

TEST REPORT

Report No.: D7177.01-901-44

Rendered to:

NORTHCLAD RAINSCREEN SOLUTIONS
Everett, Washington

PRODUCT TYPE: Aluminum Cladding System
SERIES/MODEL: NorthClad AL Plate

*AAMA 508-07, Voluntary Test Method and Specification for Pressure Equalized
Rain Screen Wall Cladding Systems*



Test Dates: 05/12/14

Through: 01/23/15

Report Date: 02/09/15

Test Record Retention Date: 01/23/19

1.0 Report Issued To: NorthClad Rainscreen Solutions
11831 Beverly Park Road, Building C
Everett, WA 98204

2.0 Test Laboratory: Architectural Testing, Inc.
22155 68th Ave. South
Kent, Washington 98032
253-395-5656

3.0 Project Summary:

3.1 Product Type: Aluminum Cladding System

3.2 Series/Model: NorthClad AL Plate

3.3 Compliance Statement: Results obtained are tested values and were secured by using the designated test methods. Test specimen description and results are reported herein.

3.4 Test Dates: 05/12/14 - 01/23/15

3.5 Test Location: Architectural Testing facility located in Kent, Washington.

3.6 Test Sample Source: The test specimen was provided by the client.

3.7 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 the appropriate Appendix. Any deviations are documented herein or on the drawings.

3.8 List of Official Observers:

<u>Name</u>	<u>Company</u>
Michael Evers	NorthClad Rainscreen Solutions
Arbind Raj	Architectural Testing, Inc.
Brian Rasmussen	Architectural Testing, Inc.

4.0 Test Method(s):

AAMA 508-07, *Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems.*

ASTM E 283-04, *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.* Testing was conducted at 75 Pa (1.57 psf) positive static air pressure difference.

ASTM E 1233-06 (Modified), *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Cyclic Static Air Pressure Differential.* Testing was conducted for 100, three-second cycles from 240 Pa (5.0 psf) to 1200 Pa (25.0 psf) to 240 Pa (5.0 psf).

ASTM E 331-00, *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform Static Air Pressure Difference.* Testing was conducted at 300 Pa (6.24 psf) positive static air pressure difference for a 15 minute duration. Water was applied to the mock-up at a minimum rate of 5 gal/hr/ft².

AAMA 501.1-05, *Standard Test Method for Water Penetration of Windows, Curtain Walls, and Doors Using Dynamic Pressure.* Testing was conducted with a dynamic pressure equivalent of 300 Pa (6.24 psf) for a 15 minute duration. Water was applied to the mock-up at a minimum rate of 5 gal/hr/ft².

5.0 Test Specimen Description: Reference attached drawings.

5.1 Product Sizes:

Overall Area: 5.9 m ² (64.0 ft ²)	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	2438	96	2438	96
Panels (4)	1200	47-1/4	1200	47-1/4

5.0 Test Specimen Description: (Continued)

5.2 Panel Construction: The test specimen was constructed of four aluminum panels that were 3 mm (1/8") thick. The panel edges were bent and aluminum extrusions were secured to the perimeter of the panels with #8 by 3/4" flathead screws at approx. 406 mm (16") spacing on center. The bottom of each panel utilized six 25.4 mm x 6.4 mm (1" x 1/4") weeps per panel.

5.3 Test Wall Construction: The 96" wide by 96" high test wall was constructed of 2 x 6 Douglas-fir wood studs. The studs were spaced 16" on center inside a 2x8 wood buck. The stud wall was covered with 1/8" thick clear polycarbonate and sealed and secured to the exterior of the wall to simulate an air/water barrier. The polycarbonate was calibrated to a pre-determined air leakage rate by drilling 1/8" diameter holes on the backside in a uniform pattern, making sure to create an even pressure drop and leakage rate across the wall and in each quadrant.

5.4 Reinforcement: Two 1" x 1" aluminum stiffeners were secured vertically to the back of each panel with adhesive sealant.

5.5 Installation: Installation was performed by the client.

The wall panel system was installed onto the polycarbonate in a manner consistent with normal construction procedures for the system. The panels were installed in a bottom to top and left to right order. The sill utilized metal flashing and a continuous "C" shaped starter strip, which was secured to the studs with #12 x 1-1/2" pan head screws at approximately 16" spacing on center. The bottom panels were slid into the "C" channel starter strip. 152 mm (6") long aluminum clips/spacers were fit onto the remaining panel edges, three evenly spaced along each edge. The clips/spacers across the top of the panels were secured to the studs/buck with #12 x 1-1/2" screws at approximately 16" spacing on center. Aluminum 'splines' were sealed to the panel edges at the tops of the panels only. Perimeter splines were also butted against the wood buck and sealed to the buck only.

5.6 Cavity Depth: 44 mm (1-3/4")

5.7 Vent Area (Weeps): 0.0039m² (6.00 in²)

5.8 Air Cavity Volume to Vent Area Ratio: 66.1 m³/m² (217.1 ft³/ft²)

6.0 Test Results: The temperature during testing was approximately 21°C (69°F). The results are tabulated as follows:

Air Leakage (Infiltration per ASTM E 283)

Pressure	Results	Allowed	Note
75 Pa (1.57 psf)	0.642 L/s/m ² (0.126 cfm/ft ²)	0.6 L/s/m ² (0.12 cfm/ft ²) (+/- 10%)	1, 2

Pressure Cycling (per ASTM E 1233)

100 cycles from 240 Pa (5 psf) to 1200 Pa (25 psf) to 240 Pa (5 psf)

Compartment	Results	Allowed	Note
Cycle Time Lag	0.03 sec.	0.08 sec. max.	2
Cycle Pressure Difference	2 Pa (0.56 psf)	600 Pa (12.5 psf) max.	
PASS / FAIL	PASS		

Static Water Penetration (per ASTM E 331)

Pressure	Results	Allowed	Note
300 Pa (6.24 psf)	0.04 m ² (0.43 ft ²)	0.30 m ² (3.20 ft ²)	
PASS / FAIL	PASS		

Dynamic Water Penetration (per AAMA 501.1)

Pressure	Results	Allowed	Note
300 Pa (6.24 psf)	0.03 m ² (0.37 ft ²)	0.30 m ² (3.20 ft ²)	3
PASS / FAIL	PASS		

Note #1: The calibrated leakage was achieved with 1/8" diameter holes drilled through the polycarbonate. All holes were evenly distributed and were located 6" above the bottom and the mid-span of the wall. A pressure tap was attached through the air barrier at the lower left quadrant of the system.

Note #2: Reference Pressure Cycling graph in the appropriate Appendix.

Note #3: Water on the polycarbonate air/water barrier surface was present at the bottom and horizontal stack in the form of mist or droplets.

General Note: All testing was performed in accordance with the referenced standards. This report is not intended as a comprehensive evaluation of the system regarding performance and application to specific buildings.

7.0 Test Equipment:

- Computerized control panel to run positive pressures, cyclic pressures, and measure air leakage rates.
- Structural test chamber to mount the test wall, as to evaluate the performance of the wall panel system for static and cyclic pressures, as well as water penetration. The wall was situated such that the interior side of the test wall was accessible to observe air and water leakage.
- Dynamic wind generator to create a wind pressure to test the wall panel system for dynamic water penetration.
- Computerized data management equipment to read, log, and graph differential pressures.

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

If the test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in any glazed test specimen(s) can be made. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

Brian L. Rasmussen
Technician

Jeffrey L. Dideon
Director – Regional Operations

BLR:pac

Attachments (pages): This report is complete only when all attachments listed are included.
Appendix-A: Photographs (1)
Appendix-B: Graph (1)
Appendix-C: Drawings (12)

This report produced from controlled document template ATI 00521, issued 03/4/11.

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	02/09/15	N/A	Original report issue.

Appendix A
Photographs



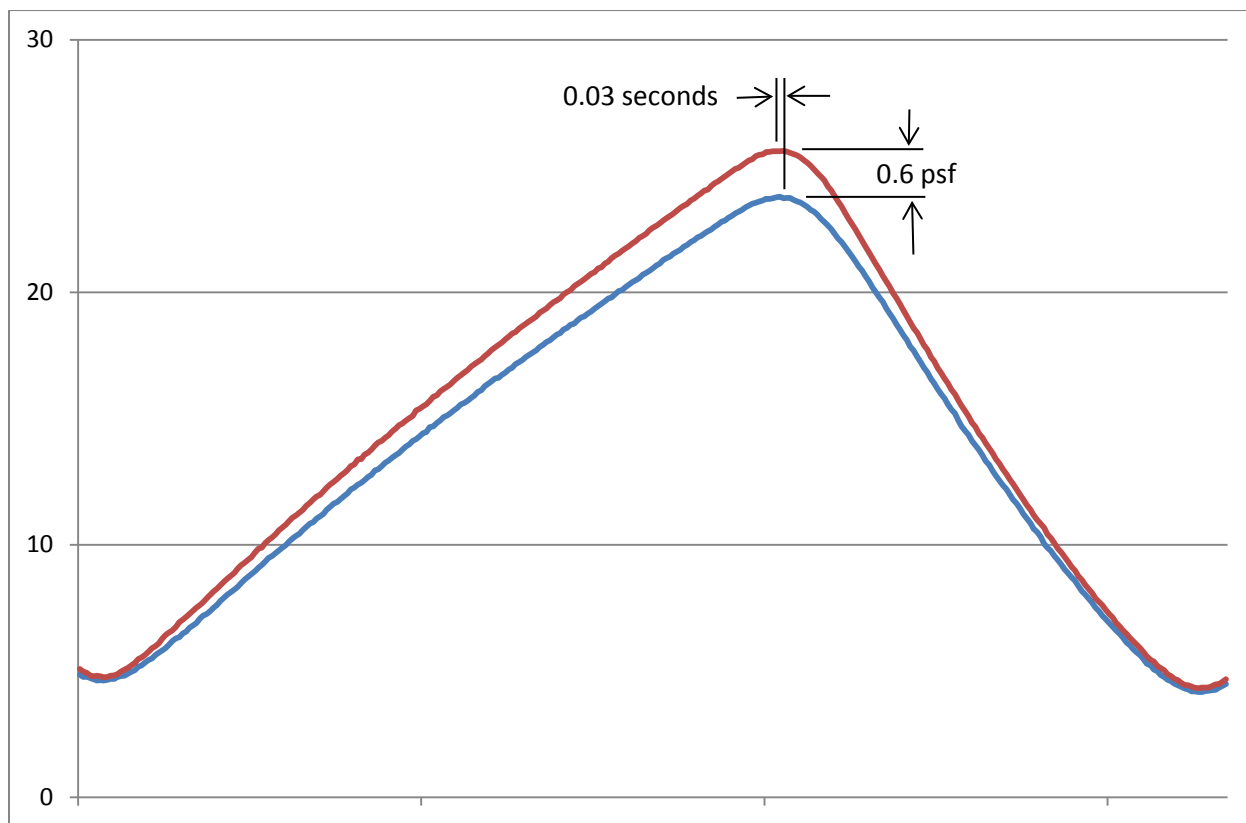
Interior face of test wall



Exterior face of test wall

Appendix B

Graph



Appendix C

Drawings

NorthClad

Project Name: AAMA 508 Testing for NorthClad AL Plate System

Project No: NC0001
Address: 22155 68th Ave S
City/Zip: Kent, WA 98032-1937

Address: NorthClad
 11831 Beverly Park Rd, Bldg C
City/Zip: Everett, WA 98204

Project Manager: Michael Evers E-Mail: eversm@northclad.com
Project Engineer: Michael Evers E-Mail: eversm@northclad.com
Phone: (425) 740-3702 **Fax:** (425) 485-3503

Testing Agency: Architectural Testing

Address: 22155 68th Ave S
City/Zip: Kent, WA 98032-1937

Project Manager: Jeff Dideon E-Mail: jdideon@archtest.com
Phone: (253) 395-5656 **Fax:** (717) 764-4129 **Cell:** (206) 940-5660

Installer: NorthClad Rainscreen Solutions

Address: 11831 Beverly Park Rd, Bldg C
City/Zip: Everett, WA 98204

PM/Contact: Michael Evers E-Mail: eversm@northclad.com
Phone: (425) 740-3702 **Fax:** (425) 485-3503 **Cell:**



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Test sample complies with these details.
 Deviations are noted.

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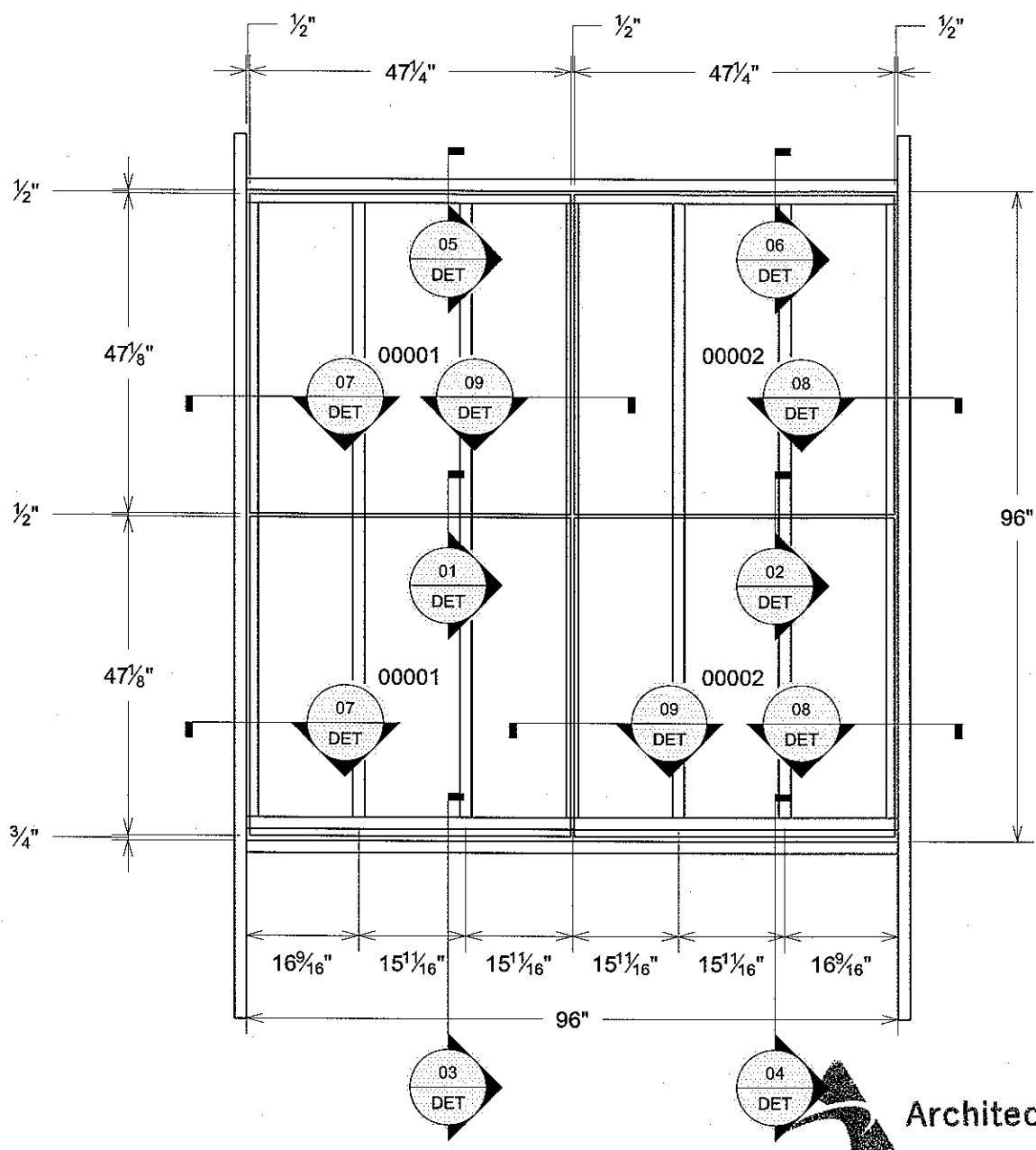
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**AAMA 508 Testing
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Architectural Testing

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Key Elev NorthClad ALP Testing

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Plate System**

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01. Section - Horizontal Joint at Formed Return	NorthClad AL Plate Testing
02. Section - Horizontal Joint at Back Routed Return	NorthClad AL Plate Testing
03. Section - Base of Wall at Formed Return	NorthClad AL Plate Testing
04. Section - Base of Wall at Back Routed Return	NorthClad AL Plate Testing
05. Section - Top of Wall at Formed Return	NorthClad AL Plate Testing
06. Section - Top of Wall at Back Routed Return	NorthClad AL Plate Testing
07. Plan - Edge of Wall at Formed Return	NorthClad AL Plate Testing
08. Plan - Edge of Wall at Back Routed Return	NorthClad AL Plate Testing
09. Plan - Vertical Joint Between Formed Return and Backrouted Return	NorthClad AL Plate Testing



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Architectural Testing

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0.160" Aluminum Spline

1 3/8" at Spline

2"

7/8"

"ACMFCM" Extrusion Provided In 6" Pieces, Located at 16" O.C., Attached with (1) #12 Screw

"ACMP4M" Extrusion Set in Sealant at Edge of Panel

1/4" x 1" Weep Holes 8" O.C. Typical

Countersunk Screws at 16" O.C.

SikaLastomer-511 at Spline Slot of "ACMP4M", Shop Applied, at Top of Panel, Only

"ACMP4M" Extrusion Set in Sealant at Edge of Panel

"ACMFCM" Extrusion Attached To Top "ACMP4M" Extrusion with #10 Fastener

1/8" NorthClad AL Plate Panel

Panel Dimension

Panel Dimension

1/2"

01 Section - Horizontal Joint at Formed Return
DET NorthClad AL Plate Testing



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0.160" Aluminum Spline

1 3/8" at Spline

2"
7/8"

"ACMFCM" Extrusion Provided In 6" Pieces, Located at 16" O.C., Attached with (1) #12 Screw

"ACMP4M" Extrusion Set in Sealant at Edge of Panel

1/4" x 1" Weep Holes 8" O.C. Typical

Countersunk Screws at 16" O.C.
SikaLastomer-511 at Spline Slot of "ACMP4M", Shop Applied, at Top of Panel, Only

"ACMP4M" Extrusion Set in Sealant at Edge of Panel

"ACMFCM" Extrusion Attached To Top "ACMP4M" Extrusion with #10 Fastener

1/8" NorthClad AL Plate Panel

Panel Dimension

Panel Dimension

1/2"

02 Section - Horizontal Joint at Back Routed Return
DET NorthClad AL Plate Testing



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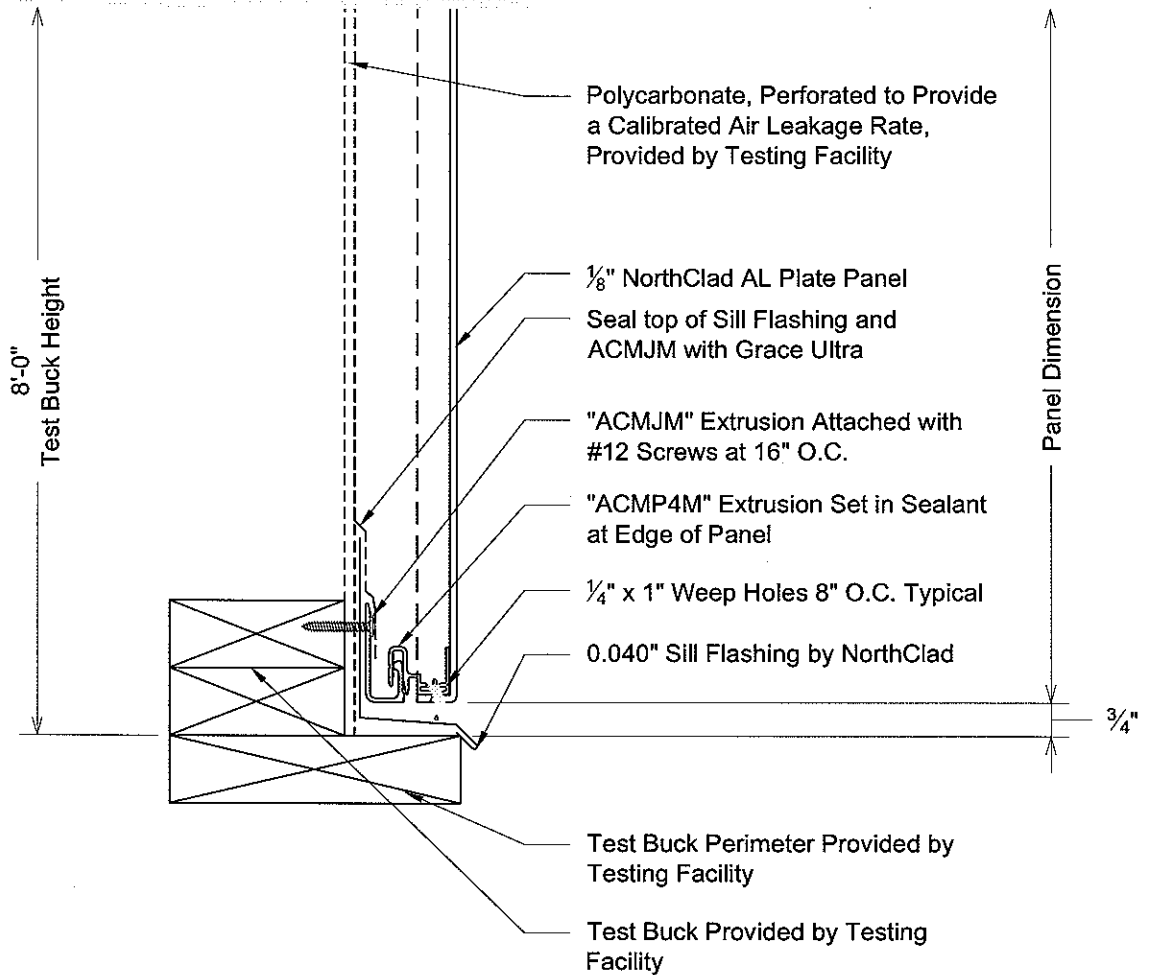
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03 Section - Base of Wall at Formed Return
DET NorthClad AL Plate Testing



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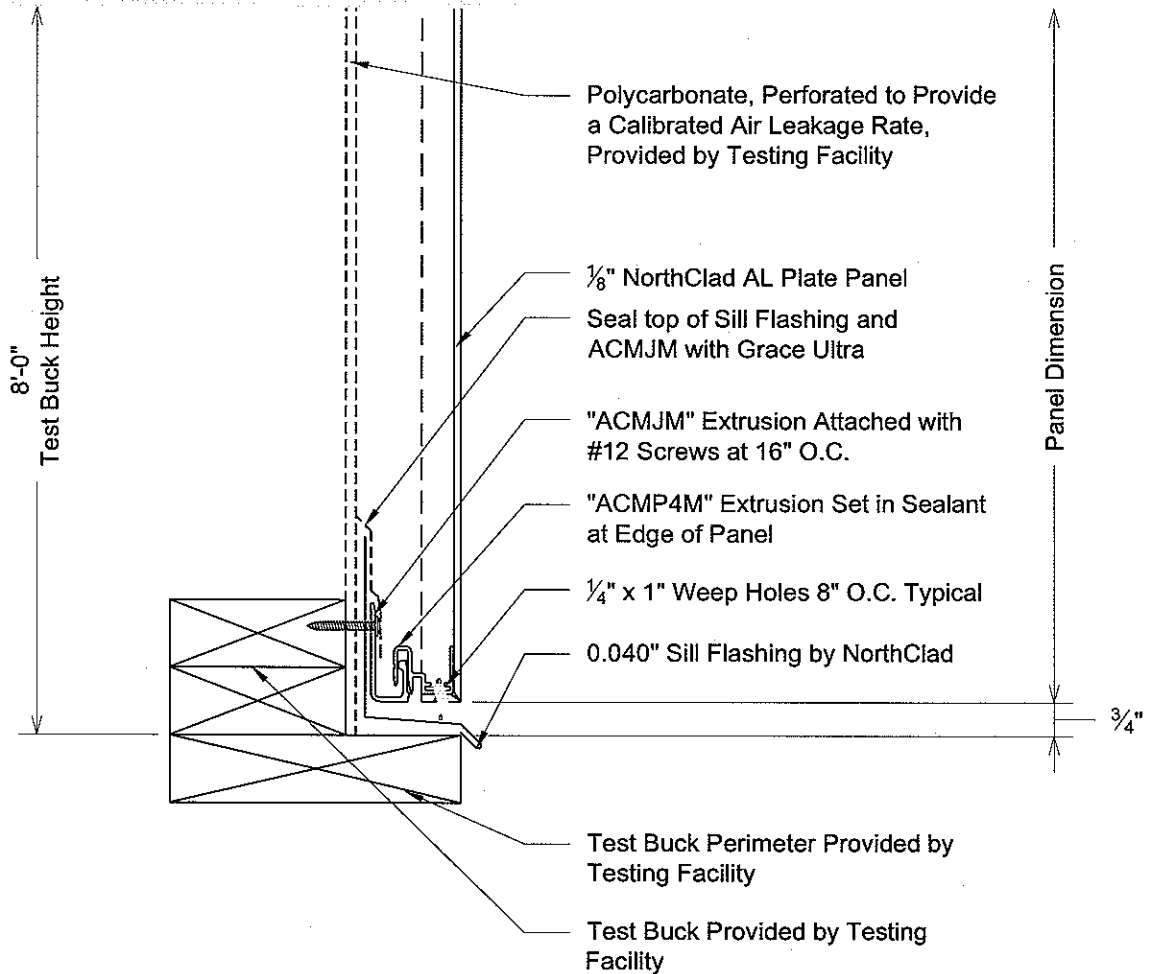
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04 Section - Base of Wall at Back Routed Return
DET NorthClad AL Plate Testing



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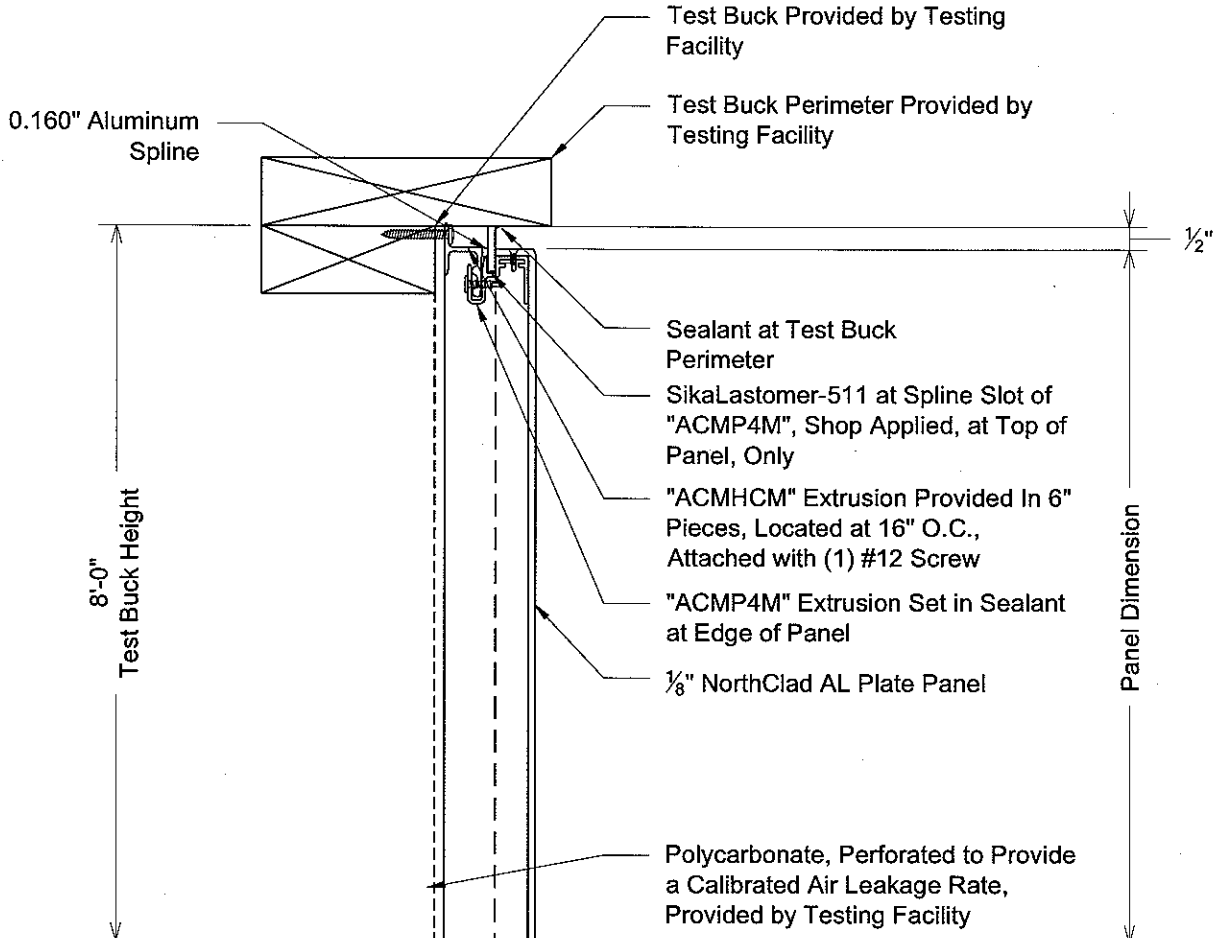
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05 Section - Top of Wall at Formed Return
DET NorthClad AL Plate Testing



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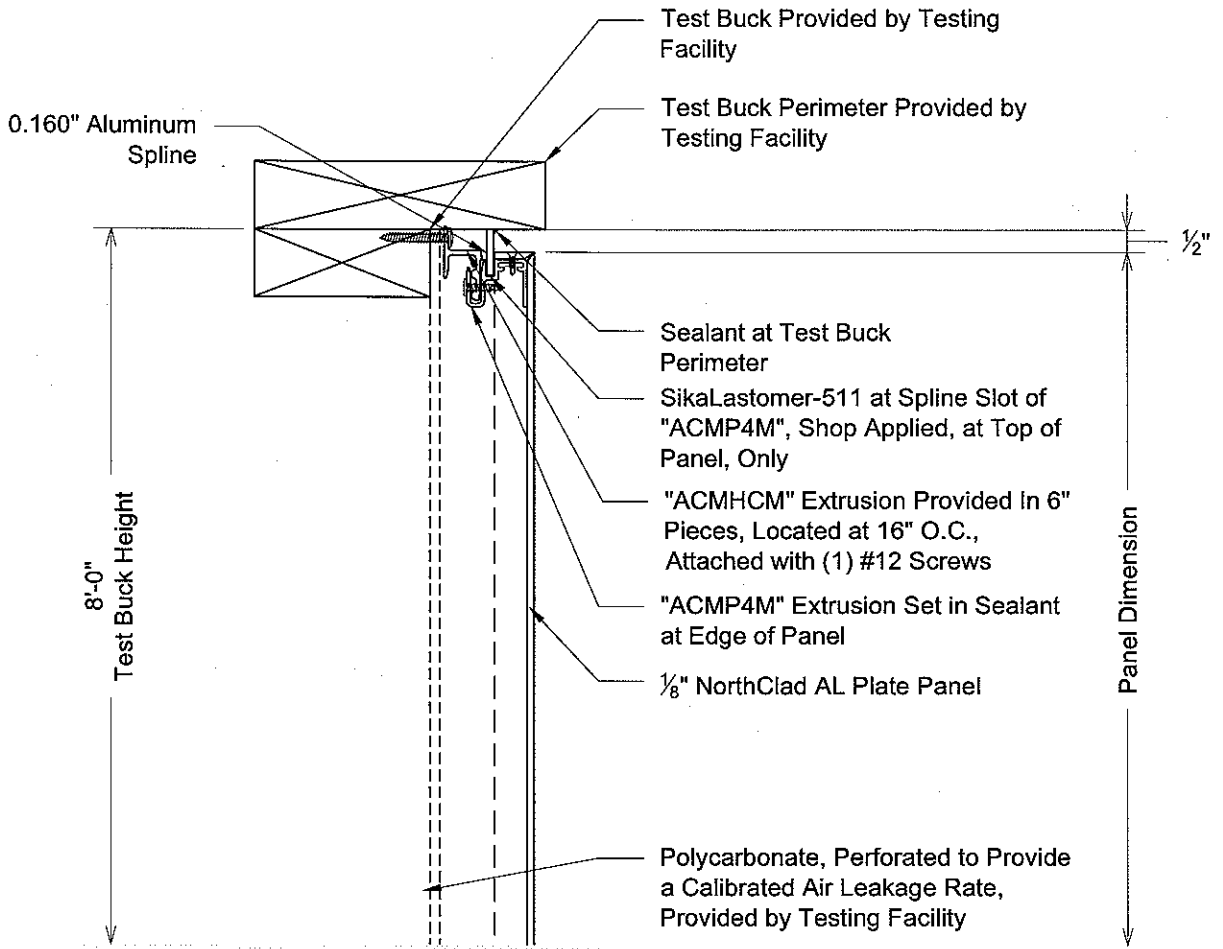
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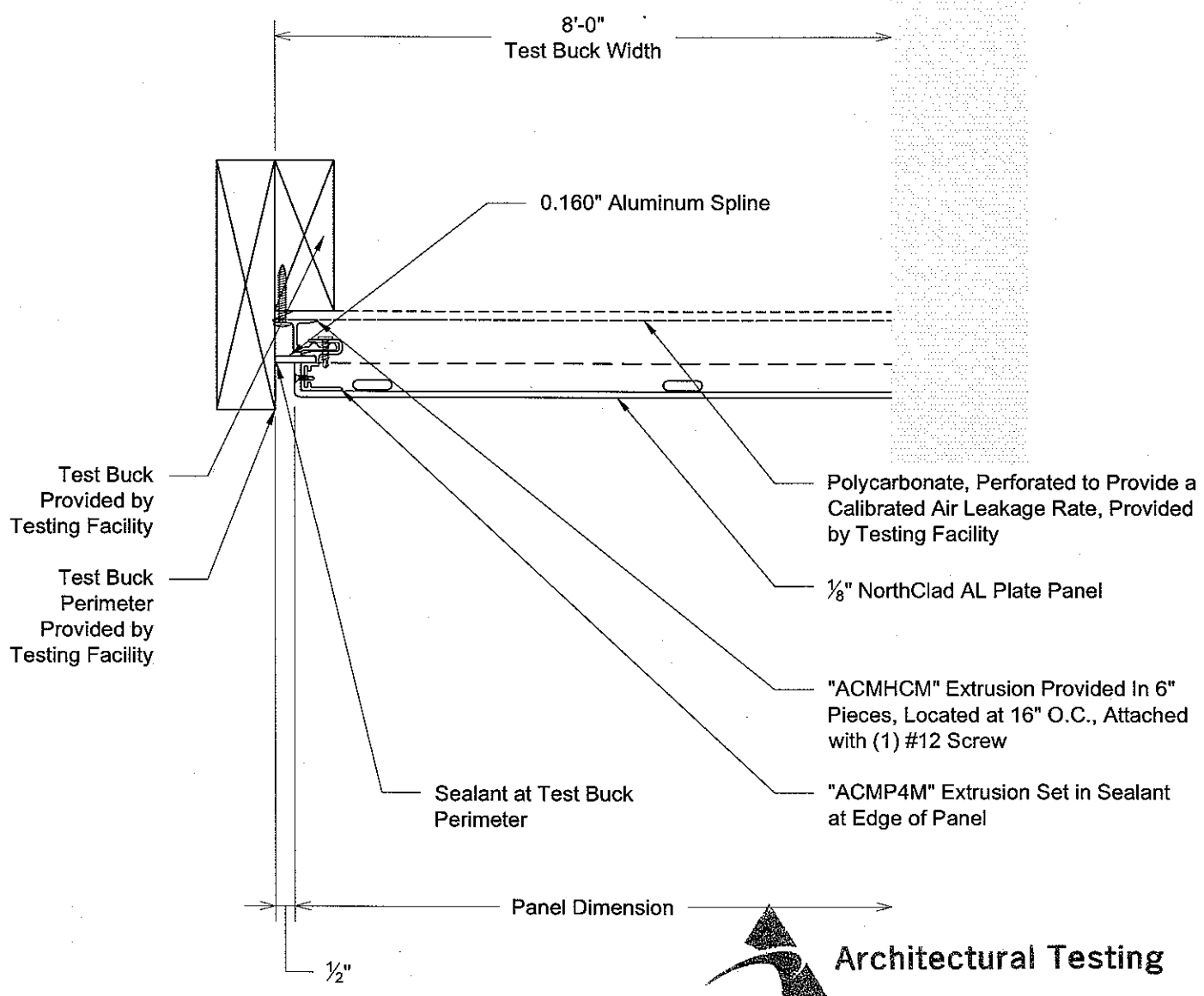
06 Section - Top of Wall at Back Routed Return
 DET NorthClad AL Plate Testing

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07 Plan - Edge of Wall at Formed Return
 DET NorthClad AL Plate Testing



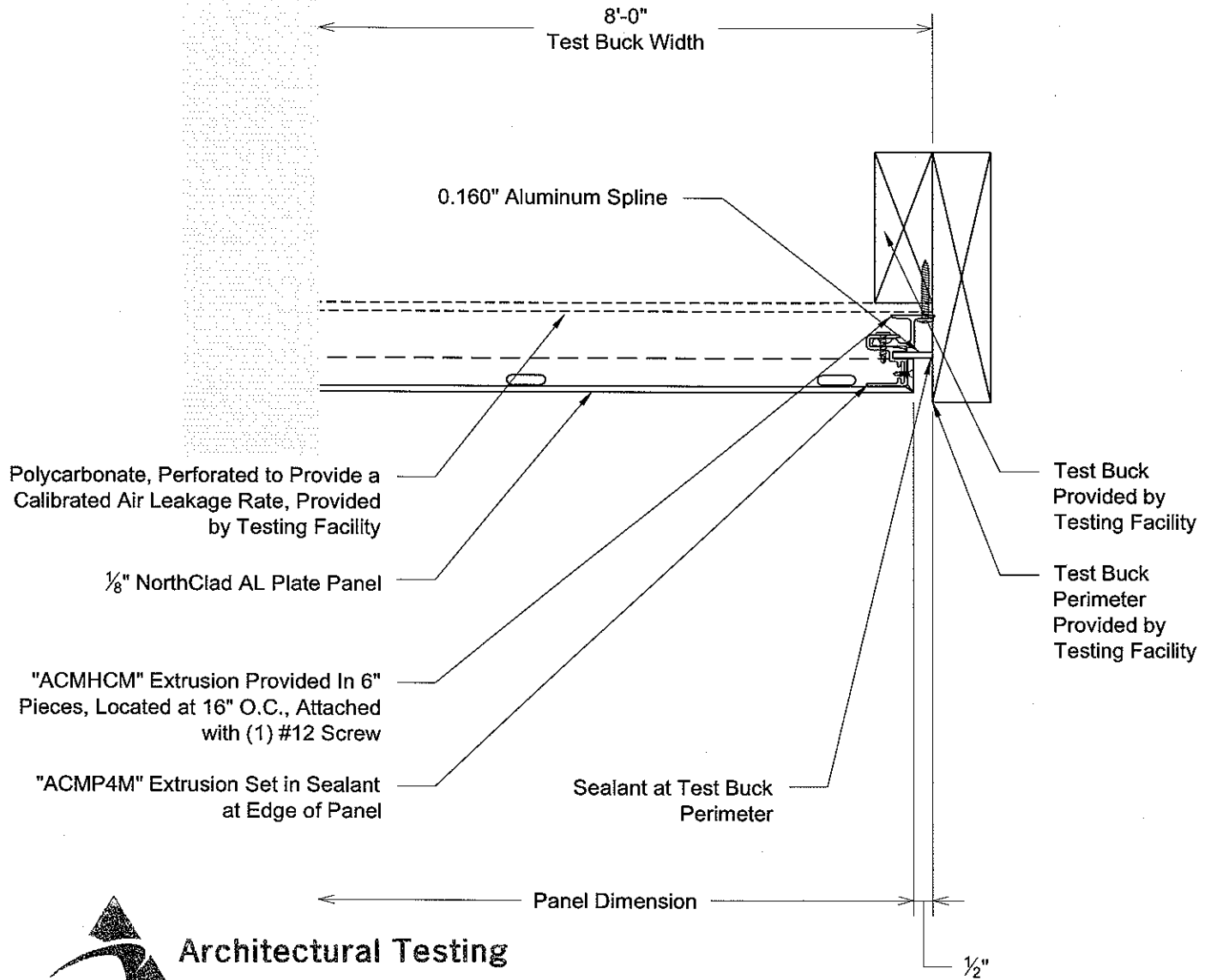
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08 Plan - Edge of Wall at Back Routed Return
DET NorthClad AL Plate Testing



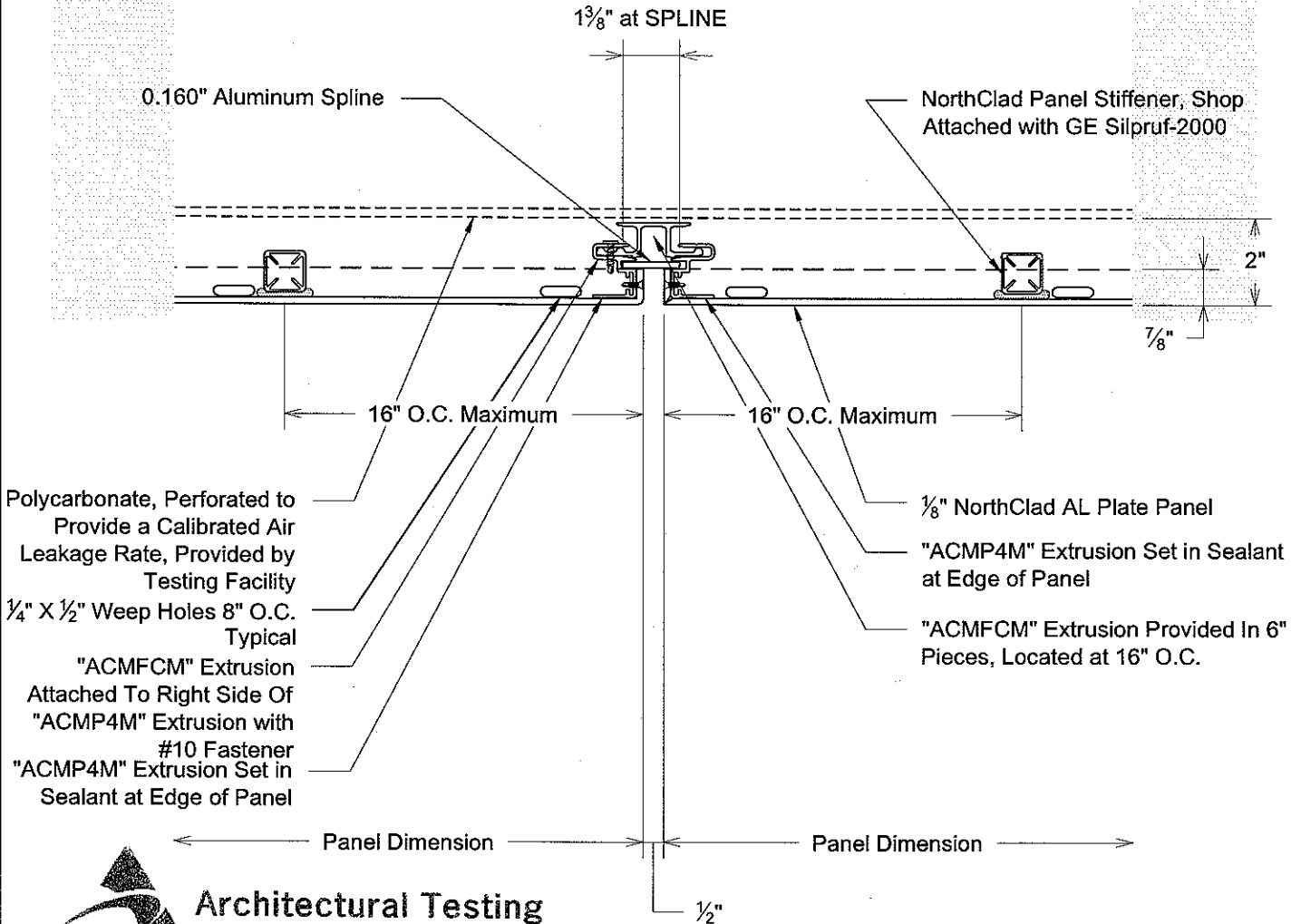
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09 Plan - Vertical Joint Between Formed Return and Backrouted Return
DET NorthClad AL Plate Testing



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