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ANENDA SYSTEMS INC.
TEST REPORT

SPECIFICATION
AAMA 508-14

PRODUCT EVALUATED
AL13 V2 4mm ACM System

REPORT NUMBER
102731078COQ-008

ISSUE DATE
09-Mar-2018

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TEST REPORT FOR ANENDA SYSTEMS INC.

Report No.: 102731078COQ-008
Date: 09-Mar-2018

CONCLUSION

The AL13 V2 4mm ACM System, submitted by Anenda Systems Inc., had met the performance requirements as noted in Section 7 of this report when tested in accordance with AAMA 508.

Note – This report is not intended as a comprehensive evaluation of the system regarding performance and application to specific buildings.

Jason Komorski
TECHNICIAN
BUILDING PRODUCTS

David Park
REVIEWER
BUILDING PRODUCTS

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SECTION 2
OBJECTIVE

Intertek Testing Services NA Ltd. (Intertek) has conducted testing for Anenda Systems Inc. on the AL13 V2 4mm ACM System. Testing was conducted in accordance with the following:

- AAMA 508-14, *Voluntary Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems* (AAMA 508)

This evaluation began on December 19, 2017 was completed on December 20, 2017.

SECTION 3
SAMPLE SELECTION

The client submitted the exterior metal composite wall panel system to the Evaluation Center on December 18, 2017. Samples were not independently selected for testing. The system/specimen was provided by Anenda Systems Inc. located at 827 Cambie Street, Vancouver, BC, Canada, V6P 2P4.

The specimen was installed and as provided by the client. Intertek has not verified the composition, manufacturing techniques, or quality assurance procedures, and accepts no responsibility for any inaccuracies therein.

SECTION 4

SAMPLE ASSEMBLY AND DESCRIPTION

The product was identified as the AL13 V2 4mm ACM System, and measured 2438 mm x 2438 mm (96” x 96”). The upper half of the wall was one panel, measuring approximately 47-1/4” by 95-1/4”, and the lower half was split into two square sections, measuring approximately 47-1/4” by 47-1/4”, split by a vertical joint. An aluminum perimeter track is secured with 1/4" x 1-1/2” self-tapping washer-head fasteners, approximately 76 mm (3”) from the corners, and 406 mm (16”) o.c. The horizontal cap snaps in to 6x track profiles, each cut approximately 83 mm (3-1/4”) long. Located approximately 406 mm (16”) from either end, with 406 mm (16”) spacing o.c. except mid-span, where there is a track section centered approximately 76 mm (3”) from either side of the mid-point. Each track section is secured with 2x 1/4" x 1-1/2” self-tapping washer-head fasteners. The vertical cap snaps in to one 1092 mm (43”) long track section, secured with 4x 1/4" x 1-1/2” self-tapping washer-head fasteners, located approximately 25 mm (1”) and 330 mm (13”) from either end of the track. Each the perimeter track and the center horizontal and vertical tracks have composite spacer blocks slid over the edge of the perimeter track, or both edges of the center tracks. The blocks measure approximately 102 mm (4”), x 14 mm (0.55”) x 20 mm (0.79”) with an 18 mm (0.71”) deep slot approximately 3 mm (0.12”) from the interior side. The blocks along the perimeter track are spaced approximately 152 mm (6”) from the corners, spaced 254 mm – 406 mm (10” – 16”) o.c. The blocks along the vertical track are located approximately 102 mm (4”) from either end, and mid-span.

A 96” wide by 96” high steel stud wall was constructed using 16 ga. 2x6 steel studs placed at 16” on center. The wall was then sheathed with 1/2” thick clear poly carbonate sheet. The wall panel system was then installed onto the clear polycarbonate in a manner consistent with normal construction procedures for the system. The exterior of the test unit was sealed to the wood buck with silicone.

Drawings supplied by Anenda Systems Inc. are included in Appendix A.

SECTION 5
TESTING AND EVALUATION METHODS

AIR LEAKAGE

The Air Leakage tests (Air Infiltration) were conducted in accordance with ASTM E283. The tests were performed using a test pressure of 75 Pa (1.57 psf). As per AAMA 508, air leakage was induced in the system to provide a leakage rate of 0.6 L/s*m^2.

PRESSURE EQUALIZATION

The Pressure Equalization test was tested in accordance with ASTM E1233 and evaluated to AAMA 508. The test was performed at a specified pressure differential of 240 Pa (5 psf) to 1200 Pa (25 psf) for a minimum of 100 cycles.

WATER PENETRATION RESISTANCE – STATIC

The Static Water Penetration test was tested in accordance with ASTM E331 and evaluated to Section 6.1 of AAMA 508. This test was performed at the specified pressure differential of 730 Pa (15 psf) and a water spray rate of at least 204 L/m^2 per hour (5.0 U.S. gal/ft^2 per hour). The test was run for fifteen minutes, during which the pressure and water spray were continuously applied.

WATER PENETRATION RESISTANCE – DYNAMIC

The Dynamic Water Penetration test was tested in accordance with AAMA 501.1 and evaluated to Section 6.1 of AAMA 508. The test was performed at the specified pressure differential of 720 Pa (15 psf), or 120 kph (75 mph) wind speed equivalent, generated using a Wind Generator, and a water spray rate of at least 204 L/m^2 per hour (5.0 U.S. gal/ft^2 per hour). This test consisted of fifteen minutes, during which the wind and water spray were continuously applied.

DEVIATION FROM STANDARD METHOD

Structural performance was performed on a separate sample. Refer to Intertek Report No. 103193419COQ-001A.

SECTION 6
TEST EQUIPMENT

Equipment used during testing is listed as follows:

Test	Equipment	Intertek ID#
Air Leakage, Pressure Equalization, Static Water Penetration, Structural	Fenestration Testing Control Unit	60650
	Water Spray Assembly	60651
		60652
	Micro Mule	63170
	Rain Screen Pressure Box	INT00712
	20" Line Gauge	60673
		64928
		64926
		64923
		64920
Dynamic Water Penetration	Wolf Wind Generator	63339
	Spray Rack Assembly	ITS-1

SECTION 7
RESULTS AND OBSERVATIONS

AIR LEAKAGE

Air leakage test data is indicated in the following table:

Test Pressure	75 Pa
Overall Area	5.94 m^2 (63.98 ft^2)
Air Leakage	0.60 L/s*m^2 (0.12 cfm/ft^2)

PRESSURE EQUALIZATION

During the Pressure Equalization test cycling at a pressure differential from 240 Pa (5 psf) to 1200 Pa (25 psf) for 100 cycles the systems lag times was below the required 0.08 seconds and the differential between the cavities and cyclic wind pressure did not exceed 50% of the maximum test pressure. Refer to Appendix B for a graph on 1 cycle. The tested specimen **met** the performance requirements for Pressure Equalization of AAMA 508.

WATER PENETRATION RESISTANCE – STATIC

During the 15-minute test period, using a pressure differential of 730 Pa (15 psf), there was no water leakage observed through the tested sample. The sample **met** the performance requirements for Static Water Penetration of ASTM E331.

WATER PENETRATION RESISTANCE – DYANMIC

During the 15-minute test period, using wind speed 120 kph (75 mph), no water leakage was observed through the tested sample. The sample **met** the performance requirements for Dynamic Water Penetration of AAMA 501.1.

SECTION 8

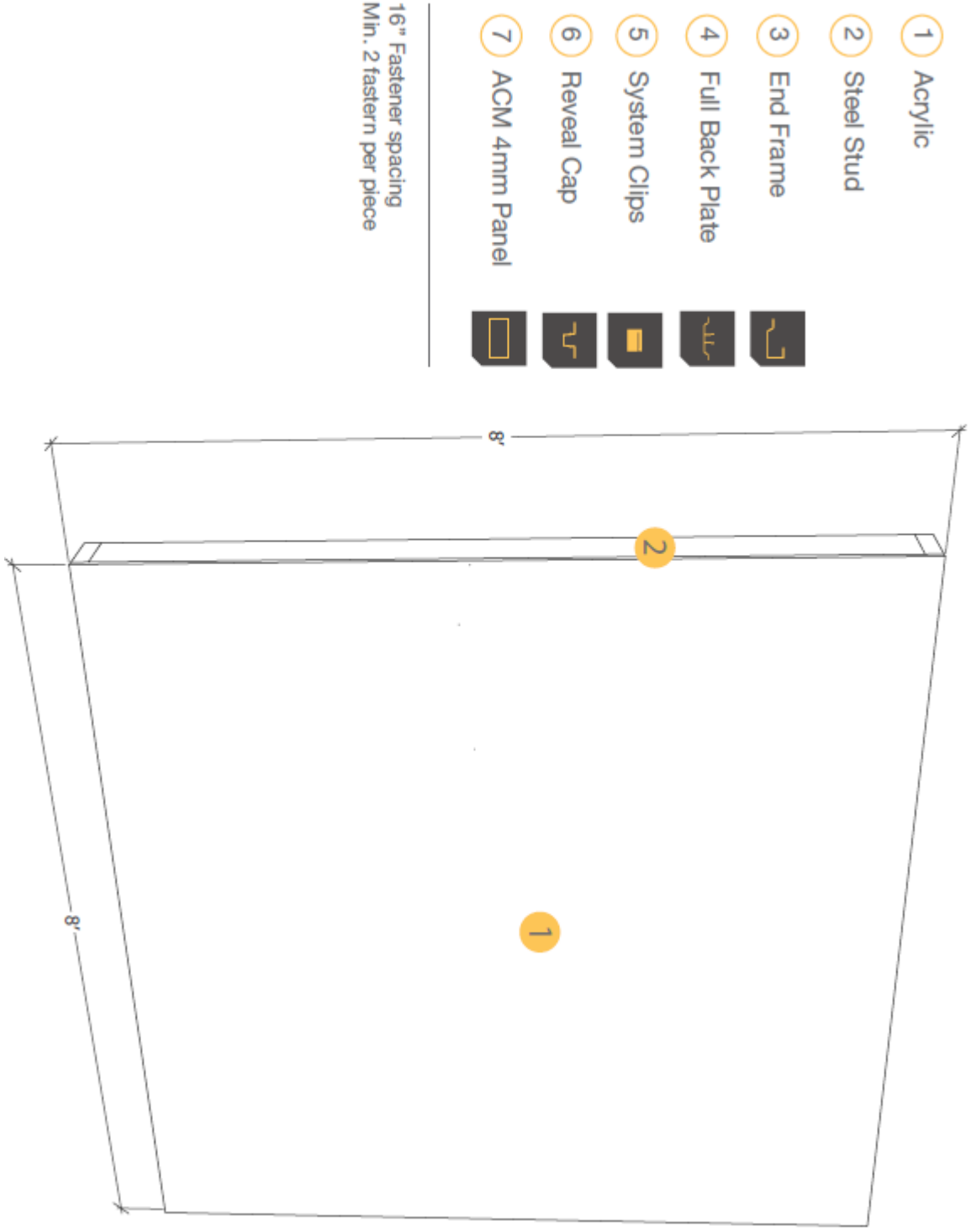
CONCLUSION

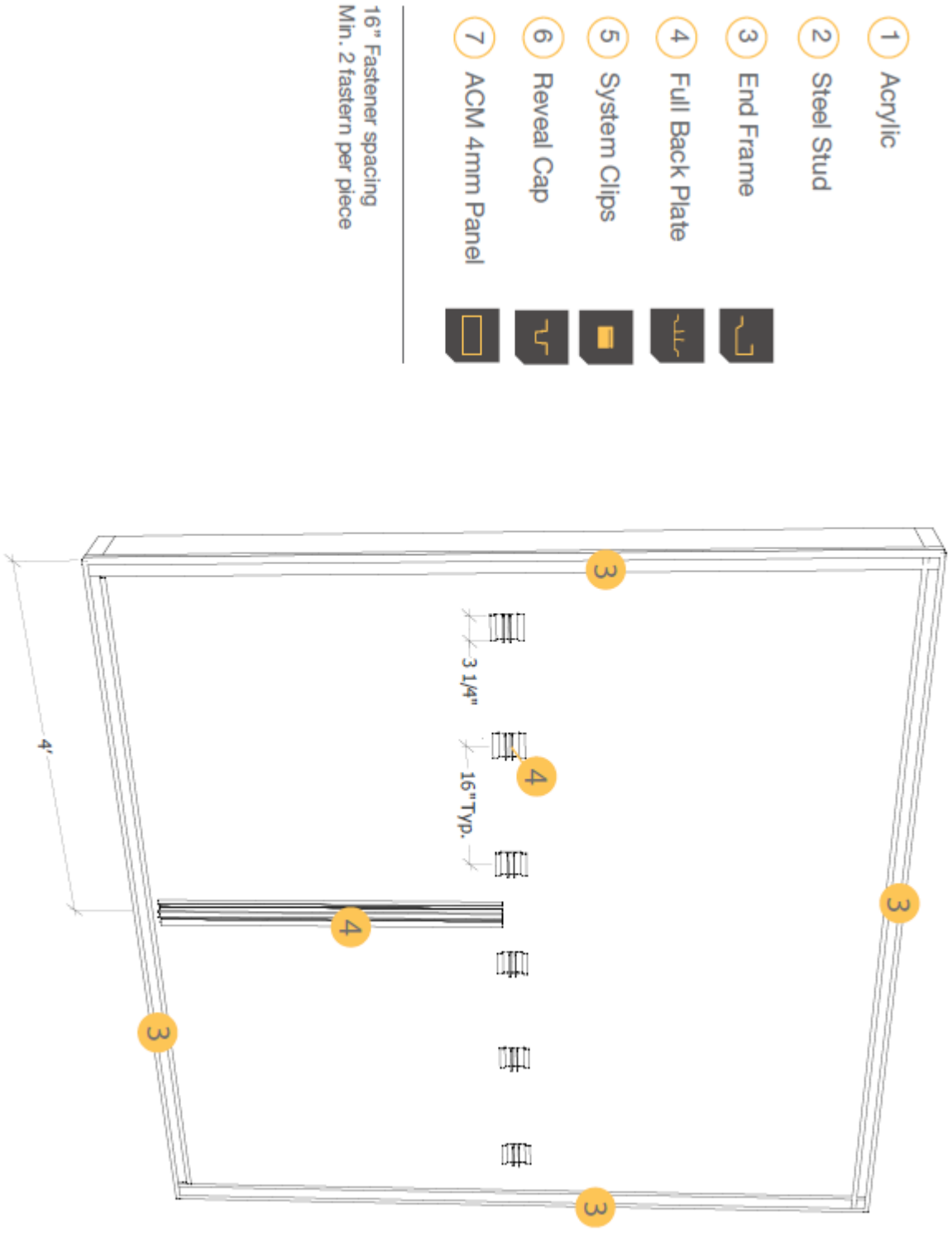
The AL13 V2 4mm ACM System, submitted by Anenda Systems Inc., had met the performance requirements as noted in Section 7 of this report when tested in accordance with AAMA 508.

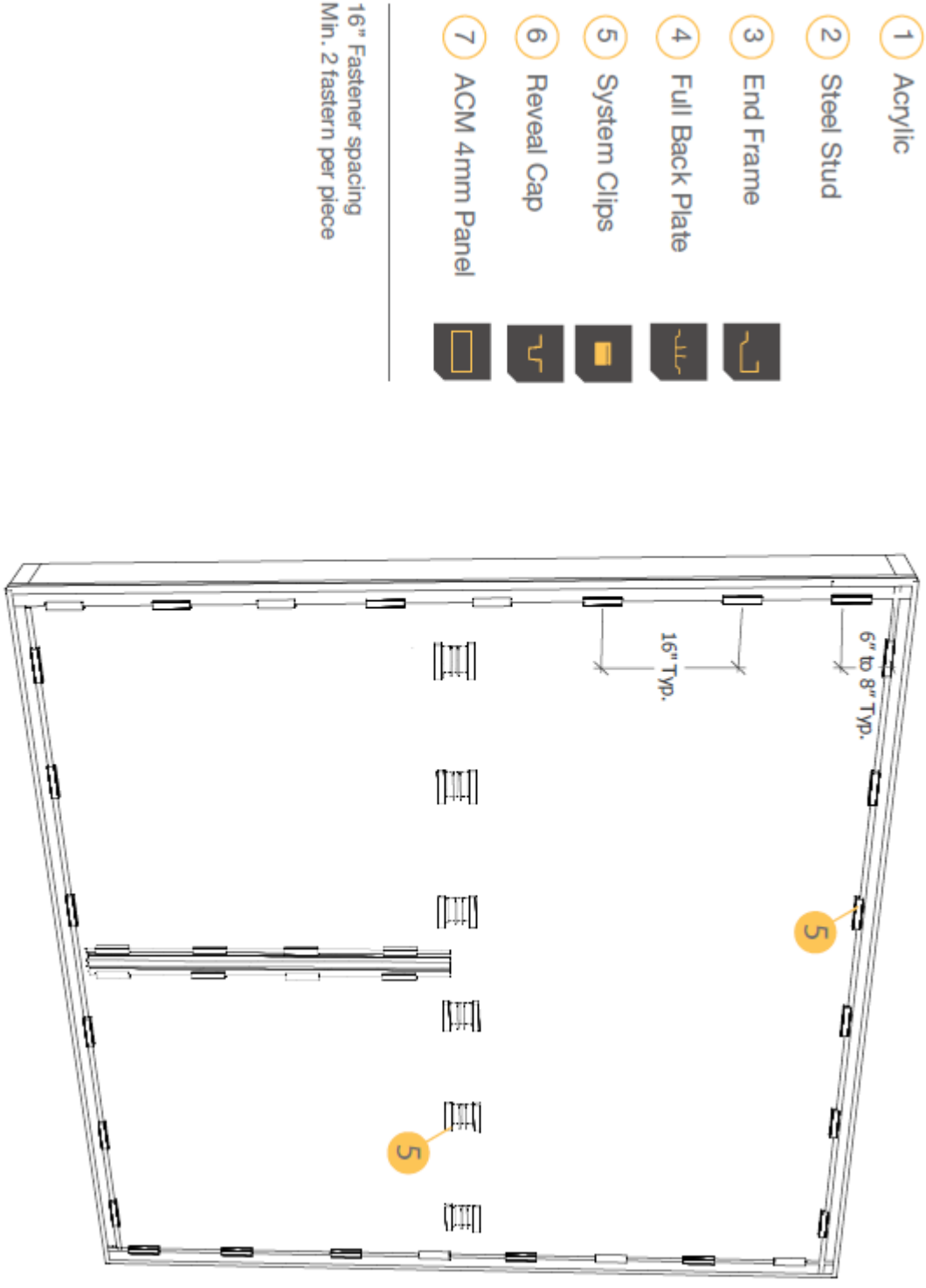
Note – This report is not intended as a comprehensive evaluation of the system regarding performance and application to specific buildings.

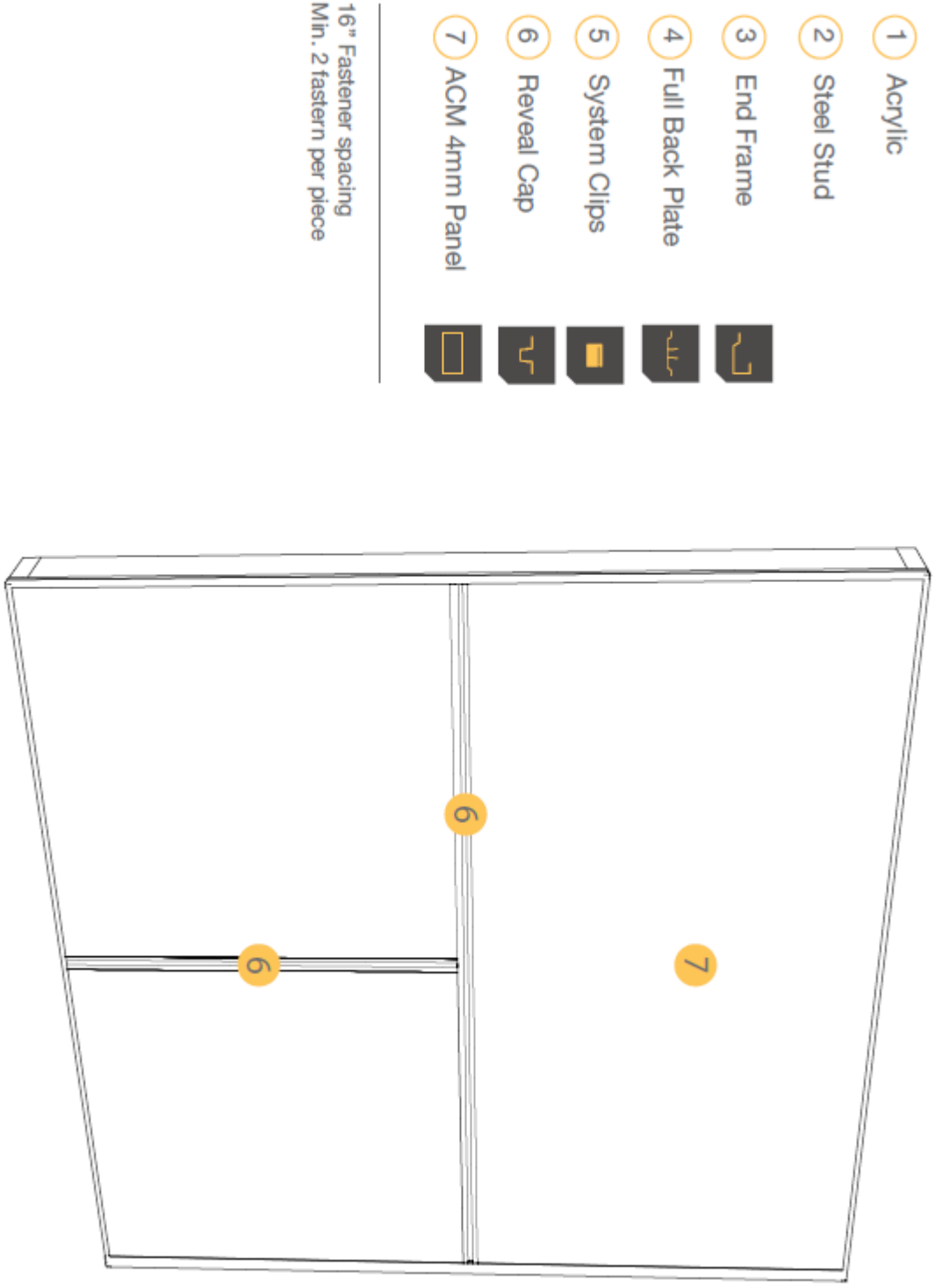
SECTION 9

APPENDIX A: DRAWINGS
(4 Pages)









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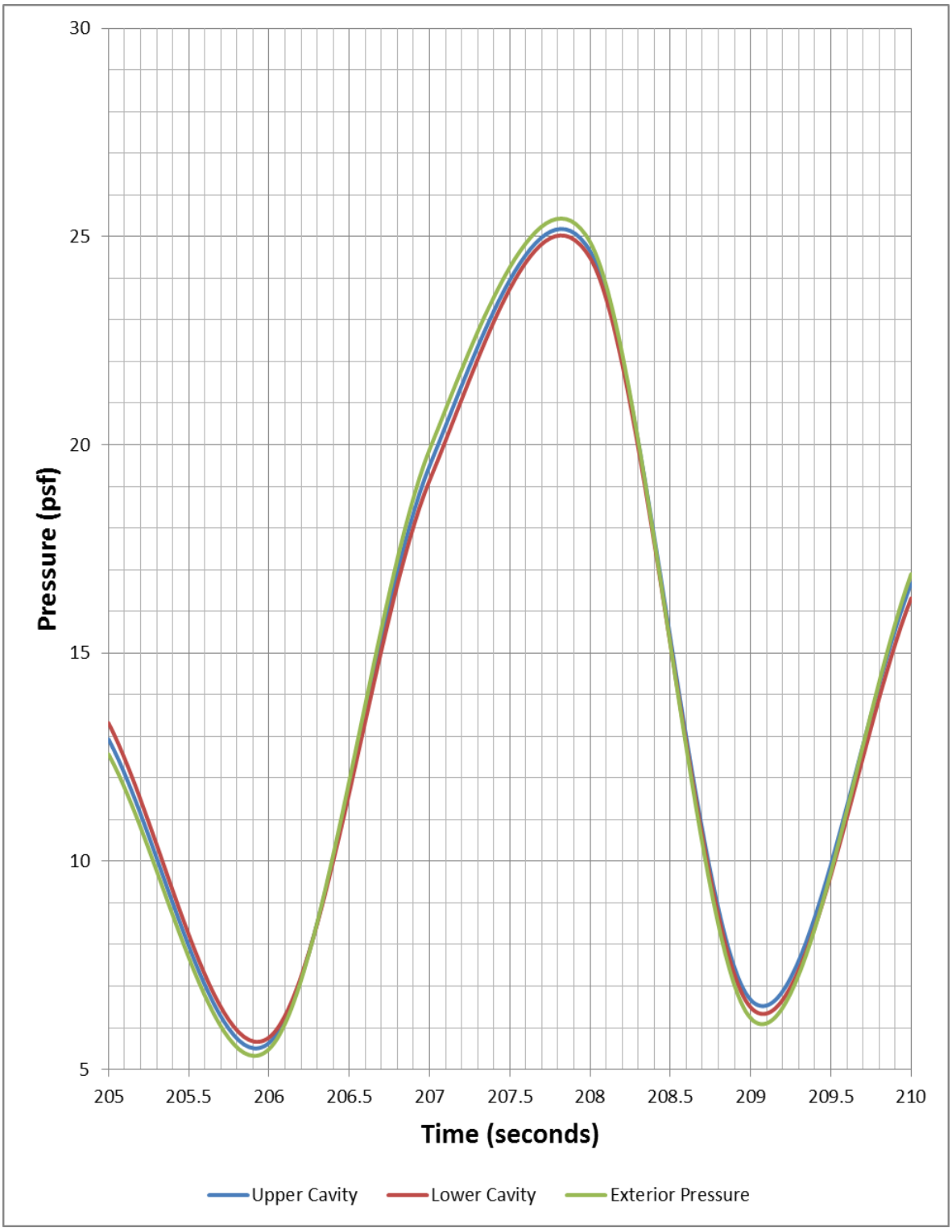
APPENDIX B: PRESSURE EQUALIZATION GRAPH (1 Page)



SECTION 11

APPENDIX C: PHOTOGRAPHS
(2 Pages)

AL13 V2 4mm Cladding System

Water Penetration Resistance – Static, Test setup

SECTION 12

APPENDIX D: REVISION TABLE
(1 Page)

Revision Table				
Date	**Section**	**Description**	**Technician**	**Reviewer**
09-Mar-2018	---	Original Issue Date	---	---

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AAMA 508-07

RAIN SCREEN PERFORMANCE TEST REPORT SUMMARY

RENDERED TO:
AL13 Architectural Panel Systems
827 Cambie Street
Vancouver BC Canada V6B 2P4

MODEL/TYPE: 3-Section Aluminum Composite Panel

TITLE	SUMMARY OF RESULTS
ASTM E283 Air Infiltration 75 Pa (1.57 psf)	Confirmed rate 0.61 L/s/m^2 (0.12 cfm/ft^2)
ASTM E331 & AAMA 501.1 Water Penetration Resistance Test Pressures	Pass at 479 Pa (10 psf)
ASTM E1288 Pressure Cycling 240 Pa (5 psf)/ 1200 (25 psf)/ 240 Pa (5 psf)	Passed 100 Cycles

Test Completion Date: 02/27/14

Reference must be made to Report Number NCTL-110-16354-1 dated 04/02/14 for complete test sample description and data. This test report is not intended as a comprehensive evaluation of the system regarding performance and application to specific buildings.

National Certified Testing Laboratories

Robert Wm. DeFayette
Field Testing/ Curtain Wall Manager

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RAIN SCREEN PERFORMANCE TEST REPORT

Report Number	NCTL-110-16354-1
Report Date	04/02/14
Report To	AL13 Architectural Panel Systems 827 Cambie Street Vancouver BC Canada V6B2P4
Starting Test Date **Ending Test Date**	02/24/14 02/24/14
Specification	AAMA 508-07, "Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems."

Description of Sample Tested

Note: All dimensions are in the order (Width x Height x Thickness) unless otherwise noted.

The test specimen consisted of a (3)-section aluminum composite panels measuring 2444.75 mm x 2501.9 mm (96.25" x 98.5") overall. The panels were 2.79 mm (0.110") thick and were fastened to the vertical Z-bar with adhesive tape at the center Z-bar and an aluminum clip at the perimeter. The vertical Z-bar was fastened to a 1.02 mm (0.040") thick steel horizontal Z-bar. The verticals were fastened to the horizontals with (1) screw at each intersection. An extruded aluminum receiver was fastened with screws at the panel seams. An extruded aluminum cover was snap-fitted at the receiver. An extruded aluminum cover was fastened with screws at the exterior perimeter and employed (7) evenly spaced 6.35 mm (0.25") diameter weep holes at the bottom. (38) 3.18 mm (0.125") Holes were equally distributed 304.8 mm (12") above the horizontal seams and at the base to achieve required air leakage. A pressure tap was centered between the screen and the dens glass also a pressure tap in the chamber between the dens glass and the test wall.

Test Results

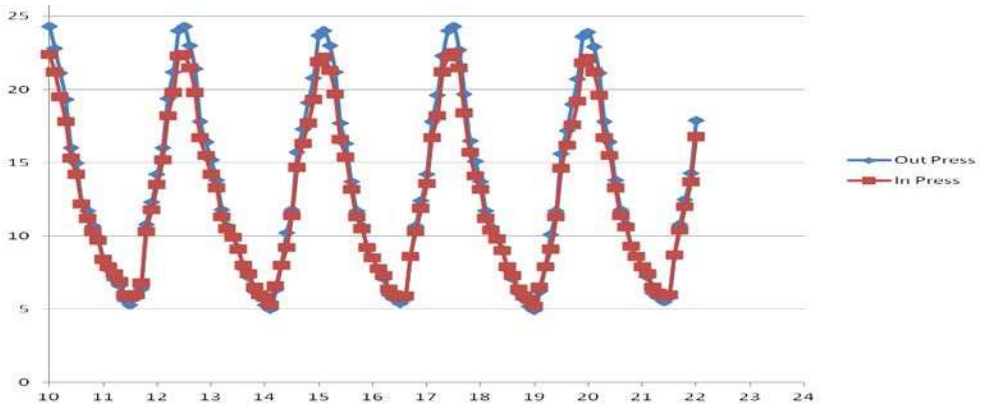
Paragraph	Test
5.3	Air Leakage Resistance ASTM E283-04(12) Barrier leakage confirmation at 75 Pa (1.57 psf). Required Leakage = 0.6 L/s/m^2 (0.12 cfm/ft^2) +/- 10% Air Infiltration Rate = 0.6 L/s/m^2 (0.12 cfm/ft^2)

Paragraph	Test
5.5	Pressure Cycle Testing ASTM E1233-14 (modified per AAMA 508-07)

100 Total Cycles at maximum 3 second durations

Positive Load	240 Pa (5 psf)
Positive Load	1200 Pa (25 psf)
Positive Load	240 Pa (5 psf)

NOTE: The lag time between the cavity and the cyclic wind pressure did not exceed 0.8 seconds



Paragraph	Test
5.6	Static Water Penetration Resistance ASTM E331-00(09) with rate of 3.4 L/m^2·min (5 gal/ft^2·h)

1 cycle of 15 minutes at 479 Pa (10.0 psf)

NOTE: A stream ran down the vertical seam not penetrating the interior

NOTE: Small droplets formed at the vertical/ horizontal junction

NOTE: Water appearing was not in excess of 5% of barrier surface

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Paragraph	Test
5.7	Dynamic Water Penetration Resistance AAMA 501.1 with rate of 3.4 L/m^2·min (5 gal/ft^2·h)

1 cycle of 15 minutes at 479 Pa (10.0 psf)

NOTE: Small droplets formed at the vertical/ horizontal junction

NOTE: Water appearing was not in excess of 5% of barrier surface

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Paragraph	Test
5.8	Static Pressure Loading ASTM E330-14 at client specified pressures

Horizontal

No damage after positive	1200 Pa (25 psf) held for 10 seconds
No damage after negative	1200 Pa (25 psf) held for 10 seconds

Measured Deflection $_{Positive}$	=	1.47 mm (0.058 inches)
Measured Deflection $_{Negative}$	=	2.16 mm (0.085 inches)
Measured Permanent Set $_{Positive}$	=	0.10 mm (0.004 inches)

Measured Permanent Set $_{Negative}$ = 0.15 mm (0.006 inches)

Vertical

No damage after positive	1200 Pa (25 psf) held for 10 seconds
No damage after negative	1200 Pa (25 psf) held for 10 seconds

Measured Deflection $_{Positive}$	= 2.79 mm (0.110 inches)
Measured Deflection $_{Negative}$	= 4.39 mm (0.173 inches)
Measured Permanent Set $_{Positive}$	= <0.03 mm (<0.001 inches)
Measured Permanent Set $_{Negative}$	= 0.20 mm (0.008 inches)

Official Observers:

Justin Bupp	National Certified Testing Laboratories
Robert Wm. DeFayette	National Certified Testing Laboratories
Jay Leader	National Certified Testing Laboratories

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Attachments
Appendix A – Revision Log
Appendix B – Test Mockup Drawing (1)
Appendix C – Photographs (6)