ANSI/SPRI ES-1 PERFORMANCE TEST REPORT

Rendered to:

SOUTHERN ALUMINUM FINISHING COMPANY, INC.

For:

***Press-Loc*® Aluminum Edge Flashing and Coping**

Report No.: D6438.01-119-16
Report Date: 07/11/14
Test Record Retention Date: 05/09/18
Revision 1: 10/01/14

130 Derry Court
York, PA 17406

www.archtest.com • www.intertek.com/building

p. 717.764.7700
f. 717.764.4129

ANSI/SPRI ES-1 PERFORMANCE TEST REPORT

Rendered to:

SOUTHERN ALUMINUM FINISHING COMPANY, INC.
8370 Highway 78
Villa Rica, Georgia 30180

Report No.:	D6438.01-119-16
Test Dates:	05/05/14
Through:	05/09/14
Report Date:	07/11/14
Test Record Retention Date:	05/09/18
Revision 1:	10/01/14

1.0 General Information

1.1 Product

Press-Loc® Aluminum Edge Flashing and Coping

1.2 Project Summary

Architectural Testing was contracted by Southern Aluminum Finishing Company, Inc. to perform ANSI/SPRI Test RE-2, and RE-3 on formed aluminum edge flashing and coping materials in accordance with ANSI/SPRI ES-1 2003.

1.3 Qualifications

Architectural Testing in York, Pennsylvania has demonstrated compliance with ANSI/ISO/IEC Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by International Accreditation Service, Inc.

1.4 Witnessing

Mr. Corey Faciane from Southern Aluminum Finishing Company, Inc. was present from 05/05/14 to 05/09/14 to demonstrate proper installation of the edge flashing and coping, as well as for the testing conducted and reported herein.

1.5 Conditions of Testing

All testing reported herein was conducted in a laboratory set to maintain temperature in the range of 68 ± 4ºF and humidity in the range of 50 ±5% RH.

2.0 ANSI/SPRI Test RE-2, Pull-Off Test for Edge Flashings

2.1 Specimen Description

10 ft long sections of 6 in and 8 in wide by 0.040 in thick, mill formed aluminum flashing and 10 ft long by nominal 5-5/8 in wide by 0.063 in thick and 10 ft long by nominal 7-5/8 in wide by 0.090 in thick aluminum cleat were attached to roof edge mock-ups constructed of Southern White Pine.

Prior to assembly, the top face of the flashing was drilled and fitted with ten 5/16 in eyebolts, fender washers (one side, inside face only) and hex nuts (one each side), six inches from the end of the edge flashing and twelve inches on center, on the longitudinal centerline.

The top face of the 6 in cleat was screwed to the edge of a 2x12 Southern White Pine member with a single row of ten #12 x 1-1/2 in (0.156 in minor diameter) hex-head, stainless steel screws 6 in from the end and 12 in on center.

The top face of the 8 in cleat was screwed to the edge of a 2 x 12 Southern White Pine member with two rows of ten #12 x 1-1/2 in (0.156 in minor diameter) hex-head, stainless steel screws 2 in from the bottom and 2-3/4 in from the top, 6 in from the end and 12 in on center.

The flashing was then hooked onto the top bend of the cleat over spring steel clips spaced 24 in apart on center.

See Drawings in Appendix A and Photographs in Appendix B for additional details.

2.2 Test Procedure

Load was applied to the ten eye bolts using equal-length chains, a spreader beam, steel cable and an electric winch. Applied load was measured with an in-line 2000 pound load cell. Center-point deflection of the flashing face was measured with an electronic linear displacement transducer. Load was applied incrementally and held ("Sustained") for a minimum of 60 seconds with intermediate load relaxation periods for specimen deflection to stabilize.

Mode of failure for all 6 in specimens was flashing pull-off from the cleat, while load was increasing.

Mode of failure for all 8 in specimens was flashing pull-off from the lower lip of the cleat, while relaxing load to stabilize deflection.

See photographs in Appendix B for test set-ups.

2.3 Test Results

ANSI/SPRI Test RE-2 Pull-Off Test for 6 in Edge Flashing
Test Date: 05/05/14

Specimen No.	Peak Load at Failure (lb)	Max. Sustained Load prior to Failure (lb)	Equivalent Sustained Pressure (psf)
1	1211	1200	240
2	1412	1350	270
3	1437	1400	280
Average:	1353	1316	**263**

ANSI/SPRI Test RE-2 Pull-Off Test for 8 in Edge Flashing
Test Date: 05/05/14

Specimen No.	Peak Load at Failure (lb)	Max. Sustained Load prior to Failure (lb)	Equivalent Sustained Pressure (psf)
1	1289	1267	190
2	1293	1267	190
3	1219	1200	180
Average:	1267	1245	**187**

3.0 ANSI/SPRI Test RE-3, Pull-Off Test for Copings

3.1 Specimen Description

10 ft long sections of 12-1/2 in wide top face by 6 in high front face by 4-1/2 in high back face by 0.040 in thick, mill finished, formed aluminum coping and by 12 in by 12-1/4 in by 0.063 in thick 16 Ga galvanized steel cleat (spaced 60 in on-center) were attached to parapet mock-ups constructed of Southern White Pine.

Prior to assembly, the top and front faces of the coping were drilled and each fitted with ten 5/16 in eyebolts, fender washers (one side, inside face only) and hex nuts (one each side), 6 inches from ends and twelve inches on center, on the longitudinal centerlines.

The top face of the cleat was screwed to the face of a 2x12 Southern Pine member with a two #12 x 1-1/2 in (0.158 in minor diameter) flat-head, Phillips-drive, stainless steel screws in slots provided in the cleat at the bottom edge of the face. The front face of the cleat was screwed to the edge of the 2x12 Southern Pine member with two #12 x 1-1/2 in (0.158 in minor diameter) flat-head, Phillips-drive, stainless steel screws in slots provided in the cleat.

The coping was then hooked onto the front bend of the cleat, wrapped over the top of the mock-up, and its back face hooked onto the back bend of the cleat.

See drawings in Appendix A and Photographs in Appendix B for additional details.

3.2 Test Procedure

Load was applied to the ten eye bolts of the coping top surface using equal-length chains, a spreader beam, steel cable and an electric winch. Applied load was measured with an in-line 2000 pound load cell. Center-point deflection of the coping face was measured with an electronic linear displacement transducer.

Load was applied to the ten eye bolts of the coping face surface using equal-length chains, a spreader beam, steel cable and a mechanical winch. Applied load was measured with an in-line 1000 lb ring force gage.

The two loads were applied simultaneously, proportionally and incrementally and held ("Sustained") for a minimum of 60 seconds with intermediate load relaxation periods for specimen deflection to stabilize.

Mode of failure for all specimens was coping deformation under load and subsequent disengagement from the lower lip of the cleat as load was relaxed. See photographs in Appendix A for test set-up.

3.3 Test Results

ANSI/SPRI Test RE-3 - Pull-Off Test for Coping

Test Dates: 05/07/14 and 05/08/14

Specimen No.	Surface [2] (in)		Max. Sustained Load prior to Failure (lb)		Equivalent Sustained Pressure (psf) [1]	
	Top	Face	Top	Face	Top	Face
1	12.5	6	1962	519	180	110
2		4.5	1821	349	170	104
3			1831	350	170	104
4			1816	343	170	104
Average [3]:			1823	347	**170**	**104**

[1] *Note that top and face pressures are in the ratio of 1.8 to 1.1 as specified by ANSI/SPRI ES-1 for roof height 60 ft or less*

[2] *Testing conducted on 6 in face to prove that testing was conducted on the worst case (4.5 in) face creating the most conservative loads*

[3] *Reported average is calculated from results of testing conducted on the 4.5 in face (specimens No. 2 through 4) and does not include the results from test specimen No. 1.*

4.0 Closing Statement

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.

Results obtained are tested values and were secured using the designated test methods. 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 specimens tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.:

Digitally Signed by: Virgal Thomas Mickley, Jr.

V. Thomas Mickley, Jr., P.E.
Senior Project Engineer
Structural Systems Testing

Digitally Signed by: Travis Hoover

Travis A. Hoover
Program Manager
Structural Systems Testing

JIS:tah/jas

Attachments (pages): This report is complete only when all attachments listed are included
Appendix A - Drawings (9)
Appendix B - Photographs (6)

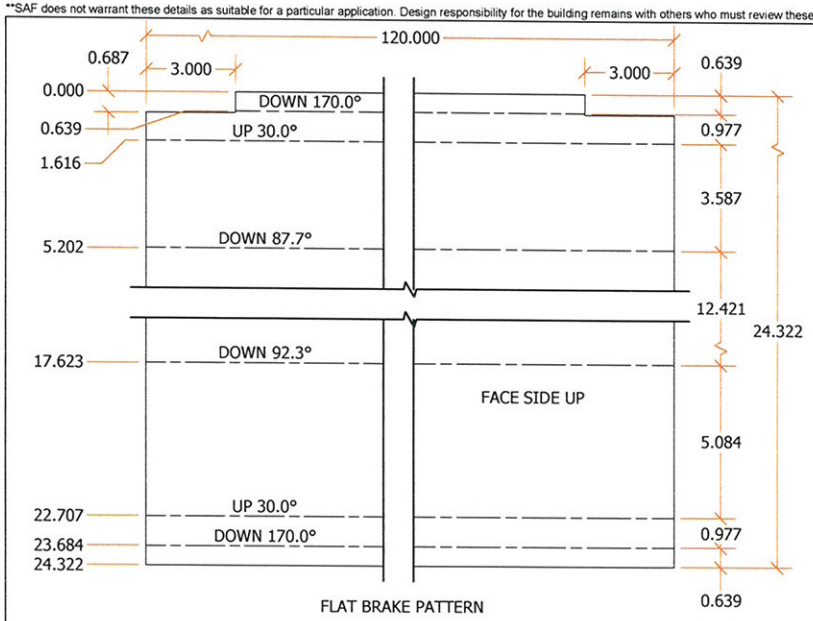
Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	07/11/14	N/A	Original report issue
1	10/01/14	4	Updated Equivalent Sustained Pressures (Top and Face) in the Test Results table

APPENDIX A

Drawings

SAF does not warrant these details as suitable for a particular application. Design responsibility for the building remains with others who must review these details for compliance with the overall design.



FLAT BRAKE PATTERN

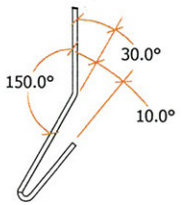
ALL LABELS TO BE PLACED ON UNFINISHED SIDE OF PROFILE

Architectural Testing

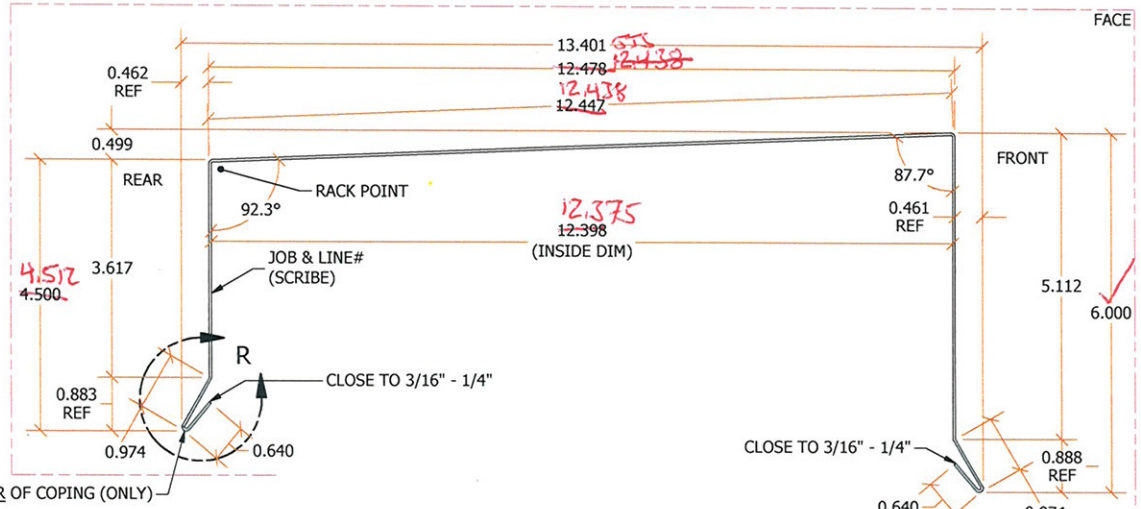
Test sample complies with these details. Deviations are noted.

Report # D6438.01-119-16

Date 6/23/14 **Tech** JIS



DETAIL R
SCALE 1 : 1



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SAF Perimeter Systems
8370 Hwy 78
Villia Rica, GA 30180
Phone: 770-942-1207
Fax: 770-942-4173

Material Schedule

Materials

Item	Value
Material:	Aluminum
Thickness	0.040

Finish Schedule

Finish

Item	Value
Type:	Mill
Class:	
Code & Color	

Customer Info

Customer

Item	Value
Name:	Perimeter System
ID	per27330

Job Information

Project

Item	Value
Name:	Perimeter System R&D
Job No.:	67413
Proj. ID:	2074

Drawing Information

Part & Drawing Info

Item	Value
Line:	20
Sub Assy (Y/N)	N
Part Name:	PLC 4.5x12x6
Quantity:	5
Fab Type:	2
Shear Girth:	24.322
Shear Length:	120.000
Date:	4/10/2014
Drawn By:	wec

ALL ANGLES ARE 90° OTHERWISE NOTED
RACK AT HOLES OR SLOTS OTHERWISE NOTED

Southern Aluminum Finishing Co., Atlanta, Nashville, Winston, Redding

Architectural Testing

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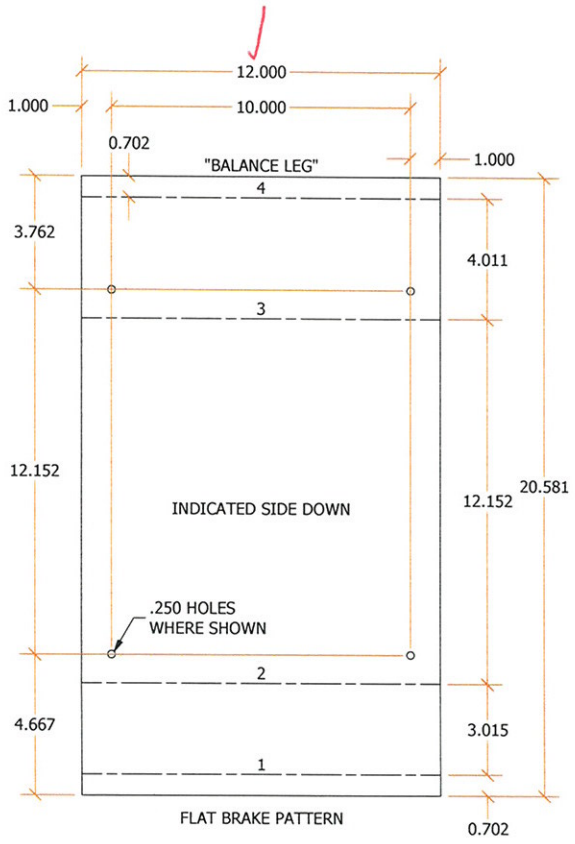
Test sample complies with these details.
Deviations are noted.

Report # D6438.01-119-16

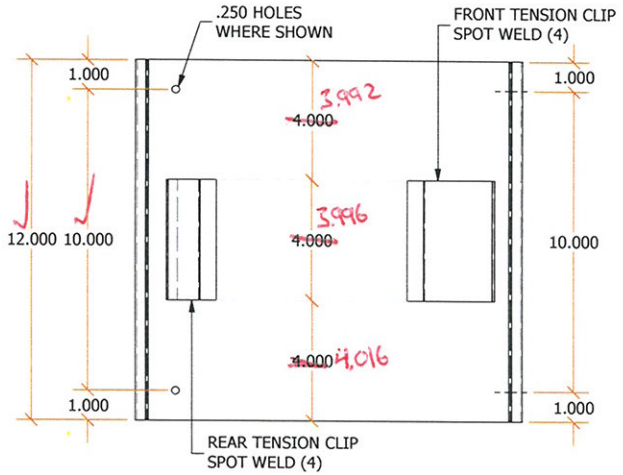
Date 6/23/14 Tech JIS

ASSEMBLY DRAWING

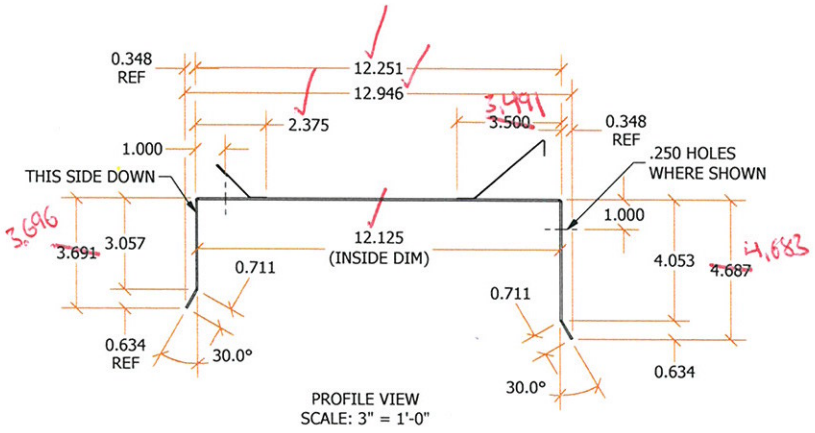


Table

BEND ID	BEND DIRECTION	BEND ANGLE	BEND RADIUS
4	DOWN	30	.03
3	UP	90	.03
2	UP	90	.03
1	DOWN	30	.03



TOP VIEW
SCALE: 3" = 1'-0"



PROFILE VIEW
SCALE: 3" = 1'-0"

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Perimeter Systems

8370 Hwy 78
Villia Rica, GA 30180

Phone: 770-942-1207
Fax: 770-942-4173

Material Schedule

Materials

Item	Value	
Material:	Galv. Steel	
Thickness	0.063	**16 Ga**

Finish Schedule

Finish

Item	Value
Type:	Mill
Class:	
Code & Color	

Customer Info

Customer

Item	Value
Name:	Perimeter System
ID	per27330

Job Information

Project

Item	Value
Name:	Perimeter System R&D
Job No.:	67413
Proj. ID:	2074

Drawing Information

Part & Drawing Info

Item	Value
Line:	21
Sub Assy (Y/N)	N
Part Name:	Compression Cleat
Quantity:	15
Fab Type:	22
Shear Girth:	20.581
Shear Length:	12.000
Date:	Drawn By:
4/10/2014	wec

ALL ANGLES ARE 90° OTHERWISE NOTED
RACK AT HOLES OR SLOTS OTHERWISE NOTED

Southern Aluminum Finishing Co., Atlanta, Nashville, Winston, Redding

SUB-ASSY
PART# PLCfront

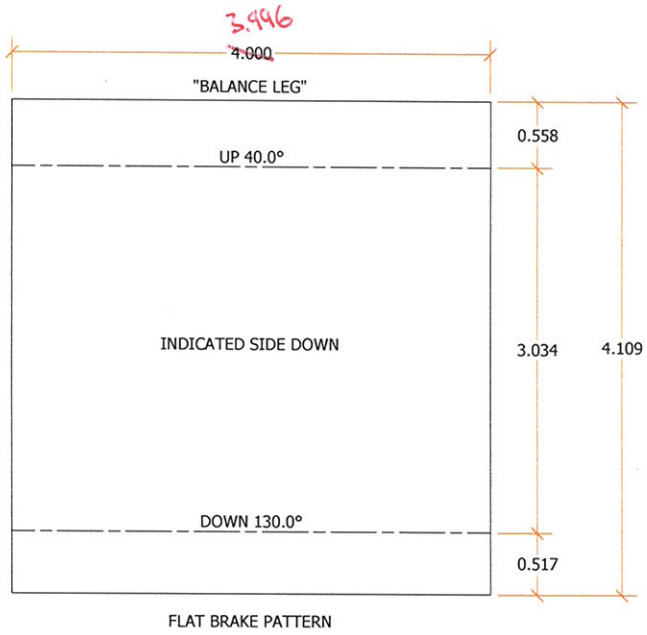
SAF Perimeter Systems
8370 Hwy 78
Villia Rica, GA 30180
Phone: 770-942-1207
Fax: 770-942-4173

Architectural Testing

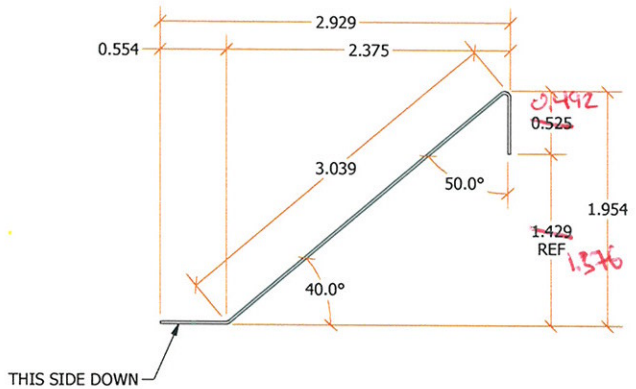
Test sample complies with these details.
Deviations are noted.

Report # D6438.01-119-16

Date 6/23/14 Tech JIS



FLAT BRAKE PATTERN



Material Schedule

Materials

Item	Value
Material:	Spring Steel
Thickness	0.022 **26 GA**

Finish Schedule

Finish

Item	Value
Type:	Mill
Class:	
Code & Color	

Customer Info

Customer

Item	Value
Name:	Perimeter System
ID	per27330

Job Information

Project

Item	Value
Name:	Perimeter System R&D
Job No.:	67413
Proj. ID:	2074

Drawing Information

Part & Drawing Info

Item	Value
Line:	21~1
Sub Assy (Y/N)	Y
Part Name:	PLCfront
Quantity:	15
Fab Type:	15
Shear Girth:	4.109
Shear Length:	4.000
Date:	Drawn By:
4/10/2014	wec

ALL ANGLES ARE 90° OTHERWISE NOTED
RACK AT HOLES OR SLOTS OTHERWISE NOTED

Southern Aluminum Finishing Co., Atlanta, Nashville, Winston, Redding

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SUB-ASSY
PART# PLCrear

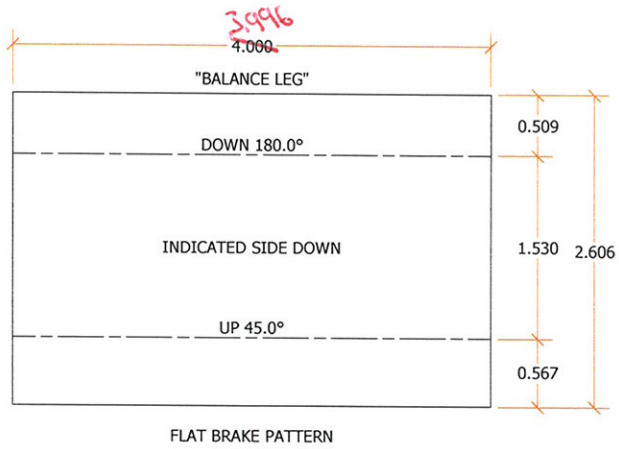
SAF Perimeter Systems
8370 Hwy 78
Villia Rica, GA 30180
Phone: 770-942-1207
Fax: 770-942-4173

Architectural Testing

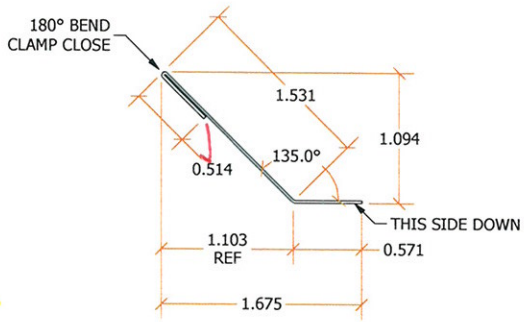
Test sample complies with these details.
Deviations are noted.

Report # D6438.01-119-16

Date 6/23/14 Tech JIS



FLAT BRAKE PATTERN



Material Schedule

Materials

Item	Value
Material:	Spring Steel
Thickness	0.022 **26 GA**

Finish Schedule

Finish

Item	Value
Type:	Mill
Class:	
Code & Color	

Customer Info

Customer

Item	Value
Name:	Perimeter System
ID	per27330

Job Information

Project

Item	Value
Name:	Perimeter System R&D
Job No.:	67413
Proj. ID:	2074

Drawing Information

Part & Drawing Info

Item	Value
Line:	21~2
Sub Assy (Y/N)	Y
Part Name:	PLCrear
Quantity:	15
Fab Type:	15
Shear Girth:	2.606
Shear Length:	4.000

Date: 4/10/2014 Drawn By: wec

ALL ANGLES ARE 90° OTHERWISE NOTED
RACK AT HOLES OR SLOTS OTHERWISE NOTED

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PART # PLGSClip

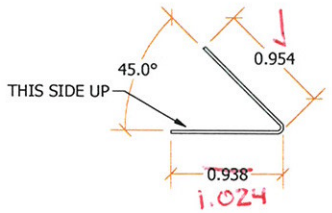
SAF Perimeter Systems
8370 Hwy 78
Villia Rica, GA 30180
Phone: 770-942-1207
Fax: 770-942-4173

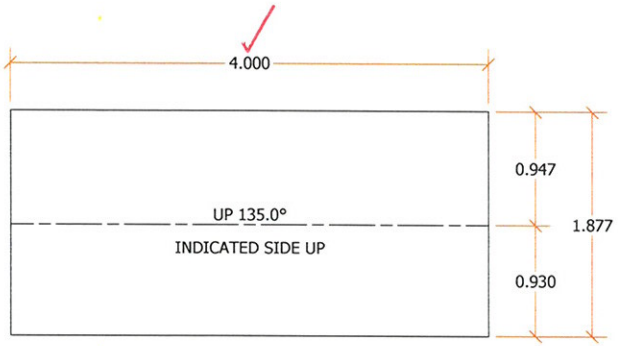
Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # D6438.01-119-16

Date 6/23/14 Tech JIS





FLAT BRAKE PATTERN

Material Schedule

Materials

Item	Value	
Material:	Spring Steel	
Thickness	0.022	**26 GA**

Finish Schedule

Finish

Item	Value
Type:	Mill
Class:	
Code & Color	

Customer Info

Customer

Item	Value
Name:	Perimeter System
ID	per27330

Job Information

Project

Item	Value
Name:	Perimeter System R&D
Job No.:	67413
Proj. ID:	2074

Drawing Information

Part & Drawing Info

Item	Value
Line:	26
Sub Assy (Y/N)	N
Part Name:	PLGSClip
Quantity:	60
Fab Type:	15
Shear Girth:	1.877
Shear Length:	4.000

Date: 4/10/2014 Drawn By: wec

ALL ANGLES ARE 90° OTHERWISE NOTED
RACK AT HOLES OR SLOTS OTHERWISE NOTED

Southern Aluminum Finishing Co., Atlanta, Nashville, Winston, Redding

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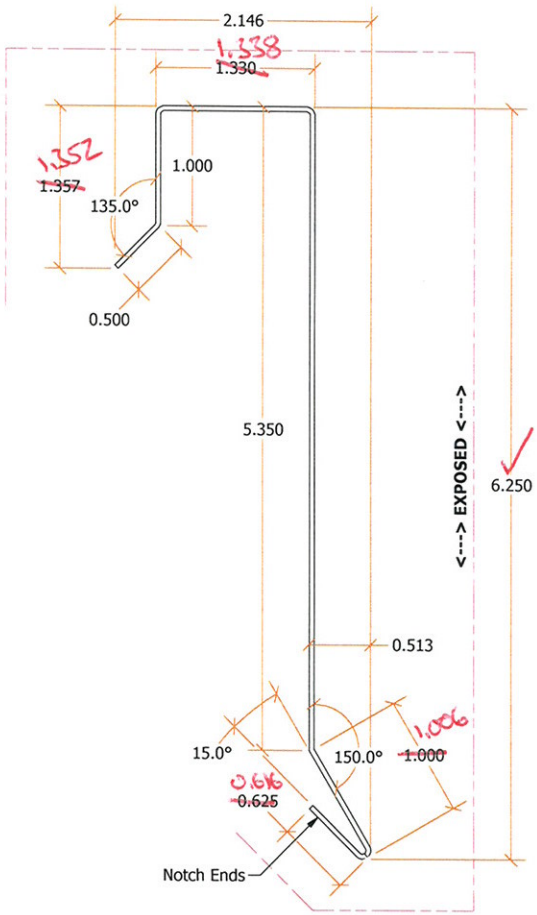

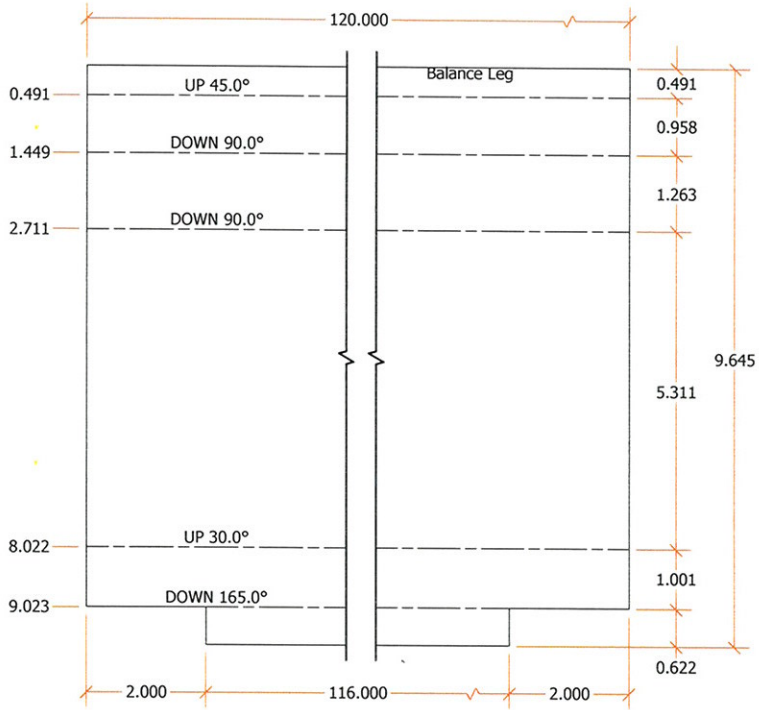

FLAT PATTERN
TAPE UP

SAF Perimeter Systems
8370 Hwy 78
Villia Rica, GA 30180
Phone: 770-942-1207
Fax: 770-942-4173

Material Schedule

Materials

Item	Value
Material:	Aluminum
Thickness	0.040

Finish Schedule

Finish

Item	Value
Type:	Mill
Class:	
Code & Color	

Customer Info

Customer

Item	Value
Name:	Perimeter System
ID	per27330

Job Information

Project

Item	Value
Name:	Perimeter System R&D
Job No.:	67413
Proj. ID:	2074

Drawing Information

Part & Drawing Info

Item	Value
Line:	22
Sub Assy (Y/N)	N
Part Name:	PLGS 6"
Quantity:	5
Fab Type:	2
Shear Girth:	9.645
Shear Length:	120.000

Date: 4/10/2014
Drawn By: wec

ALL ANGLES ARE 90° OTHERWISE NOTED
RACK AT HOLES OR SLOTS OTHERWISE NOTED

Southern Aluminum Finishing Co., Atlanta, Nashville, Winston, Redding

\\RUSK\Jobs\2074\Production Dwgs\67413\67413.idw

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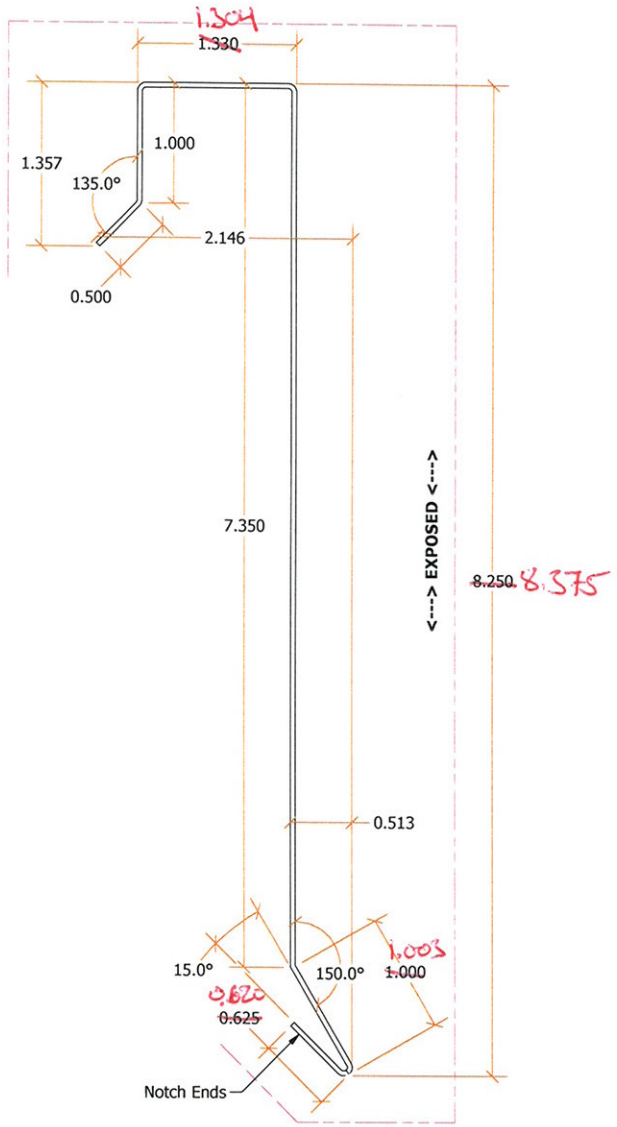
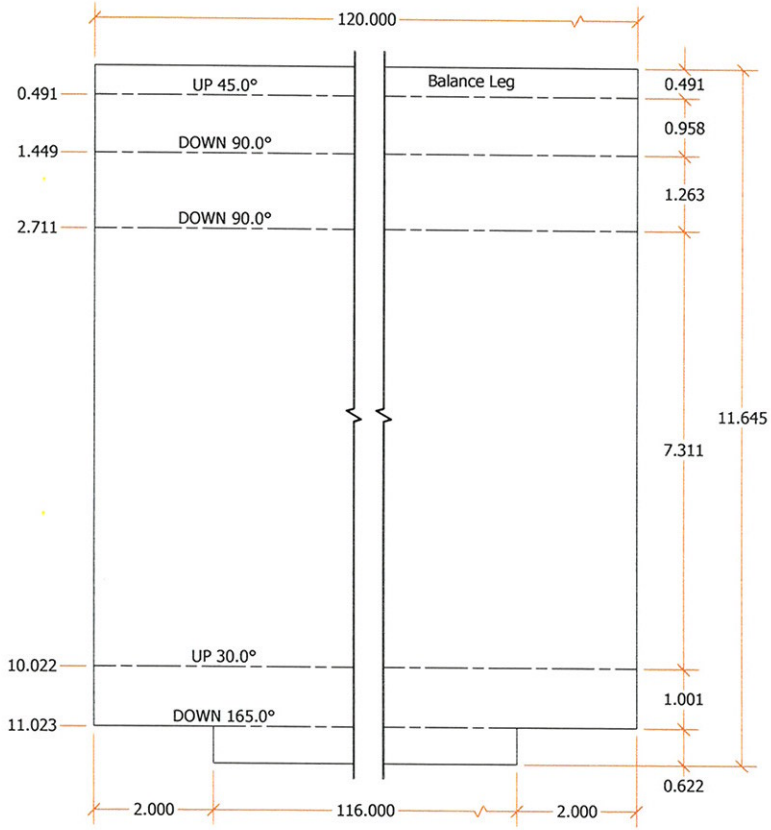




FLAT PATTERN
TAPE UP

SAF Perimeter Systems
8370 Hwy 78
Villia Rica, GA 30180
Phone: 770-942-1207
Fax: 770-942-4173

Material Schedule

Materials	
Item	Value
Material:	Aluminum
Thickness	0.040

Finish Schedule

Finish	
Item	Value
Type:	Mill
Class:	
Code & Color	

Customer Info

Customer	
Item	Value
Name:	Perimeter System
ID	per27330

Job Information

Project	
Item	Value
Name:	Perimeter System R&D
Job No.:	67413
Proj. ID:	2074

Drawing Information

Part & Drawing Info	
Item	Value
Line:	24
Sub Assy (Y/N)	N
Part Name:	PLGS8"
Quantity:	5
Fab Type:	2
Shear Girth:	11.645
Shear Length:	120.000
Date:	Drawn By:
4/10/2014	wec

ALL ANGLES ARE 90° OTHERWISE NOTED
RACK AT HOLES OR SLOTS OTHERWISE NOTED

Southern Aluminum Finishing Co., Atlanta, Nashville, Winston, Redding

\\RUSK\Jobs\2074\Production Dwgs\67413\67413.idw

USE PART # SB6

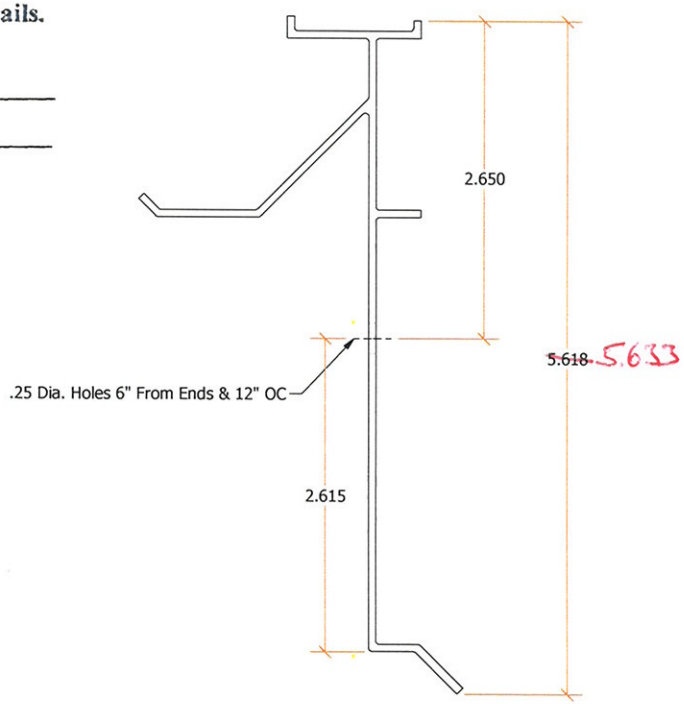
SAF Perimeter Systems
8370 Hwy 78
Villia Rica, GA 30180
Phone: 770-942-1207
Fax: 770-942-4173

Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # D6438.01-119-16

Date 6/23/14 Tech JIS



Material Schedule

Materials

Item	Value
Material:	Aluminum
Thickness	0.060

Finish Schedule

Finish

Item	Value
Type:	Mill
Class:	
Code & Color	

Customer Info

Customer

Item	Value
Name:	Perimeter System
ID	per27330

Job Information

Project

Item	Value
Name:	Perimeter System R&D
Job No.:	67413
Proj. ID:	2074

Drawing Information

Part & Drawing Info

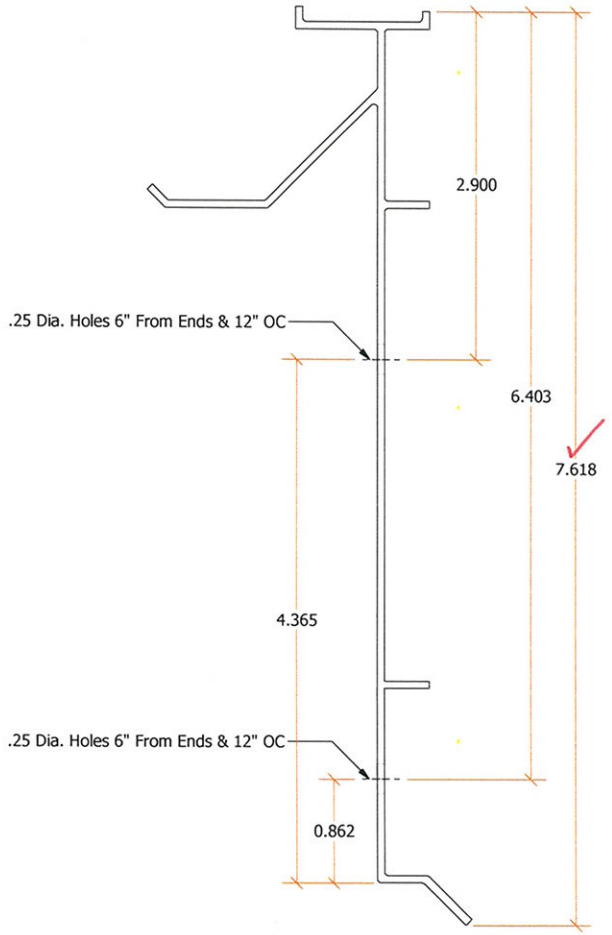
Item	Value
Line:	23
Sub Assy (Y/N)	N
Part Name:	6" Secure Bar
Quantity:	5
Fab Type:	15
Shear Girth:	
Shear Length:	120.000
Date:	Drawn By:
4/10/2014	wec

ALL ANGLES ARE 90° OTHERWISE NOTED
RACK AT HOLES OR SLOTS OTHERWISE NOTED

Southern Aluminum Finishing Co., Atlanta, Nashville, Winston, Redding

\\RUSK\Jobs\2074\Production Dwgs\67413\67413.idw

USE PART # SB8



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # D6438.01-119-16

Date 6/23/14 Tech JIS

SAF Perimeter Systems
8370 Hwy 78
Villia Rica, GA 30180
Phone: 770-942-1207
Fax: 770-942-4173

Material Schedule

Materials

Item	Value
Material:	Aluminum
Thickness	0.060

Finish Schedule

Finish

Item	Value
Type:	Mill
Class:	
Code & Color	

Customer Info

Customer

Item	Value
Name:	Perimeter System
ID	per27330

Job Information

Project

Item	Value
Name:	Perimeter System R&D
Job No.:	67413
Proj. ID:	2074

Drawing Information

Part & Drawing Info

Item	Value
Line:	25
Sub Assy (Y/N)	N
Part Name:	8" Secure Bar
Quantity:	5
Fab Type:	15
Shear Girth:	
Shear Length:	120.000
Date:	Drawn By:
4/10/2014	wec

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APPENDIX B

Photographs

Photo No. 1
6 in Cleat for ANSI/SPRI Test RE-2

Photo No. 2
8 in Cleat for ANSI/SPRI Test RE-2

Photo No. 3
ANSI/SPRI Test RE-2, 10 ft Wood Buck, Flashing with Test Eyebolts

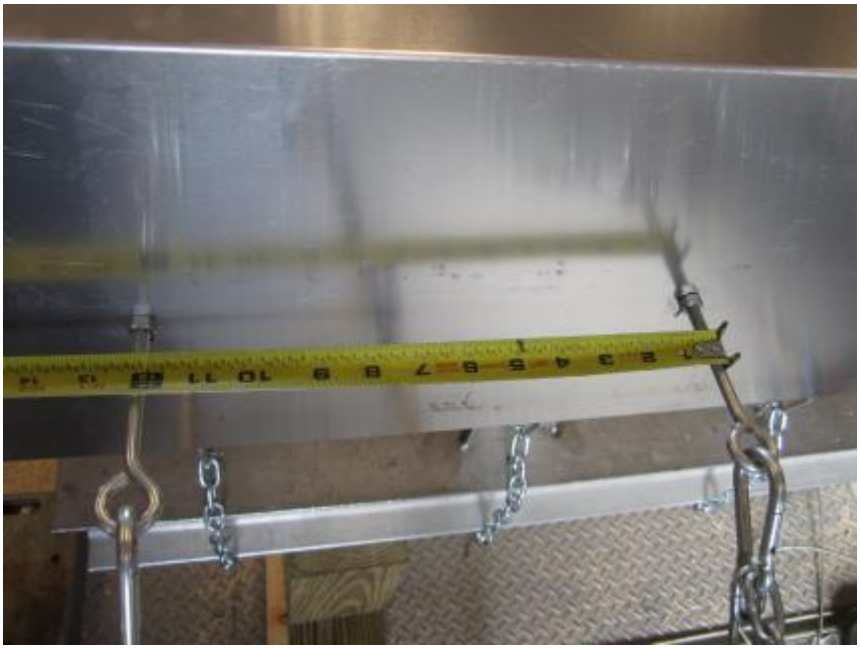

Photo No. 4
ANSI/SPRI Test RE-2, Test Specimen Top View

Photo No. 5
ANSI/SPRI Test RE-2, Flashing Pull-Off Test in Progress

Photo No. 6
ANSI/SPRI Test RE-2, Flashing Pull-Off
6 in Typical Failure Mode: Flashing Pull-Off from Cleat

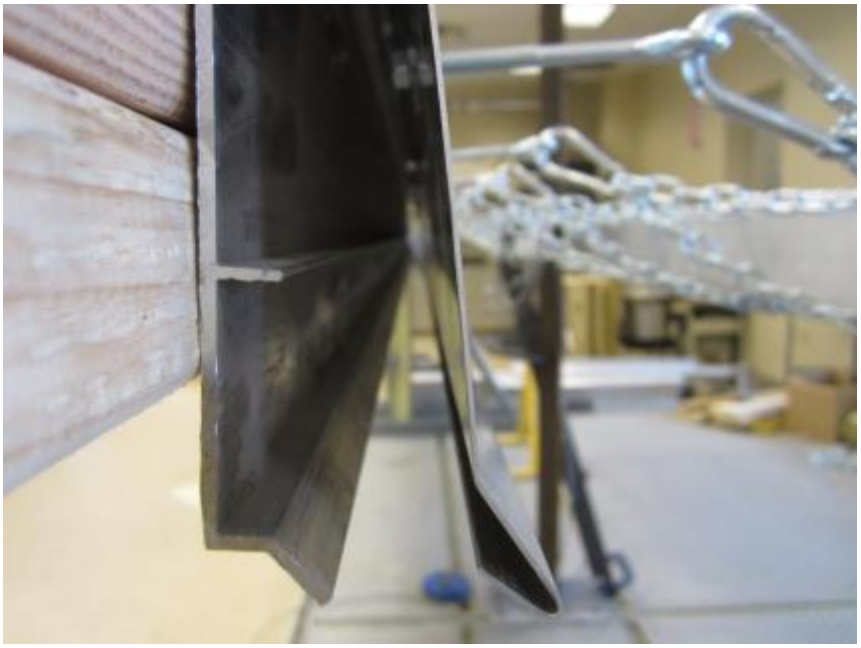

Photo No. 7
ANSI/SPRI Test RE-2, Flashing Pull-Off
8 in Typical Failure Mode: Flashing Pull-Off from Cleat

Photo No. 8
ANSI/SPRI Test RE-3, Cleat Orientation in Worst Case Scenario

Photo No. 9
ANSI/SPRI Test RE-3, Coping Pull-Off Test In Progress; Tested with Face Down

Photo No. 10
ANSI/SPRI Test RE-3, Coping Pull-off Test
Typical Failure Mode: Coping Face Lip Pull-Off from Cleat

Photo No. 11
#10 x 1-1/2 in (0.158 in minor diameter) Flat head, Phillips-drive, Stainless Steel Screw
#10 x 1-3/4 in (0.156 in minor diameter) Hex-head, Stainless Steel Screw