Architectural Testing

TEST REPORT

Report No.: A4235.01-109-44

Rendered to:

TUBLITE, INC.
Walker, Michigan

PRODUCT TYPE: Awning Window (Outswing)
SERIES/MODEL: CVW3700 Concealed Vent

SPECIFICATION: AAMA/WDMA/CSA 101/I.S.2/A440-08, *NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights*

Title	Summary of Results
Primary Product Designator	Class CW-PG75 1556 x 953 (61 x 38)-AP
Design Pressure	±3600 Pa (±75.19 psf)
Air Infiltration	0.1 L/s/m^2 (0.01 cfm/ft^2)
Canadian Air Infiltration/Exfiltration Level	A3
Water Penetration Resistance Test Pressure	580 Pa (12.11 psf)

Test Completion Date: 10/08/10

Reference must be made to Report No. A4235.01-109-44, dated 11/30/10 for complete test specimen description and detailed test results.

1.0 Report Issued To: Tubelite, Inc.
3056 Walker Ridge Dr. NW Suite G
Walker, Michigan 49544
616-301-0056

2.0 Test Laboratory: Architectural Testing, Inc.
130 Derry Court
York, Pennsylvania 17406-8405
717-764-7700

3.0 Project Summary:

3.1 Product Type: Awning Window (Outswing)

3.2 Series/Model: CVW3700 Concealed Vent

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test method(s). The specimen tested successfully met the performance requirements for a **Class CW-PG75 1556 x 953 (61 x 38)-AP** rating.

3.4 Test Dates: 10/07/2010 – 10/08/2010

3.5 Test Location: Architectural Testing, Inc. test facility in York, Pennsylvania.

3.6 Test Sample Source: The test specimen was provided by the client. Representative samples of the test specimen(s) will be retained by Architectural Testing for a minimum of four years from the test completion date.

3.7 Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Architectural Testing per the drawings located in Appendix C. Any deviations are documented herein or on the drawings.

3.8 List of Official Observers:

Name	Company
Steve Wilkening	TubeLite, Inc.
Rick Via	Wausau Window and Wall Systems
Michael D. Stremmel, P.E.	Architectural Testing, Inc.
Russell W. Clark	Architectural Testing, Inc.

4.0 Test Specification(s):

AAMA/WDMA/CSA 101/I.S.2/A440-08, *NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights*

AAMA 910-93, *Voluntary "Life Cycle" Specifications and Test Methods for Architectural Grade Windows and Sliding Glass Doors*

5.0 Test Specimen Description:

5.1 Product Sizes:

Overall Area: 1.5 m^2 (16.0 ft^2)	**Width**		**Height**	
	millimeters	**inches**	**millimeters**	**inches**
Overall size	1556	61-1/4	953	37-1/2
Vent	1518	59-3/4	911	35-7/8

5.2 Frame Construction:

Frame Member	**Material**	**Description**
All frame members	Aluminum	Poured and debridged, thermally improved extruded aluminum

	Joinery Type	**Detail**
All corners	Mitered, coped, and butted	Secured at each end with two #8 x 2" long pan head screws, sealed with silicone

5.3 Vent Construction:

Vent Member	**Species/Material/ Alloy**	**Other**
All vent members	Aluminum	Poured and debridged, thermally improved extruded aluminum

	Joinery Type	**Detail**
All corners	Mitered, coped, keyed, and staked	Sealed with silicone

5.0 Test Specimen Description: (Continued)

5.4 Weatherstripping:

Description	Quantity	Location
0.187" backed by 3/16" diameter hollow bulb	2 Rows	All vent members
0.275" backed by 3/8" diameter hollow bulb seal	1 Row	All vent members

5.5 Glazing:

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
1" IG	Stainless steel and PVC spacer sealed with butyl	1/4" thick clear tempered	1/4" thick clear tempered	The glass was exterior glazed against a bed of butyl and sealed with silicone at the perimeter

Location	Quantity	Daylight Opening	Glass Bite
Vent	1	56-1/4" x 32-1/4"	1-3/8"

5.6 Drainage: A stepped sill was utilized.

5.7 Hardware:

Description	Quantity	Location
Triple bar hinge	2	Stiles, adjacent to top rail
Quarter turn locks with adjacent keepers	2	Sill, 8-3/4" from each end

5.8 Reinforcement: No reinforcement was utilized.

6.0 Installation: The specimen was installed into a Spruce-Pine-Fir wood buck. The exterior perimeter of the window was sealed with silicone.

Location	Anchor Description	Anchor Location
Head, sill, and jambs	5/8" high by3/4" wide exterior wood blind stops	Secured with #6 x 1-5/8" long drywall screws located a nominal 6" on center at jambs and nominal 12" on center at head and sill
Head, sill, and jambs	5/8" high by 4" wide interior wood blind stops	Secured with #6 x 1-5/8" long drywall screws located a nominal 6" on center at jambs and nominal 12" on center at head and sill

7.0 Test Results: The temperature during testing was 22°C (71°F). The results are tabulated as follows:

Title of Test	Results	Allowed	Note
Life Cycle per AAMA 910			
Operating Force, per ASTM E 2068	Initiate motion: 120 N (27 lbf) Maintain motion: 67 N (15 lbf) Locks: 13 N (3 lbf)	Report Only 135 N (30 lbf) 100 N (22.5 lbf)	
Air Leakage, Infiltration per ASTM E 283 at 75 Pa (1.6 psf)	0.1 L/s/m^2 (0.01 cfm/ft^2)	1.5 L/s/m^2 (0.30 cfm/ft^2) max.	1
Water Penetration, per ASTM E 547 and ASTM E 331 at 580 Pa (12.11 psf)	No leakage	No leakage	2
Sash/Vent Cycling, per AAMA 910 1250 cycles	Vent: No damage	No damage	3

7.0 Test Results: (Continued)

Title of Test	Results	Allowed	Note
Locking Hardware Cycling, per AAMA 910 1250 cycles	Lock: No damage Lock: No damage	No damage No damage	4 4
Misuse Testing: per AAMA 910			
Ventilator Torsion Test at 222 N (50 lbf)	No damage	No damage	
Balance Arm Load Test at 222 N (50 lbf)	No damage	No damage	
Vent Lateral Racking Test at 222 N (50 lbf)	No damage	No damage	
Sash/Vent Cycling, per AAMA 910 1250 cycles	Vent: No damage	No damage	3
Locking Hardware Cycling, per AAMA 910 1250 cycles	Lock: No damage Lock: No damage	No damage No damage	4 4
Operating Force, per ASTM E 2068	Initiate motion: 178 N (40 lbf) Maintain motion: 67 N (15 lbf) Locks: 67 N (15 lbf)	Report Only 135 N (30 lbf) 100 N (22.5 lbf)	
Air Leakage, Infiltration per ASTM E 283 at 300 Pa (6.2 psf)	0.1 L/s/m^2 (0.01 cfm/ft^2)	0.5 L/s/m^2 (0.10 cfm/ft^2) max.	1
Water Penetration, per ASTM E 547 and ASTM E 331 at 580 Pa (12.11 psf)	No leakage	No leakage	2
Uniform Load Deflection, per ASTM E 330	N/A	N/A	5
Uniform Load Structural, per ASTM E 330	N/A	N/A	5
Forced Entry Resistance, per ASTM F 588, Type: B - Grade: 10	No entry	No entry	

7.0 Test Results: (Continued)

Title of Test	Results	Allowed	Note
Awning, Hopper, Projected Hardware Load Test 140 N (30 lbf)	10.9 mm (0.43")	52.8 mm (2.08")	
Optional Performance			
Uniform Load Deflection, per ASTM E 330 taken at top rail +3600 Pa (+75.19 psf) -3600 Pa (-75.19 psf)	 2.0 mm (0.08") 6.9 mm (0.27")	 8.6 mm (0.34") max. 8.6 mm (0.34") max.	 6, 7
Uniform Load Structural, per ASTM E 330 taken at top rail +5040 Pa (+105.26 psf) -5040 Pa (-105.26 psf)	 <0.3 mm (<0.01") 0.3 mm (0.01")	 4.3 mm (0.17") max. 4.3 mm (0.17") max.	 6, 7

Note 1: The tested specimen meets (or exceeds) the performance levels specified in AAMA/WDMA/CSA 101/I.S.2/A440 for air leakage resistance.

Note 2: Without insect screen.

Note 3: Observations: Minor wear marks.

Note 4: Observations: Minor wear marks to locks and keepers during first half. Additional wear marks during second half to include interior left lock handle became loose and interior right lock screws became loose.

Note 5: The client opted to start at a pressure higher than the minimum required.

Note 6: Loads were held for 10 seconds.

Note 7: Tape and film were to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.

***Note**: Test specimen met all the requirements for an AW rating with the exception of the Sash Torsion test.*

The service life of this report will expire on the stated Test Record Retention End Date, at which time such materials as drawings, data sheets, samples of test specimens, copies of this report, and any other pertinent project documentation, shall be discarded without notice.

If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made. 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 for: Russell W. Clark by Vicki L. McElwain

Russell W. Clark
Technician

Digitally Signed by: Michael D. Stremmel

Michael D. Stremmel, P.E.
Senior Project Engineer

RWC:dem

Attachments (pages): This report is complete only when all attachments listed are included.
- Appendix-A: Alteration Addendum (1)
- Appendix-B: Photograph (1)
- Appendix-C: Drawings (7)

Appendix A

Alteration Addendum

***Note**: No alterations were required.*

Appendix B

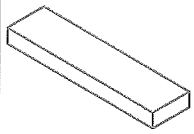
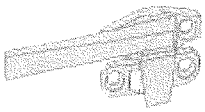
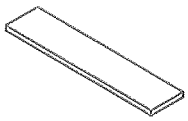
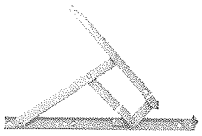
Photograph

Photo No. 1
Exterior View

Appendix C

Drawings

MATERIALS LIST & PARTS IDENTIFICATION

P1221		WIPER GASKET	N.B.T.		TREMCO GT800 BUTYL TAPE WITH 1/8" SHIM
P3702		BULB WEATHERING	N.B.T.		TREMCO SGT921 1/4" x 3/4" GLAZING TAPE
P3703		GLAZING WEDGE	N.B.T.		3/8" x 1" x 4" SETTING BLOCK
P3709L/R		CAM HANDLES	N.B.T.		1/8" x 7/8" x 4" SILICONE SETTING BLOCK
P3713A - F		STAINLESS STL HD 4 BAR HINGE			
P3707		FLUSH GLAZE ADAPTER			
P3708		CURTAINWALL ADAPTER			

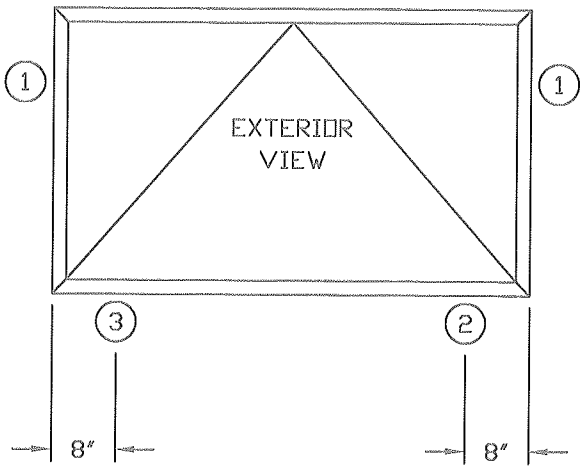
Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # A 4239

Date 11/23/10 Tech R. Clark

T960



THERMAL PERFORMANCE TEST ELEVATION
CVW3700 CASEMENT WINDOW

Architectural Testing

Test sample complies with these details.
Deviations are noted.

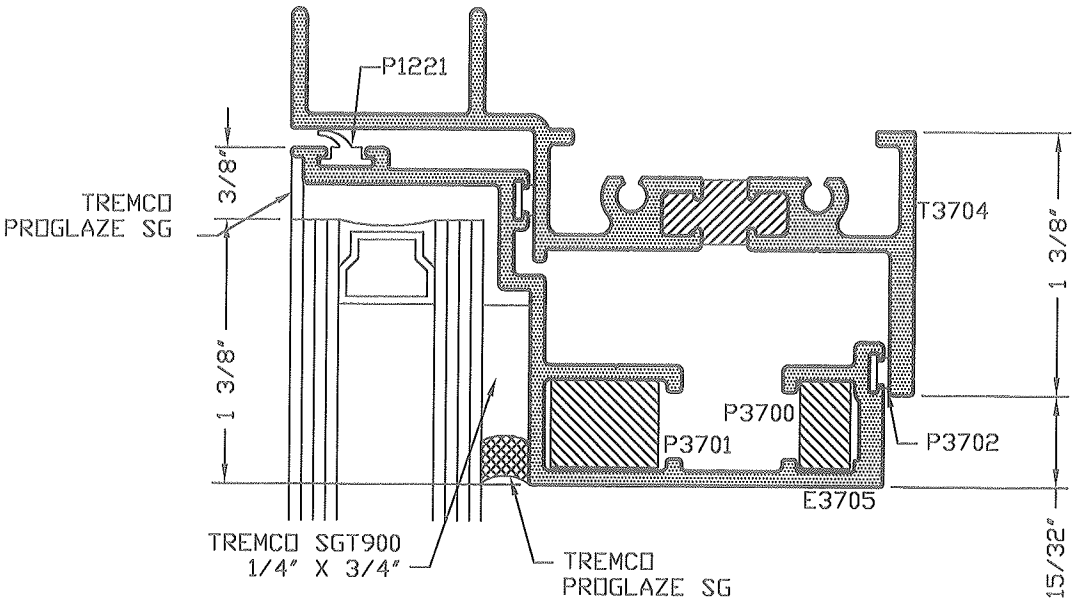
Report# A4235
Date 10/14/10 Tech RClark

TUBELITE®
STOREFRONT, CURTAINWALL & ENTRANCES
DEPENDABLE

CVW3700 CASEMENT WINDOW
THERMAL PERFORMANCE TEST
ELEVATION

DRAWN BY JEM	DRWG DATE 10/06/10	APPV'D BY	DATE APPV'D	
DRWG SCALE 1/2"=1"	PRODUCT CODE 120	T960		REV

T960-1



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# A4239

Date 10/14/10 Tech RClark

TUBELITE®

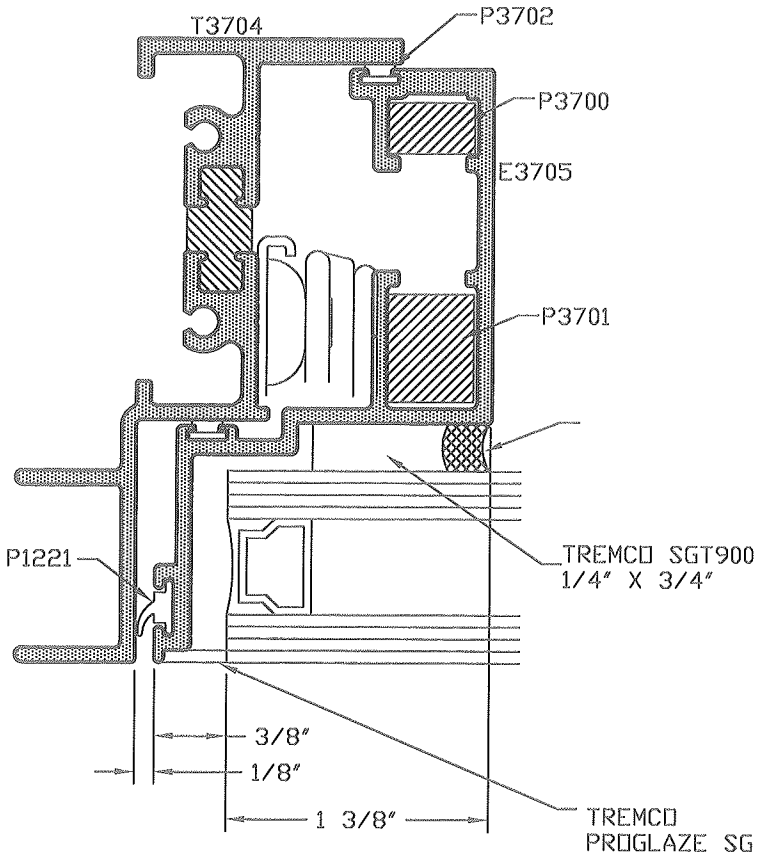
STOREFRONT, CURTAINWALL & ENTRANCES

DEPENDABLE

CVW3700 CASEMENT WINDOW
THERMAL PERFORMANCE TEST
HEAD DETAIL

DRAWN BY JEM	DRWG DATE 10/06/10	APPV'D BY	DATE APPV'D	
DRWG SCALE 1"=1"	PRODUCT CODE 120	T960-1		REV

T960-2



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# A23PC-A4235

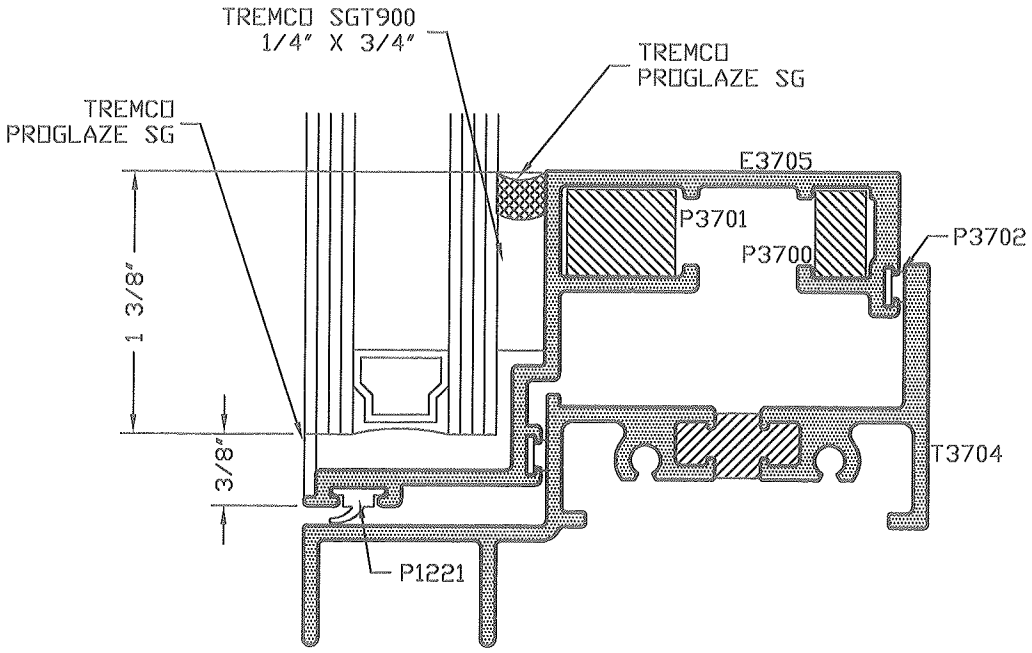
Date 10/11/10 Tech RC Lavoie

TUBELITE®
STOREFRONT, CURTAINWALL & ENTRANCES
DEPENDABLE

CVW3700 CASEMENT WINDOW
THERMAL PERFORMANCE TEST
JAMB DETAIL

DRAWN BY	JEM	DRWG DATE	10/06/10	APPV'D BY		DATE APPV'D	
DRWG SCALE	1"=1"	PRODUCT CODE	120	T960-2			REV

T960-3



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# A4235

Date 10/14/10 Tech

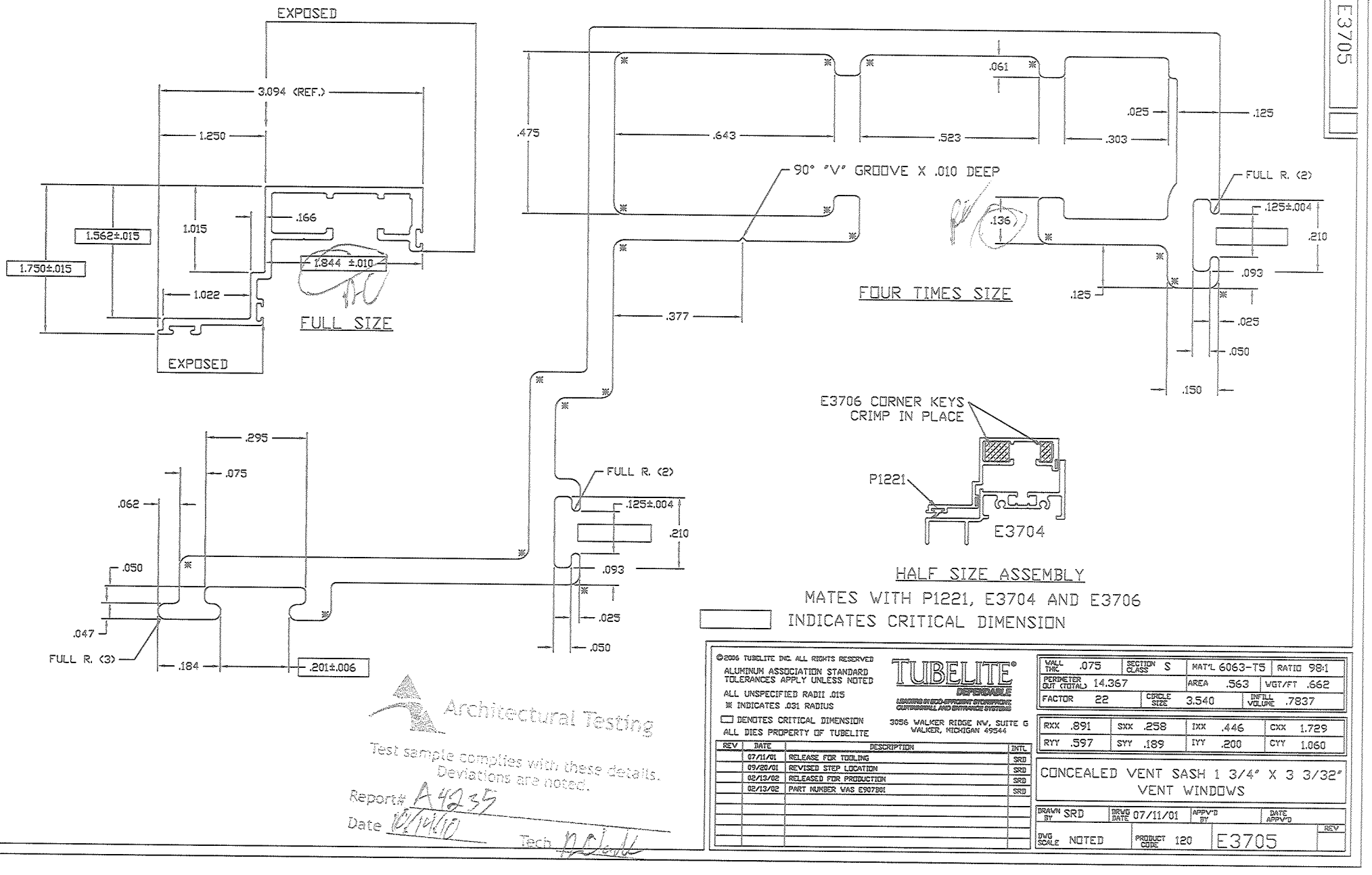
TUBELITE®

STOREFRONT, CURTAINWALL & ENTRANCES

DEPENDABLE

CVW3700 CASEMENT WINDOW
THERMAL PERFORMANCE TEST
SILL DETAIL

DRAWN BY	JEM	DRWG DATE	10/06/10	APPV'D BY		DATE APPV'D	
DRWG SCALE	1"=1"	PRODUCT CODE	120	T960-3			REV



ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

DENOTES CRITICAL DIMENSION

ALL DIES PROPERTY OF TUBELITE

TUBELITE® DEPENDABLE

LEADERS IN ECO-EFFICIENT EXTRUSIONS, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
	07/11/01	RELEASE FOR TOOLING	SRD
	09/20/01	REVISED STEP LOCATION	SRD
	02/13/02	RELEASED FOR PRODUCTION	SRD
	02/13/02	PART NUMBER WAS E907801	SRD

WALL THK	.075	SECTION CLASS	S	MAT'L	6063-T5
RATIO	98:1	PERIMETER OUT (TOTAL)	14.367	AREA	.563
WGT/FT	.662	FACTOR	22	CIRCLE SIZE	3.540
INFILL VOLUME	.7837				

RXX	.891	SXX	.258	IXX	.446
CXX	1.729	RYY	.597	SYY	.189
IYY	.200	CYY	1.060		

CONCEALED VENT SASH 1 3/4" X 3 3/32"
VENT WINDOWS

DRAWN BY	SRD	DRWG DATE	07/11/01	APPV'D BY	DATE APPV'D
DWG SCALE	NOTED	PRODUCT CODE	120	E3705	REV

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# A4235

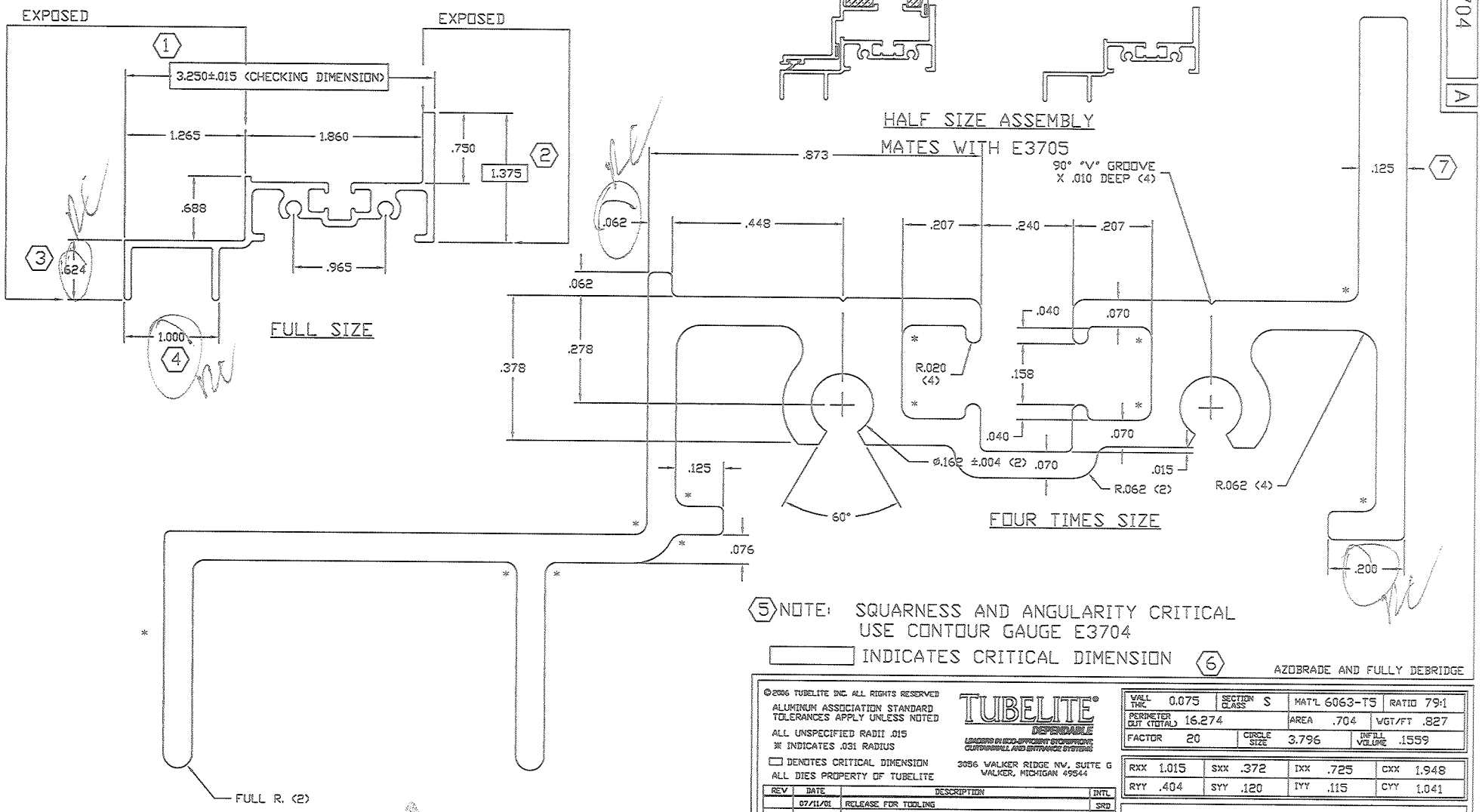
Date 10/16/10

Tech

E3705

WAS E904G02

E3704 A



HALF SIZE ASSEMBLY
MATES WITH E3705

FOUR TIMES SIZE

5 NOTE: SQUARNESS AND ANGULARITY CRITICAL
USE CONTOUR GAUGE E3704

☐ INDICATES CRITICAL DIMENSION

6 AZOBRADE AND FULLY DEBRIDGE

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS NOTED

ALL UNSPECIFIED RADII .015

* INDICATES .031 RADIUS

☐ DENOTES CRITICAL DIMENSION

ALL DIES PROPERTY OF TUBELITE

TUBELITE® DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

3056 WALKER RIDGE NW, SUITE G
WALKER, MICHIGAN 49544

REV	DATE	DESCRIPTION	INTL
	07/11/01	RELEASE FOR TOOLING	SRD
	02/13/02	RELEASE FOR PRODUCTION	SRD
	02/13/02	PART NUMBER WAS E907B02	SRD
A	04/05/06	REVISED P&D CAVITY FOR AZOBRADE	JEM
	06/06/06	RELEASED FOR TOOLING	JEM

WALL THK	0.075	SECTION CLASS	S	MAT'L 6063-T5	RATIO 79:1
PERIMETER CUT (TOTAL)	16.274			AREA .704	WGT/FT .827
FACTOR	20	CIRCLE SIZE	3.796	INFILL VOLUME	.1559

RXX	1.015	SXX	.372	IXX	.725
RYY	.404	SYY	.120	IYY	.115
				CXX	1.948
				CYY	1.041

CONCEALED VENT FRAME 1 3/8" X 3 1/4"
VENT WINDOWS

DRAWN BY	DRWG DATE	APPV'D BY	DATE APPV'D
SRD	07/11/01		

DWG SCALE	PRODUCT CODE		REV
NOTED	120	E3704	A

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# AU235
Date 10/19/10 Tech [signature]