41

2524 E. Jensen Ave
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phone: 559-233-8705
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Test Sample Description:

CONSTRUCTION		**Frame**
	Size(in.)	78 7/8 x 79 1/8
	Daylight Opening (in.)	35 3/4 x 74 1/2 (x2)
CORNERS		Square Cut
	Fasteners	Screws
	Sealant	No
MATERIAL		AL
	Color Exterior	Mill Finish
	Finish Exterior	Mill Finish
	Color Interior	Mill Finish
	Finish Interior	Mill Finish
GLAZING METHOD		Exterior

Glazing Information

Layer 1	1/4" Clear Tempered
Gap	0.50" Gap, Aluminum Spacer (A1), Air-Filled*
Layer 2	1/4" Clear Tempered
Gas Fill Method	NA*

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

Test Sample Description: (Continued)

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

Temperature Index

Measured Test Data

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	2504.76	Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	90.44	Btu/hr
3. Surround Panel Thickness	6.00	inches
4. Surround Panel Conductance	0.0375	Btu/hr·ft²·F
5. Metering Box Wall Heat Flow (Q_{mb})	6.82	Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0187*EMF + 4.016	
7. Flanking Loss Heat Flow (Q_{fl})	15.66	Btu/hr
8. Net Specimen Heat Loss (Q_s)	2391.84	Btu/hr

Areas

1. Test Specimen Projected Area (A_s)	43.34	ft^2
2. Metering Box Opening Area (A_{mb})	69.44	ft^2
3. Metering Box Baffle Area (A_{b1})	60.56	ft^2
4. Surround Panel Interior Exposed Area (A_{sp})	26.10	ft^2

Test Conditions

1. Average Metering Room Air Temperature (t_h)	67.99	F
2. Average Cold Side Air Temperature (t_c)	-21.99	F
3. Average Guard/Environmental Air Temperature	74.99	F
4. Metering Room Average Relative Humidity	8.52	%
5. Measured Cold Side Wind Velocity (Perpendicular Flow)	15.62	mph
6. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"	H_2O

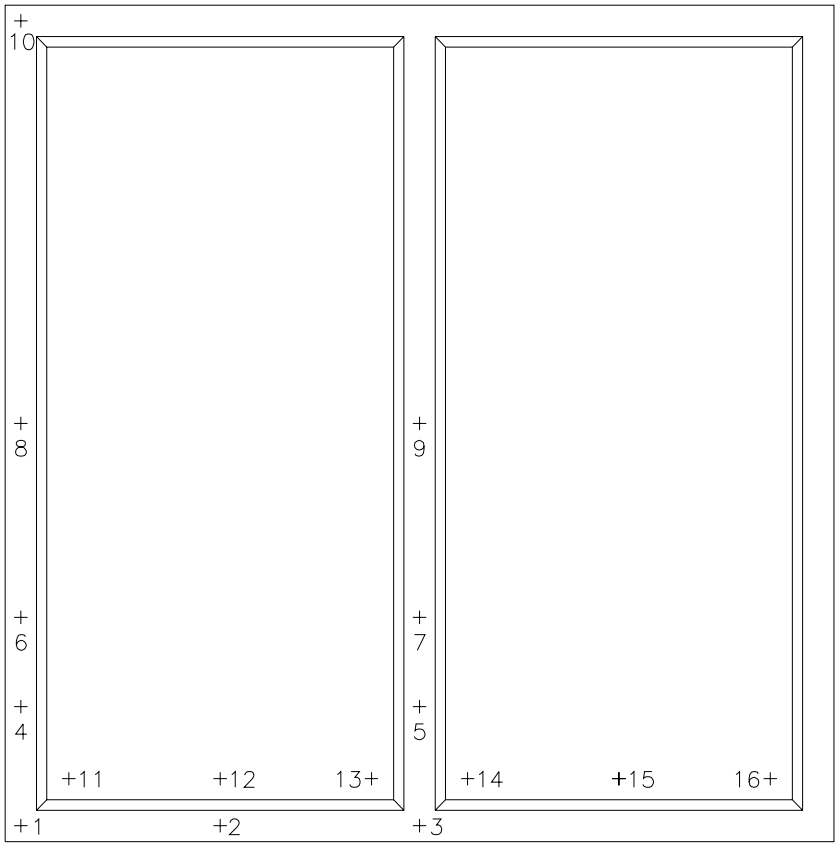
Results

1. Temperature Index	41

Test Duration

1. The environmental systems were started at 11:52 hrs., 08/30/07
2. The test parameters were considered stable for two consecutive four hour test periods 00:09 hrs., 08/31/07 to 08:09 hrs., 08/31/07.
3. The thermal performance test results were derived from 04:09 hrs, 08/31/07 to 08:09 hrs, 08/31/07.

Surface Temperatures



Individual FrameTemperature Measurements	
Thermocouple #	Temperature
1	32.12
2	31.42
3	32.22
4	32.25
5	44.32
6	47.42
7	46.79
8	44.92
9	47.52
10	47.91
Average	33.07

Individual Glass Temperature Measurements	
Thermocouple #	Temperature
11	15.71
12	18.28
13	16.61
14	14.78
15	17.37
16	15.39
Average	32.62

1. Average of Three Coldest Glass Thermocouples (T_g) 15.29 F
2. Average of Three Coldest Frame Thermocouples (T_f) 31.92 F

Glazing Deflection:

	Left Glazing*	Right Glazing*
Edge Gap Width	0.50	0.50
Estimated gap width upon receipt of specimen in laboratory (after stabilization)	0.50	0.50
Effective gap width at laboratory ambient conditions on day of testing	0.50	0.50
Effective gap width at test conditions	0.50	0.50

*Note: All measurements are in inches

The sample was inspected for the formation of frost or condensation, which may influence the surface temperature measurements. The sample showed evidence of frost on the sill, approximately two feet up bottom on the vertical members, and on the glass to the same level at the conclusion of the test.

A full calibration of the ATI 'thermal test chamber' in Fresno, California was conducted in February 2007. A calibration check was performed August 2007.

Detailed drawings, representative samples of the test specimen and a copy of this report will be retained by ATI for a period of four years. This report is the exclusive property of the client so named herein and relates only to the fenestration product tested. This report may not be reproduced, except in full, without the approval of the laboratory. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory. This report does not constitute certification of this product.

For ARCHITECTURAL TESTING, INC.:

Tested By:

Digitally Signed by: Darrin Spencer

Darrin A. Spencer
Technician

Reviewed By:

Digitally Signed by:Kenny C. White

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

DAS:kb
76380.03-301-46

Attachments:
Drawings and Bill of Materials

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	09/21/07	All	Original Report Issue. Work requested by Mr. Michael Brown of United States Aluminum.

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
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	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
A6	Aluminum / Foam / Aluminum
A7	Aluminum U-shaped
A8	Aluminum-Butyl (Corrugated)
ER	EPDM Reinforced Butyl
FG	Fiberglass
GL	Glass
OF	Organic Foam
PU	Polyurethane Foam
SU	Stainless Steel, U-shaped
CU	Coated Steel, U-shaped
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
V1	Vinyl U-shaped
WD	Wood
ZF	Silicone Foam
ZS	Silicone / Steel

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

CODE	Gap Fill Codes
AIR	Air
AR3	Argon / Krypton / Air
ARG	Argon/Air
CO2	Carbon Dioxide
KRY	Krypton/Air

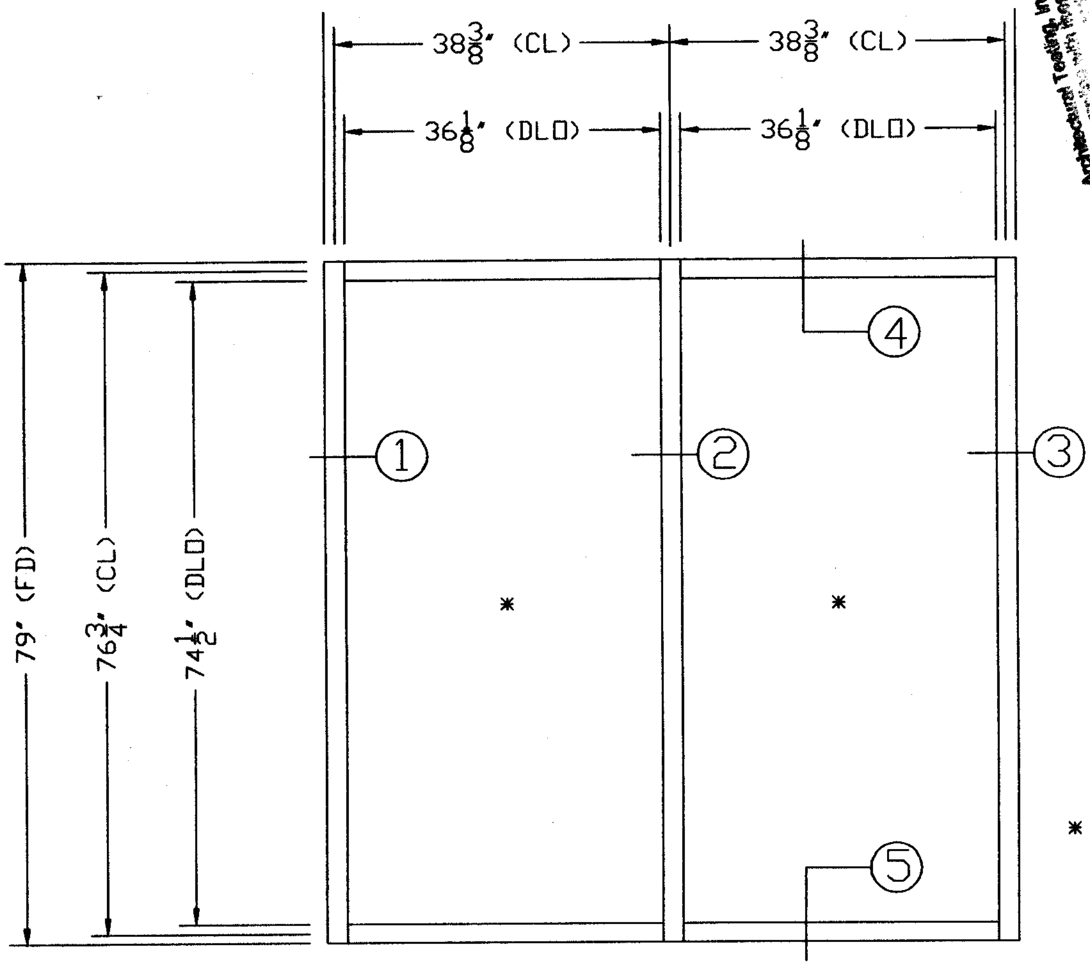
CODE	Grid Description
N	No Muntins
G	Grids between glass
S	Simulated Divided Lites
T	True Muntins

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

DOOR DETAILS	
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
CODE	**Panel**
FG	Fiberglass
PL	Plastic
WP	Wood - Plywood
WS	Wood - Solid
CODE	**Sub-Structure**
GS	Galvanized Steel
PL	Plastic
ST	Steel
WD	Wood
CODE	**Core Fill**
CH	Cellular - Honeycomb
EP	Expanded Polystyrene
PI	Polyisocyanurate
PU	Polyurethane
WP	Wood - Plywood
WS	Wood - Solid
XP	Extruded Polystyrene

CODE	Tint Codes
AZ	Azurlite
BL	Blue
BZ	Bronze
CL	Clear
EV	Evergreen
GD	Gold
GR	Green
GY	Gray

CODE	Thermal Breaks
FO	Foam
UR	Urethane
VY	Vinyl
FB	Fiberglass
RN	Reinforced Nylon
AB	ABS
NE	Neoprene
AI	Air



ELEVATION DRAWING

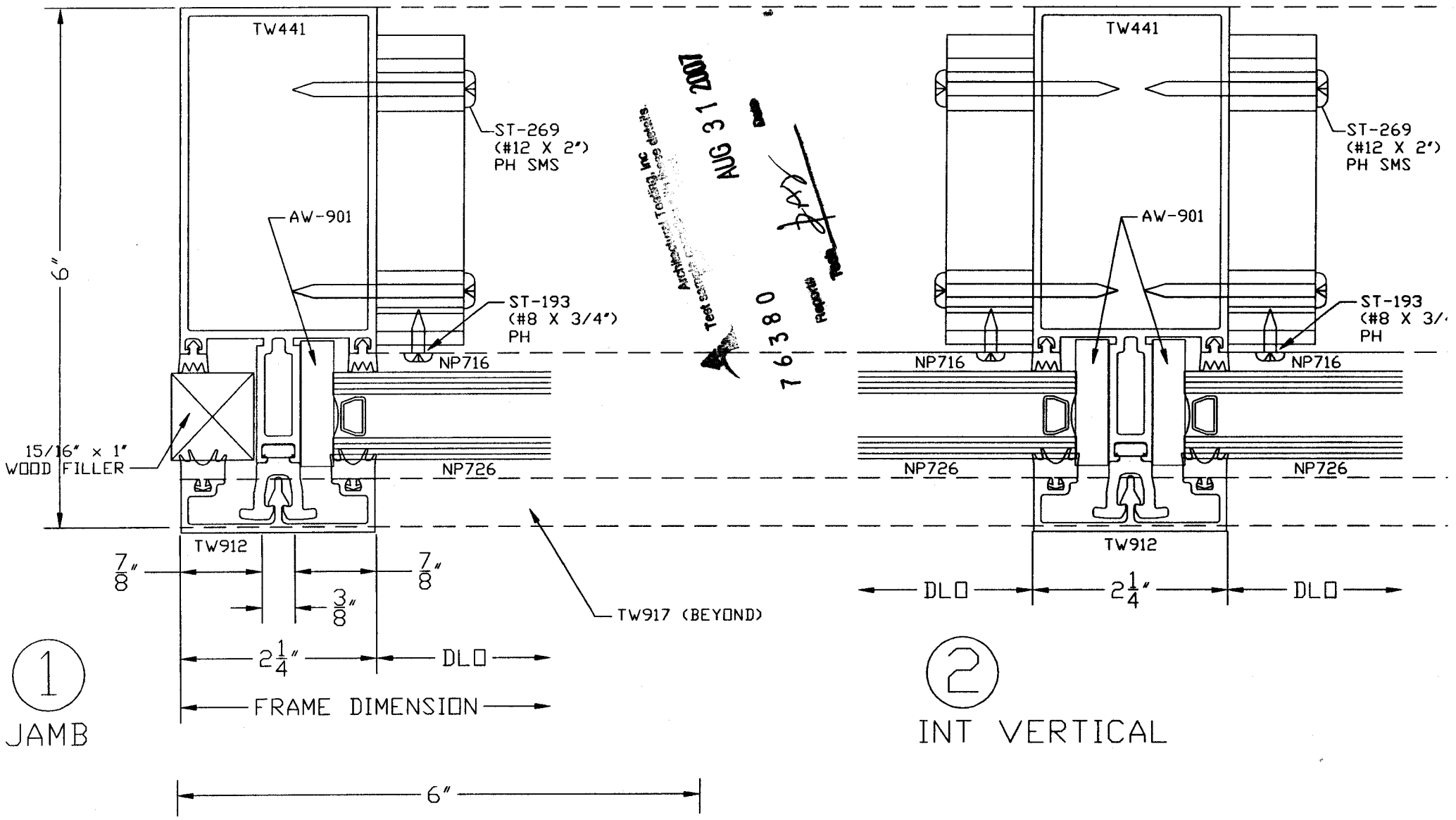
Architectural Testing, Inc
Test sample complies with these details.
AUG 3 1 2007
Date
76380
Report
Tech

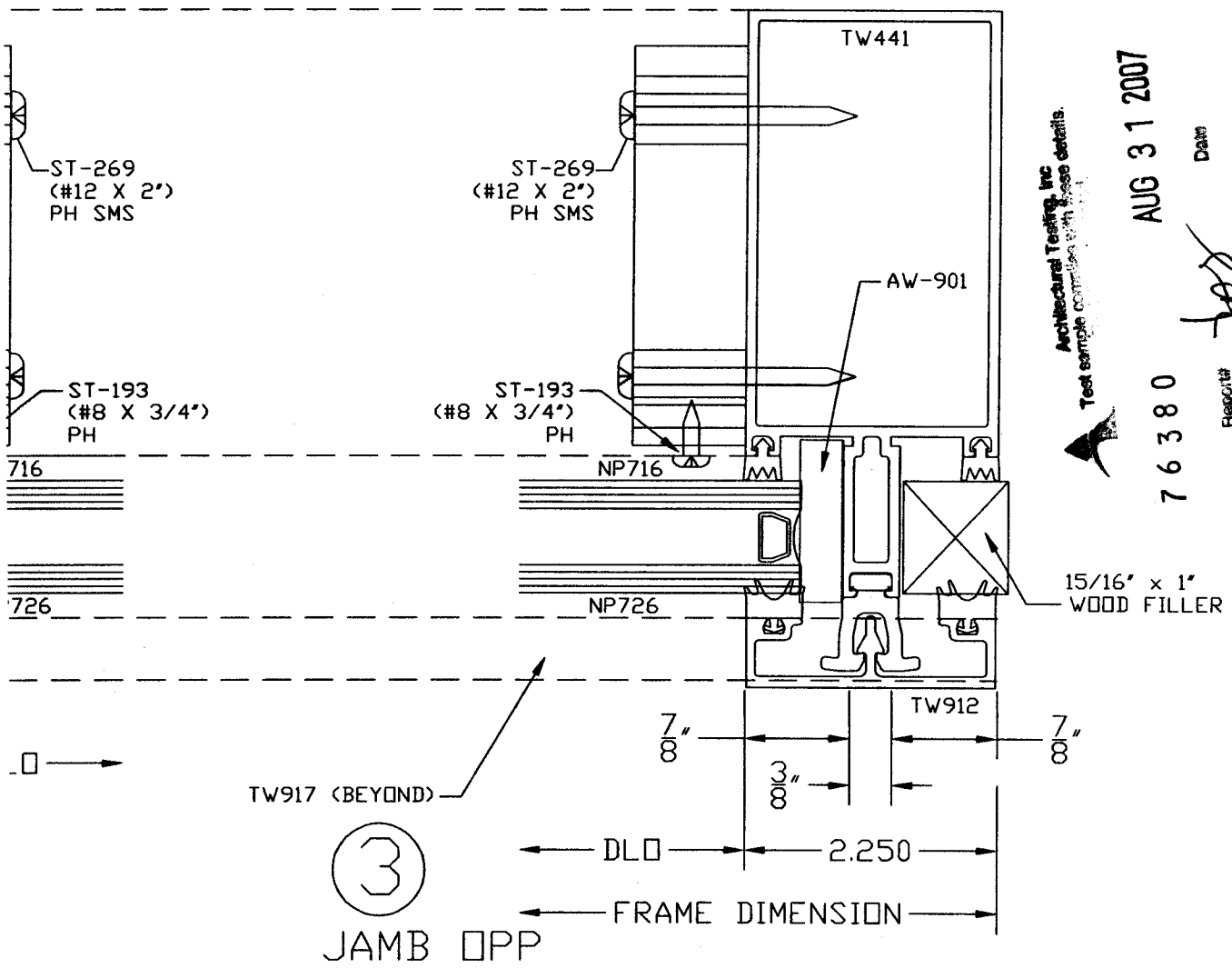
FOR NFRC TESTING & SIMULA
SERIES 4500 CURTAINWALL
CAPTURED 1" GLAZING SYSTE
CLEAR ANODIZED FINISH

GLASS SIZE (2 THUS):
37⅛" × 75½"

* 1" CLEAR TEMPERED INSULATED GLASS
(1/4" CLEAR TEMPERED - 1/2" AIR SPACE - 1/4" CLEAR TEMPE

NOTE: (PER ATI) - ENDCAPS & DAMS NOT USED


TW441
ST-269
(#12 X 2")
PH SMS
AW-901
ST-193
(#8 X 3/4")
PH
NP716
6"
15/16" x 1"
WOOD FILLER
NP726
TW912
7/8"
7/8"
3/8"
TW917 (BEYOND)
2 1/4"
DLO
FRAME DIMENSION
6"
1
JAMB
TW441
ST-269
(#12 X 2")
PH SMS
AW-901
ST-193
(#8 X 3/
PH
NP716
NP716
NP726
NP726
TW912
DLO
2 1/4"
DLO
2
INT VERTICAL

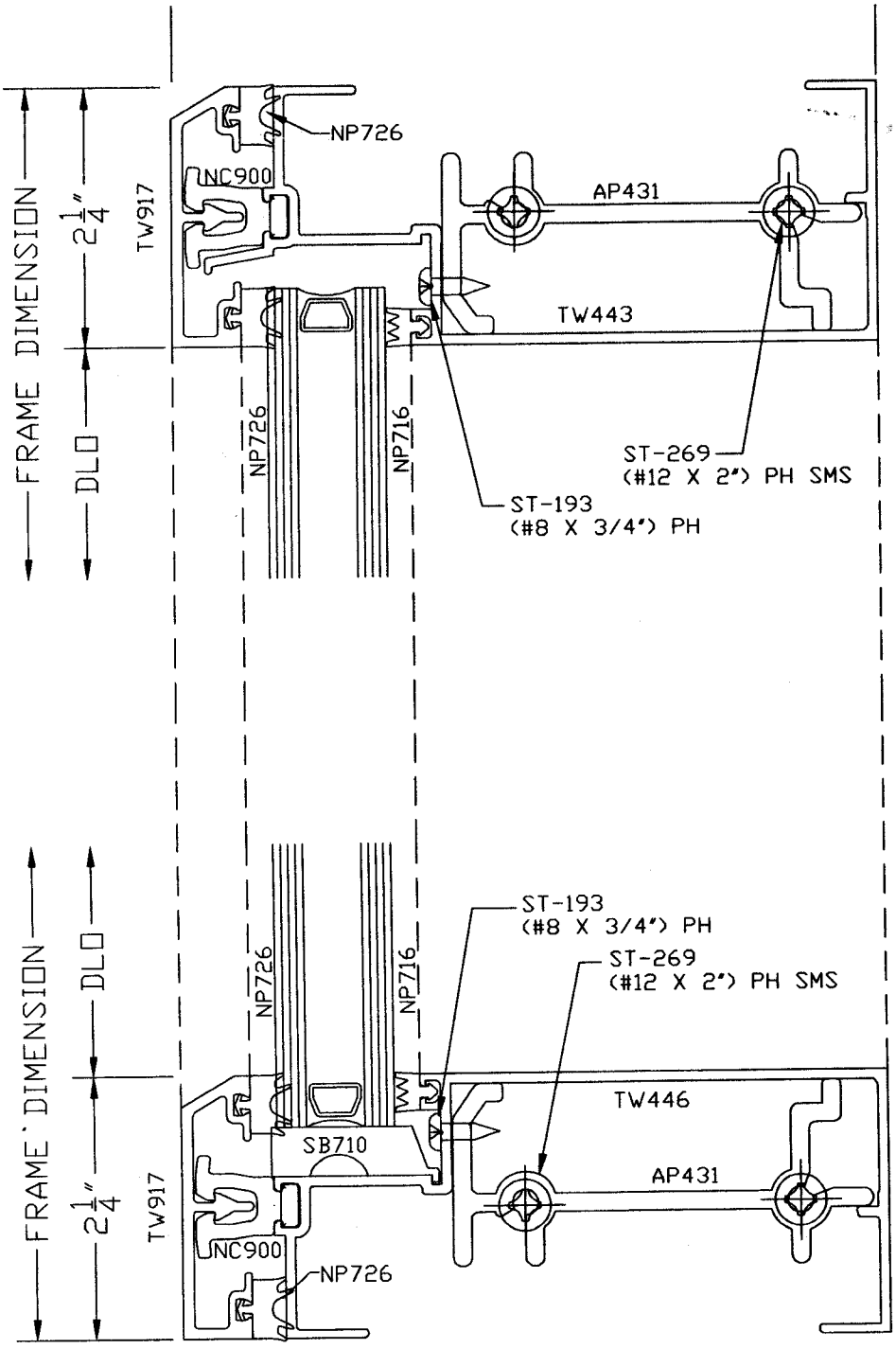


United States ALUMINUM
COMMERCIAL PRODUCTS GROUP

Architectural Testing, Inc
Test sample conforms with these details.
AUG 31 2007
Date
76380
Report#
Tech

BILL OF MATERIALS

ITEM	QUANTITY
TW441	3
TW912	3
TW443	2
TW446	2
TW917	4
NP716	
NP726	
AP431	8
ST-269 PH SMS	16
ST-193 PH SMS	8
NC900	27
SB710	4
AW901	8



4 HEAD

5 SILL