

TEST REPORT

Report No.: B8036.02-250-44

Rendered to:

Universal Window and Door, LLC
Marlborough, Massachusetts

PRODUCT TYPE: Aluminum Double Hung Window
SERIES/MODEL: 400 Series

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-PG45- 1524x2515 (60x99)
Design Pressure	±2160 Pa (±45.11 psf)
Air Infiltration	0.2 L/s/m ² (0.03 cfm/ft ²)
Water Penetration Resistance Test Pressure	360 Pa (7.52 psf)

Test Completion Date: 04/02/2012

Reference must be made to Architectural Testing, Inc. Report No. B8036.02-250-44, dated 06/13/12 for complete test specimen description and detailed test results.

1.0 Report Issued To: Universal Window and Door, LLC
303 Mechanic Street
Marlborough, Massachusetts 01752

2.0 Test Laboratory: Architectural Testing, Inc.
10 Tracy Road
Chelmsford, Massachusetts 01824
978-244-9300

3.0 Project Summary:

3.1 Product Type: Aluminum Double Hung Window

3.2 Series/Model: 400 Series

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test methods. The specimen tested successfully met the performance requirements for a **Class CW-PG45- 1524x2515 (60x99)** rating.

3.4 Test Dates: 03/19/12 - 04/02/12

3.5 Test Record Retention End Date: All test records for this report will be retained until June 13, 2016.

3.6 Test Location: Architectural Testing, Inc. test facility in Chelmsford, Massachusetts.

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

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

3.9 List of Official Observers:

<u>Name</u>	<u>Company</u>
Paul Weisblatt	Universal Window and Door, LLC
Forrest Mitchell	Universal Window and Door, LLC
J.P. McDonald	Architectural Testing, Inc.
Brian Philcrantz	Architectural Testing, Inc.

4.0 Test Specification:

AAMA/WDMA/CSA 101/1.S.2/A440-08, *NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights*

5.0 Test Specimen Description:

5.1 Product Sizes:

Overall Area: 3.8 m ² (41.3 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	1524	60	2515	99
Exterior sash	1435	56-1/2"	1251	49-1/4"
Interior sash	1461	57-1/2"	1251	49-1/4"
Screen	1426	56-1/8"	1257	49-1/2"

5.2 Frame Construction:

Frame Member	Material	Description
Head, sill and jambs	Aluminum	Thermally broken extruded aluminum

	Joinery Type	Detail
All corners	Coped, butted and sealed	One #8 x 1" pilot screw in each corner

5.3 Sash Construction:

Sash Member	Material	Description
Rails and stiles	Aluminum	Thermally broken extruded aluminum

	Joinery Type	Detail
All corners	Coped and butted	One #8 x 1" pilot screw in each corner

5.0 Test Specimen Description: (Continued)

5.4 Weatherstripping:

Description	Quantity	Location
Rubber bulb gasket	1 row	Sill
0.270" x 0.250" Polypile	2 row	Upper sash - top rail; lower sash - meeting rail
0.270" x 0.250" Polypile	1 rows	Upper sash - top rail; head - sash pocket
0.270" x 0.230" Polypile	1 row	Lower sash - sill riser and stiles
0.270" x 0.230" Polypile	2 row	Upper sash - stiles
0.270" x 0.250' Triple fin	1 row	Lower sash - stiles

5.5 Glazing: *No conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen can be made.*

Glass Type	Spacer Type	Interior Lite	Exterior Lite	Glazing Method
1" IG	Foil backed structural foam	3/16"	3/16"	Dry glazed in a vinyl U-channel

5.6 Drainage: A sloped sill was utilized.

5.7 Hardware:

Description	Quantity	Location
Sweep lock with keepers	2	14" inches from edge of meeting rail
Metal tilt latch	4	Ends of interior meeting rail and top rail
Hybrid balance	4	Two per jamb
Anti-bow pins	4	Center of stiles, top and bottom sash
Snap lock	2	Top rail 3" from each end
Metal pivot bar	4	Exterior meeting rail and bottom rail ends

5.0 Test Specimen Description: (Continued)

5.8 Reinforcement: No reinforcement was utilized.

5.9 Screen Construction:

Frame Material	Corner Construction	Mesh Type	Mesh Attachment Method
Aluminum	Mitered and keyed	Fiberglass	Flexible vinyl spline

6.0 Installation:

The specimen was installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for a 1/4" shim space. The exterior perimeter of the window was sealed with silicone.

Location	Anchor Description	Anchor Location
Jambs	3" aluminum installation clip attached to the buck with two #8 x 1" self-tapping screws and to the window with #8 x 1/2 " self-tapping pan head screws	5" from each corner, spaced 15" on center
Head and sill	Continuous aluminum installation clip attached to the buck with two #8 x 1" self-tapping screws and to the window with #8 x 1/2 " self-tapping pan head screws	Continuous across head and sill
Head, sill, jambs	Aluminum nail fin attached to the buck with 1-1/2" self-tapping screw	5" from each corner, spaced 15" on center

7.0 Test Results: The temperature during testing was 13°C (56°F). The results are tabulated as follows:

Title of Test	Results	Allowed	Note
Operating Force, per ASTM E 2068	Initiate motion: 133 N (30 lbf) Maintain motion: 178 N (40 lbf) Latches: 49 N (11 lbf)	Report Only 200 N (45 lbf) max. 111 N (25 lbf) max.	
Air Leakage, Infiltration per ASTM E 283 at (1.57 psf)	0.2 L/s/m ² (0.03 cfm/ft ²)	1.5 L/s/m ² (0.3 cfm/ft ²) max.	1
Water Penetration, per ASTM E 547 and ASTM E 331	N/A	N/A	2
Uniform Load Deflection, per ASTM E 330	N/A	N/A	2
Uniform Load Structural, per ASTM E 330	N/A	N/A	2
Forced Entry Resistance, per ASTM F 588, Type: A - Grade: 10	Pass	No entry	
Deglazing, per ASTM E 987 Operating direction, 320 N (70 lbf) Remaining direction, 230 N (50 lbf)	Pass Pass	Meets as stated Meets as stated	

7.0 Test Results: (Continued)

Optional Performance			
Water Penetration, per ASTM E 547 at 7.52 psf	Pass	No leakage	3
Uniform Load Deflection, per ASTM E 330 taken at meeting rail +2160 Pa (+45.11 psf) -2160 Pa (-45.11 psf)	7.4 mm (0.29") 8.1 mm (0.32")	8.1 mm (0.32") max. 8.1 mm (0.32") max.	4, 5, 6
Uniform Load Structural, per ASTM E 330 taken at meeting rail +3240 Pa (+67.67 psf) -3240 Pa (-67.67 psf)	0.5 mm (0.02") 0.3 mm (0.01")	4.3 mm (0.17") max. 4.3 mm (0.17") max.	5, 6

Note 1: The tested specimen meets (or exceeds) the performance levels specified in ANSI/AAMA/NWWDA 101/I.S.2-97 for air infiltration.

Note 2: The client opted to start at a pressure higher than the minimum required. Test results are reported under Optional Performance.

Note 3: With and without insect screen.

Note 4: The deflections reported are not limited by ANSI/AAMA/NWWDA 101/I.S.2-97 for this product designation. The deflection data is recorded in this report for special code compliance and information only.

Note 5: Loads were held for 10 seconds.

Note 6: Tape and film were used to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.

Architectural Testing will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period.

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 tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, Inc.

Brian Philcrantz
Technician

J.P. McDonald
Director-Regional Operations

BP:jpm:dr

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Drawings (10)

This report produced from controlled document template ATI 00438, issued 01/31/12.

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	06/13/12	N/A	Original Report Issue
1	08/21/12	Page 1	Corrected test retention date
		Page 3	Changed Glass Type dimension to 1"



Test Report No.: B8036.01-250-44

Report Date: 06/13/12

Revision Date: 08/21/12

Appendix A

Drawings



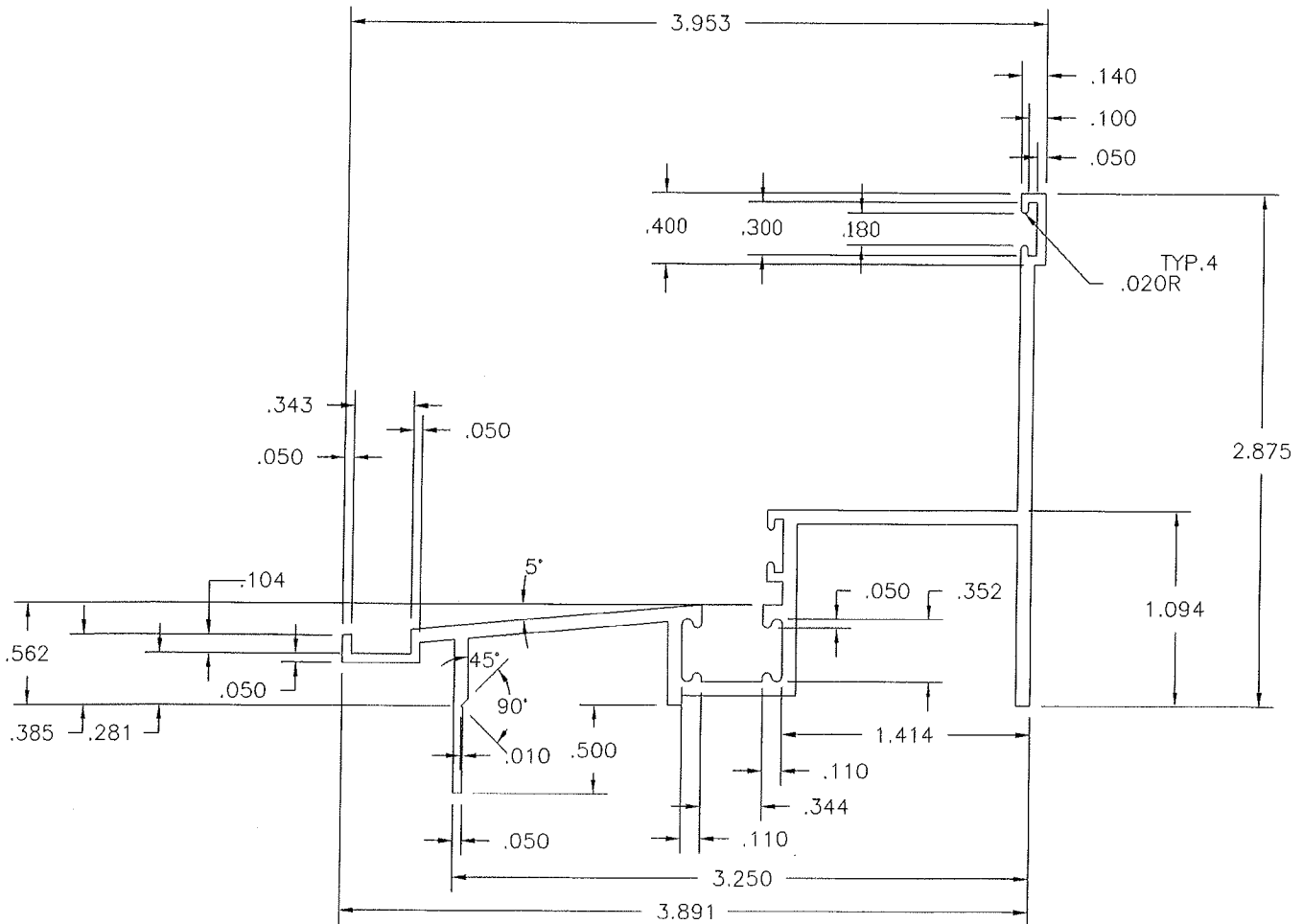
Architectural Testing

Test sample complies with these details.
Deviations are noted.

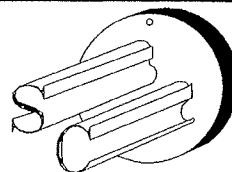
Report# B8036.01 + B8036.02
Date 4/18/12 Tech BJ

UNI-S-3171

DIE NUMBER



UNSPECIFIED WALLS	.078	CIRCLE SIZE	3-4
UNSPECIFIED RADII		EST. PERIMETER	20.307
BREAK CORNERS	.015R	FACTOR	23
EST. AREA	.730		
EST. WT. PER FT.	.876		



SILVER CITY ALUMINUM CORPORATION

Custom Aluminum Extrusion
704 WEST WATER STREET TAUNTON, MA. 02780

CUSTOMER: UNIVERSAL ALUMINUM
CITY: MARLBORO STATE: MA

APPLICATION: SILL (400 SERIES)		SCALE	DRAWN
		1 : 1	JCH
DIE DATA		DATE	TRACED
TYPE	SOLID	9-12-94	ET
SIZE	9x2w3/4"POCKET	MAT'L	CK'D
BACKER	1S-9A-5617	6063-T5	
BOLSTER	1B - 1	CUST. NO.	
RUNOUT		3171	

STANDARD TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE

REVISIONS	DATE
REDRAWN W/ NO REVISIONS	9-27-99

SOLID	<input checked="" type="checkbox"/>	HOLLOW	<input type="checkbox"/>	SEMI HOLLOW	<input type="checkbox"/>
TUBE	<input type="checkbox"/>	BAR	<input type="checkbox"/>	ROD	<input type="checkbox"/>



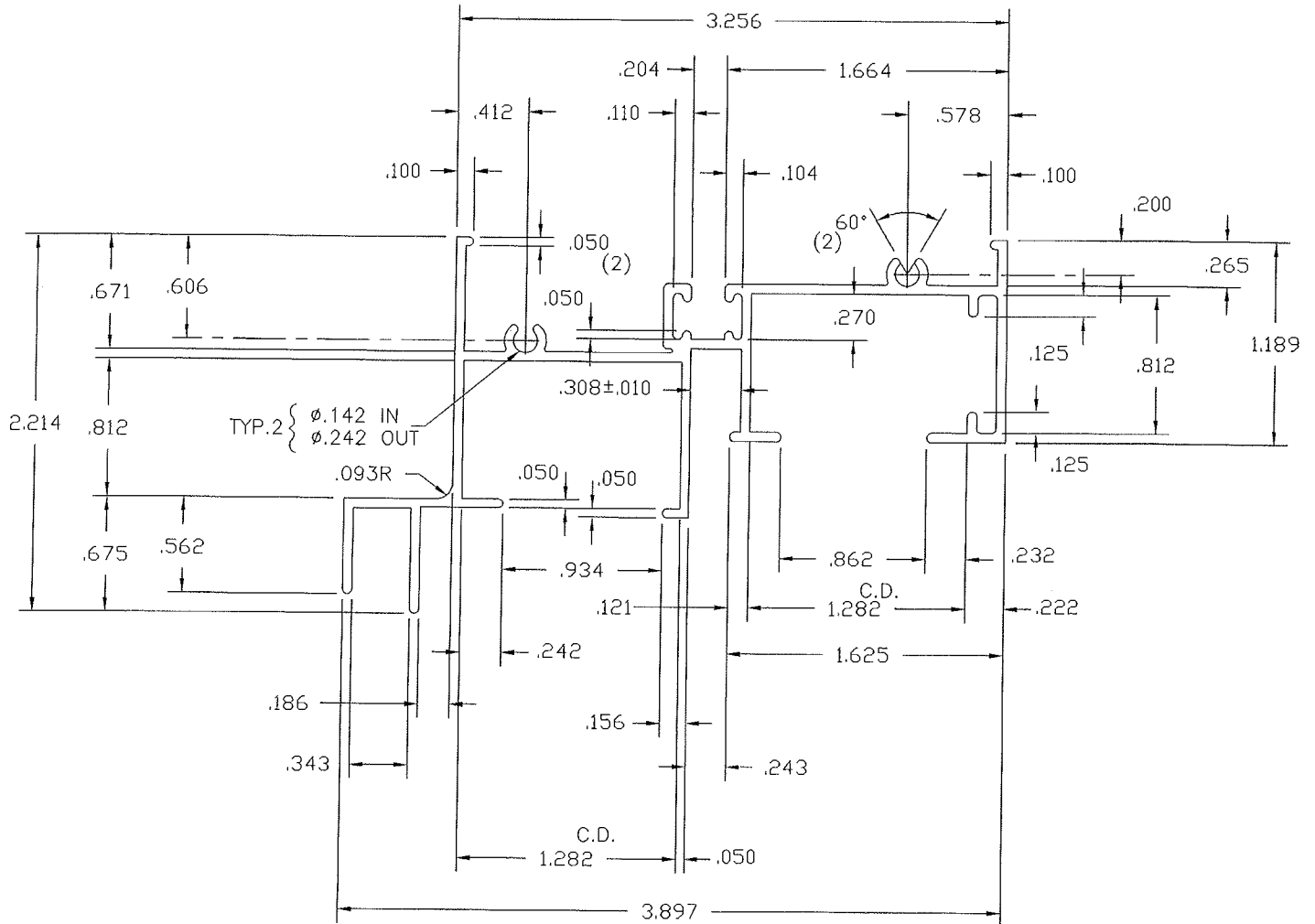
Architectural Testing

UNI-S-3434

DIE NUMBER

Test sample complies with these details.
Deviations are noted.

Report# B8036.01 + B8036.02
Date 4/18/12 Tech BB



UNSPECIFIED WALLS	.056	CIRCLE SIZE	3-4
UNSPECIFIED RADII	.025R	EST. PERIMETER	24.080
BREAK CORNERS	.010R	EST. WT. PER FT.	.817
EST. AREA	.681	FACTOR	30

SILVER CITY ALUMINUM CORPORATION

Custom Aluminum Extrusion

704 WEST WATER STREET TAUNTON, MA. 02780

CUSTOMER: UNIVERSAL ALUMINUM
 CITY: MARLBORO STATE: MA

STANDARD TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE	
REVISIONS	DATE
REDRAWN W/ NO REVISIONS	9-27-99

APPLICATION: JAMB	SCALE 1 : 1	DRAWN JCH
DIE DATA	DATE 9-12-94	TRACED ET
TYPE SOLID	MAT'L 6063-T5	CK'D
SIZE 9x2w3/4"POCKET	CUST. NO. 3434	
BACKER 1S-9A-4532		
BOLSTER 1B-1		

SOLID HOLLOW SEMI HOLLOW
 TUBE BAR ROD

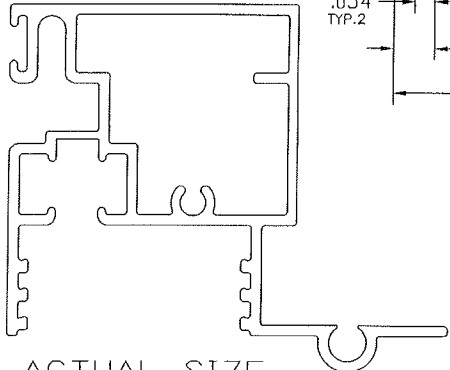
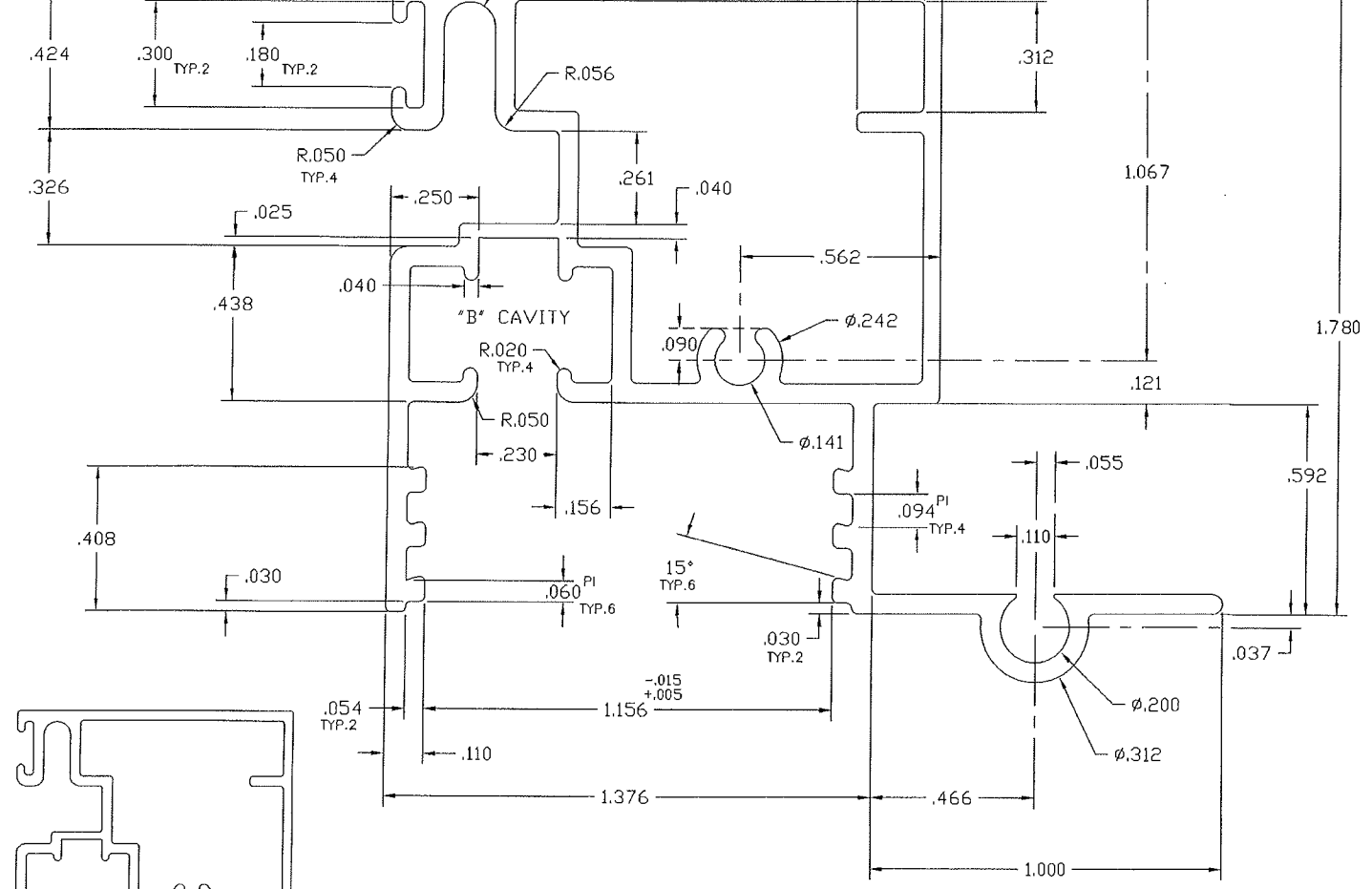


Architectural Testing

UNI-H-8679
DIE NUMBER

Test sample complies with these details.
Deviations are noted.

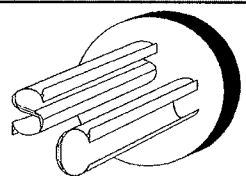
Report# B8036.01 + B8036.02
Date 4/18/12 Tech FD



ACTUAL SIZE

400 DOUBLE HUNG TSTR FOR METAL TILT LATCHES

UNSPECIFIED WALLS	.056	CIRCLE SIZE	2-3
UNSPECIFIED RADII	.020	EST. PERIMETER	14,631
BREAK CORNERS	.015R	EST. AREA	.568
EST. WT. PER FT.	.682	FACTOR	42
STANDARD TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE			
REVISIONS		DATE	
REDESIGN KEPT ORIG. NO.		9-9-02	
SOLID <input type="checkbox"/>		HOLLOW <input type="checkbox"/>	
TUBE <input type="checkbox"/>		SEMI HOLLOW <input type="checkbox"/>	
BAR <input type="checkbox"/>		ROD <input type="checkbox"/>	



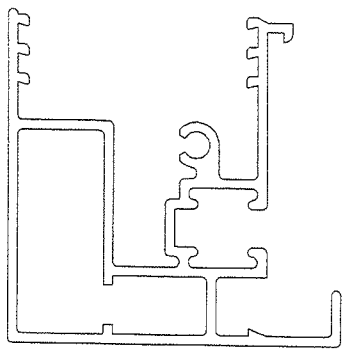
SILVER CITY ALUMINUM CORPORATION

Custom Aluminum Extrusion
704 WEST WATER STREET TAUNTON, MA. 02780

CUSTOMER: UNIVERSAL ALUMINUM
CITY: MARLBORO STATE: MA

APPLICATION: THERMAL TILT DH - TOP RAIL		SCALE	DRAWN
DIE DATA		2 : 1	LD
BILLET DATA		DATE	TRACED
TYPE HOLLOW		7-16-02	CK'D
SIZE 9 X 4		MAT'L	
BACKER		6063-T5	
BOLSTER 1B-2194		CUST. NO.	
RUNOUT		8679	

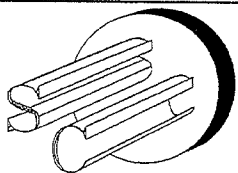
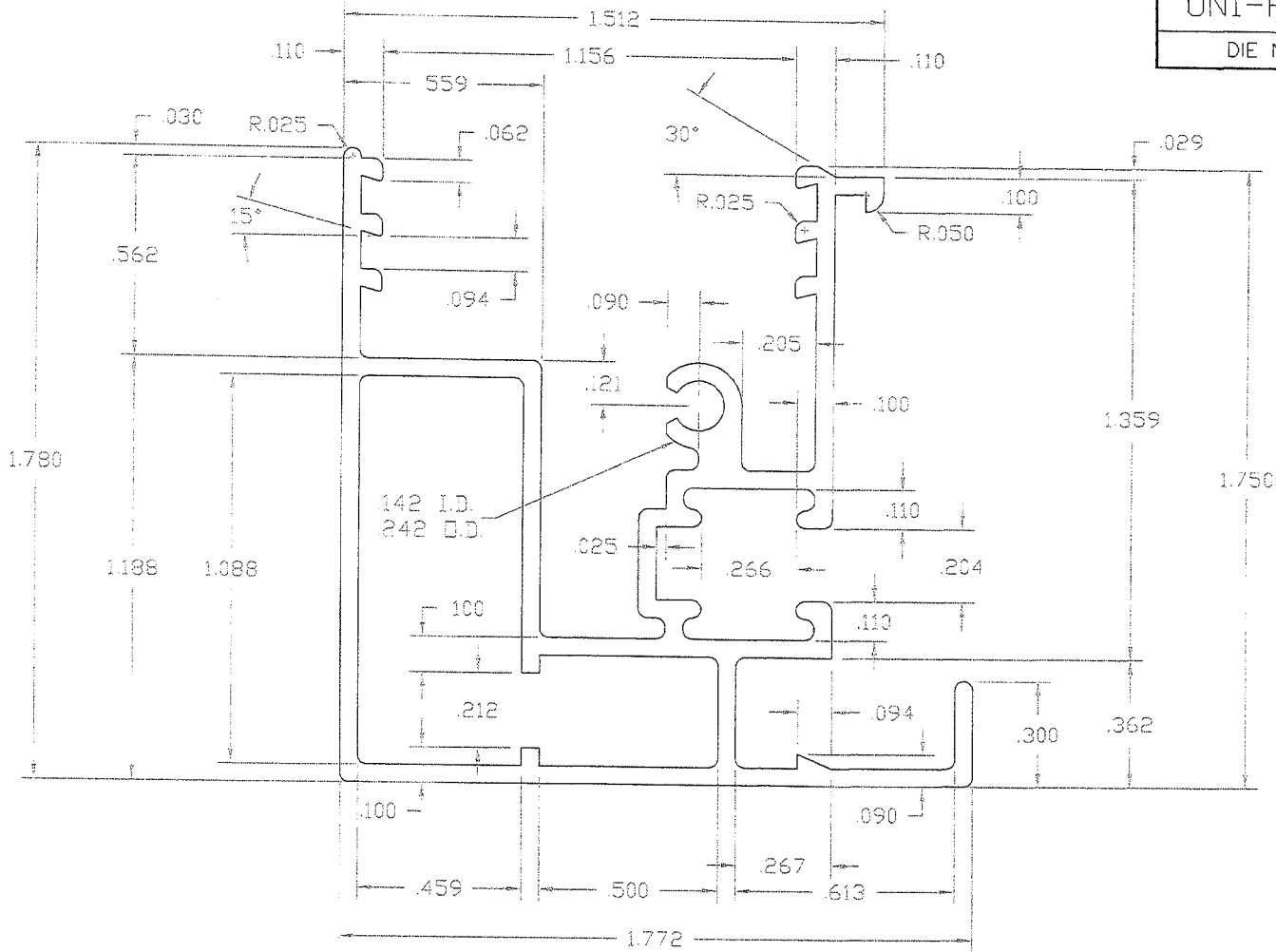
UNI-H-3131
DIE NUMBER



ACTUAL SIZE

Report# B7036.01 + B66036.02
Date 9/18/12 Tech JB

Architectural Testing
Test sample complies with these details.
Deviation are noted.



SILVER CITY ALUMINUM CORPORATION
Custom Aluminum Extrusions
704 WEST WATER STREET TAUNTON, MA. 02780

EST. AREA		EST. PERIMETER	
.495		14.483	
EST. WT. PER FT.		FACTOR	
.594		36	
APPLICATION: KEEPER RAIL 400 SERIES			
SCALE	DRAWN	CIRCLE SIZE	
2 : 1	JCH	1-2	
DATE	TRACED	UNSPECIFIED WALL	
12-2-02		.05	
MAT'L	CK'D	UNSPECIFIED RADII	
6063-T5		.025R	
CUST. NO.		BREAK CORNERS	
CUST #		.015R	

NOTES:			
REVISIONS		DATE	
DIE DATA		BILLET DATA	
TYPE	HOLLOW	TYPE	
DIE SIZE	9 X 4	SIZE	
BACKER	- - - -	RUNOUT	
BOLSTER	1B-2194		

CUSTOMER: UNIVERSAL ALUMINUM
CITY: MARLBORO STATE: MA

SOLID HOLLOW SEMI HOLLOW
TUBE BAR ROD

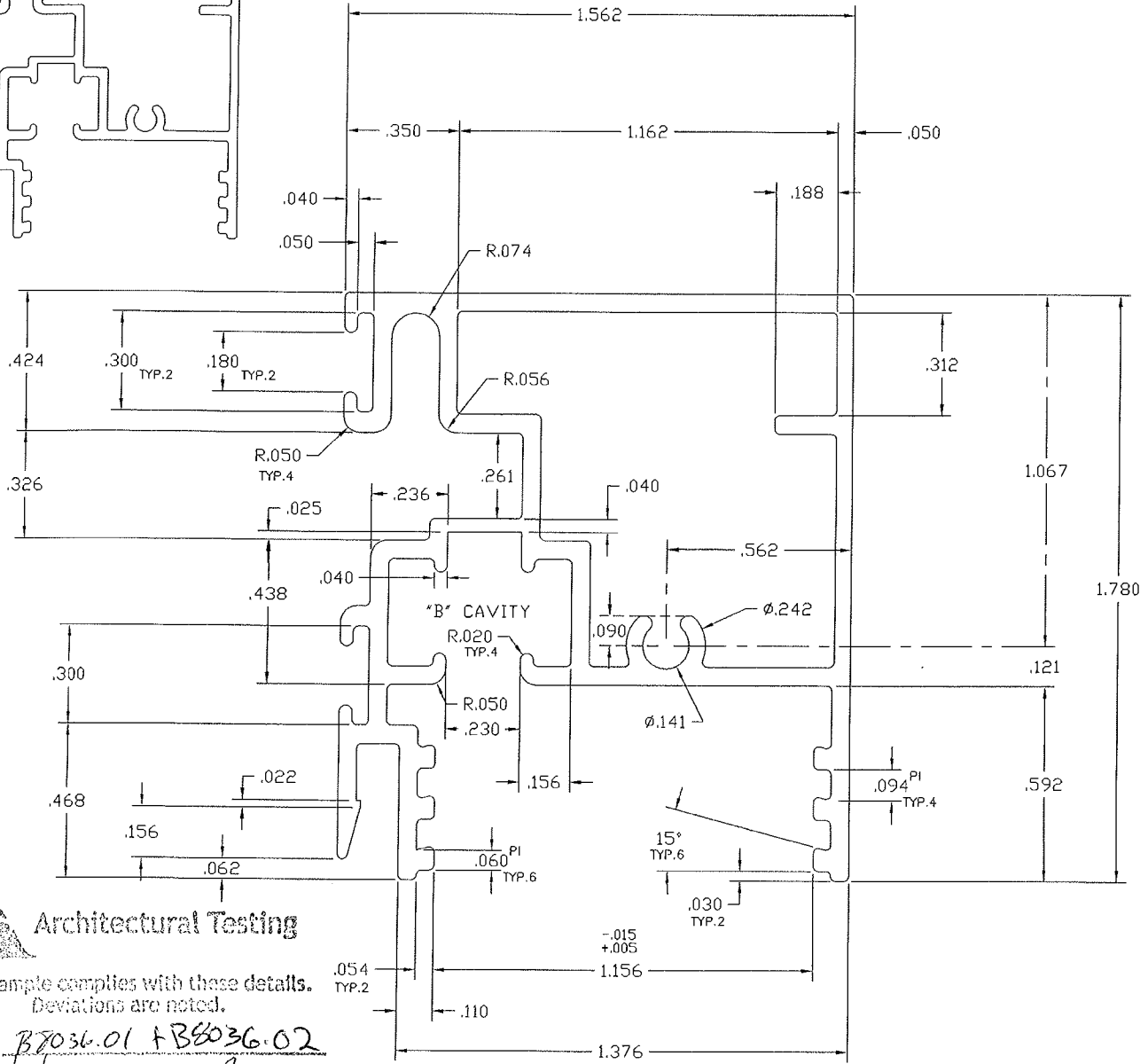
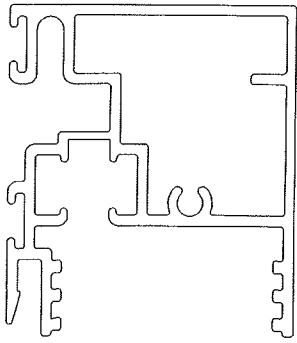
STANDARD TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE

ACTUAL SIZE

400 DOUBLE HUNG LOCK RAIL FOR METAL TILT LATCHES

UNI-H-8685

DIE NUMBER



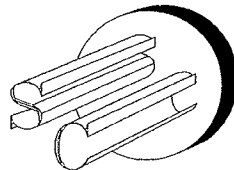
Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# B7036.01 + B8036.02

Date 4/10/12 Tech BB

UNSPECIFIED WALLS	.056	CIRCLE SIZE	2-3
UNSPECIFIED RADII	.020	EST. PERIMETER	13.308
BREAK CORNERS	.015R	EST. AREA	.530
		EST. WT. PER FT.	.636
		FACTOR	52
STANDARD TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE			
REVISIONS		DATE	
SOLID <input type="checkbox"/>	HOLLOW <input checked="" type="checkbox"/>	SEMI HOLLOW <input type="checkbox"/>	
TUBE <input type="checkbox"/>	BAR <input type="checkbox"/>	ROD <input type="checkbox"/>	



SILVER CITY ALUMINUM CORPORATION

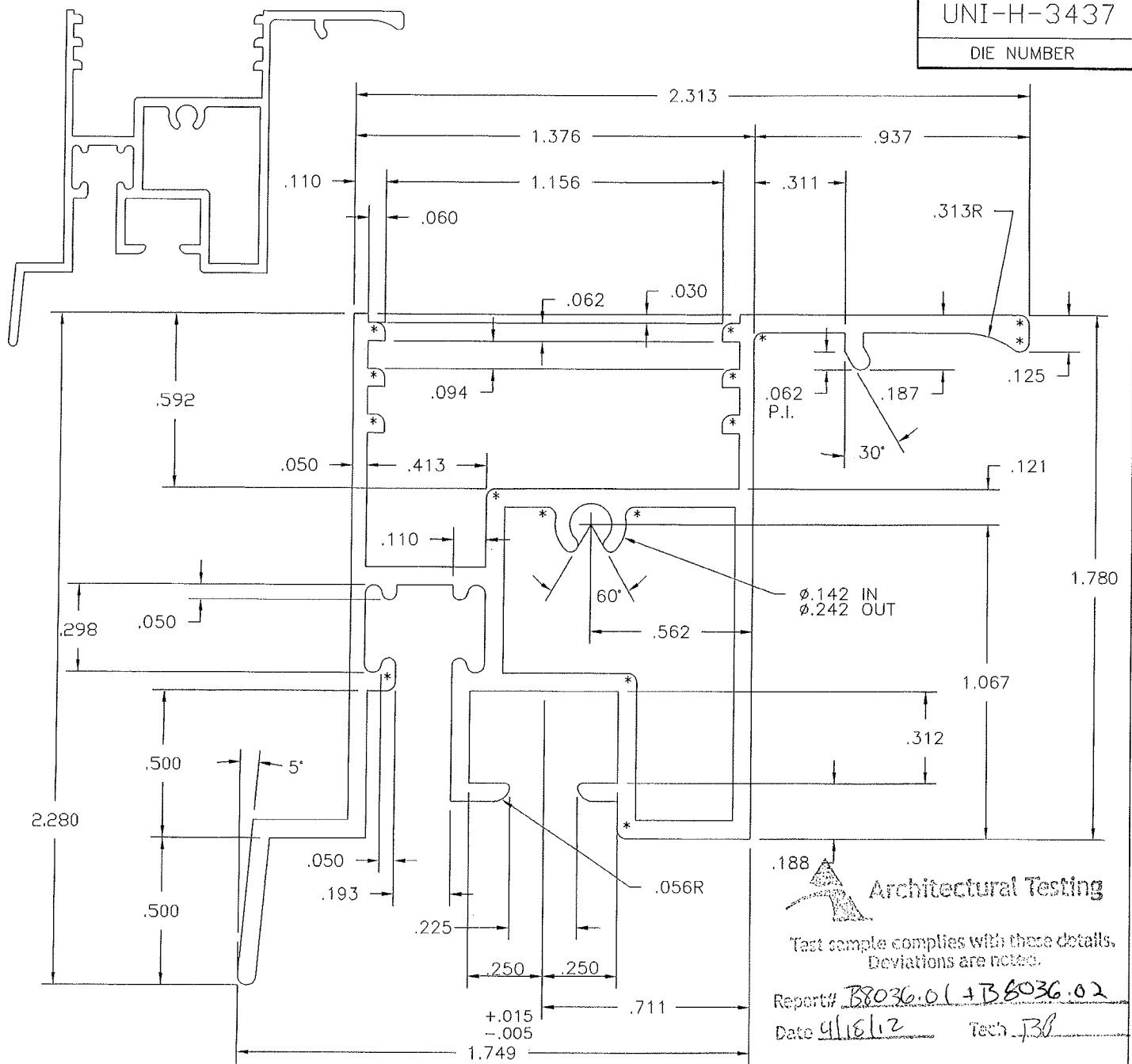
Custom Aluminum Extrusion
704 WEST WATER STREET TAUNTON, MA. 02780

CUSTOMER: UNIVERSAL ALUMINUM
CITY: MARLBORO STATE: MA

APPLICATION: THERMAL TILT OH - TOP RAIL		SCALE	DRAWN
		2 : 1	LD
DIE DATA		DATE	TRACED
TYPE	HOLLOW	7-15-02	
SIZE	9 X 4	MAT'L	CK'D
BACKER		6063-T5	
BOLSTER	1B-2194	CUST. NO. 8685	

UNI-H-3437

DIE NUMBER



UNSPECIFIED WALLS	.062	CIRCLE SIZE	3-4
UNSPECIFIED RADII	.031R *	EST. PERIMETER	15.896
BREAK CORNERS	.015R	FACTOR	54
EST. AREA	.614		
EST. WT. PER FT.	.737		



SILVER CITY ALUMINUM CORPORATION

Custom Aluminum Extrusion

704 WEST WATER STREET TAUNTON, MA. 02780

STANDARD TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE

CUSTOMER: UNIVERSAL ALUMINUM PRODUCTS
 CITY: MARLBORO STATE: MA

REVISIONS	DATE
REDRAWN W/ NO REVISIONS	9-8-99

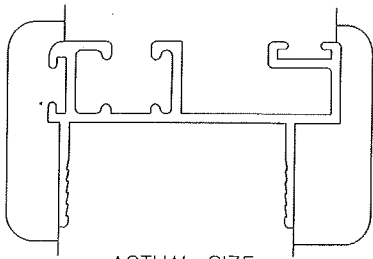
DIE DATA		BILLET DATA	
TYPE	HOLLOW	TYPE	
SIZE	9 X 4	SIZE	
BACKER	~ ~	BACKER	
BOLSTER	1B-2194	BOLSTER	
		RUNOUT	

SCALE	2 : 1	DRAWN	JCH
DATE	9-12-94	TRACED	ET
MAT'L	6063-T5	CK'D	
CUST. NO.		6052	

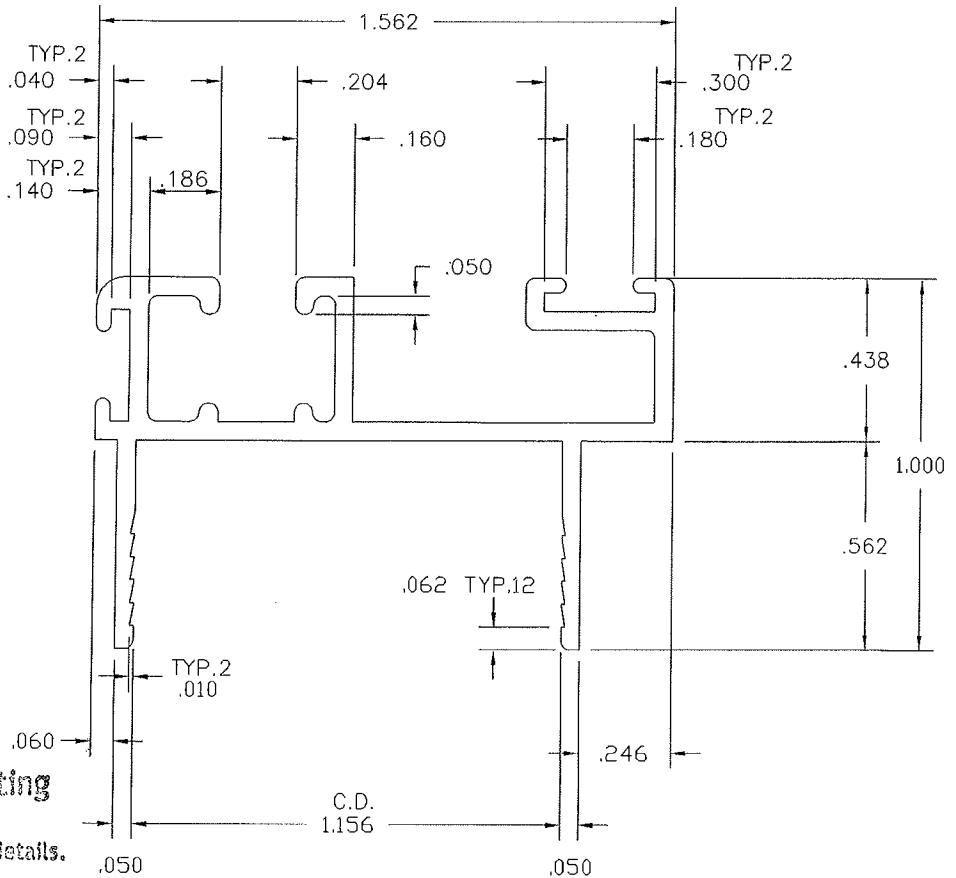
SOLID HOLLOW SEMI HOLLOW
 TUBE BAR ROD

UNI-S-3436

DIE NUMBER



ACTUAL SIZE

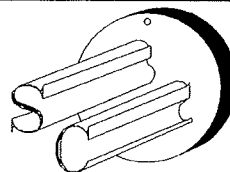


Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# B7036.01 + 34036.02
Date 4/18/12 Tech BJ

UNSPECIFIED WALLS	.050	CIRCLE SIZE	1-2
UNSPECIFIED RADII	.025R		
BREAK CORNERS	.010R		
EST. AREA	.251	EST. PERIMETER	10.081
EST. WT. PER FT.	.301	FACTOR	34



SILVER CITY ALUMINUM CORPORATION
Custom Aluminum Extrusion
704 WEST WATER STREET TAUNTON, MA. 02780

CUSTOMER: UNIVERSAL ALUMINUM
CITY: MARLBORO STATE: MA

APPLICATION: TOP STILE		SCALE	DRAWN
		2 : 1	
		DATE	TRACED
		9-12-94	AF
		MAT'L	CK'D
		6063-T5	
		CUST. NO.	
		3436	

STANDARD TOLERANCES FOR EXTRUDED PRODUCTS APPLY UNLESS SPECIFICALLY SHOWN OTHERWISE

REVISIONS	DATE
REDRAWN W/ NO REVISIONS	11-13-02

SOLID	<input checked="" type="checkbox"/>	HOLLOW	<input type="checkbox"/>	SEMI HOLLOW	<input type="checkbox"/>
TUBE	<input type="checkbox"/>	BAR	<input type="checkbox"/>	ROD	<input type="checkbox"/>

DIE DATA		BILLET DATA	
TYPE	SOLID	TYPE	
SIZE	9x2w3/4"POCKET	SIZE	
BACKER	2S-9A-4533	BOLSTER	2B-2218
BOLSTER	2B-2218	RUNOUT	

