Architectural Testing

PERFORMANCE TEST REPORT

Rendered to:

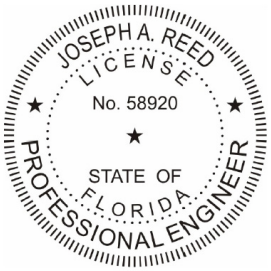
UNITED STATES ALUMINUM CORPORATION

SERIES/MODEL: 450 Center Glaze
PRODUCT TYPE: Aluminum Curtain Wall

Title	Summary of Results
Air Infiltration	<0.01 cfm/ft^2
Water Resistance Test Pressure	8.0 psf
Uniform Load Deflection Test Pressure	±30.0 psf
Uniform Load Structural Test Pressure	±45.0 psf

This report contains in its entirety:
Cover Page: 1 page
Report Body: 5 pages
Drawings: 14 pages

Secure Electronic Seal
for Electronic Submittal



Digitally Signed by: Joseph A. Reed

Date: 2008.07.29 15:34:25 -04'00'

Reference should be made to Architectural Testing, Inc. Report No. 79428.03-801-47 for complete test specimen description and data.

2865 Market Loop, Suite B
Southlake, Texas 76092
phone: 817-410-7202
fax: 817-424-8463
www.archtest.com

Architectural Testing

PERFORMANCE TEST REPORT

Rendered to:

UNITED STATES ALUMINUM CORPORATION
200 Singleton Dr.
Waxahachie, Texas 75165

Report No.:	79428.03-801-47
Revision1:	07/24/08
Test Date:	01/04/08
Report Date:	07/11/08
Expiration Date:	01/04/12

Project Summary: Architectural Testing, Inc. was contracted by United States Aluminum Corporation to witness testing on a Series/Model 450 Center Glaze, aluminum curtain wall at the United States Aluminum test facility in Waxahachie, Texas. Test specimen description and results are reported herein. The sample was provided by the client.

Test Methods: The test specimen was evaluated in accordance with the following:

ASTM E 283-04, *Test Method for Determining Rate of Airflow Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.*

ASTM E 330-02, *Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.*

ASTM E 331-00, *Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.*

Test Specimen Description:

Series/Model: 450 Center Glaze

Product Type: Aluminum Curtain Wall

Overall Size: 182" wide by 96-3/8" high

Upper Daylight Opening Size (3): 58" wide by 66" high

Lower Daylight Opening Size (3): 58" wide by 24" high

Overall Area: 121.81 ft^2

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Test Specimen Description: (Continued)

Finish: Painted Aluminum

Glazing Details: Monolithic 1/4" thick tempered glass. Glass units were glazed using the NP225 gasket on the interior and exterior. SB140 setting blocks were used at the sill and intermediate horizontals to support the glass units at the quarter points.

Note: No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen can be made.

Frame Construction: Horizontal members were secured to vertical members with two #10 x 1" sheet metal screws. Water deflectors were placed at both ends of the intermediate horizontal members. Vertical fillers snap fit with the mullions/jambs. Sill dams were coped and fitted to the sill pan and secured with two #8 x 1" sheet metal screws. All joints were sealed with silicone sealer.

Drainage:

Description	Quantity	Location
1/8" x 1-1/4" Slot	8	Sill pan, 24" on center

Installation: The test specimen was installed to a Spruce-Pine-Fir test frame. The head was secured with an aluminum anchor channel located at the end of each vertical member. The aluminum anchor channel was fastened with six #12 x 3" screw at the intermediate verticals and with four #12 x 3" screws at the jambs. The jambs and sill pan were secured with
#12 x 3" screws located 4" from each end and 12" on center thereafter. The perimeter was sealed with silicone sealant.

Test Results: The temperature during testing was 69°F. The results are tabulated as follows:

Test Method	Title of Test	Results
ASTM E 283	Air Infiltration 6.24 psf	<0.01 cfm/ft^2
ASTM E 331	Water Resistance 8.0 psf	No leakage
ASTM E 330	Uniform Load Deflection (Deflections reported were taken on the vertical mullion; mullion length was 96-3/8") (Loads were held for 10 seconds) 30.0 psf (positive) 30.0 psf (negative)	 0.55" 0.54"
ASTM E 330	Uniform Load Structural (Permanent sets reported were taken on the vertical mullion; mullion length was 96-3/8") (Loads were held for 10 seconds) 45.0 psf (positive) 45.0 psf (negative)	 0.04" 0.01"

***General Note**: All testing was performed in accordance with the referenced standards.*

Tape and film were not used to seal against air leakage during structural testing.

Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen reported herein.

List of Official Observers:

Name	Company
Terry Hopgood	United States Aluminum Corporation
Jim Sturdevant	Architectural Testing, Inc.

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 will expire.

Results obtained are tested values and were secured by using the designated test methods. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen 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 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: James A. Studevant by John H. Waskow

James Sturdevant
Laboratory Technician

Digitally Signed by: Joseph A. Reed

Joseph A. Reed, P.E.
Director – Engineering and Product Testing

JS:ay/cmd

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Drawings (14)

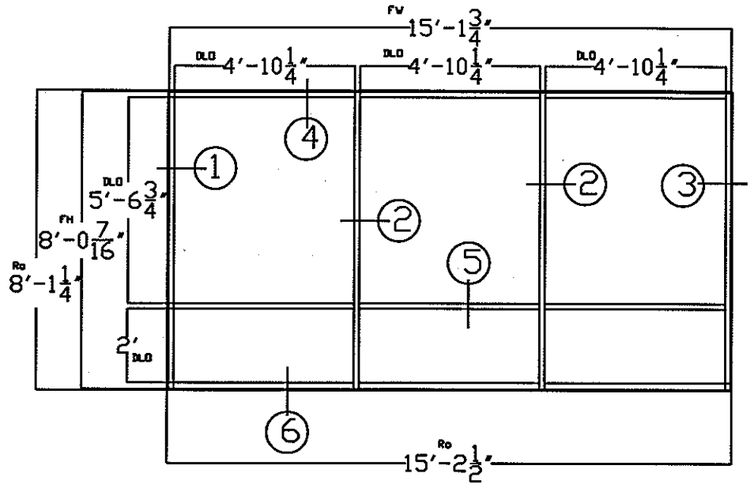
Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	07/11/08	N/A	Original report issue – Reissued Report No. 79428.01-801-47 with Florida P.E. review and seal
1	07/24/08	Page 2	Under Installation, corrected the next to last sentence to, "The jambs and sill pan were secured with #12 x 3" screws located 4" from each end and 12" on center thereafter."
		Appendix-A	Replaced second drawing sheet with revised drawing.

Appendix A

Drawings

Series 450
Center Glaze Mock Up



Elevations

Architectural Testing
Test sample complies with these details.
Deviations are noted.
Report# 29428.01
Date 5/9/08 Tech JS

Design For
-30 Psf Wind Pressure
-¼" Clear Tempered Glass

Bill Of Materials		Series 450 Center Glaze Mock Up		
	FRAME			
Item	Part#	Descripton	Qty	Supplier
1	J-452	VERTICALS	3	INTEX TX
2	JS452	HEAD	3	INTEX TX
3	JH463	INTERMEDIATE HORZONTIAL	3	INTEX TX
4	JS463	SILL	3	INTEX TX
5	M453	GLASS STOP	6	INTEX TX
	HARDWARE			
6	HC 251	12" ANCHOR CHANNEI	4	INTEX TX
7	ST 244	#10X 3/4" PHSMS		A.B.S.
8	ST 251	# 10 x 1" HWH	36	A.B.S.
9	WD150	WATER DEFLECTOR DEEP POCKET	3	ASHLAND
10	WD160	/ATER DEFLECTOR SHALLOW POCKE	1	ASHLAND
	GLAZING			
11	NP 225	GASKET		TREMCO
12	SB 140	SETTING BLOCK	12	TREMCO
13	WB 452	WEDGE BLOCK	6	TREMCO

United States ALUMINUM Commercial Products Group

NO. | REVISIONS | DATE | BY

CUSTOMER

ARCHITECT

PROJECT
Series 450 Center Glaze

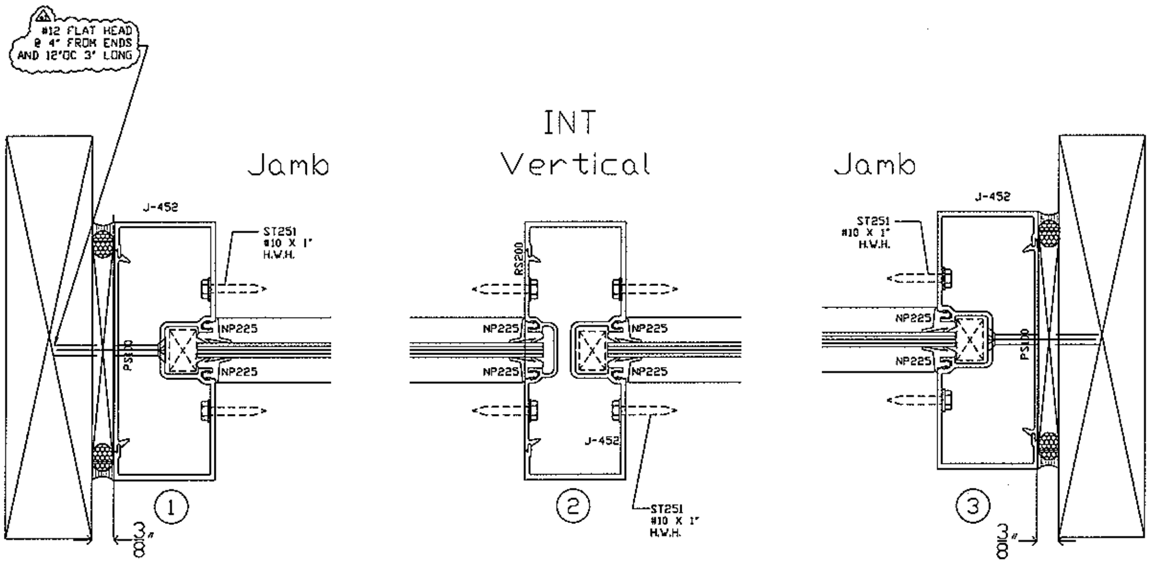
DRAWN BY
TLH

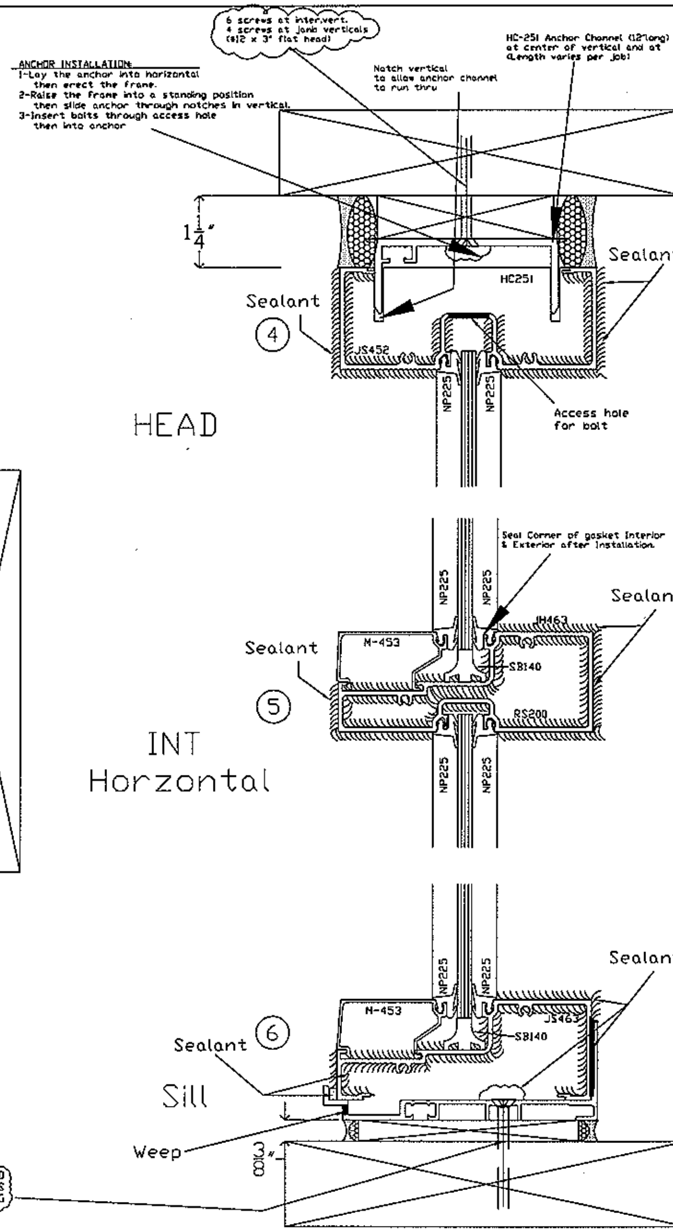
DATE
10-30-07

DRAWING NO

SHEET
1

Series 450 Center Glaze





Architectural Testing

Test sample complies with these details
Deviations are noted.

Report# 79428.01-801-47
Date 7/17/08 Tech [signature]

REVISIONS | DATE | BY

United States ALUMINUM
Commercial Products Group

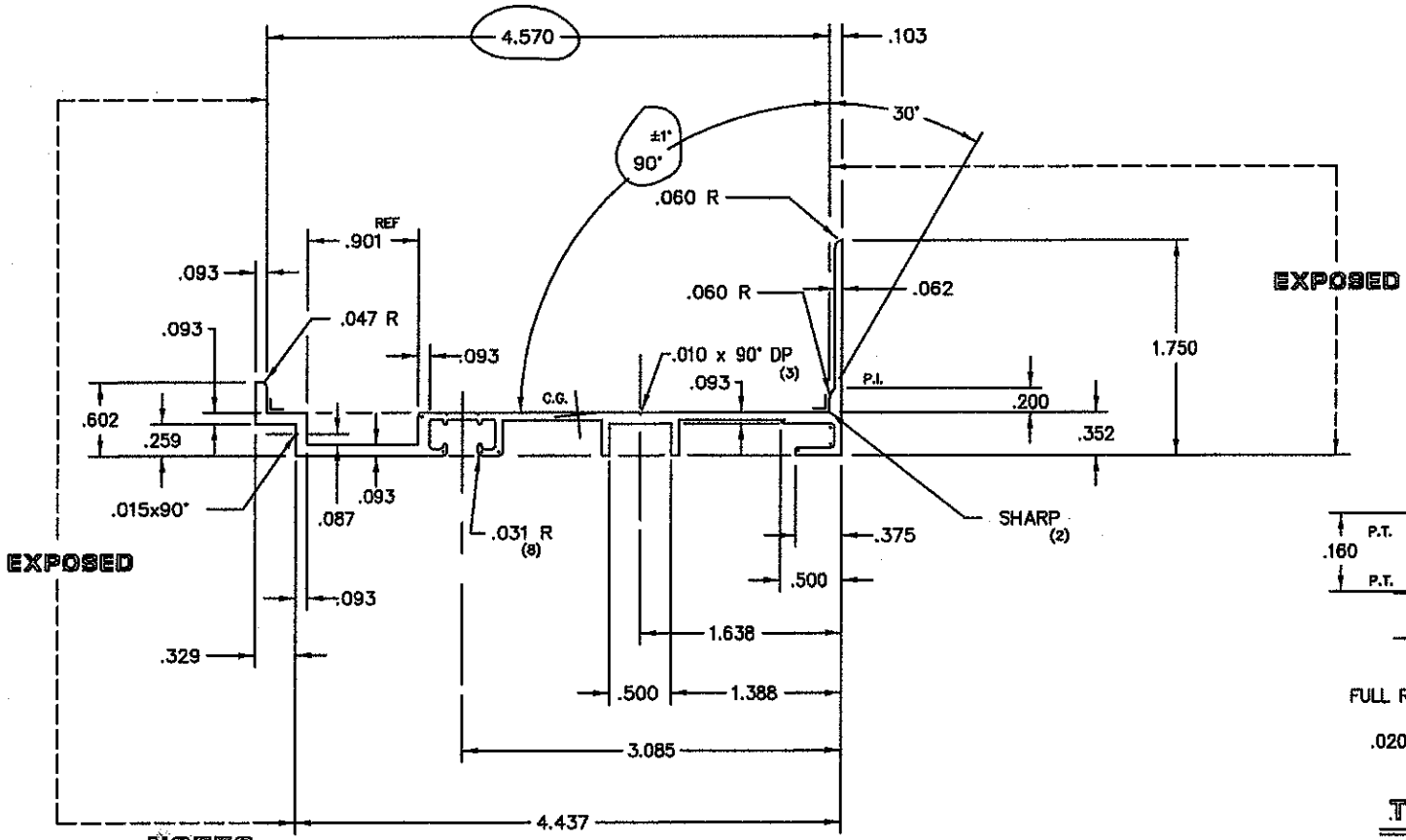
ARCHITECT
CUSTOMER

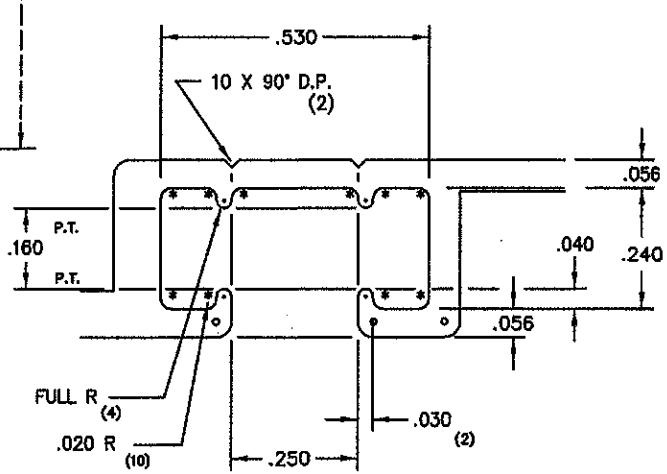
PROJECT
Series 450
Center Glaze

DRAWN BY: TLH
DATE: 10-30-07
DRAWING NO
SHEET: 2

U.S. ALUMINUM CORP.		T-60619
SUB-SILL	G.HALL	11/29/00
FF401	FULL SIZE	

ECN 2000-176
(REPLACES DIE #31332 E)





THERMAL BREAK DETAIL

SCALE: 4X SIZE

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# 79428.01

Date 6/5/08 Tech CS

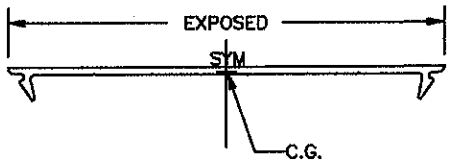
NOTES:

1. ASSEMBLES W/FF483; DIE #31338
2. THERMAL BREAK AREA: .137
3. DEBRIDGE WITH A .218 WIDE X .015 MAX. PENETRATION INTO THERMAL MATERIAL.
4. PAINT PERIMETER: 2.895"

.062

.640	US-100483	
.768	5.001	
17.561	SOLID	
23		T-60619

FLUSH FRONT



ACTUAL SIZE

NOTE
SNAPS WITH:

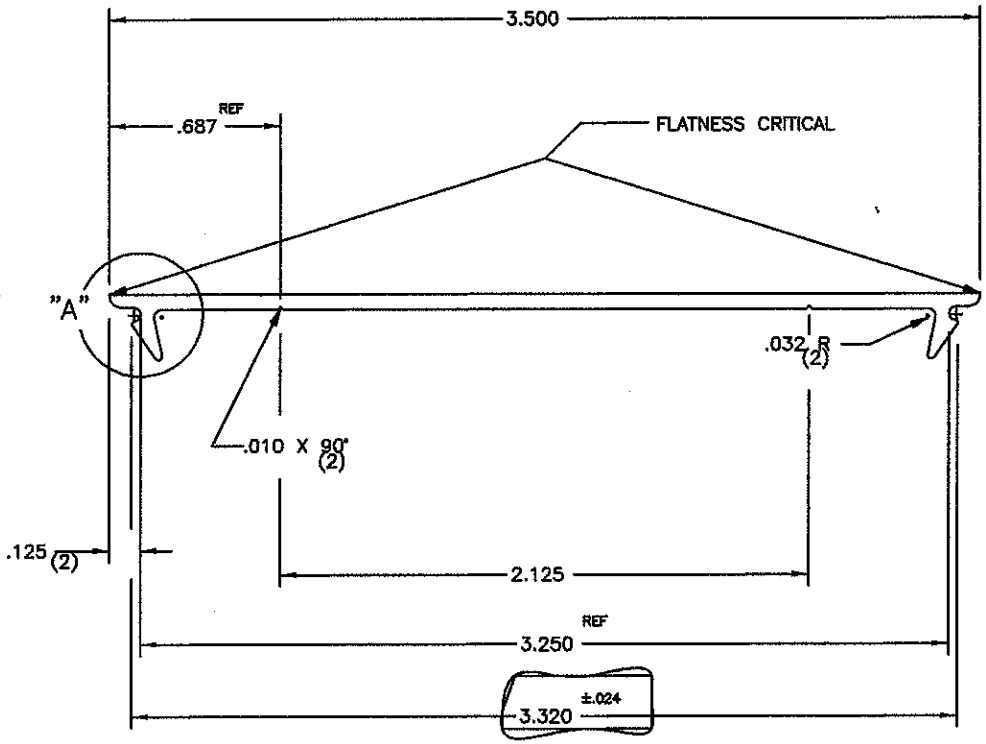
Architectural Testing

Test sample complies with these details.
Deviations are noted.

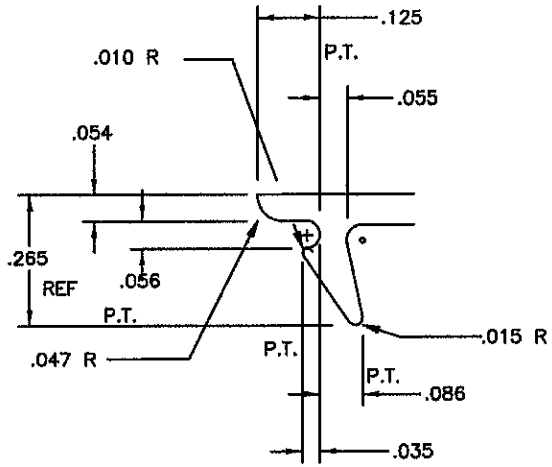
Report# 79428.01

Date 5/9/08 Tech JS

U.S. ALUMINUM CORP.		3604	
FLAT SNAP IN COVER	B.R	7/12/89	
PS100	2 X SIZE		



DETAIL "A"
(4X SIZE)

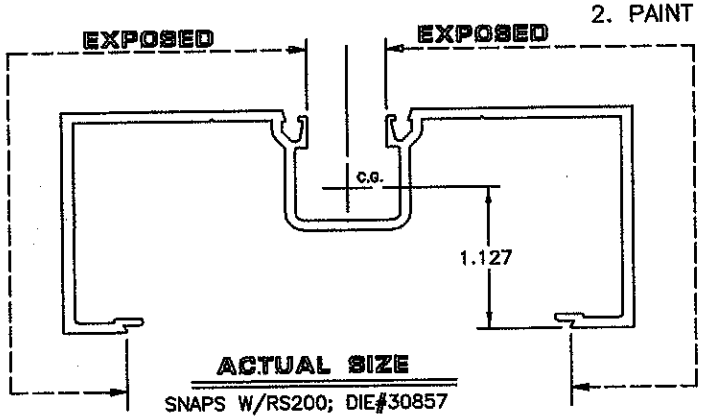


.062

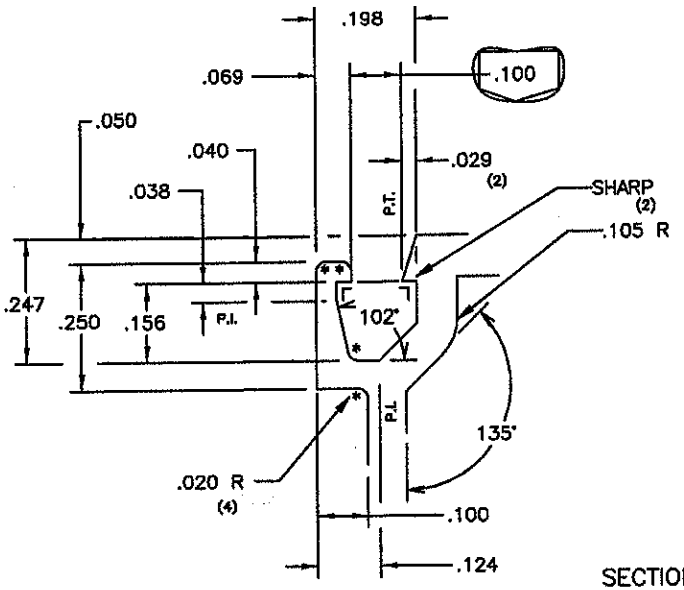
	.239	P-17250	2
	.287	3.750	8 X STD-2
	7.890	SOLID	B02-8
	27.	6 63	3604

NOTE:
1. SNAPS W/DIE # 30857
2. PAINT PERIMETER: 7.960"

B	ADDED .010x90°ID MARKS FOR IEC-TX	DG	10-27 94	U.S. ALUMINUM CORP.	T-30848 | B
*	ADDED PAINT PERIMETER	DG	10-27 94	4 1/2" VERT MULL FOR 1/4 GLASS / BRIAN	7/17/90
.				J-452 TL / 2 X SIZE	

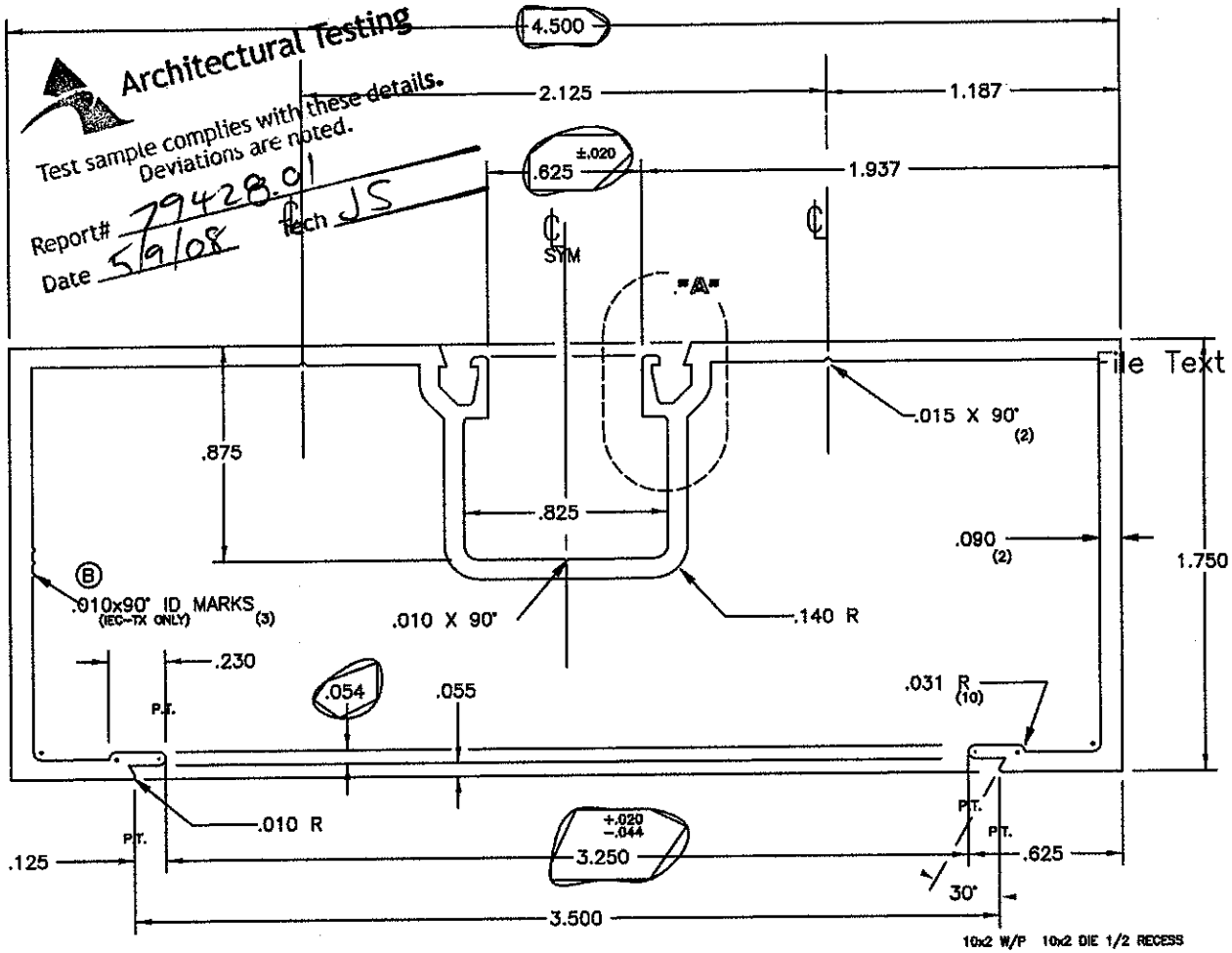


ACTUAL SIZE
SNAPS W/RS200; DIE#30857



DETAIL "A"
(4 X SIZE)

Architectural Testing
Test sample complies with these details.
Deviations are noted.
Report# 79428.01
Date 5/9/08
Tech JS

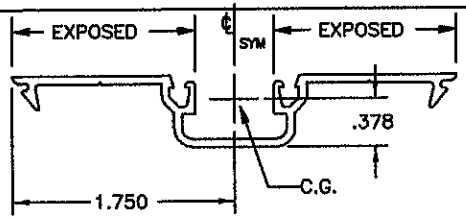


SECTION PROPERTIES

I_{xx} = 2.408 in^4
S_{xx} = 1.070 in^3
I_w = 0.310 in^4
S_w = 0.275 in^3

.080

.902	P-18088	1	
1.082	4.828		
22.491	SOLID		
21		T-30848	B



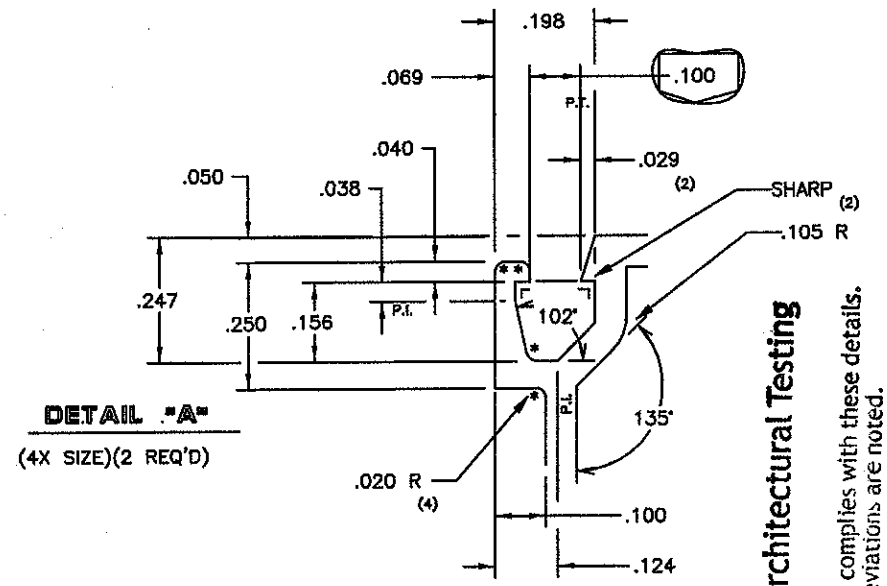
ACTUAL SIZE

NOTE
SNAPS W/S-450; DIE#30854
W/JS452; DIE#30841
W/JS463; DIE#30842
W/J-452; DIE#30848

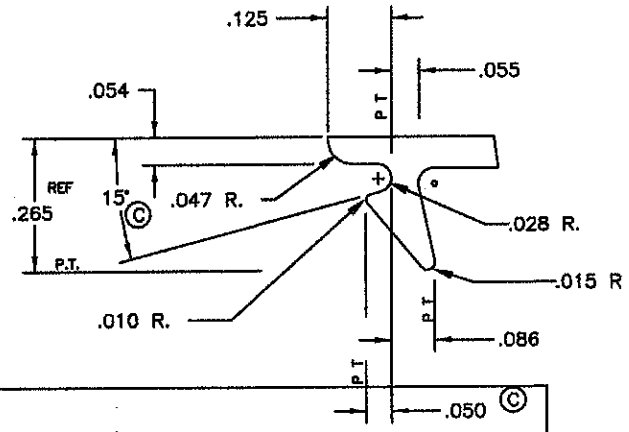
B	.500 WAS .437 CALCS REVISED	MM	9/13 90
C	3.350 WS 3.320 AND .050 WS .035, CHG TOL RECALC	SC	3/31 93
D	ADDED .010x90° ID MARKS FOR IEC-TX	DG	10-27 94

U.S. ALUMINUM CORP. | T-30857 | D

SHALLOW SNAP-IN REGLET	BRIAN	6/12/90
RS200 TL	2 X SIZE	



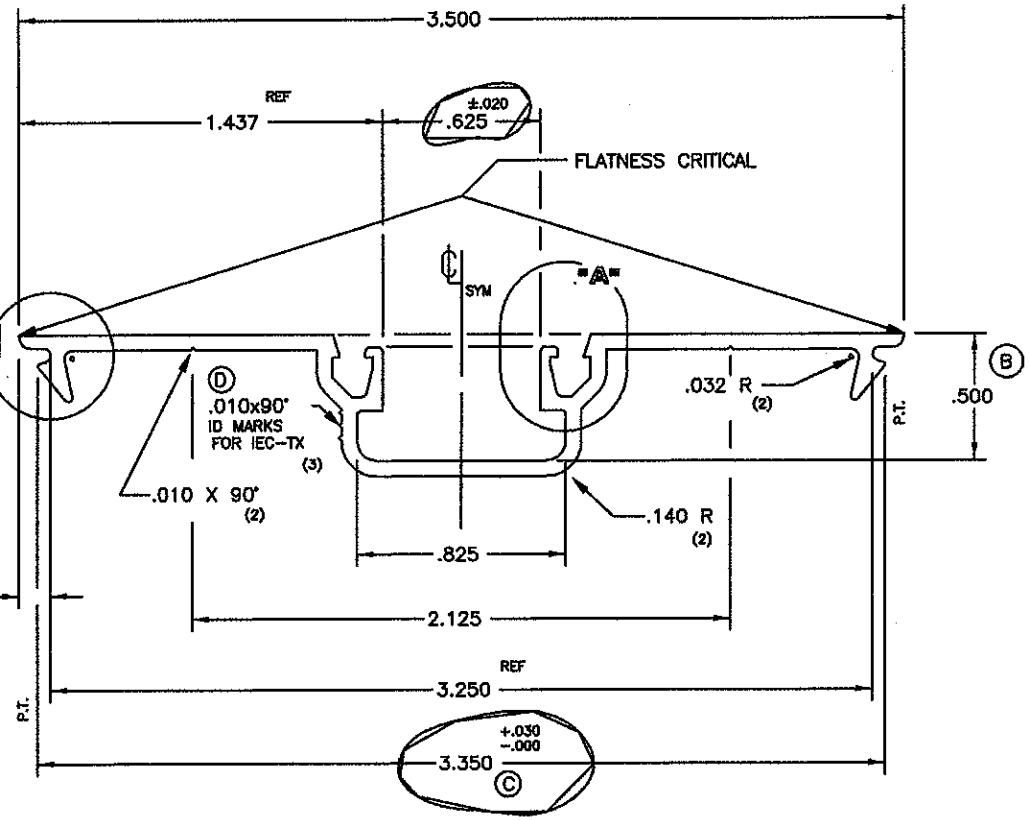
DETAIL "A"
(4X SIZE)(2 REQ'D)



DETAIL "B"
(4X SIZE)(2 REQ'D)

Architectural Testing
Test sample complies with these details.
Deviations are noted.
Report# 79428.01
Date 5/6/95
Tech JS

SECTION PROPERTIES:
Ixx = 0.301 in⁴
Sxx = 0.172 in³
Iyy = 0.012 in⁴
Syy = 0.032 in³



PAINT PERIMETER: 2.478

.062
WP

.326 Ⓒ	P-18077	
.391 Ⓒ	3.500	
10.820 Ⓓ	SOLID	
28 Ⓒ		T-30857 | D

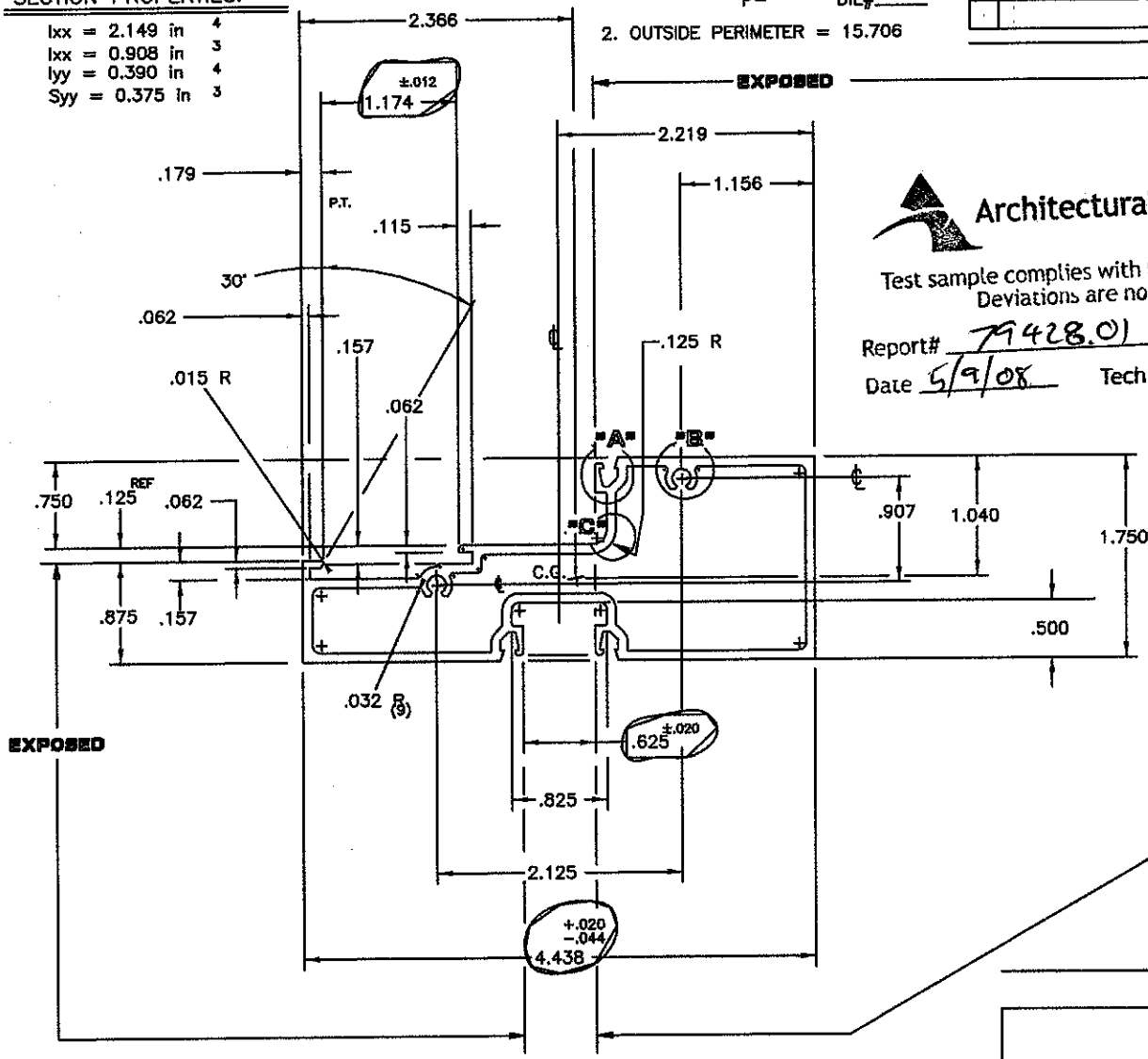
NOTE:

1. SNAPS W/ P– DIE#
   P– DIE#
2. OUTSIDE PERIMETER = 15.706

SECTION PROPERTIES:

Ixx = 2.149 in 4
Ixx = 0.908 in 3
Iyy = 0.390 in 4
Syy = 0.375 in 3

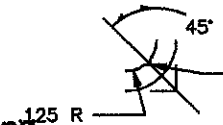
U.S. ALUMINUM CORP.			T–30845
HOLLOW 4.5" HORIZ MULLION	BRIAN		7/17/90
JH463 TL	FULL SIZE		



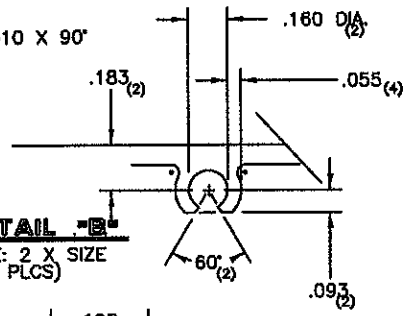
Architectural Testing

Test sample complies with these details.
Deviations are noted.

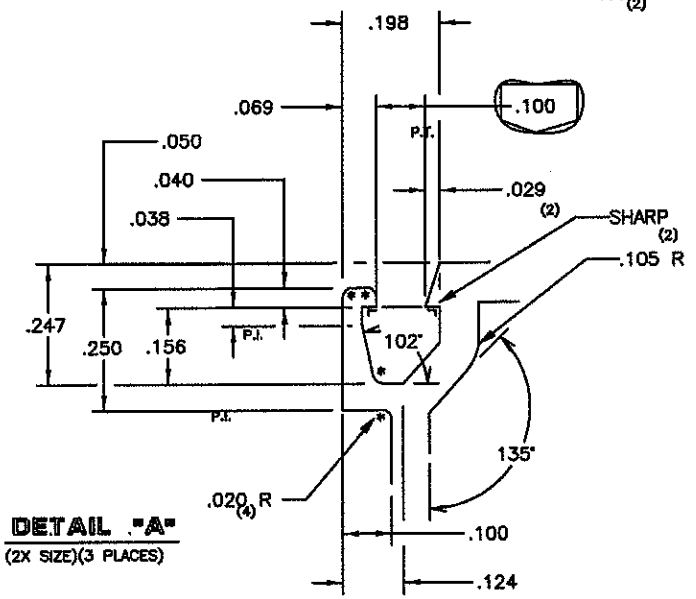
Report# 29428.01
Date 5/9/08 Tech JS



DETAIL "C"
SCALE: 2 X SIZE



DETAIL "B"
SCALE: 2 X SIZE
(2 PLCS)

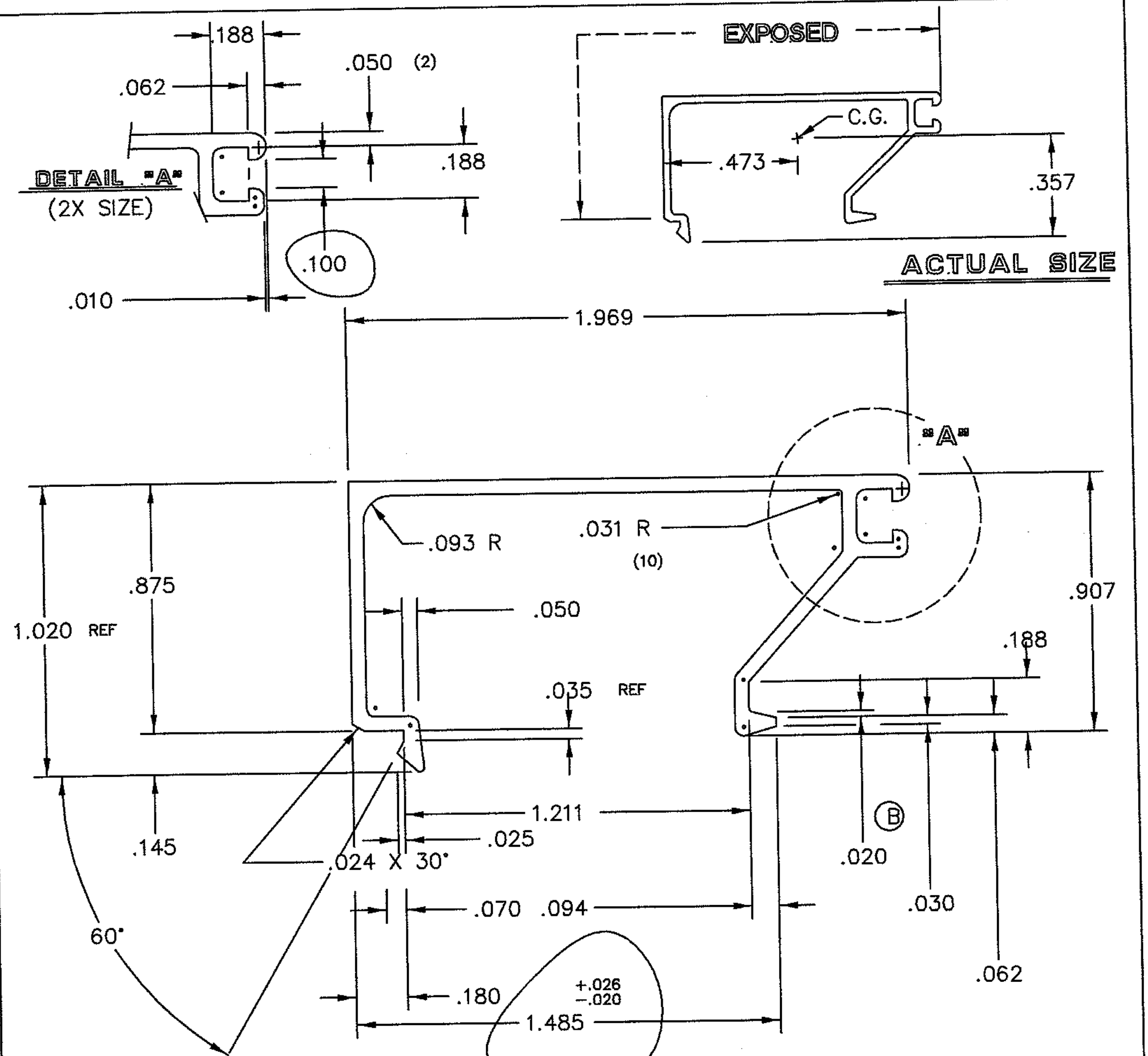


DETAIL "A"
(2X SIZE)(3 PLACES)

.080

1.136	P–18090	1
1.363	4.800	12X5 1/2
29.080	HOLLOW II	3078
21	8" 47	H–30845

				U. S. ALUMINUM CORP.	3068
B	.093 R WAS .031 R ADD .020 X .094 A WAS .230			STOP FOR 4.5 HOR.MULL. -1/4 GLASS	J.D	5/28/81
	WT/FT. WAS .276	E.B	10/30/81	M-453	2X SIZE	



Date 5/9/08
Tech JS
Report# 79428.01
Test sample c... Deviati...
details.
Architectural Testing

		:050
:230	P-10524	3
:276	2.128	8 X 4536
8.921	SOLID	
32	6" = 46	3068 B

NOTE:
1. SNAPS W/ P-18070 DIE# 30843B
P-18129 DIE# 30844B
P-18077 DIE# 30857B
2. PAINT PERIMETER: 5.255"

SECTION PROPERTIES:

Ixx = 1.885in^4
Sxx = 0.773 in^3
Iyy = 0.243 in^4
Syy = 0.264 in^3

B	REDESIGNED @ HORI LEG	MM	10/09/90
C	ADDED .010X90 I.D. MARK FOR IEC-TEX	MM	10/11/94
*	ADDED PAINT PERIMETER	BG	4/21/95

U.S. ALUMINUM CORP. — 30842 | C

4.5" HORIZ MULLION | BRIAN | 7/17/90

JS463 TL | FULL SIZE

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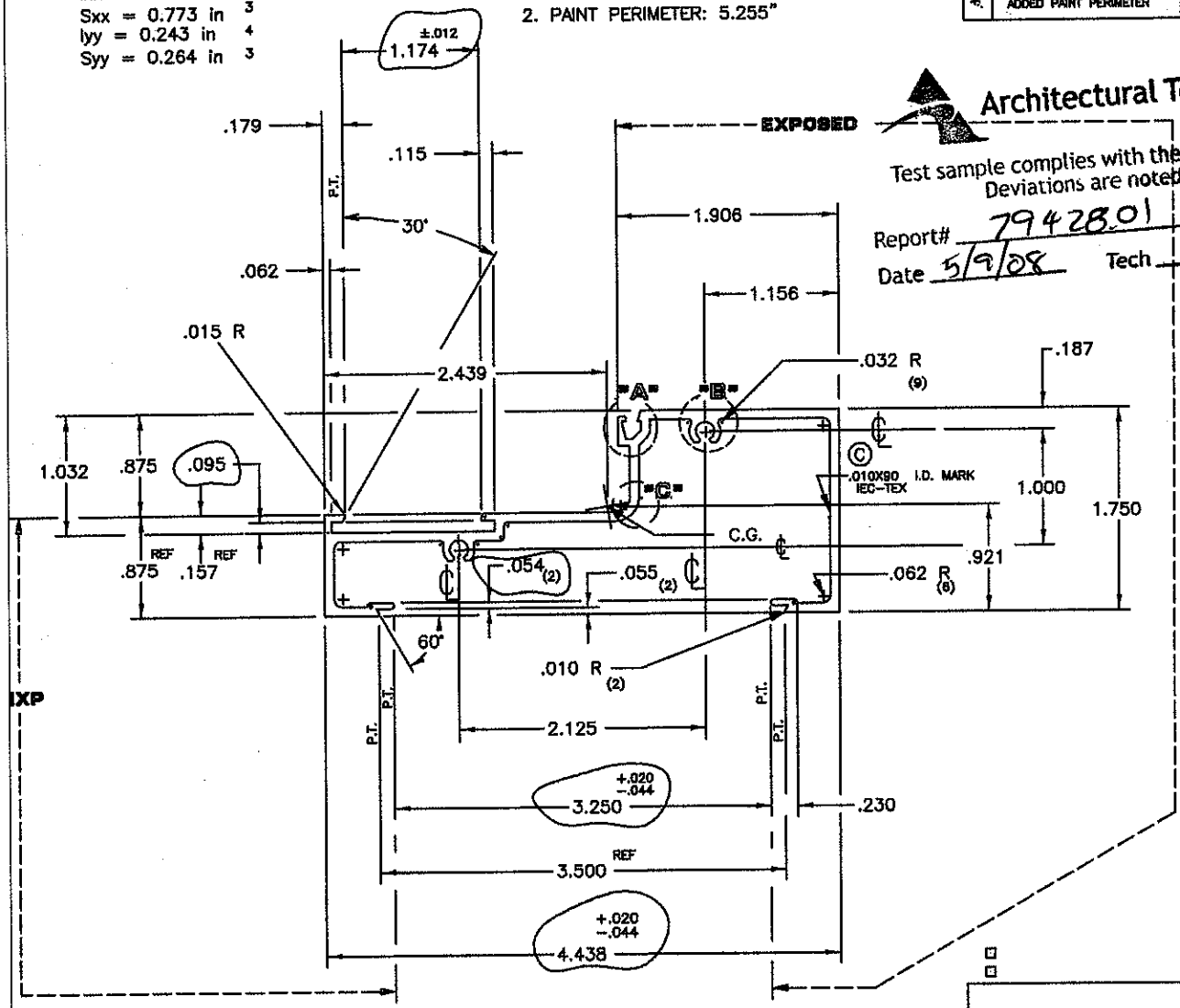
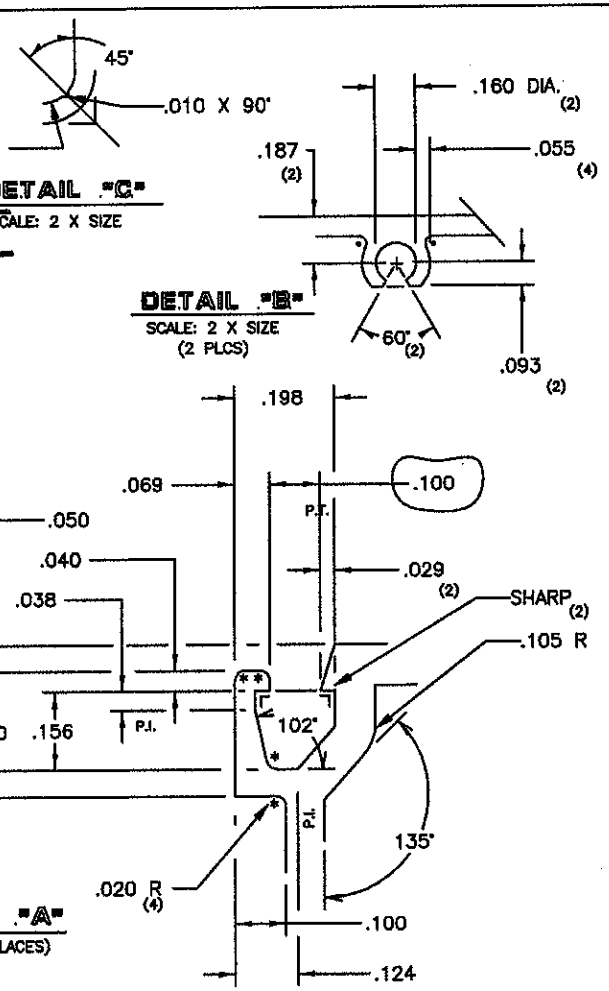




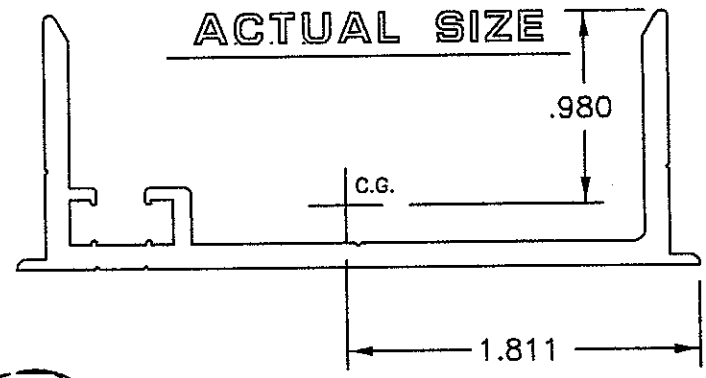
.080

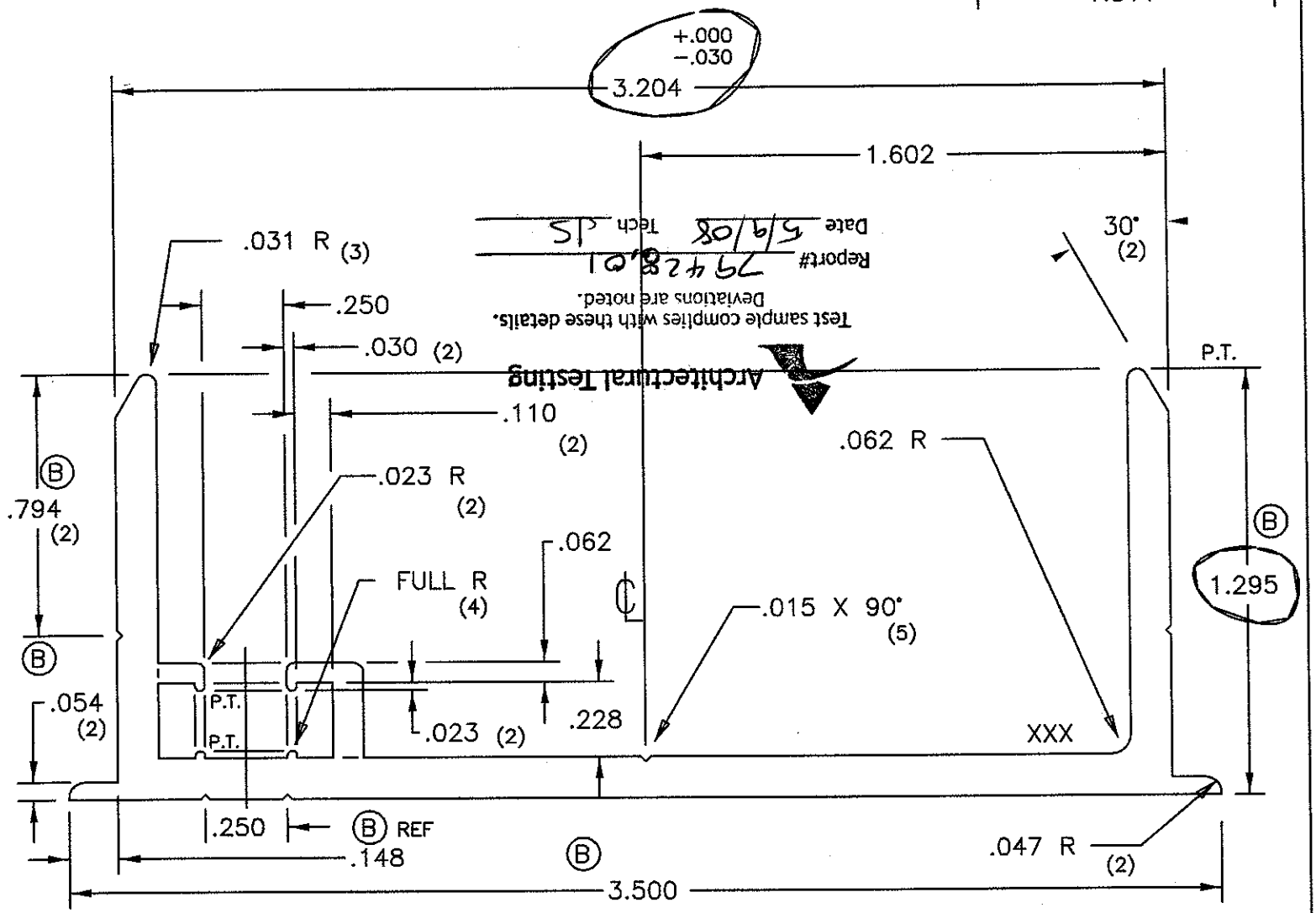
.785	P-18069	1	WP
.942	4.771		
20.264	SOLID		
22		30843	C

B	P/N WAS HC261 REVISED PER DIMENSIONS	MM	5/7 96	U.S. ALUMINUM CORP.	T-31730 | B
				HEAD CHANNEL / MAMO	3/1/96
				Ⓑ HC251 / 2X SIZE	

NOTE:

1. NO EXPOSED SURFACE
2. 6063-T6 ALLOY & TEMPER
3. XXX INDICATES I.D. MARK FOR IEC-TX
4. FAB P/N: HC250;THERMAL P/N: HT250
5. THERMO DETAIL AREA: .134; "AA"
6. DEBRIDGE WITH A .218 WIDE x .015 MAX PENETRATION INTO THERMO MATERIAL.





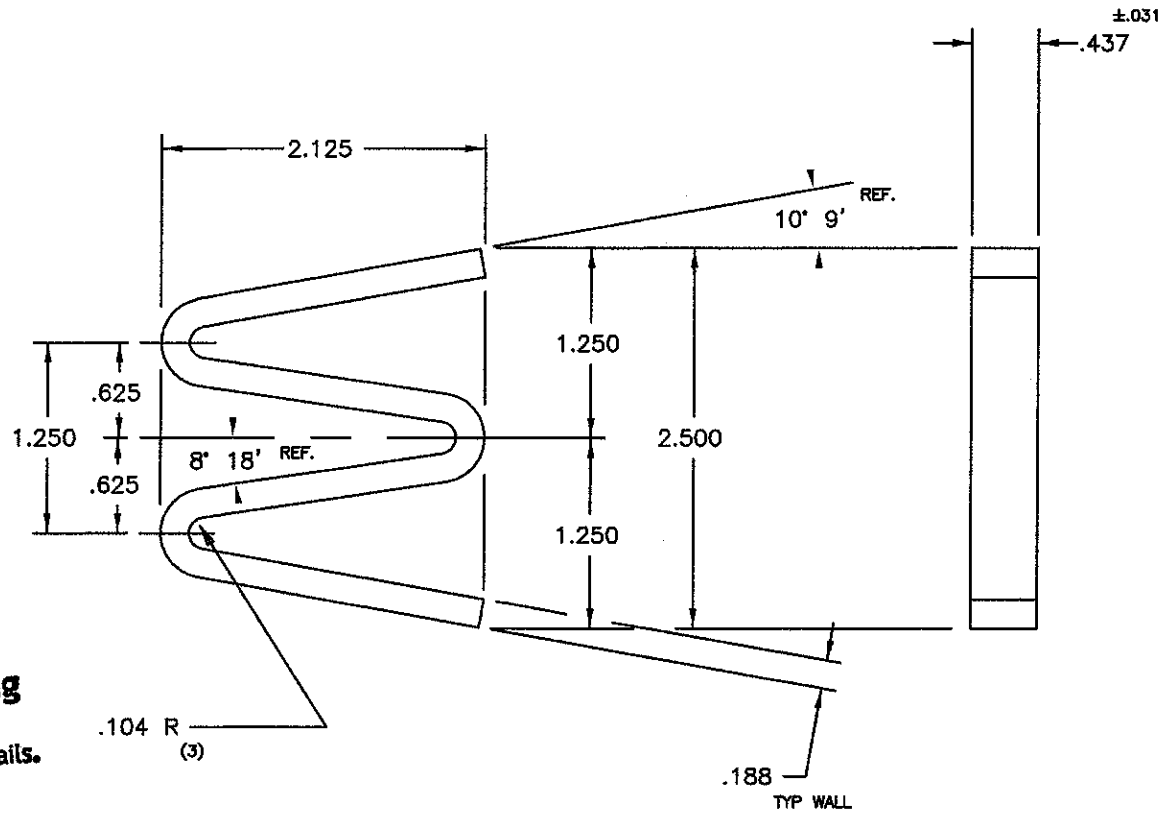
☐ CA
☒ TX

.125

	.743	P-26504	1 WELDRING
	.8923	3.608	9 x 31730
	13.016	SOLID	14366
	15	8 = 60\SHIRLEY	T-31730 | B

NOTE:

1. MATERIAL: EPDM, BLACK; TREMCO TR547E OR EQUAL
2. HARDNESS: 60 ±5 SHORE
3. AREA: .936

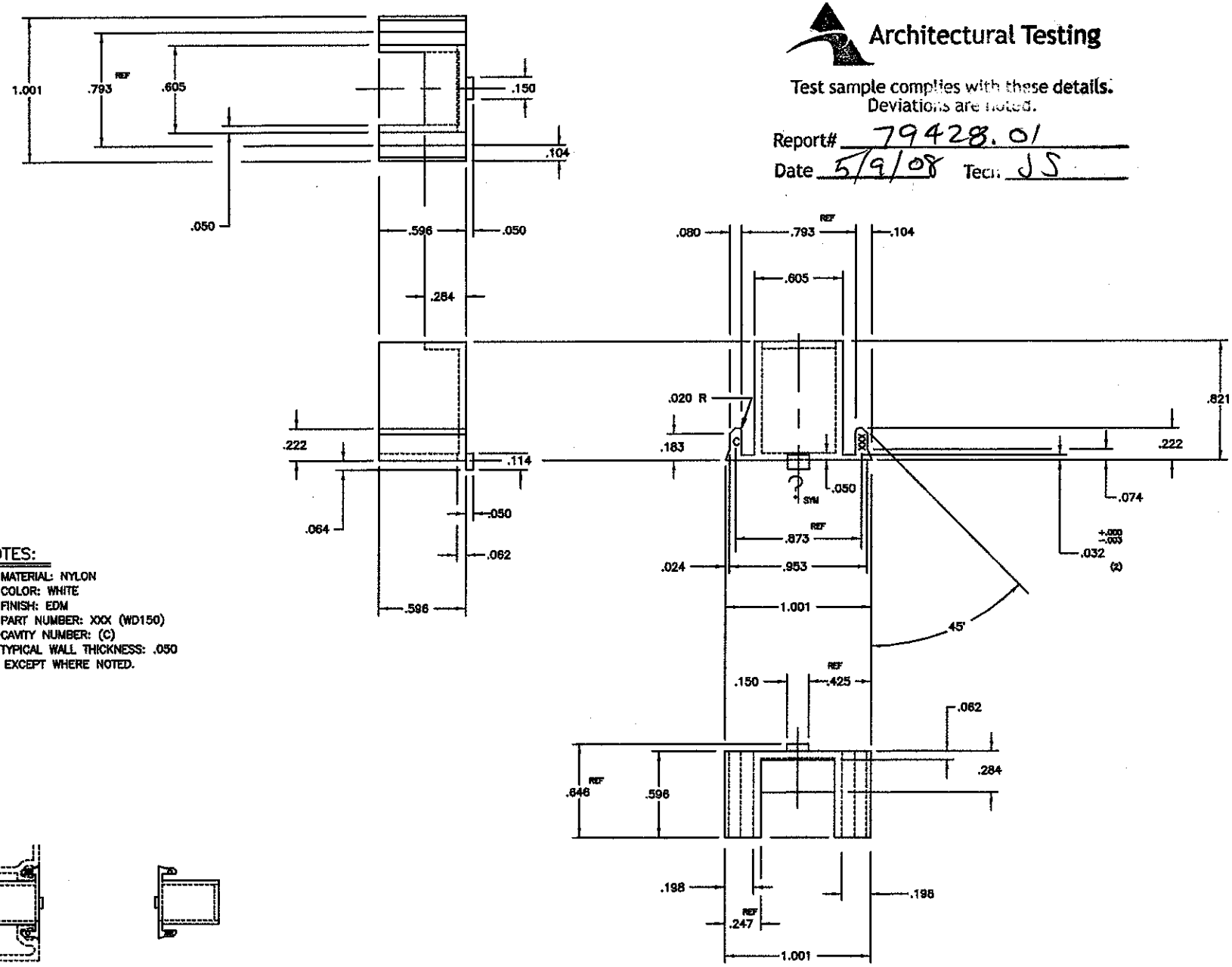


Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# 79428.01
Date 5/9/08 Tech JS

				U.S. ALUMINUM CORP.		
				MAMO	W SIDE BLOCKS – FLUSH FRONT SYSTEM PART NO.: WB452	
				10/18/93		USA–1009
				FULL SIZE		



Architectural Testing

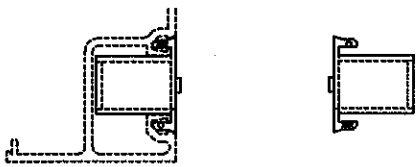
Test sample complies with these details.
Deviations are noted.

Report# 79428.01

Date 5/9/08 Tech: JS

NOTES:

1. MATERIAL: NYLON
2. COLOR: WHITE
3. FINISH: EDM
4. PART NUMBER: XXX (WD150)
6. CAVITY NUMBER: (C)
7. TYPICAL WALL THICKNESS: .050 EXCEPT WHERE NOTED.

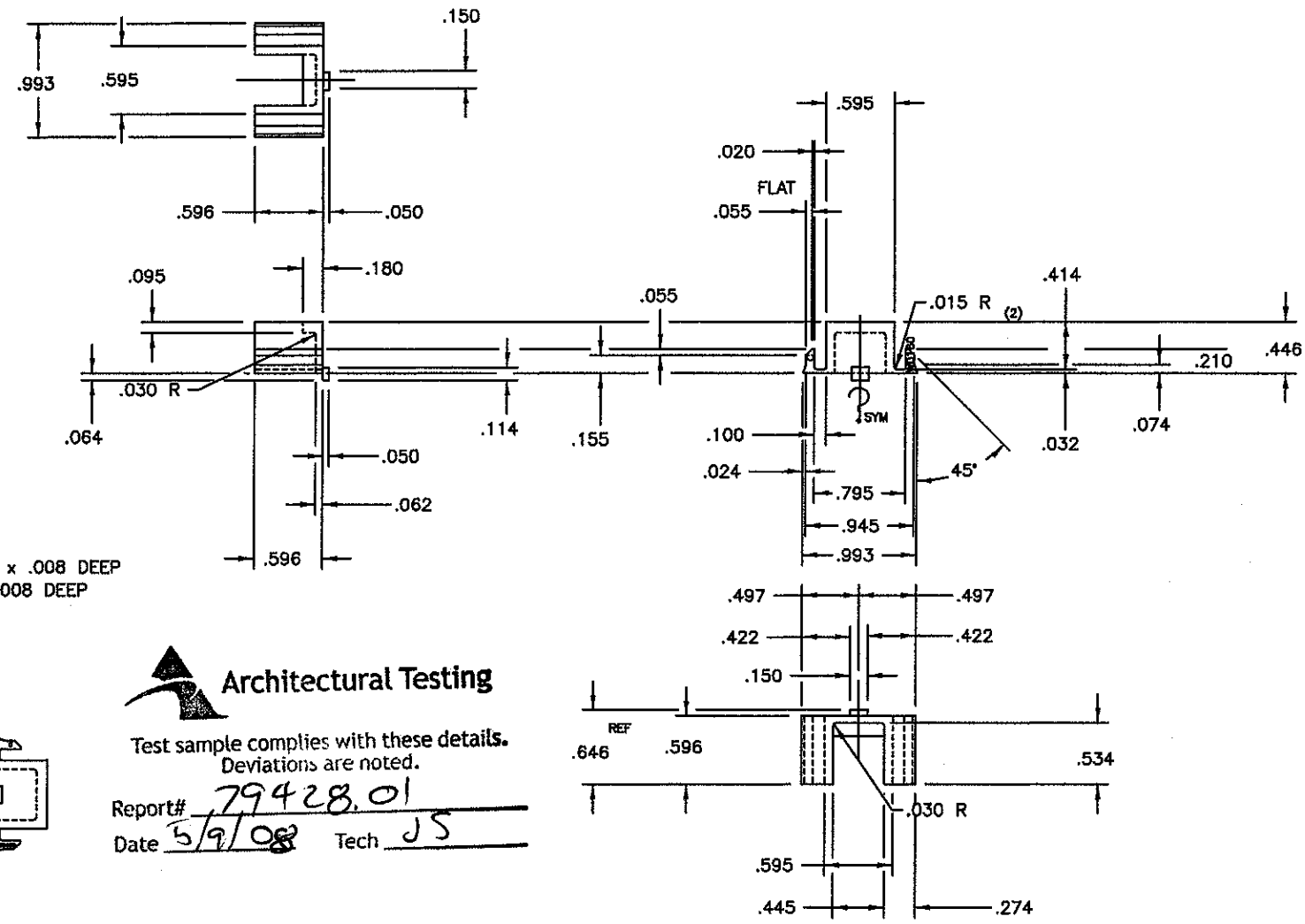


USED ON LEFT USED ON RIGHT

SCALE: FULL SIZE

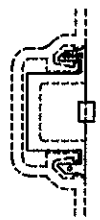
		U.S. ALUMINUM CORP.	
MAMO	WATER DEFLECTOR		
2/16/95	TOP LOAD SYSTEMS		USA–1066
2X SIZE	PART NUMBER: WD150		

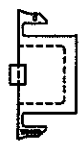
USA–1067B



NOTES:

1. MATERIAL: NYLON
2. COLOR: WHITE
3. FINISH: EDM
4. PART NUMBER: (WD160) ENGRAVE .062 x .008 DEEP
5. CAVITY NUMBER: (C) ENGRAVE .062 x .008 DEEP
6. TYPICAL WALL THICKNESS: .050
   EXCEPT WHERE NOTED.





Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# 79428.01

Date 5/9/08 Tech JS

USED ON LEFT USED ON RIGHT

SCALE: FULL SIZE

				U.S. ALUMINUM CORP.	
				MAMO	WATER DEFLECTOR
B	REVISED IN AGREEMENT WITH VENDOR	MM	6/30/95	2/16/95	TOP LOAD SYSTEMS
				FULL SIZE	PART NUMBER: WD160

USA–1067B

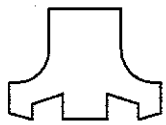
NOTES:

MATERIAL: E.P.D.M. BLACK

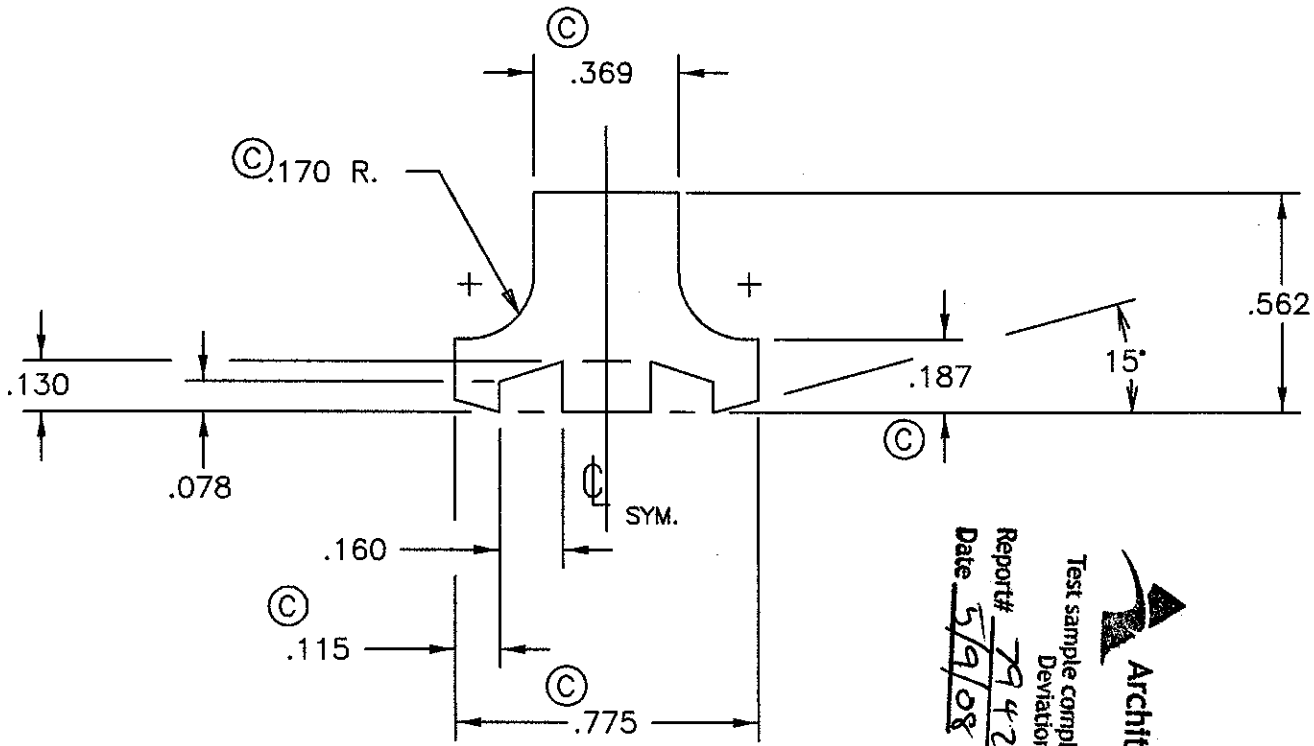
(D) (B) SHORE: 85±5 , "A" SCALE

CUT LENGTH: 4" ±1/16

(C) AREA:.259 SQ.IN.



ACTUAL SIZE



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# 79428.01

Date 5/9/08 Tech JS

(D) REVISED, SHORE WAS 90, CUT LENGTH TOL. WAS +1/8" –0"
7/20/94,GLS PER JD WILLIAMS

(C) REVISED, P/N was SB100
3/16/94,MM

(B) PART NO. WAS SB140, SHORE WAS 85 BR 5/92

U.S. ALUMINUM CORP.		
BRIAN 1/08/91 2X SIZE	(B) SB140TL SETTING BLOCK FOR 4,4–1/2" TOP LOAD SYS.	USA–863 D