Architectural Testing

TEST REPORT

Report No.: C4921.01-901-44

Rendered to:

NORTHCLAD RAINSCREEN SOLUTIONS
Everett, Washington

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

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

Test Dates: 09/24/13
Through: 09/25/13
Report Date: 11/20/13
Test Record Retention Date: 11/20/17

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 Aluminum

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

3.4 Test Dates: 09/24/13 – 09/25/13

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:

Name	Company
Michael Evers	NorthClad Rainscreen Solutions
Jeff Dideon	Architectural Testing, Inc.
Brian Rasmussen	Architectural Testing, Inc.
Vitaliy Tsuz	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.

4.0 Test Method(s): (Continued)

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/ft^2.

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/ft^2.

5.0 Test Specimen Description:

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
Panel sizes (4)	1213	47-3/4	1213	47-3/4

5.2 Panel Construction: The test specimen was constructed of four 1.3 mm (0.05") thick NorthClad Aluminum panels. Each panel edge was designed to interlock with adjacent panels. The bottom of each panel utilized 12.7 mm x 6.4 mm (1/2" x 1/4") weeps, ten 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 2 x 10 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 wall panel system was then installed onto the clear polycarbonate in a manner consistent with normal construction procedures for the system. The clear 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.

5.0 Test Specimen Description: (Continued)

5.4 Reinforcement: Three extruded aluminum tube stiffeners 25 mm x 25 mm (1" x 1") were adhered to each panel with adhesive sealant at approx. 12" on center spacing.

5.5 Installation: Installation of the tested product was performed by the client.

The panels were installed in a bottom-to-top and left-to-right order. The sill utilized metal flashing and continuous starter strip, secured to the studs with #12 x 2" long pan head gasketed screws, spaced 16" on center. The tops of the panels were also secured to the studs with #12 x 2" long pan head gasketed screws, spaced 16" on center. The bottom panels were slid into the starter strip, and the top panels were slid into the top of the bottom panels. The vertical edges of the panels were also slid into each other to interlock.

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

5.7 Vent Area (Weeps): 0.0032 m^2 (5 in^2)

5.8 Air Cavity Volume to Vent Area Ratio: 81.9 m^3/m^2 (268.8 ft^3/ft^2)

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)	0.57 L/s/m^2 (0.11 cfm/ft^2)	0.5 L/s/m^2 (0.11 cfm/ft^2) min. 0.7 L/s/m^2 (0.13 cfm/ft^2) max.	1

Pressure Cycling (per ASTM E 1233)
100 cycles from 240 Pa (5 psf) to 1200 Pa (25 psf) to 240 Pa (5 psf)

Compartment #1	Results	Allowed	Note
Cycle Time Lag	0.04 sec.	0.08 sec. max.	2
Cycle Pressure Difference	5 Pa (0.10 psf)	600 Pa (12.5 psf) max.	
PASS / FAIL	PASS		

6.0 Test Results: (Continued)

Static Water Penetration (per ASTM E 331)

Pressure	Results	Allowed	Note
300 Pa (6.24 psf)	<0.01 m^2 (<0.01 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)	0.04 m^2 (0.43 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 in each stud cavity and located 6" above the bottom and the mid-span of the wall. A pressure tap was attached through the air barrier at the right side of the system.

Note #2: Reference Appendix A.

Note #3: Water on the polycarbonate air/water barrier surface was present at the horizontal joint 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 in, so 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(s) 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: Brian L. Rasmussen by Patricia A Cain

Brian L. Rasmussen
Technician

Digitally Signed by: Jeffrey L. Dideon

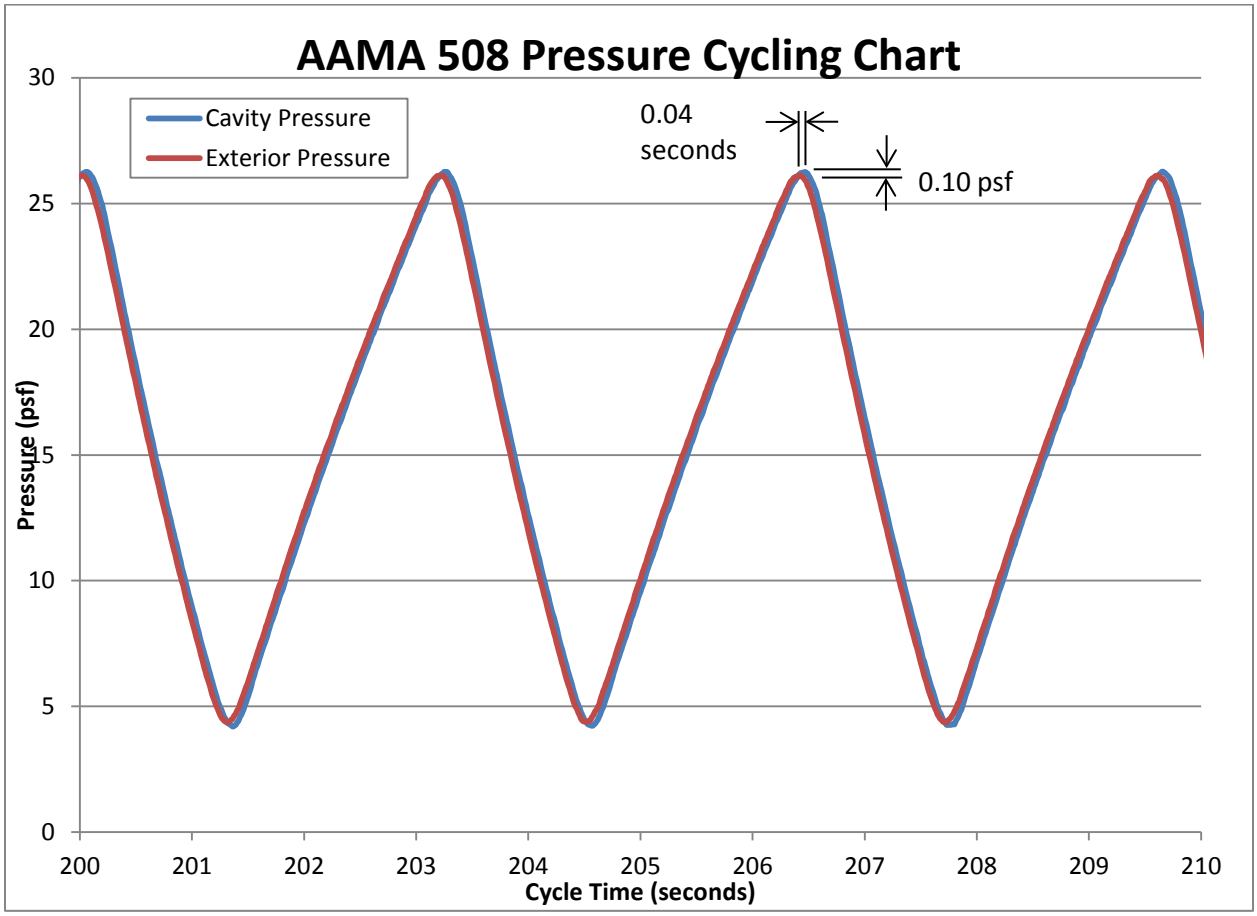
Jeffrey L. Dideon
Director – Regional Operations

BLR:pac

Attachments (pages): This report is complete only when all attachments listed are included.
- Appendix-A: Graph (1)
- Appendix-B: Photographs (1)
- Appendix-C: Drawings (6)

Appendix A

Graph



Appendix B

Photographs

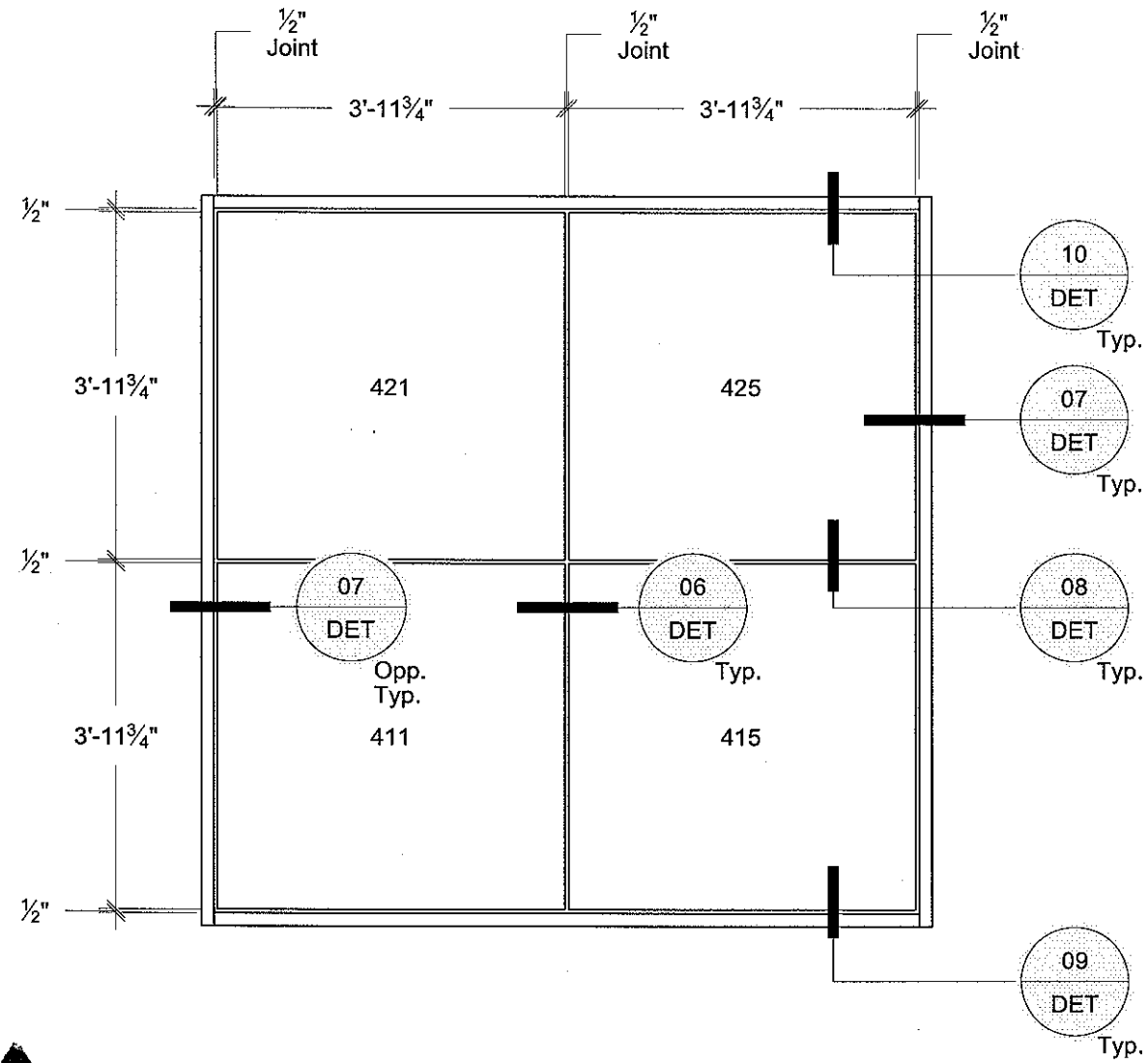
Exterior face of test specimen

Interior face of test specimen

Appendix C

Drawings

Last Saved By: eversm on 5/6/2013 P:\NorthClad\NorthClad Sales\NorthClad Material Info\Testing Procedures and results\CADD Shops\08 08 2013\Details.dwg



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# C4921

Date 11/4/13 Tech BLR

E04 Elev — Aluminum Wall Panel Testing Assembly for ~~AAMA~~ 508-07 Test
NorthClad Panel Test Assembly

NorthClad® rainscreen solutions

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ISSUED	
DESCRIPTION	DATE
FOR SUBMITTAL	08.08.2013
Drawn By: —	

REVISIONS		
NO.	DESCRIPTION	DATE
1	— Drawn By: —	—
2	— Drawn By: —	—
3	Drawn By:	

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NorthClad Panel Testing

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Sheet Title: DET

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Sheet: E04

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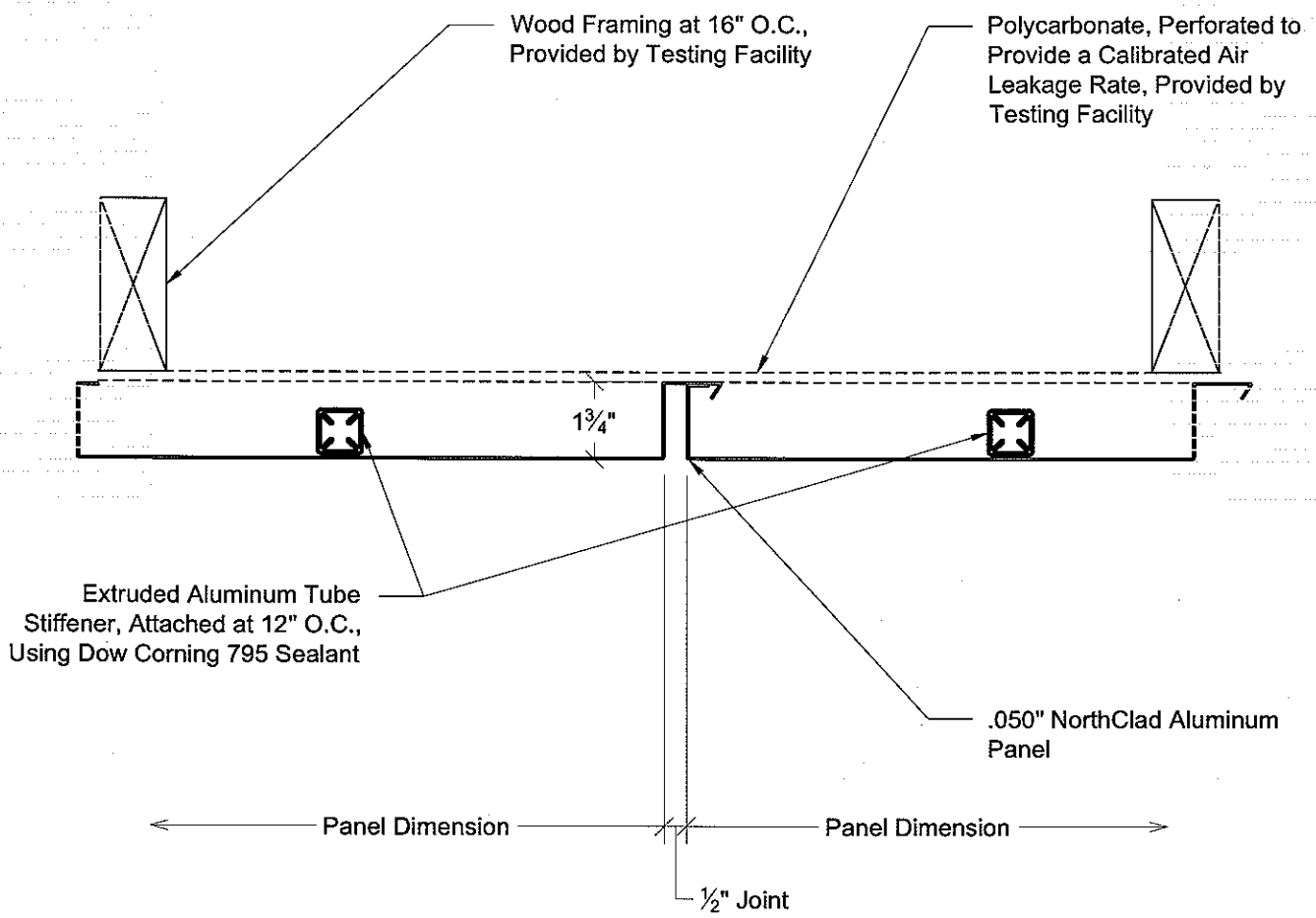

Architectural Testing

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Date 11/4/13 Tech BLK

06 / DET — Plan View - NorthClad Aluminum Panel System Typical Vertical Joint

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ISSUED	
DESCRIPTION	DATE
FOR SUBMITTAL	01.16.2013
Drawn By: M E	

REVISIONS		
NO.	DESCRIPTION	DATE
1	Added AAMA 509	01.22.2013
	Drawn By: M E	
2	Panel Configuration	02.01.2013
	Drawn By: M E	
3		
	Drawn By:	

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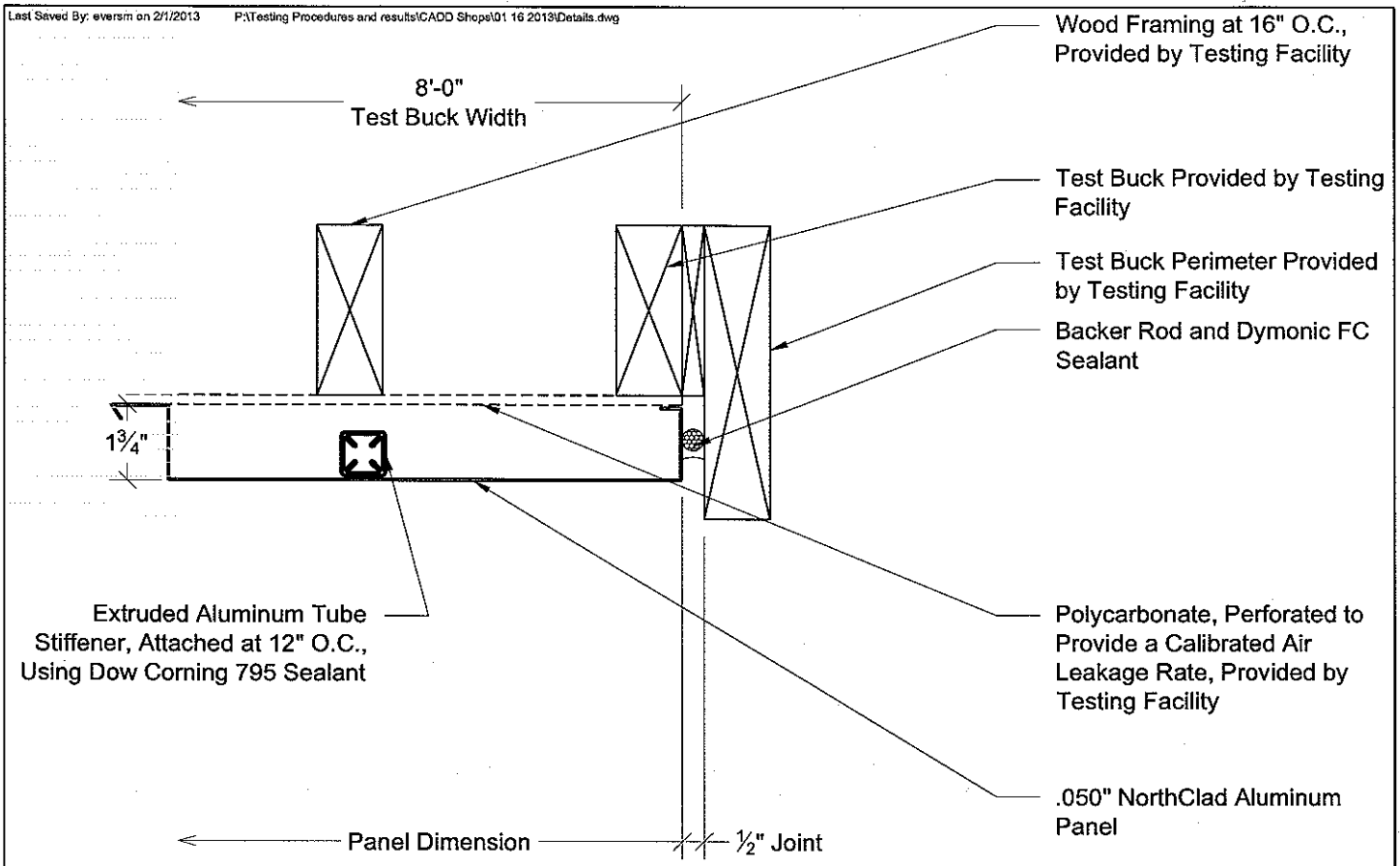
Job Number:

Sheet: 06



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07 / DET — Plan View - NorthClad Aluminum Panel System Test Buck Perimeter Vertical Joint

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3		
	Drawn By:	

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Test sample complies with these details.
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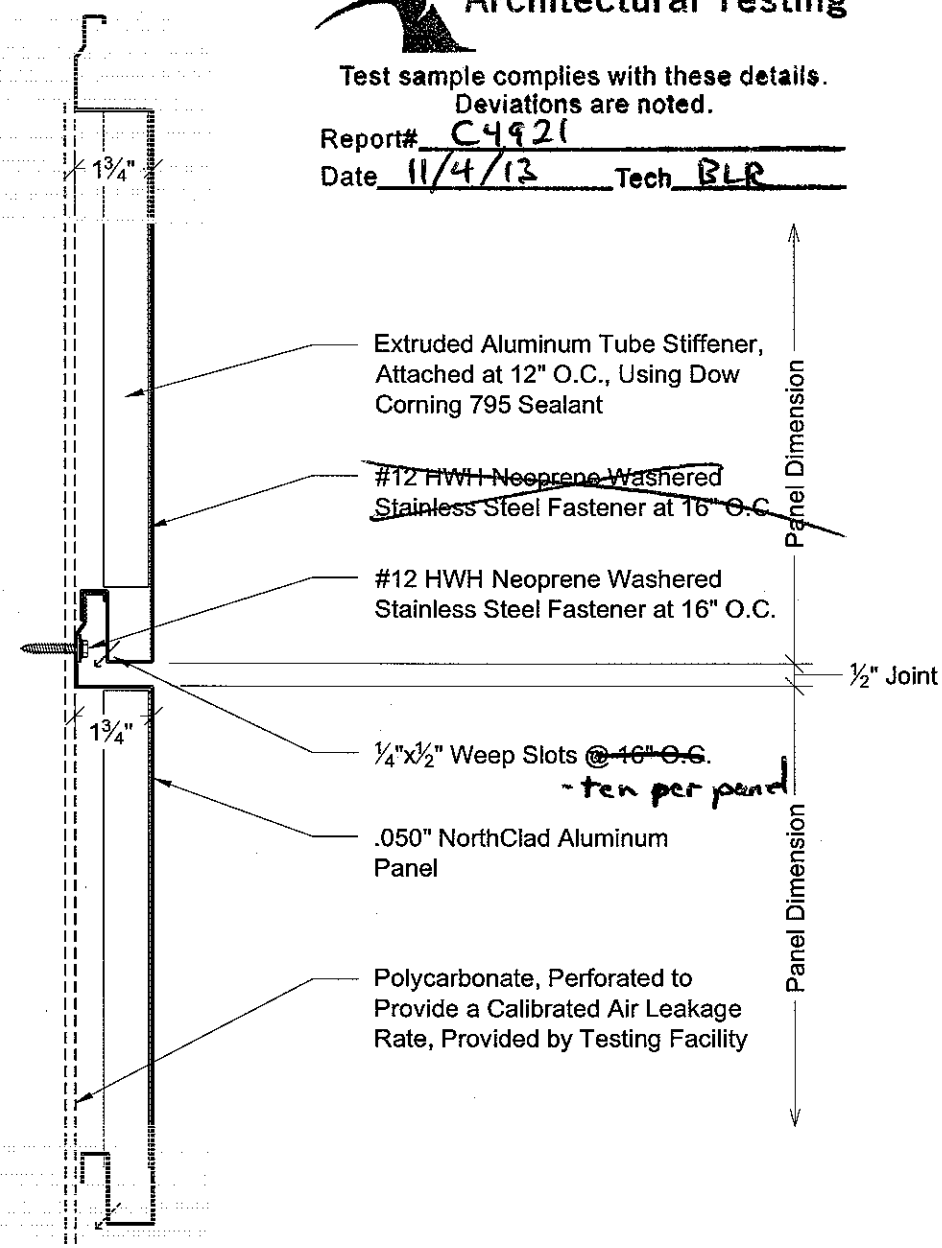

08 DET — Section View - NorthClad Aluminum Panel System Typical Horizontal Joint

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FOR SUBMITTAL	01.16.2013
Drawn By: ME	

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NO.	DESCRIPTION	DATE
1	Added AAMA 509	01.22.2013
	Drawn By: ME	
2	Panel Configuration	02.01.2013
	Drawn By: ME	
3		
	Drawn By:	

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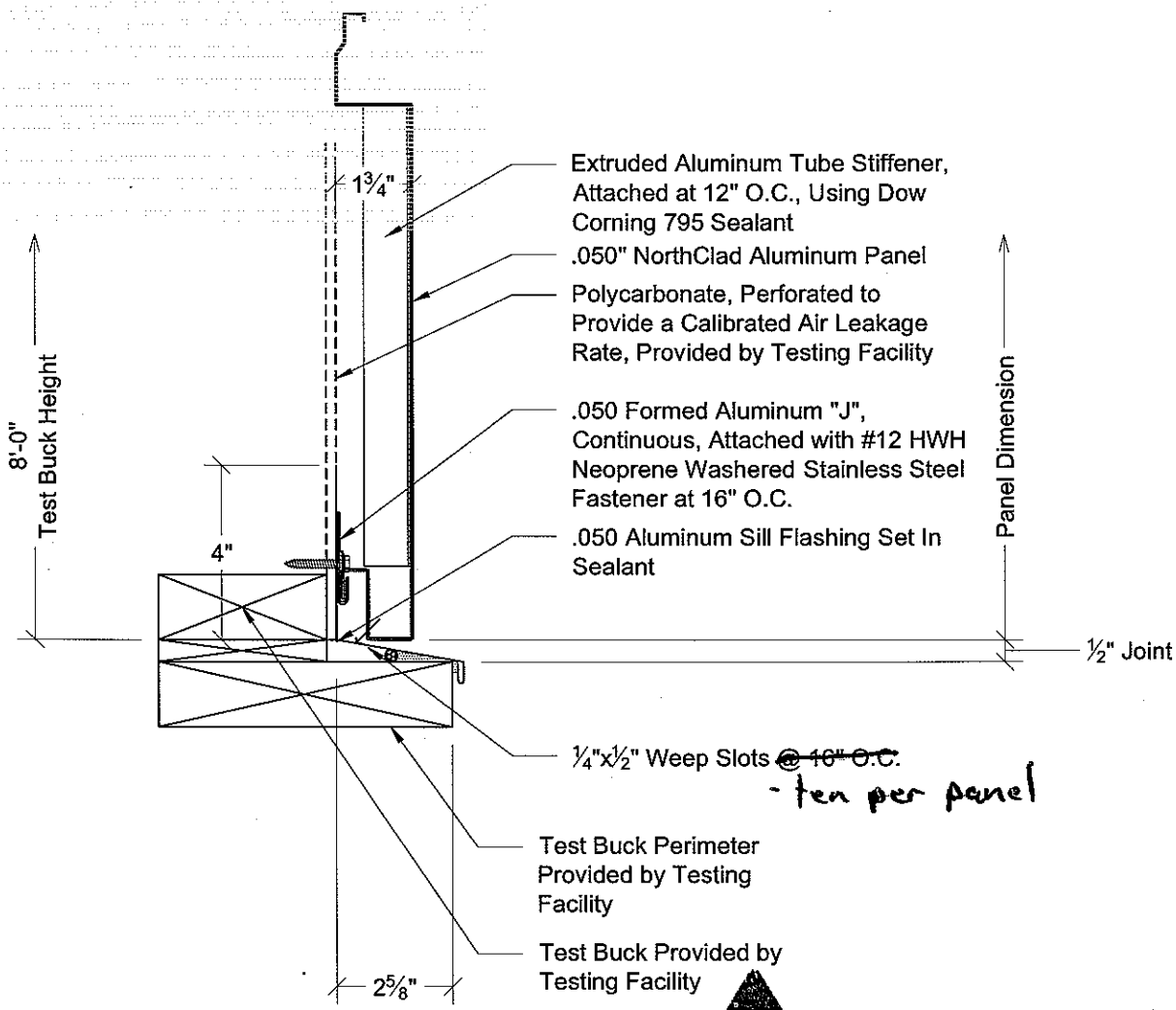

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09 / DET — Section View - NorthClad Aluminum Panel System Test Buck Perimeter Base Joint

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REVISIONS		
NO.	DESCRIPTION	DATE
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	Drawn By: M E	
2	Panel Configuration	02.01.2013
	Drawn By: M E	
3		
	Drawn By:	

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Job Number:

Sheet: 09

Architectural Testing

Test sample complies with these details.
Deviations are noted.

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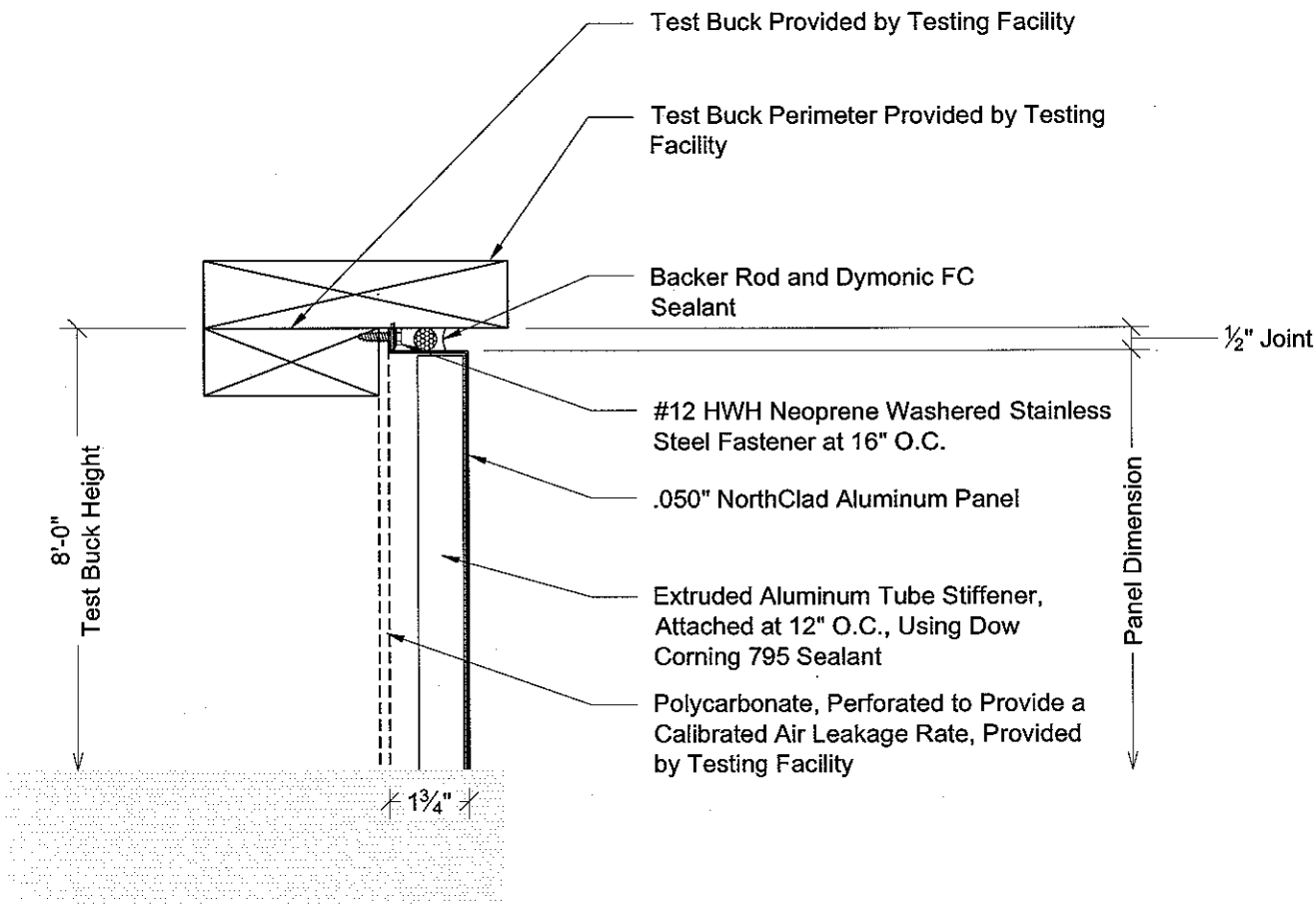
Date 11/4/13 Tech BLR



10 / DET Section View - NorthClad Aluminum Panel System Test Buck Perimeter Head Joint

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