HURRICANE TEST LABORATORY, LLC

Testing & Evaluation Solutions

ROLL-A-WAY STORM & SECURITY SHUTTERS

P55 End Retention Shutter

HURRICANE TEST LABORATORY, LLC

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P55 End Retention Shutter

TEST REPORT

MANUFACTURER INFORMATION

1.0 NAME OF APPLICANT: Roll-a-way Storm and Security Shutters
10601 Oak Street N.E.
St. Petersburg, FL 33716
(727) 803-9283

2.0 CONTACT PERSON: Mr. Don Fowler

3.0 HTL TEST NOTIFICATION #: N/A

4.0 HTL LAB CERTIFICATION: Miami-Dade County (03-0813.01); Florida Building Code (TST1527); AAMA; WDMA; Keystone Certifications

5.0 REPORT INFORMATION:

Job Number	Specimen #	Test Date
0006-0104-05	2	1/13-14/05
0006-0104-05	3	1/20/05
0006-0104-05	4	1/25-26/05
0006-0104-05	5	2/11-21/05

PRODUCT IDENTIFICATION

6.0 Product Type: PVC Slat Aluminum Rebar Reinforced Roll Down Shutter System

7.0 Model Number: P55 End Retention Shutter

8.0 Performance Class and Overall Size:

Specimen #	Performance Class	Overall Size
2	+72 psf/-72 psf	157-5/16" (w) x 156" (h)
3	+72 psf/-72 psf	157-5/16" (w) x 156" (h)
4	+72 psf/-72 psf	157-5/16" (w) x 156" (h)
5	+72 psf/-72 psf	157-5/16" (w) x 156" (h)

9.0 Configuration: Jamb Mounted To Free Standing Posts

10.0 No./Size of Panels: Two panels, shutter #1 @ 60-38" (w) x 156" (h) and shutter #2 @ 65-13/16" (w) x 156" (h).

11.0 Drawing: This test report is incomplete without the attached Roll-a-way Storm and Security Shutters Drawing # S-0904-EG Rev. "A", Sheets 1 thru 3 each bearing the raised seal of Hurricane Test Laboratory, LLC.

12.0 Source of Sample: Sample provided by Roll-a-way Storm and Security Shutters.

PRODUCT DESCRIPTION

13.0 DETAILED DESCRIPTION:

13.1 This Shutter Assembly consists of the four components: posts, side tracks, slats and shutter box assembly.

Posts Assembly: Each post is square cut at both ends and mounted directly to the opening as described in the installation section of this report. There are two (2) ¼" x 1-1/2" (full length) reinforcement bars inserted between the multi-angle post bases.

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Description	Die #	Overall Cross Section	Alloy
Multi-angle Post @ intermediate mullion location	GAH-45193	6.125" x 2.982" x 0.084"	6005-T5
Post @ jamb mullion locations	GAH-43696	3.000" x 6.000" x 0.250"	6005-T5
Post Base @ jamb mullion locations	GAS-43343	4.866" x 2.125" x 0.125"	6005-T5
Zero Degree Post	GAH-46048	1.973" x 6.125" x 0.084"	6005-T5

Side Tracks Assembly: Each sidetrack is square cut at its ends and mounted to the posts as described in the installation section of this report.

Description	Item #	Overall Cross Section	Alloy
Track (Tab & Flanged) @ jamb & intermediate mullion locations	GAH-45206	2.500" x 1.888" x 0.095"	6063-T6

5-Sided Shutter Box Assembly: Please refer to Roll-a-way Drawing # S-0904-EG for details on the overall assembly of the shutter box (Item #1-26-500).

Slat Assembly: All of the slats used in each sample are square cut at the ends and assembled into a roll shutter curtain by sliding the slats together. In shutter #1 the P55 Top ER Rebar is located in every slat. In shutter #2 the P55 ER Rebar was located in every other slat. Both side track members in this sample used to secure the slats to the openings were located such that the slats had a minimum engagement of 5/8" into each sidetrack with retention screws.

Description	Item #	Overall Cross Section	Alloy
Top Slat	N/A	2.540" x 0.551" x 0.039"	PVC
P55 ER (End Retention) Slats	N/A	2.540" x 0.551" x 0.039"	PVC
Bottom Slat	GAH-42635	2.270" x 0.500" x 0.050"	6063-T6
P55 ER Rebar	GAS-45356	0.365" x 0.574" x 0.055"	6005-T5
P55 Top ER Rebar	GAS-46374	0.319" x 0.372" x 0.097"	6063-T6

PRODUCT INSTALLATION

14.0 The following section of this report details how this specimen was installed into the concrete opening:

14.1 Posts: The two posts used in this sample were installed as follows:

14.1.1 Intermediate Post @ interior: The intermediate post used in this sample was mechanically attached to the concrete opening at both the head and the sill using two (2) 1/4" thick multi-angle post base clips (Item #GAS-33322). The post was mounted over each post base clip and there was a ¼" x 1-1/2" 6005-T5 aluminum bar (full length) inserted into the post between the post base clips. The clips and bars were attached to the post using one (1) 5/16" x 2-1/2" through bolt. Each post base clip was attached to the concrete opening using one (1) 3/8" x 2-1/4" rawl power bolt concrete anchors.

14.1.2 Intermediate Post @ exterior: The intermediate post used in this sample was mechanically attached to the concrete opening at both the head and the sill using two (2) 1/4" thick multi-angle post base clips (Item #GAS-33322) and two (2) 1" x 2" x 1/8" 6063-T5 aluminum angles. The post was mounted next to each post base clip and there was a ¼" x 1-1/2" 6005-T5 aluminum bar (full length) placed between the post and the post base clips. The clips and bars were attached to each side of the post using

two (2) ¼-14 x ¾" SS drill flex (AG790) fasteners. Each angle was mechanically attached to the post using ¼"-14 x 1" SS drill flex fasteners spaced 8" on center. Each post base clip was attached to the concrete opening using one (1) 3/8" x 2-1/4" rawl power bolt concrete anchors.

14.1.3 Jamb Posts: The jamb posts used in this sample were mechanically attached to the concrete opening at the head and the sill through two (2) 1" x 2" x 1/8" 6063-T5 aluminum angles and a post base (Item #GAS-33322) using four (4), 3/8" x 2-1/4" rawl power bolts. Each angle was mechanically attached through the jamb posts to the post base using three (3) ¼"-14 x 1" SS drill flex fasteners.

14.2 Side Tracks: The exterior of each side track slide fits into the intermediate or zero degree post. The interior side of the side track is mechanically attached to the intermediate post using ¼-14 x 1" SS Drill-Flex fasteners spaced at 5" on center. The interior side of the side track is mechanically attached to the zero degree post using ¼-14 x ¾" SS Drill-Flex (AG790) fasteners spaced at 5" on center. See drawing # S-0904-EG Rev. "A", detail "B" for additional details.

14.3 Zero Degree Post: The zero degree post is mechanically attached to the jamb post on the exterior side using ¼"-14 x ¾" SS drill flex (AG790) fasteners spaced 4" on center. The zero degree post is mechanically attached to the jamb post on the interior side using ¼"-14 x ¾" SS drill flex (AG790) fasteners spaced 8" on center.

14.4 5-Sided Shutter Box Assembly: Each end of the 5-sided shutter box assembly used in this sample was secured to the jamb using three (3), #14 x ¾" SS TEK screws.

TEST RESULTS

15.0 SUMMARY OF RESULTS:

Test Method	Test Conditions	Specimens
Static Load Test (ASTM E330)	See section 8.0	2
Large Missile Impact Test (ASTM E1886/E1996)	--	3, 4 & 5
Small Missile Impact Test (ASTM E1886/E1996)	--	3, 4 & 5
Cyclic Load Test (ASTM E1886/E1996)	See section 8.0	3, 4 & 5

16.0 TEST SEQUENCE:

TEST SEQUENCE	Specimens
Uniform static load test at positive pre load. Uniform static load test at positive design load. Uniform static load test at positive over load. Uniform static load test at negative pre load. Uniform static load test at negative design load. Uniform static load test at negative over load.	2

ENGINEER OF RECORD

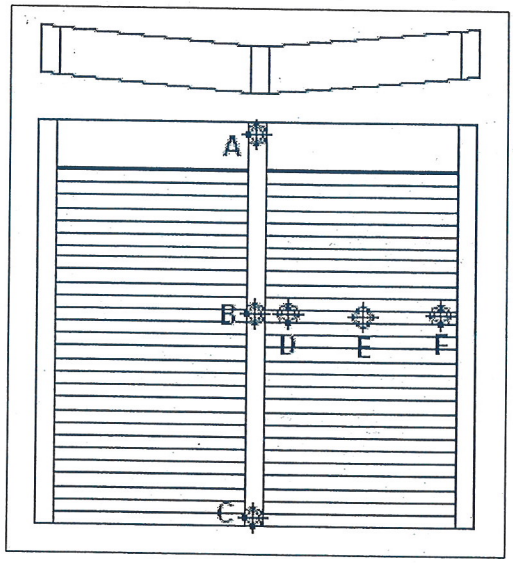
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TEST SEQUENCE	Specimens
Small Missile Impact Test Large Missile Impact Test Positive Cyclic Load Test Negative Cyclic Load Test	3 & 5
Large Missile Impact Test Small Missile Impact Test Positive Cyclic Load Test Negative Cyclic Load Test	4

17.0 UNIFORM STATIC LOAD TEST RESULTS:

17.1 LOCATION OF DEFLECTION MEASUREMENTS:

SPECIMEN 2:



17.2 UNIFORM STATIC LOAD TEST RESULTS:

17.2.1 POSITIVE LOAD:

+ 54 psf (33 seconds)		
Location	**Measured Net Deflection (in.)**	**% Recovery**
B	1.608	95.46
E	3.325	97.19
+ 72 psf (33 seconds)		
B	2.213	92.93
E	4.594	98.06

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+ 108 psf (30 seconds)		
Location	**Measured Net Deflection (in.)**	**% Recovery**
B	3.260	83.65
E	4.563	97.00

17.2.2 NEGATIVE LOAD:

- 54 psf (33 seconds)		
Location	**Measured Net Deflection (in.)**	**% Recovery**
B	1.780	95.17
E	3.474	98.10
- 72 psf (33 seconds)		
B	2.090	92.63
E	5.010	97.90
- 108 psf (30 seconds)		
B	2.120	82.618
E	6.650	97.47

17.3 REMARKS:

Deflection data reported is the overall deflection between three points (longest unsupported span) accounting for support movement. No signs of failure were observed during the second uniform static load test. As such, this specimen was found to satisfy the uniform static load test requirements of ASTM E330. After the uniform static load test the specimen was tested to failure. The product reached a total load of 189 psf before the steel-enclosed concrete buck failed.

18.0 MISSILE IMPACT TESTS

18.1 IMPACT DATA:

SMALL MISSILE:

Weight: *2 grams*

Type: *10 steel ball bearings*

LARGE MISSILE:

Weight: *9 lb. 5 oz.*

Length: *97.00 in.*

Impact #	Type of Missile	Velocity (ft/s)	X Coordinate (in.)	Y Coordinate (in.)
SPECIMEN 3				
1	SMALL	130.04	17.25	8.00
2		128.92	64.25	72.00
3		129.57	21.00	131.00

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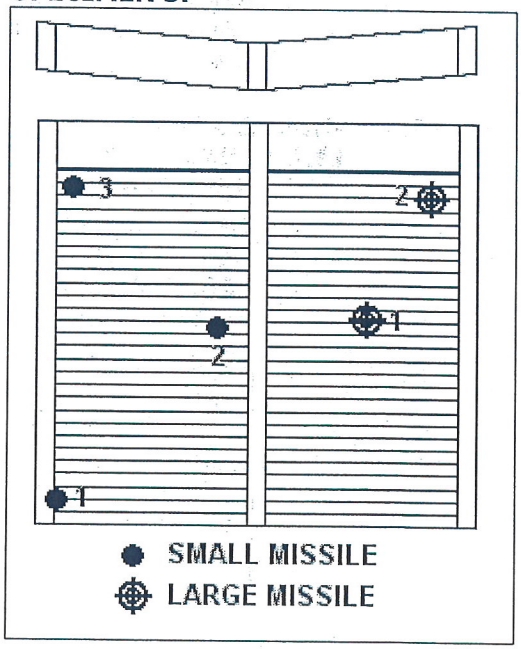
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Impact #	Type of Missile	Velocity (ft/s)	X Coordinate (in.)	Y Coordinate (in.)
SPECIMEN 3 *continued*				
1	LARGE	50.30	115.50	74.00
2		49.93	142.00	133.00
SPECIMEN 4				
1	LARGE	49.93	92.500	9.50
2		49.23	115.50	74.50
1	SMALL	129.63	71.00	8.00
2		128.98	15.00	71.00
3		129.92	72.00	138.00
SPECIMEN 5				
1	SMALL	129.61	33.00	10.00
2		130.12	33.00	71.50
3		128.98	33.00	151.00
1	LARGE	49.31	115.50	72.50
2		49.19	137.00	132.00

18.2 IMPACT LOCATIONS AND REMARKS:

These samples were inspected carefully upon completion of the impact test for failures. None were found. As such, these specimens were found to satisfy the impact test requirements of ASTM E1886/E1996. Upon completion of the missile impact tests, these samples subsequently underwent the cyclic load test as specified by ASTM E1886/E1996.

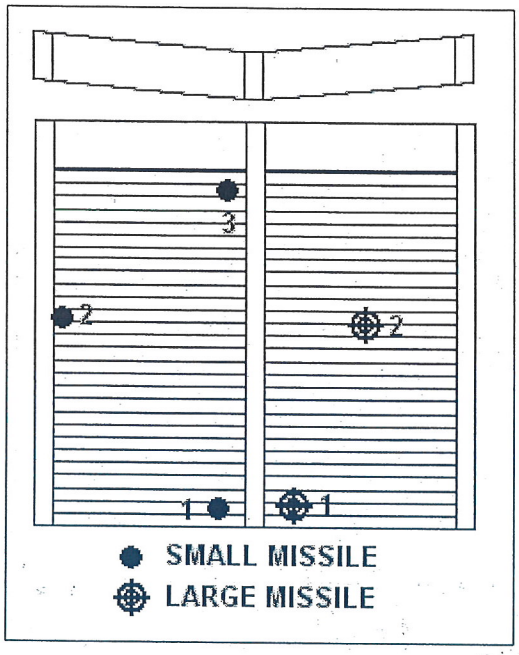
SPECIMEN 3:



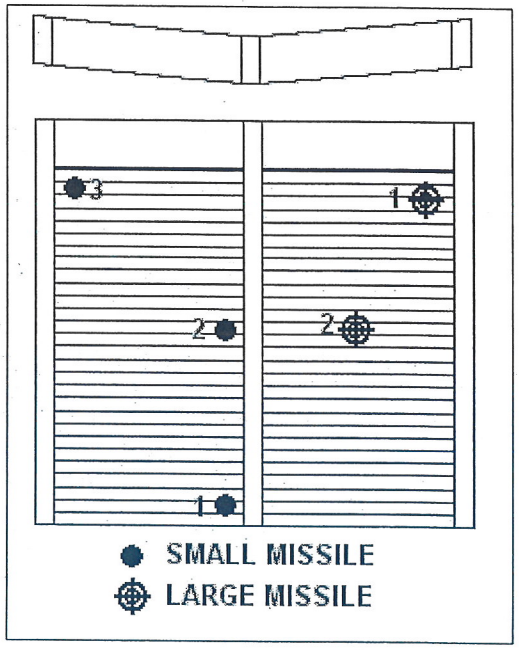
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SPECIMEN 4:



SPECIMEN 5:



19.0 CYCLIC LOAD TEST

19.1 CYCLIC TEST PRESSURE:

SPECIMENS	CYCLIC TEST PRESSURE	
	$(P_d)_{in} = P_{max}$	$(P_d)_{out} = P_{max}$
3, 4 & 5	72 psf	72 psf

19.2 CYCLIC LOAD SPECTRUM:

19.2.1 POSITIVE CYCLIC LOAD SPECTRUM:

SPECIMENS	# OF INWARD ACTING CYCLES/STAGE			
	3500	300	600	100
3, 4 & 5	14.4 – 36.0 (psf)	0.0 – 43.2 (psf)	36.0 – 57.6 (psf)	21.6 – 72.0 (psf)

19.2.2 NEGATIVE CYCLIC LOAD SPECTRUM:

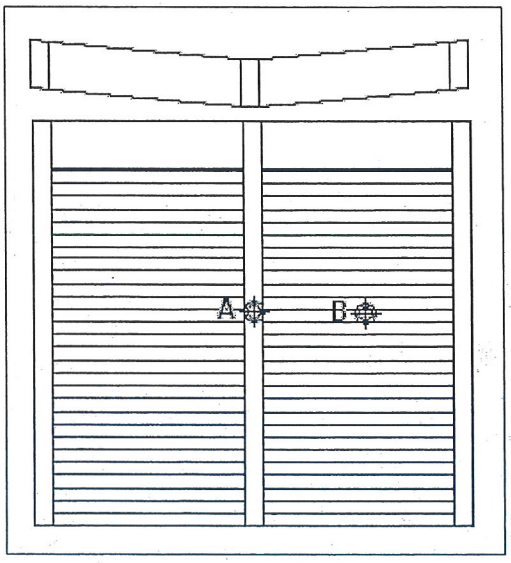
ELEVATION	# OF INWARD ACTING CYCLES/STAGE			
	50	1050	50	3350
3, 4 & 5	14.4 – 36.0 (psf)	0.0 – 43.2 (psf)	36.0 – 57.6 (psf)	21.6 – 72.0 (psf)

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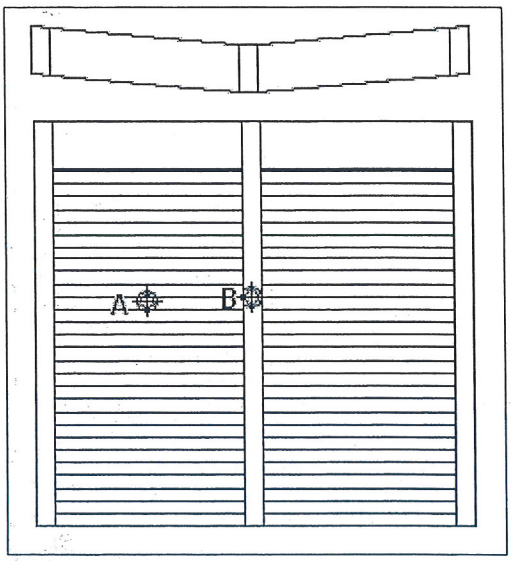
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19.3 DEFLECTION GAGE LOCATIONS:

SPECIMENS 3 & 5:



SPECIMEN 4:



19.4 DEFLECTION DATA:

		INWARD (POSITIVE) LOAD			OUTWARD (NEGATIVE) LOAD		
SPECIMEN	Location	Max (in.)	Perm. Set (in.	% Recovery	Max (in.)	Perm. Set (in.)	% Recovery
3	A	4.500	0.853	81.04	3.000	0.580	80.67
	B	7.000	1.200	82.86	5.500	1.000	81.82
4	A	8.500	2.125	81.36	7.679	2.054	82.67
	B	1.320	0.250	81.06	2.000	0.125	80.47
5	A	7.350	1.200	83.673	6.680	1.140	82.93
	B	2.370	0.120	94.937	2.150	0.420	92.00

19.5 REMARKS:

These samples were inspected carefully upon completion of the cyclic test for failures. None were found. As such, these specimens were found to satisfy the cyclic test requirements of ASTM E1886/E1996.

MISCELLANEOUS INFORMATION

20.0 CERTIFICATION & DISCLAIMER STATEMENT:

All tests performed on this test specimen were conducted in accordance with the specifications of the applicable codes, standards & test methods listed below by the Hurricane Test Laboratory, LLC located at 6655 Garden Road, Riviera Beach, FL 33404. HTL does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products tested at HTL. HTL is not owned, operated or controlled by any company manufacturing or distributing products it tests. This

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report is only intended for the use of the entity named in section 1.0 of this report. Detailed assembly drawings showing wall thickness of all members, corner construction and hardware applications are on file and have been compared to the test specimen submitted. A copy of this test report along with representative sections of the test specimen will be retained at HTL for a period of three (3) years. All results obtained apply only to the specimen tested and they do indicate compliance with the performance requirements of the test methods and specifications listed in the following section.

21.0 APPLICABLE CODES, STANDARDS & TEST METHODS:

ASTM E330-02 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
ASTM E331-00 – Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
ASTM E1886-05 – Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missiles and Exposed to Cyclic Pressure Differentials.
ASTM E1996-05 – Standard Specification for Performance of Exterior Walls, Glazed Curtain Walls, Doors, and Storm Shutters Impacted by Windborne Debris in Hurricanes.

22.0 LIST OF OFFICIAL OBSERVERS:

Vinu J. Abraham – HTL, Professional Engineer
Urmilla Jokhu-Sowell – HTL, Professional Engineer
Justin McDonald – HTL, Technician
Steve Ciavola – HTL, Technician
Eric Reyes – HTL, Technician
Fred Henderson – HTL, Technician
Ron Nixon, Sr. – HTL, Technician

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FL Reg. # 53820

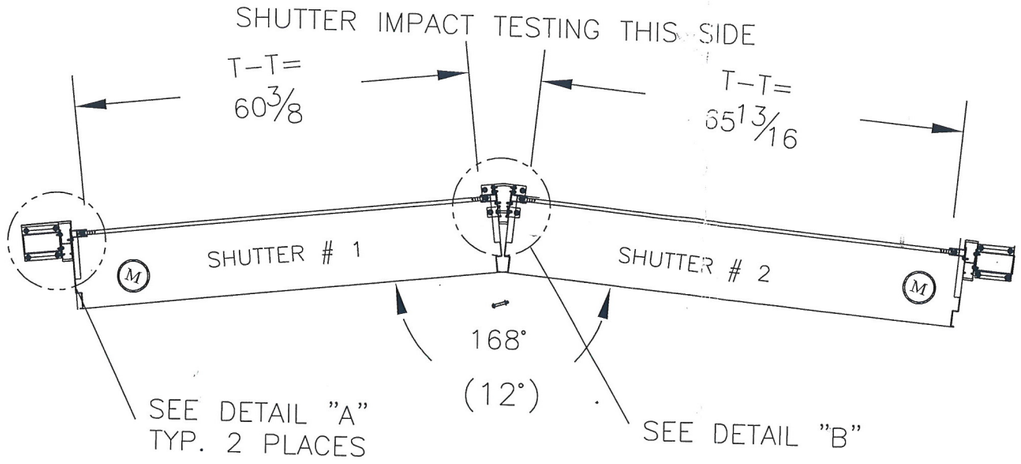
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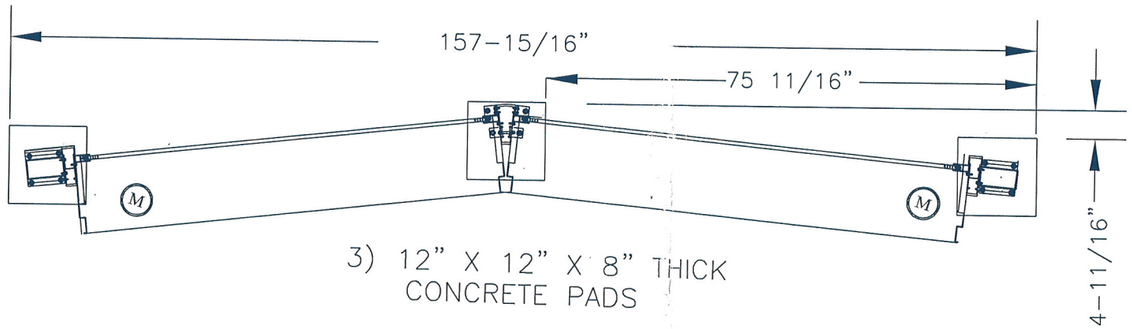
Hurricane Test Laboratory, LLC.

AS TESTED UNLESS OTHERWISE NOTED

Date 6/28/05

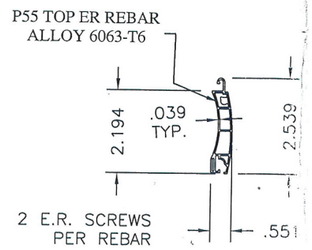
Job# 0206-0104-05



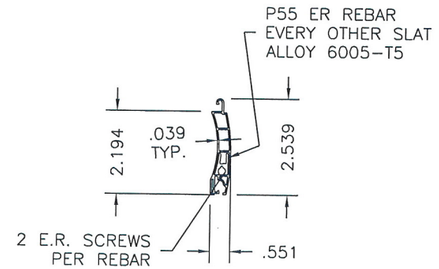


3) 12" X 12" X 8" THICK CONCRETE PADS

NOTES:
1. THIS DRAWING IS THE TESTING LAYOUT FOR ASTM E 1886 AND ASTM E 1996 PRODUCT EVALUATIONS TO DETERMINE COMPLIANCE WITH THE FLORIDA BUILDING CODE 2001 AND CURRENT AMENDMENTS.
2. TESTING LAB TO BUILD TESTING PLATFORM OR TESTING BUCK AND TO PROVIDE TESTING TO MEET THE ASTM E 1886 AND ASTM E 1996 REQUIREMENTS.
3. MAXIMUM LOADING PRESSURE IS +/- 72 PSF.
4. UPON COMPLETION OF CYCLIC AND IMPACT TESTING, 3 SEPARATE SAMPLES, A 4TH SAMPLE WILL BE INSTALLED AND TESTED TO ASTM E-330 REQUIRMENTS WITH A MAXIMUM TESTING LOAD OF 1.5 TIMES +/- 72 PSF (+/- 108 PSF). LARGE OPENINGS WILL BE SMALL MISSILE IMPACTED AND SMALL OPENINGS WILL BE LARGE MISSILE IMPACTED.
5. AFTER COMPLETION OF THIS 4TH SAMPLE, FACTOR OF SAFETY TEST, THE SAMPLE WILL BE TESTED TO FAILURE.
6. CENTER POST BASE LOADING APPROX. 3000 LBS.
7. END POST BASE LOADING APPROX. 6000 LBS AT 15 DEGREES FROM SHUTTER FACE.



P55 ER TOP REBAR SLAT DETAIL
SCALE: 1:4
POLYVINYL CHLORIDE
SMALLER OPENING



P55 ER 2ND SLAT DETAIL
SCALE: 1:4
POLYVINYL CHLORIDE
LARGER OPENING

REVISION

REV	DESCRIPTION
A	AS BUILT CHANGES - CENTER POST ONLY
B	
C	
D	
E	

THIRD ANGLE PROJECTION

CONDO:

TREVISO
RESIDENCE 02 PH

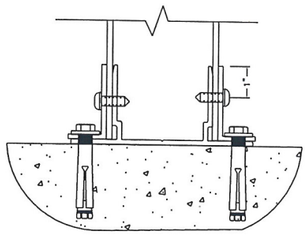
Roll-a-way STORM AND SECURITY SHUTTERS

10601 OAK STREET N.E.
ST. PETERSBURG, FL 33716

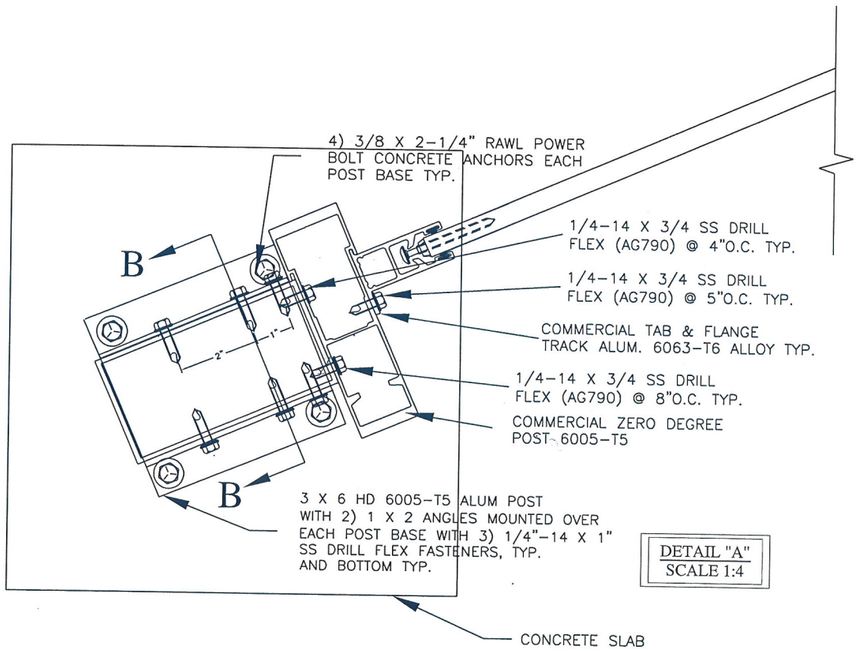
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TITLE: SHUTTER PLAN VIEW
UNIT 02, PH

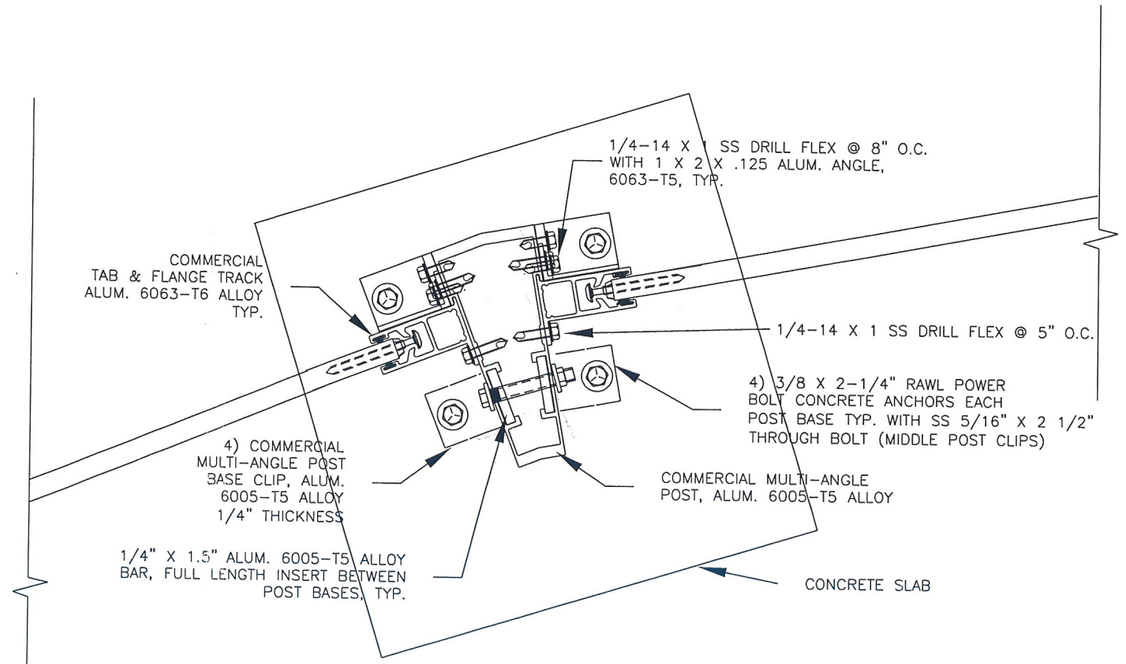
DRAWN: DLF	DATE: 09-27-04	REV: A
CHECKED:	DATE:	
APPROVED:	DATE:	
SIZE: B	DRAWING NO: S-0904-EG	SCALE: 3/8" = 1'-0"
FSCM NO:		SHEET 1 OF 3



SECTION B-B
SCALE 1:4



DETAIL "A"
SCALE 1:4



DETAIL "B"
SCALE 1:4

TYPICAL MIDDLE POST FLOOR CONNECTION

Hurricane Test Laboratory, LLC

AS TESTED UNLESS OTHERWISE NOTED
Date 6/20/05
Job# 0605-0104-05

REVISION

REV	DESCRIPTION
A	AS BUILT CHANGES- CENTER POST ONLY
B	
C	
D	
E	

THIRD ANGLE PROJECTION

CONDO:

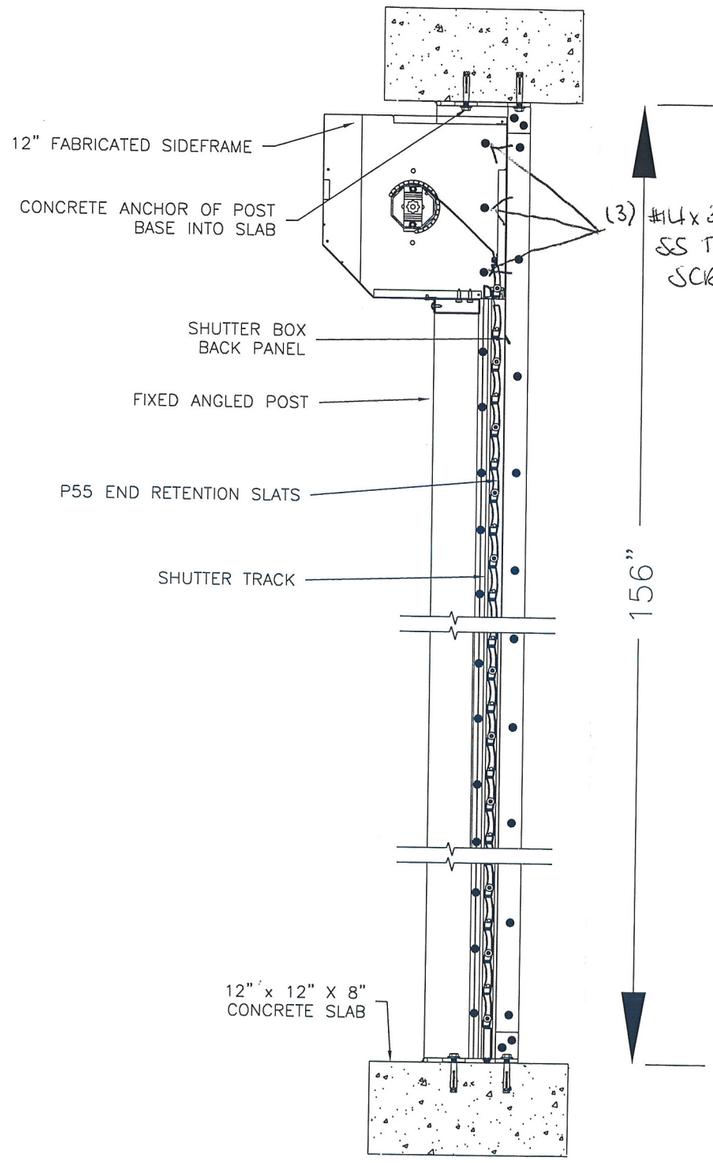
TREVISO
RESIDENCE 02

10601 OAK STREET N.E.
ST. PETERSBURG, FL 33716

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TITLE:
SLAB
MOUNTING DETAILS

DRAWN: DLF	DATE: 09-27-04	SIZE: B	DRAWING NO: S-0904-EG
CHECKED:	DATE:	REV: A	
APPROVED:	DATE:	SCALE: AS NOTED	
FSCM NO:		SHEET 2 OF 3	



TYPICAL SECTION
SCALE 1:10

Hurricane Test Laboratory, LLC
HTL LLC
AS TESTED UNLESS OTHERWISE NOTED
Date 6/28/05
Job# 0608-0104-05

REVISION		
REV	DESCRIPTION	
A	AS BUILT CHANGES- CENTER POST ONLY	
B		
C		
D		
E		

THIRD ANGLE PROJECTION
CONDO:

TREVISO
RESIDENCE 02 PH

Roll-a-way® STORM AND SECURITY SHUTTERS
10601 OAK STREET N.E.
ST. PETERSBURG, FL 33716

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TITLE:
SHUTTER SECTION
& MOUNTING DETAILS

DRAWN: DLF	DATE: 09-27-04	SIZE: B	DRAWING NO: S-0904-EG
CHECKED:	DATE:	REV: A	
APPROVED:	DATE:	SCALE: AS NOTED	
FSCM NO:		SHEET 3 OF 3	

REVISION			
REV	DESCRIPTION	APPROVED	DATE
A	FLANGE RETURNED 3" INCH	PJW	12-15-05
B	FLANGE LENGTHENED, 8 PLCS WAS 7 PLCS, 6 PLCS WAS 4 PLCS	PJW	01-27-06

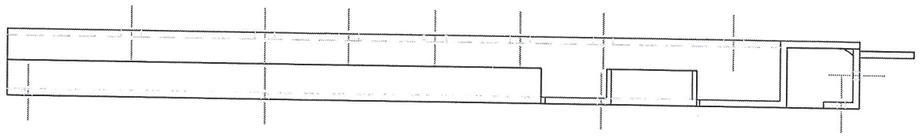
Hurricane Test Laboratory, LLC

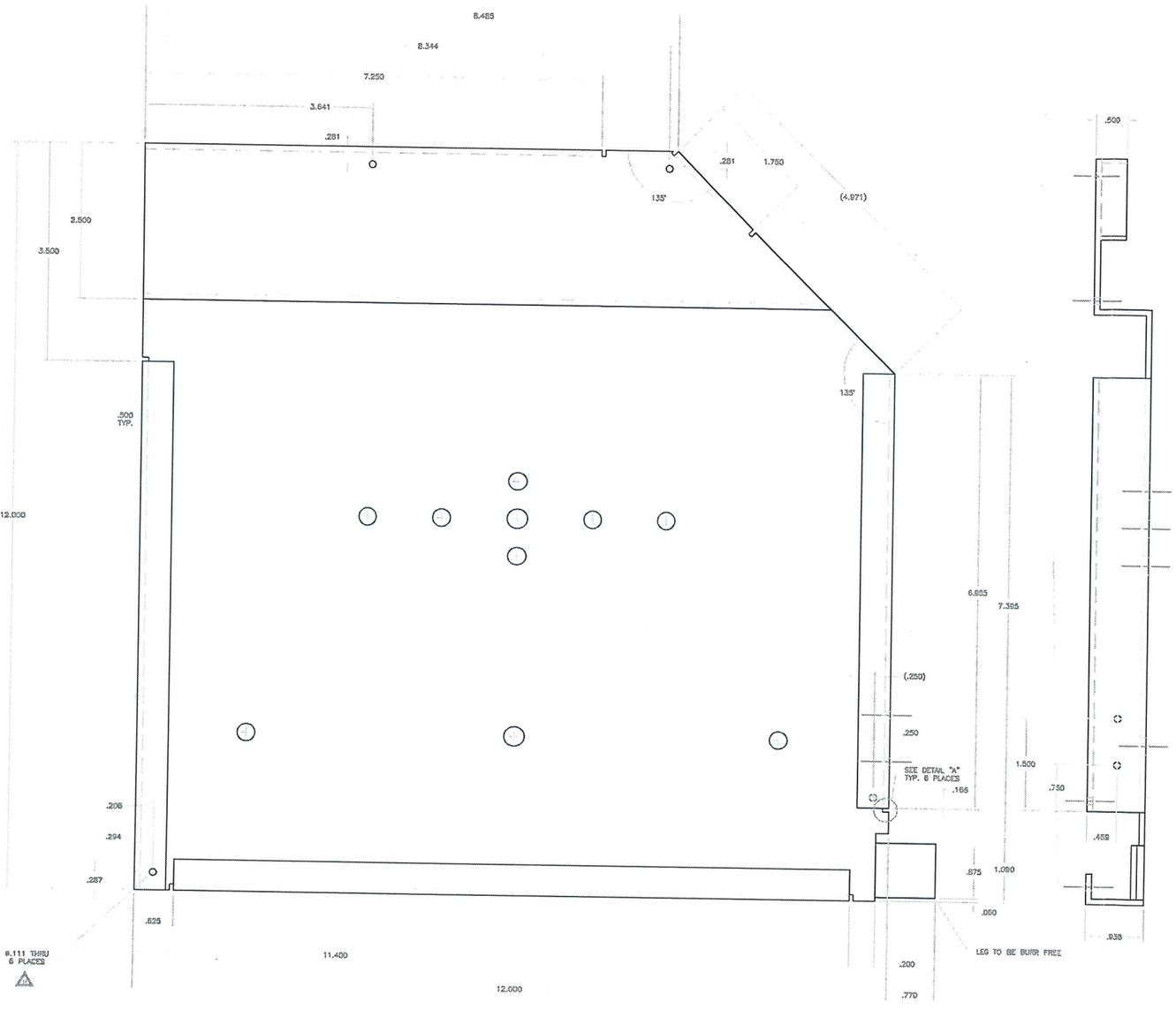
HTL LLC

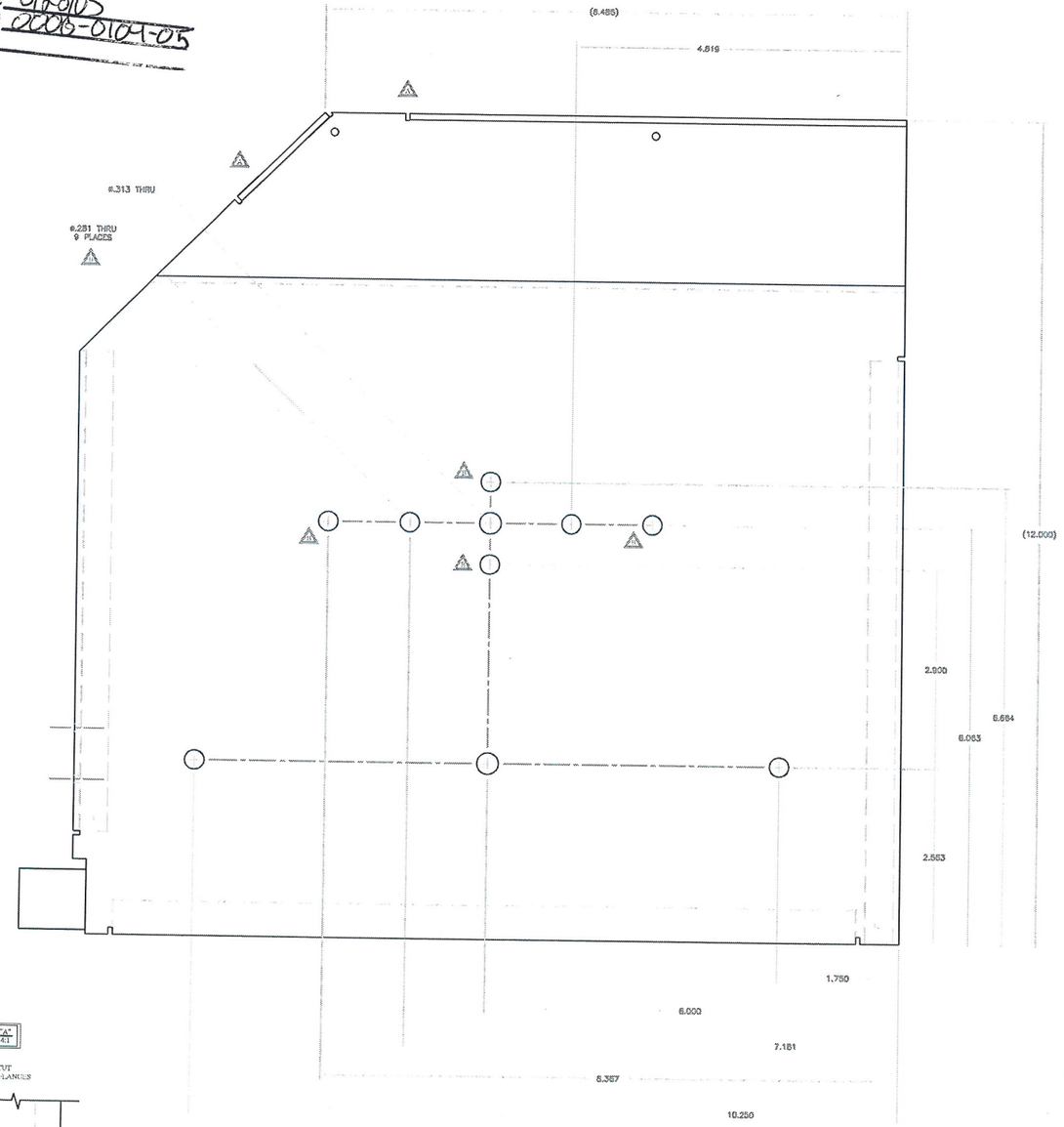
AS TESTED UNLESS OTHERWISE NOTED

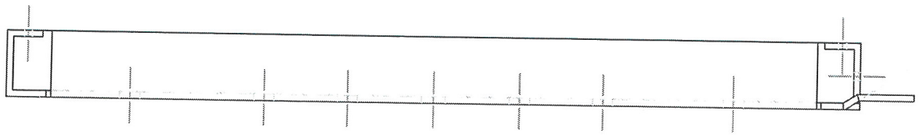
Date 6/28/05

Job# 0208-0104-05

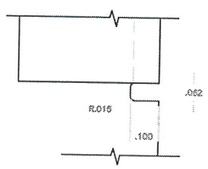








DETAIL "A"
SCALE: 4/1



NOTES:
1. TYP. MATERIAL THICKNESS .090
2. BREAK ALL SHARP INTERNAL CORNERS R .015 MIN.
3. MATERIAL: 5052-H32 ALUMINUM.
4. FLANGE TO BE OUTER MOST SURFACE TYPICAL ALL FLANGES

DRAWN	PJW	DATE	7-20-05
APPROVED	JW	DATE	7-20-05
SF. AREA		SEC. WT.	#/FT
THIRD ANGLE PROJECTION			
UNLESS OTHERWISE SPECIFIED: DIMS ARE IN INCHES			
TOLERANCES			
DECIMALS	INCHES	MM	
XX	±.01	±.25	
XXX	±.005	±.13	
ANGULAR	±1°	±1°	
MACHINING < 32"	.016		
FRACTIONS > 3"	1/8		

Roll-a-way Corporation
10601 OAK STREET N.E.
ST. PETERSBURG, FL 33716

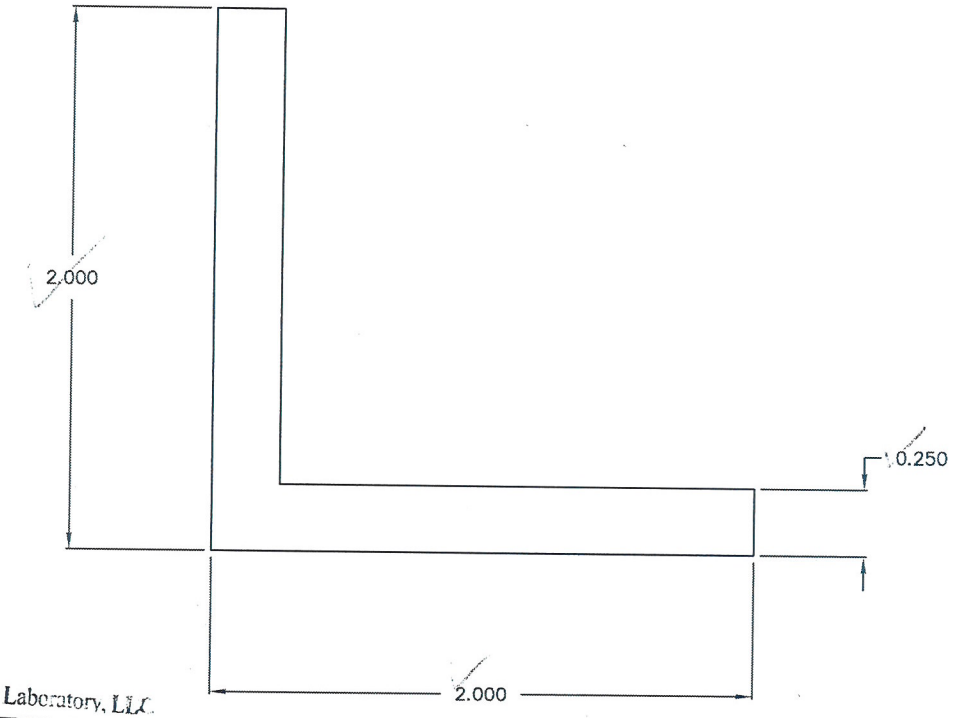
COPYRIGHT © 1998 VALCO ENTERPRISES, LTD.

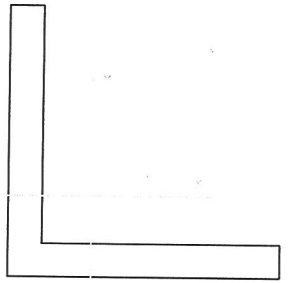
12" 5 - SIDED FABRICATED SIDEFRAME (RIGHT)

SIZE	DRAWING NO.	REV
D	1-26-500	B

SCALE	HEL	SHEET	1	OF	1

CUSTOMER		CUSTOMER NO.	DIE NO.
DESCRIPTION		DIE LOC	DASH NO.
	PROPOSAL NO.	BACKER LOC.	BOLSTER LOC.





ACTUAL SIZE

Hurricane Test Laboratory, LLC.

HTL LLC

AS TESTED UNLESS OTHERWISE NOTED

Date 6/28/05

Job# 2006-0104-05

STANDARD BOW AND TWIST TOLERANCES MUST BE MAINTAINED AS SET FORTH BY "THE ALUMINUM ASSOCIATION"

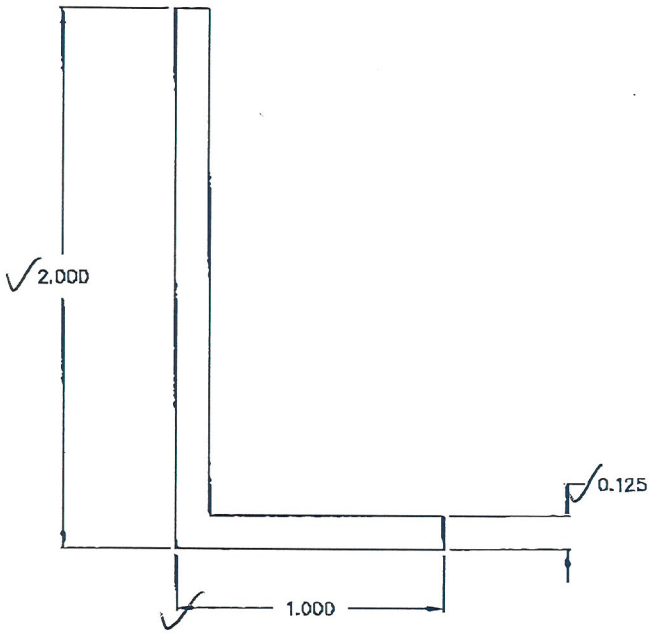
UNSPECIFIED WALL THICKNESS.....EXCEPT AS SHOWN
UNSPECIFIED RADIUS_____
STANDARD TOLERANCES TO APPLY UNLESS SPECIFIED

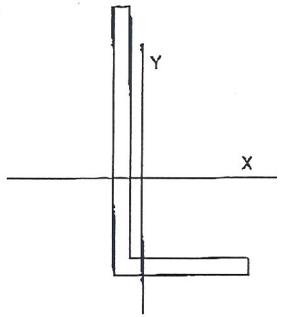
INDAL EXTRUSION
GAINESVILLE, GEORGIA

EST.AREA	IN^2	OUT PER.	IN	I X =					DIE NO.
EST.WT.	LBS/FT.	FACTOR		I Y =					
EST.PER.	IN	C.C.D.	IN						
DWN BY	CKD BY	SCALE		DATE					
PRESS	DIE SIZE		BACKER SIZE	BOLSTER NO.					
ALLOY AND TEMPER		EXT.RATIO	BACKER NO.						
					DATE	SYM	REVISION	BY	

02/03/2005 12:55 FAX 7275639701 RAW PROD CTL,PURCH,ENG 002

CUSTOMER	INDAL EXTRUSION	CUSTOMER NO.	DIE NO. GAS-34022
DESCRIPTION	ANGLES – UNEQUAL LEGS	DIE LOC	DASH NO.
	PROPOSAL NO.	BACKER LOC.	BOLSTER LOC.





ACTUAL SIZE

Hurricane Test Laboratory, LLC

AS TESTED UNLESS OTHERWISE NOTED

Date 6/28/05

Job# 0026-0104-05

STANDARD BOW AND TWIST TOLERANCES MUST BE MAINTAINED AS SET FORTH BY "THE ALUMINUM ASSOCIATION"

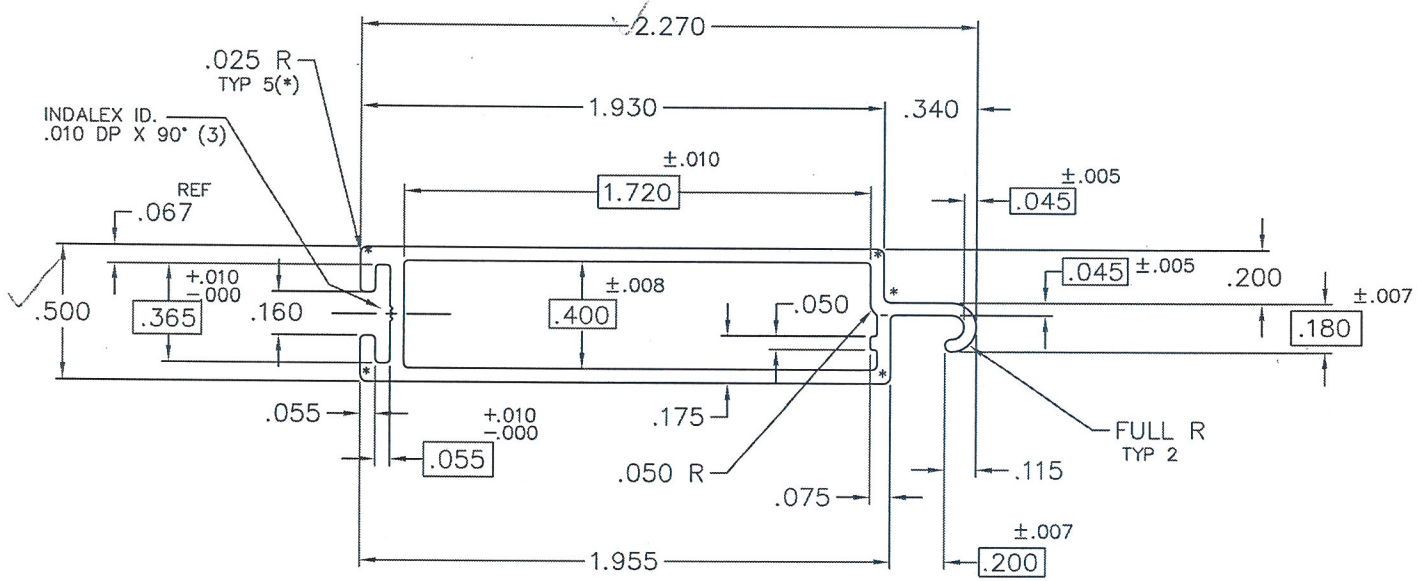
UNSPECIFIED WALL THICKNESS.....EXCEPT AS SHOWN
UNSPECIFIED RADIUS_____ 0.015
STANDARD TOLERANCES TO APPLY UNLESS SPECIFIED

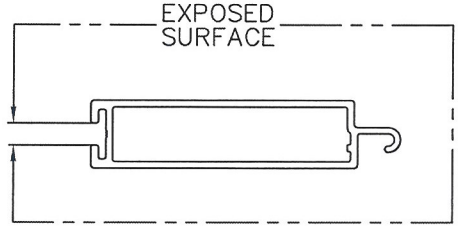
INDAL EXTRUSION
GAINESVILLE, GEORGIA

EST.AREA 0.359 IN^2		OUT PER. IN		I X = 0.150					
EST.WT. 0.431 LBS/FT.		FACTOR 14		I Y = 0.026					
EST.PER. 6.000 IN		C.C.D. 2.236 IN							
DWN BY BJ	CKD BY	SCALE 2=1		DATE 11/16/88					
PRESS	DIE SIZE	CGx= 0.215	BACKER SIZE	BOLSTER NO.					
		CGy= 0.715							
ALLOY AND TEMPER		EXT.RATIO	BACKER NO.						
6063-T5					DATE	SYM	REVISION	BY	

DIE NO. GAS-34022

CUSTOMER ROLL–A–WAY	CUSTOMER NO. 1748	DIE NO. GAH–42635	REV.
DESCRIPTION SLAT, BTM, P55/P77		PROPOSAL NO. R2330–5	





ACTUAL SIZE

Hurricane Test Laboratory, LLC

HTL LLC

AS TESTED UNLESS OTHERWISE NOTED

Date 6/28/05

Job# 0206-0104-05

DIFF. RATING 3

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS SPECIFIED OTHERWISE

UNSPECIFIED WALL THICKNESS .050

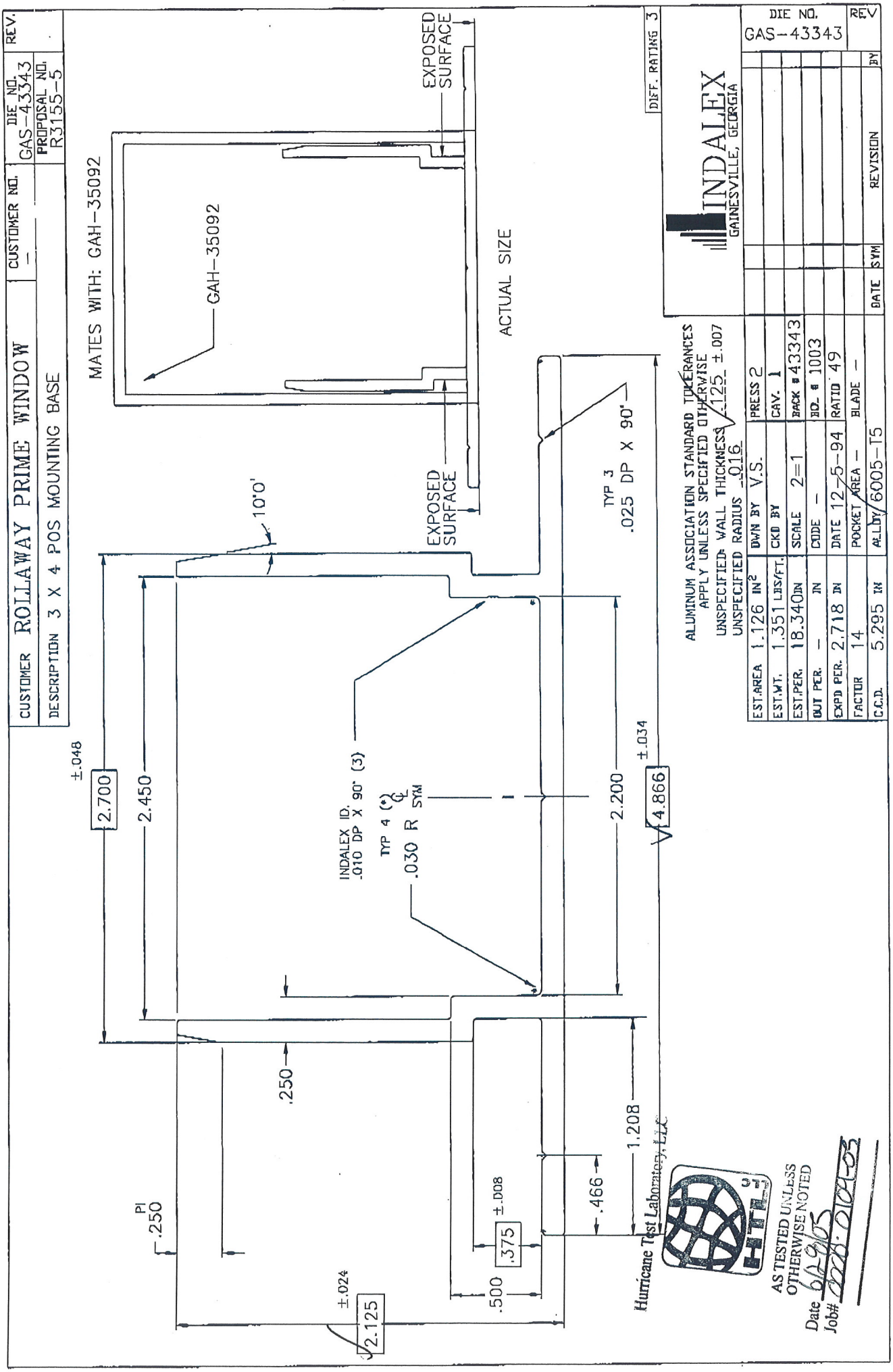
UNSPECIFIED RADIUS .016

INDALEX
GAINESVILLE, GEORGIA

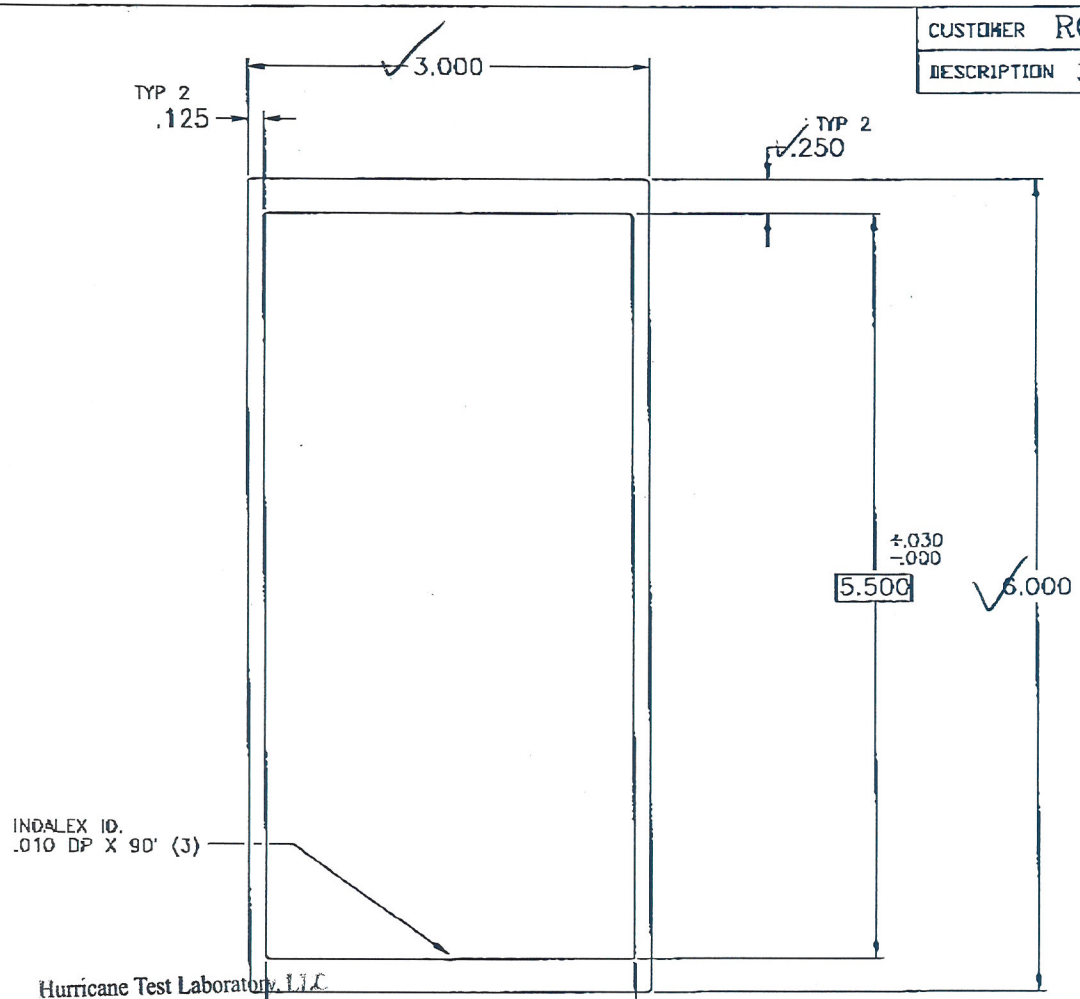
EST.AREA .272 IN²	DWN BY R.M.	PRESS 2	
EST.WT. .326 LBS/FT.	CKD BY	CAV. 4	
EST.PER. 11.082 IN	SCALE 2=1	BACK # NONE	
OUT PER. 6.353 IN	CODE —	BOL # 1038	
EXPD PER. 5.613 IN	DATE 8–20–93	RATIO 51	
FACTOR 34	POCKET AREA= —		
C.C.D. 2.294 IN	ALLOY 6063–T6		

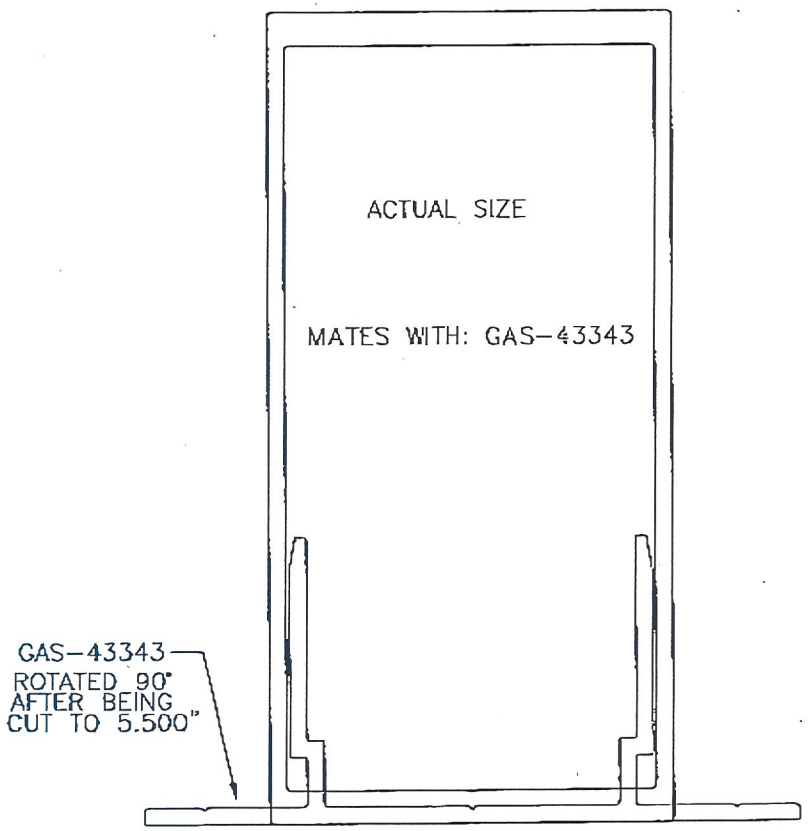
DATE	SYM	REVISION	BY

DIE NO. GAH–42635 REV


CUSTOMER ROLLAWAY PRIME WINDOW
CUSTOMER NO. —
DIE NO. GAS-43343
PROPOSAL NO. R3155-5
REV.
DESCRIPTION 3 X 4 POS MOUNTING BASE
MATES WITH: GAH-35092
GAH-35092
EXPOSED SURFACE
ACTUAL SIZE
DIFF. RATING 3
INDALEX
GAINESVILLE, GEORGIA
DIE NO. GAS-43343
REV
ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS SPECIFIED OTHERWISE
UNSPECIFIED WALL THICKNESS .125 ±.007
UNSPECIFIED RADIUS .016
EST.AREA 1.126 IN²
EST.WT. 1.351 LBS/FT.
EST.PER. 18.340IN
OUT PER. — IN
EXPD PER. 2.718 IN
FACTOR 14
C.C.D. 5.295 IN
DWN BY V.S.
CKD BY
SCALE 2=1
CODE —
DATE 12-5-94
POCKET AREA —
ALLOY 6005-T5
PRESS 2
CAV. 1
BACK #43343
BD. # 1003
RATIO 49
BLADE —
DATE SYM REVISION BY
2.700 ±.048
2.450
10°
EXPOSED SURFACE
TYP 3 .025 DP X 90°
INDALEX ID. .010 DP X 90° (3)
TYP 4 (*) .030 R SYM
2.200
4.866 ±.034
.250
1.208
.466
.375 ±.008
.500
PI .250
2.125 ±.024
Hurricane Test Laboratory, LLC
AS TESTED UNLESS OTHERWISE NOTED
Date 6/2/05
Job# 0206-0104-03

CUSTOMER	ROLL-A-WAY	CUSTOMER NO.	DIE NO.	REV.
		—	GAH-43696	
DESCRIPTION	3 X 6 POST		PROPOSAL NO. R3630-1	





Hurricane Test Laboratory, LLC

AS TESTED UNLESS OTHERWISE NOTED

Date 6/28/05

Job# 0605-0104-05

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS SPECIFIED OTHERWISE

UNSPECIFIED WALL THICKNESS —

UNSPECIFIED RADIUS .032

INDALEX
GAINESVILLE, GEORGIA

EST.AREA	2.875 IN²	DWN BY V.S.	PRESS 2
EST.WT.	3.450 LBS/FT.	CKD BY	CAV. 1
EST.PER.	34.414 IN	SCALE 1=1	BACK # NONE
CUT PER.	17.945 IN	CODE —	BOL # 1042
EXPD PER.	— IN	DATE 10-12-95	RATIO 19
FACTOR	10	POCKET AREA —	BLADE —
C.C.D.	6.710 IN	ALLOY 6005-T5	

DATE	SYM	REVISION	BY

DIE NO. GAH-43696 REV.

Hurricane Test Laboratory, LLC

HTL

AS TESTED UNLESS OTHERWISE NOTED

Date 6/23/05

Job# 0606-0104-05

CUSTOMER ROLLAWAY	CUSTOMER NO. 4-12-452	DIE NO. GAH-45193	REV.
DESCRIPTION 12° POST		PROPOSAL NO. R5184-15	

PRODUCTION DRAWING

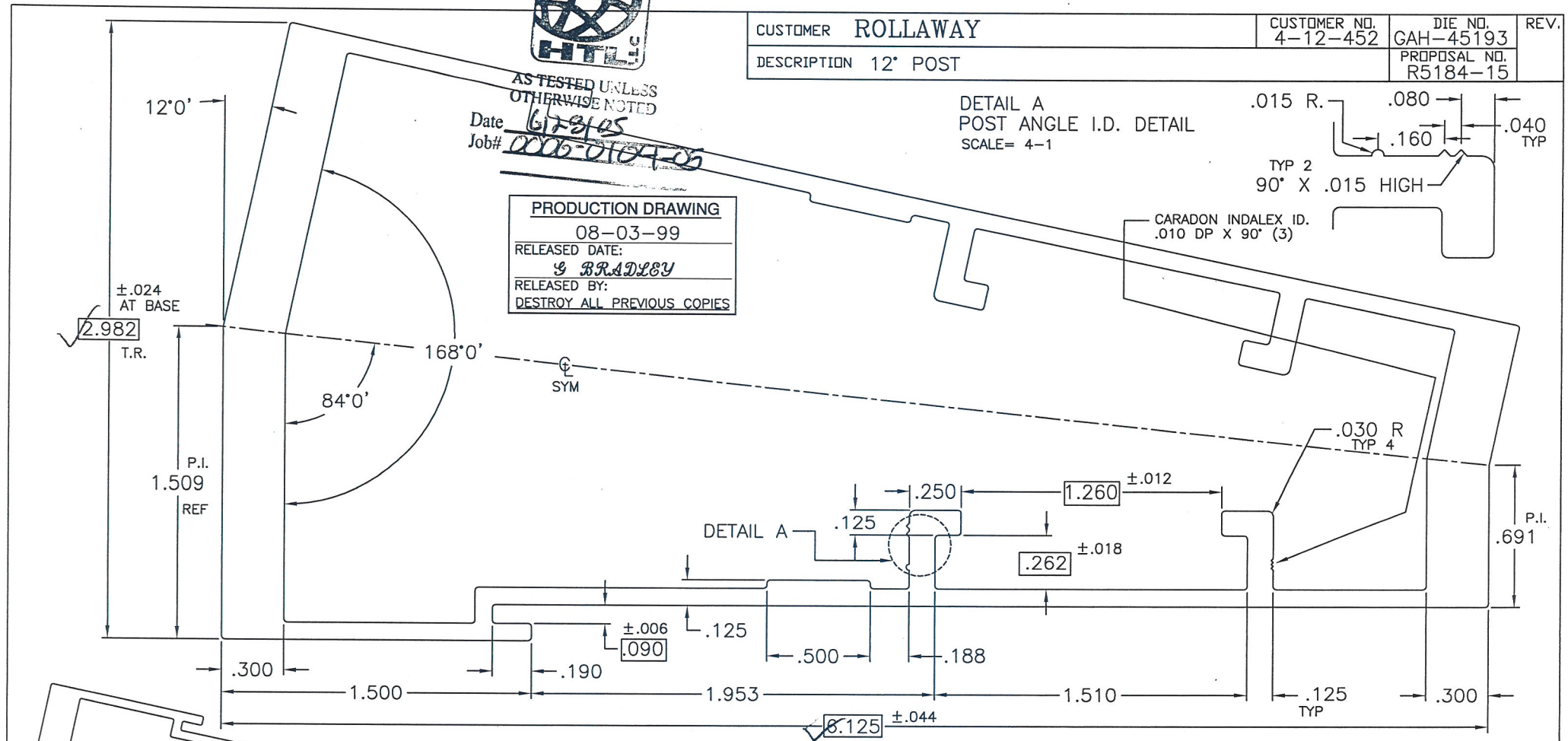
08-03-99

RELEASED DATE:

G BRADLEY

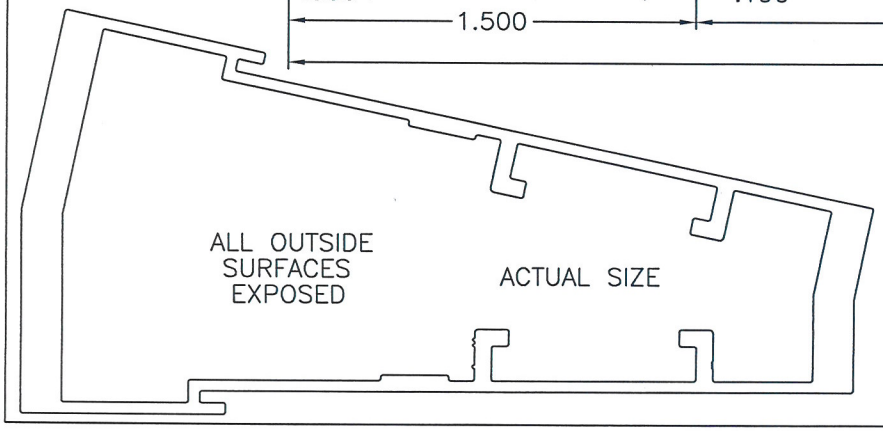
RELEASED BY:

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DETAIL A
POST ANGLE I.D. DETAIL
SCALE= 4-1

CARADON INDALEX ID.
.010 DP X 90° (3)



ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS SPECIFIED OTHERWISE

UNSPECIFIED WALL THICKNESS .084

UNSPECIFIED RADIUS .016

EST.AREA 2.605 IN²	DWN BY R.M.	DIFF. RATING 4	
EST.WT. 3.126 LBS/FT.	CKD BY	PRESS 2	
EST.PER. 37.121IN	SCALE 2=1	CAV. 1	
OUT PER. 17.675IN	CODE —	BACK #NONE	
EXPD PER. 17.675IN	DATE 7-13-99	BOL # 1250	
FACTOR 12	POCKET AREA —	RATIO 21	
C.C.D. 6.531 IN	ALLOY 6005-T5	BLADE —	

Caradon Indalex
a division of Caradon America, Inc.
GAINESVILLE, GEORGIA

DATE	SYM	REVISION	BY

DIE NO. GAH-45193 REV

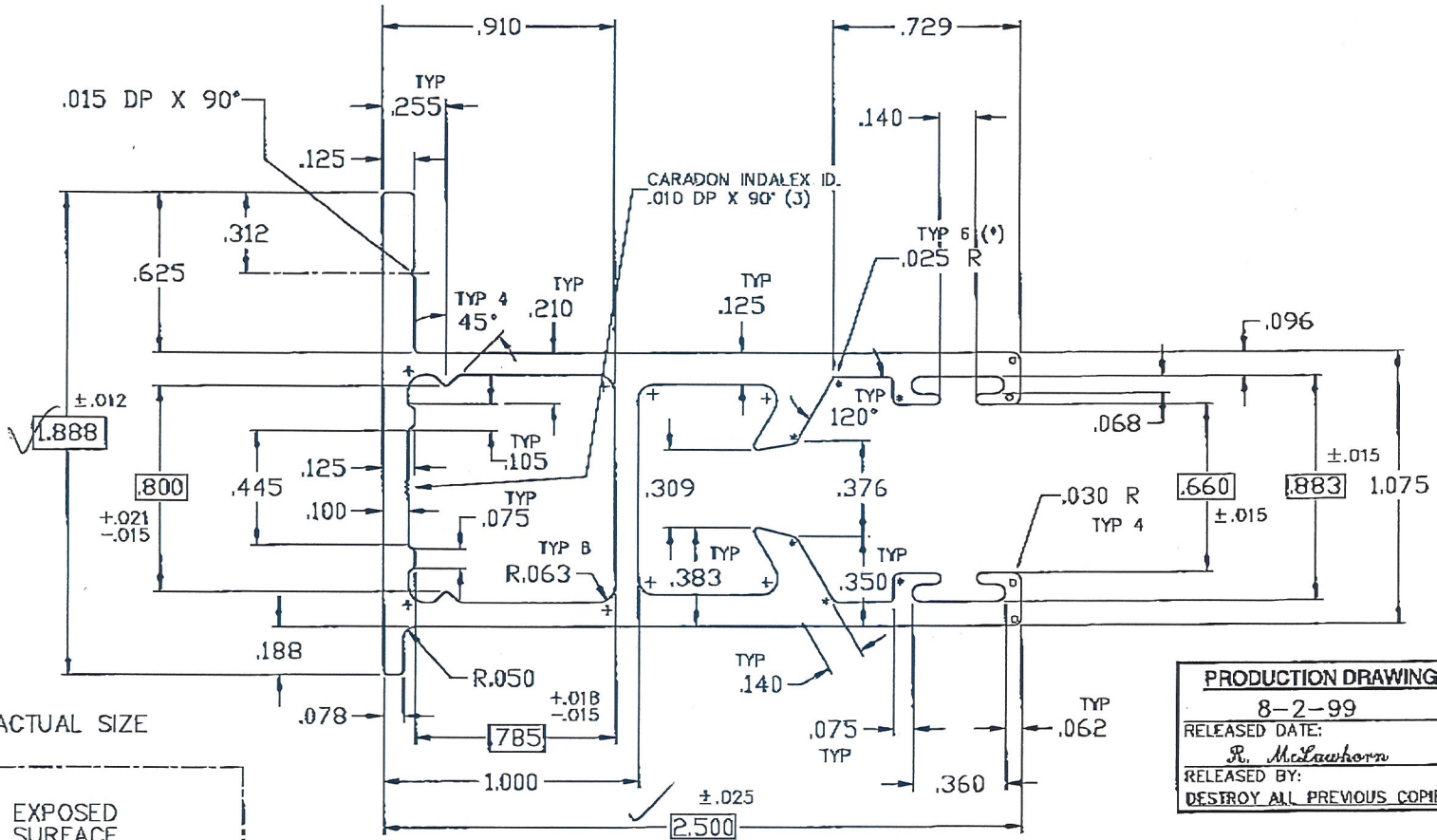
CUSTOMER	ROLL-A-WAY PRIME WINDOW	CUSTOMER NO. 3-12-459	DIE NO. GAH-45206	REV.
DESCRIPTION	END RETENTION TRACK TAB & FLANGED		PROPOSAL NO. R5184-28	

Hurricane Test Laboratory, LLC

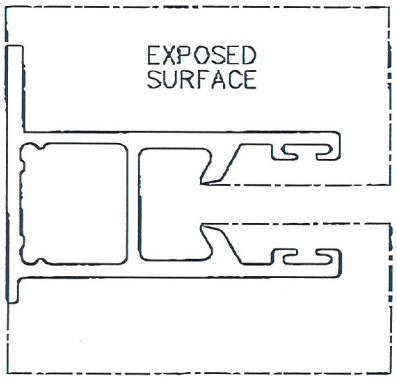
AS TESTED UNLESS OTHERWISE NOTED

Date 6/28/05

Job# 0026-0104-05



ACTUAL SIZE



PRODUCTION DRAWING

8-2-99

RELEASED DATE:

R. McLawhorn

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ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS SPECIFIED OTHERWISE

UNSPECIFIED WALL THICKNESS .095

UNSPECIFIED RADIUS .016

ESTAREA .924 IN²	DWN BY V.S.	DIFF. RATING 3	
EST.WT. 1.109 LBS/FT.	CKD BY	PRESS 3P 1S	
EST.PER. 17.498 IN	SCALE 2=1	CAV. 1	
OUT PER. 14.097 IN	CODE —	BACK # NONE	
EXPD PER. 10.032 IN	DATE 8-2-99	BOL # 1021	
FACTOR 16	POCKET AREA —	RATIO 46	BLADE —
C.C.D. 3.011 IN	ALLOY 6063-T6		

Caradon Indalex

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GAINESVILLE, GEORGIA

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DIE NO. GAH-45206 REV

02/03/2005 12:56 FAX 7275639701 RAW PROD CTL,PURCH,ENG 007

Hurricane Test Laboratory, LLC

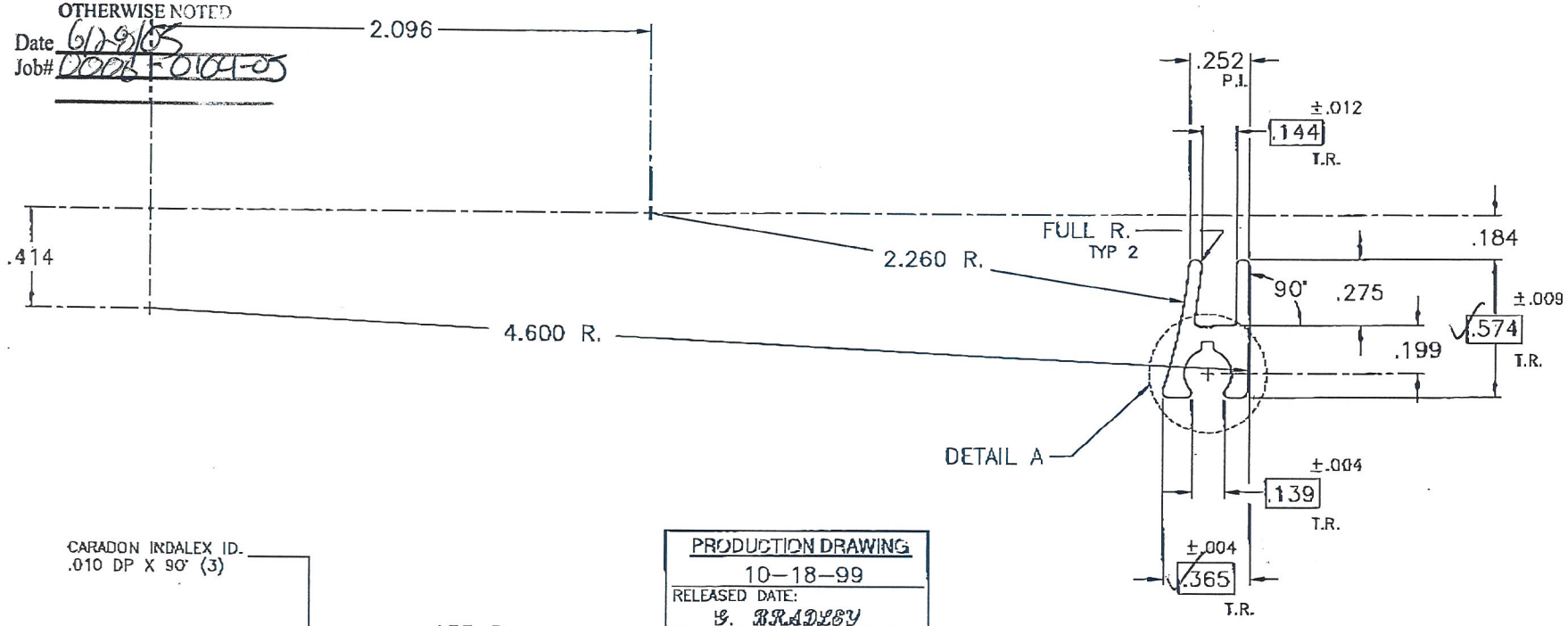
HTL

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Date 6/29/05

Job# 0002F0164-05

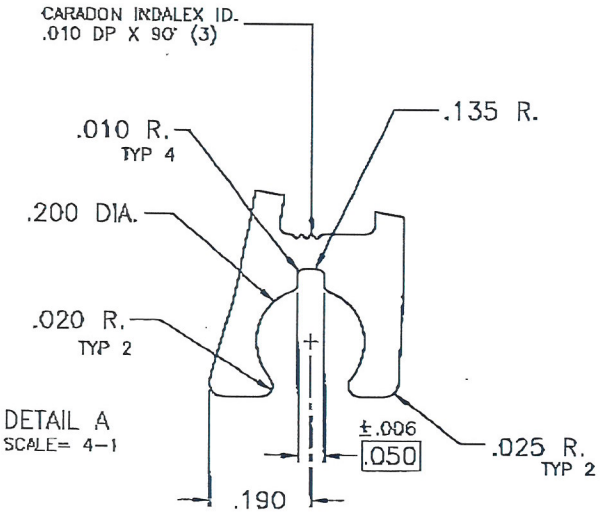
CUSTOMER ROLL-A-WAY	CUSTOMER NO. 3-12-422	DIE NO. GAS-45356	REV.
DESCRIPTION P55 END RETENTION REBAR		PROPOSAL NO. R5371-1	



NO EXPOSED SURFACES



ACTUAL SIZE



PRODUCTION DRAWING
10-18-99
RELEASED DATE:
G. BRADLEY
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ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS SPECIFIED OTHERWISE

UNSPECIFIED WALL THICKNESS .055

UNSPECIFIED RADIUS .016

EST.AREA	.092 IN²	DWN BY	G.B.	DIFF. RATING	3
EST.WT.	.110 LBS/FT.	CKD BY		PRESS	2
EST.PER.	2.729 IN	SCALE	2=1	CAV.	8
OUT PER.	— IN	CODE	—	BACK #	40454
EXPD PER.	— IN	DATE	10-18-99	BOL #	1115
FACTOR	25	POCKET AREA	—	RATIO	75
C.C.D.	.670 IN	ALLOY	6005-T5	BLADE	—

Caradon Indalex

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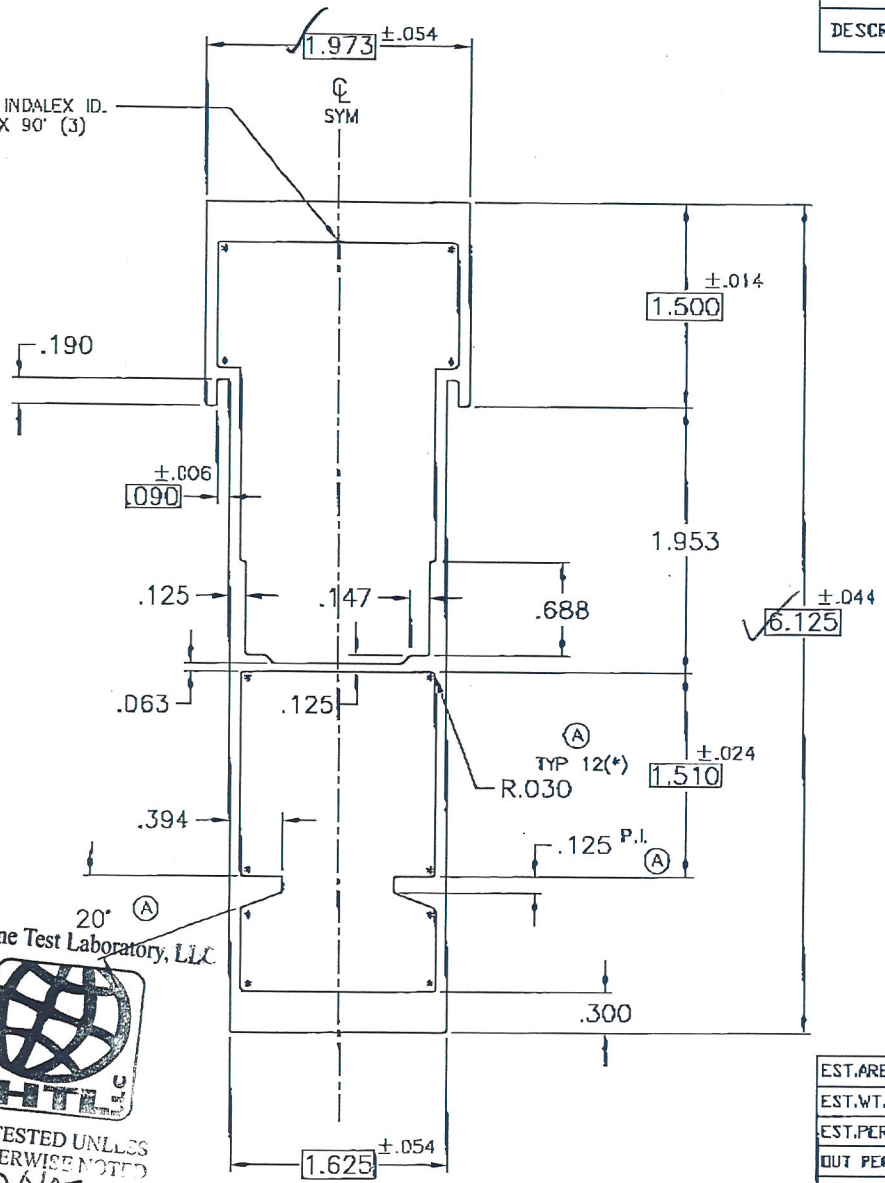
GAINESVILLE, GEORGIA

DATE	SYM	REVISION	BY

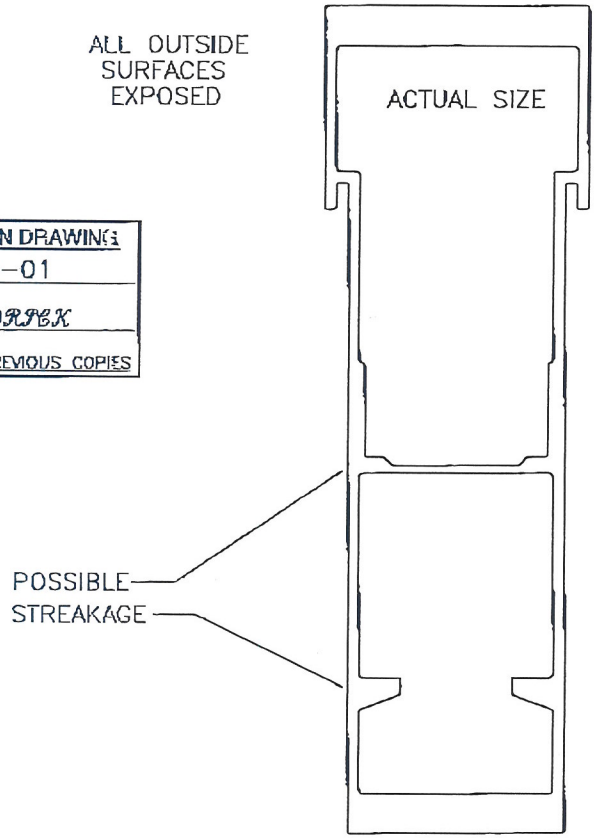
DIE NO. GAS-45356 REV

02/03/2005 12:56 FAX 7275639701 RAW PROD CTL,PURCH,ENG 006

CUSTOMER	ROLL-A-WAY	CUSTOMER NO. 4-12-477	DIE NO. GAH-46048	REV. A
DESCRIPTION	0° POST, RIBBED		PROPOSAL NO. R5941-1	



ALL OUTSIDE SURFACES EXPOSED



PRODUCTION DRAWING
8-17-01
RELEASED DATE:
V. SHEDRICK
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HTL
AS TESTED UNLESS OTHERWISE NOTED
Date 6/28/05
Job# 0006-0104-05

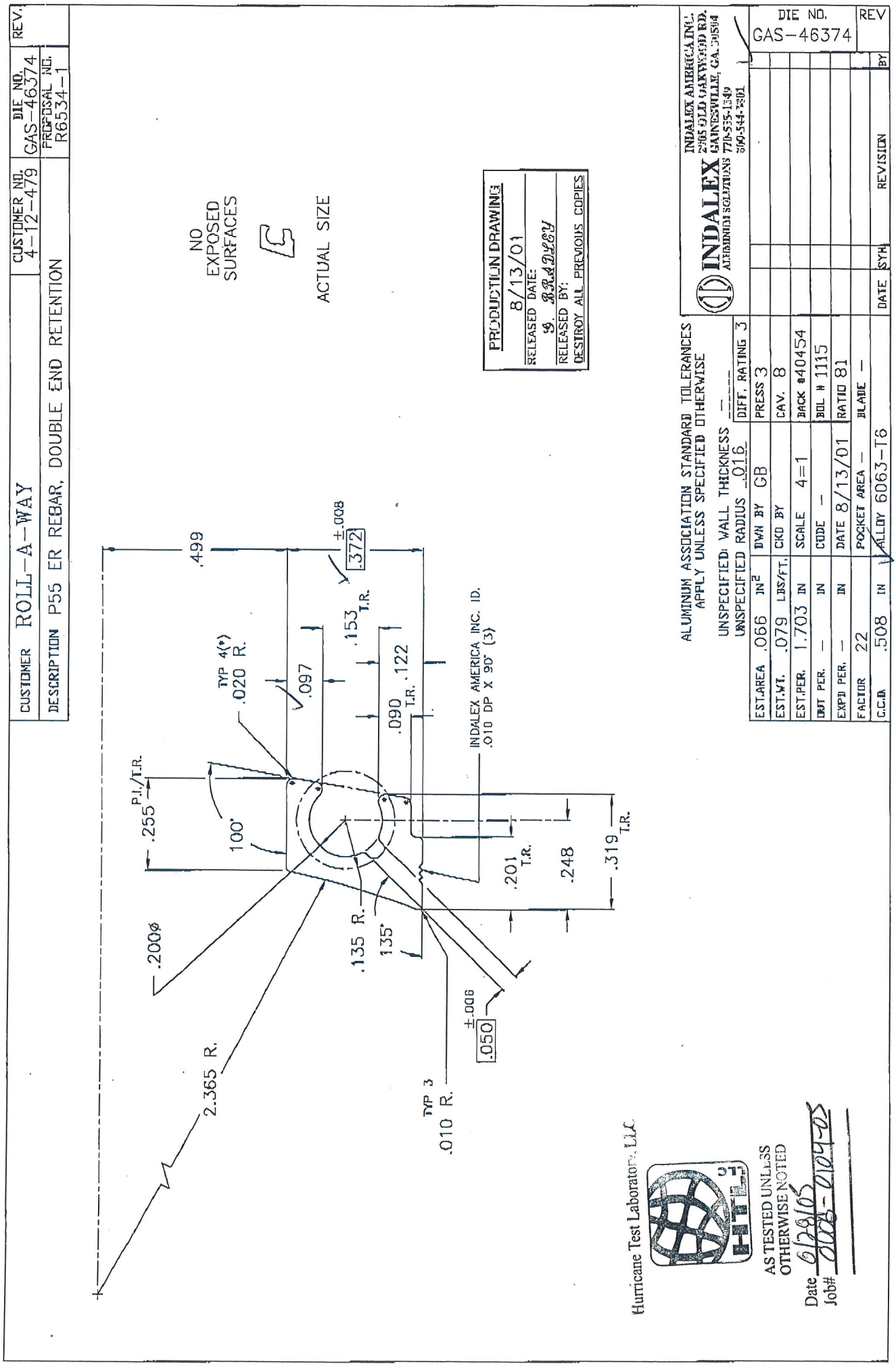
ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS SPECIFIED OTHERWISE
UNSPECIFIED WALL THICKNESS .084 ±.010
UNSPECIFIED RADIUS .016

INDALEX
ALUMINUM SOLUTIONS
GAINESVILLE, GEORGIA

EST.AREA	2.359 IN²	DWN BY V.S.	DIFF. RATING 3
EST.WT.	2.831 LBS/FT.	CKD BY	PRESS 2
EST.PER.	35.111 IN	SCALE 1=1	CAV. 1
OUT PER.	16.874 IN	CODE —	BACK #NONE
EXPD PER.	16.874 IN	DATE 1/30/01	BOL # 1031
FACTOR	12	POCKET AREA —	RATIO 23
C.C.D.	6.414 IN	ALLOY 6005-T5	BLADE ✓

DATE	SYM	REVISION	BY
9/13/01	A	ADDED 20° DIM, .03 R WAS 8 PL	ak

DIE NO. GAH-46048 REV A



Hurricane Test Laboratory, LLC

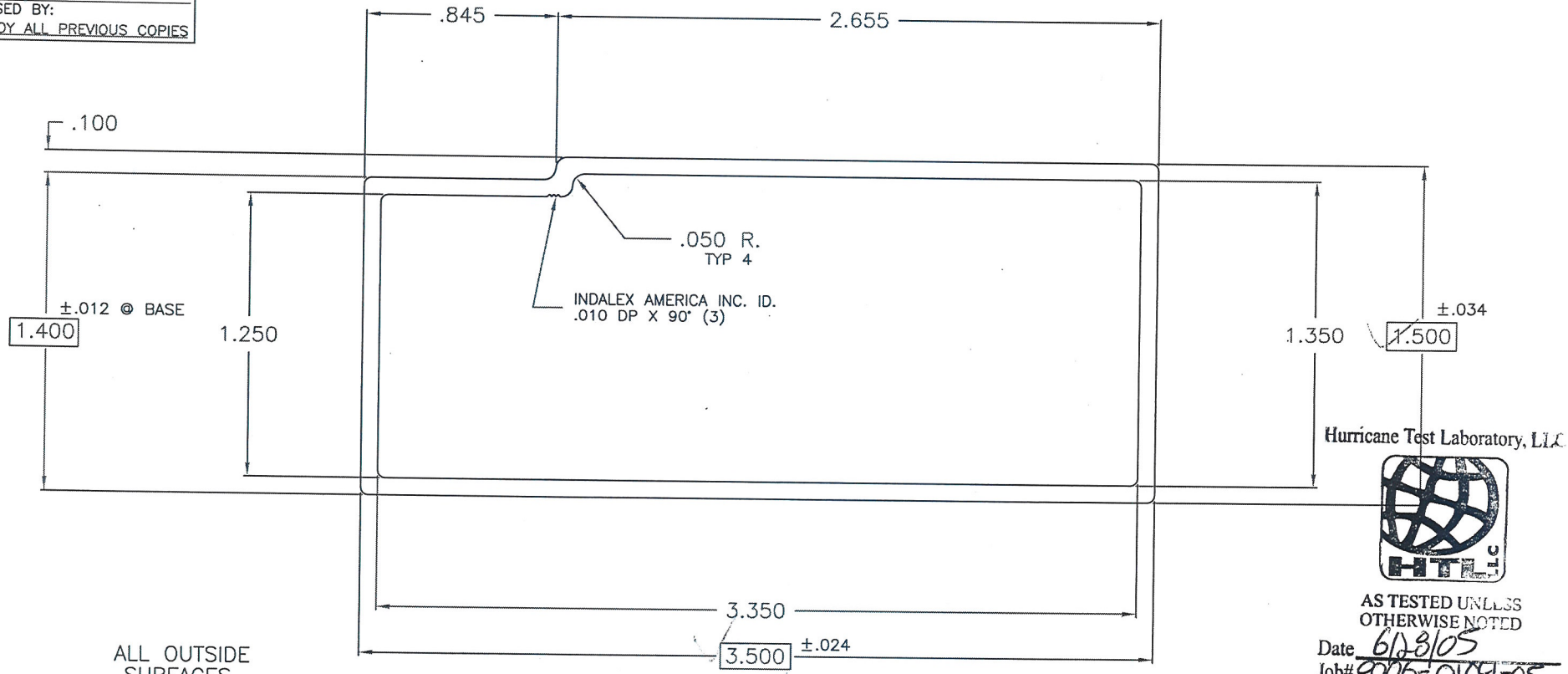
AS TESTED UNLESS OTHERWISE NOTED

Date 6/28/05

Job# 2005-0104-05

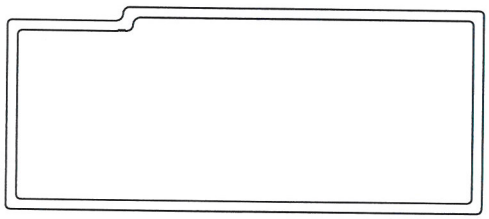
PRODUCTION DRAWING
9/15/03
RELEASED DATE:
G. BRADLEY
RELEASED BY:
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CUSTOMER	ROLL-A-WAY	CUSTOMER NO.	DIE NO.	REV.
DESCRIPTION	HEADER (E.R.)	—	GAH-47659	
			PROPOSAL NO. R9631-1	



Hurricane Test Laboratory, LLC
HTL LLC
AS TESTED UNLESS OTHERWISE NOTED
Date 6/23/05
Job# 2006-0109-05

ALL OUTSIDE SURFACES EXPOSED



ACTUAL SIZE

ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS SPECIFIED OTHERWISE

UNSPECIFIED WALL THICKNESS .075 ±.010
UNSPECIFIED RADIUS .032

EST.AREA	.728 IN²	DWN BY G.B.	DIFF. RATING 3
EST.WT.	.874 LBS/FT.	CKD BY	PRESS 2
EST.PER.	19.228IN	SCALE 2=1	CAV. 1
OUT PER.	9.902 IN	CODE —	BACK #NONE
EXPD PER.	9.902 IN	DATE 9/15/03	BOL # 1003
FACTOR	22	POCKET AREA —	RATIO 76
C.C.D.	3.784 IN	ALLOY 6063-T6	BLADE —

INDALEX AMERICA INC.
2905 OLD OAKWOOD RD.
GAINESVILLE, GA. 30504
770-535-1349
800-544-3801

INDALEX ALUMINUM SOLUTIONS

DATE	SYM	REVISION	BY

DIE NO. GAH-47659
REV.