



TEST REPORT

Report No.: E1595.01-901-44

Rendered to:

UNEEKE FABRICATION INC.
American Fork, Utah

PRODUCT TYPE: Wall Cladding System
SERIES/MODEL: uNeeke Composite Panel Series 4000

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

Test Date: 10/22/14
Test Record Retention Date: 10/22/18
Report Date: 11/14/14

1.0 Report Issued To: uNeeke Fabrication Inc.
568 East 1700 South, Suite #5
American Fork, UT 84003

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: Wall Cladding System

3.2 Series/Model: uNeeke Composite Panel Series 4000

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 Date: 10/22/14

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>
David Southam	Southam and Associates
Jonathan Alama	Southam and Associates
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.

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/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:

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 size (1)	2438	96	1213	47-3/4
Panel size (1)	1918	75-1/2	1213	47-3/4
Panel size (1)	508	20	1213	47-3/4

5.2 Panel Construction: The test specimen was constructed of three 4 mm (0.15") thick aluminum composite panels. Aluminum extrusions were sealed and secured to the panel perimeter with #8 by 1" screws at approximately 406 mm (16") spacing. The bottom of each panel utilized 12.7 mm (1/4") diameter weeps at approximately 406 mm (16") spacing: six across the large panel, five across the medium panel, and 2 across the small panel.

5.0 Test Specimen Description: (Continued)

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 8 wood buck. The stud wall was covered with 3/16" 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 back side 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 extruded aluminum "H" stiffeners, 44 mm x 32 mm (1-3/4" x 1-1/4"), were evenly spaced and adhered to each of the two larger panels with adhesive sealant.

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

The panels were installed from bottom to top and mounted on 1/4" shims. The sill utilized metal flashing overlapped at the top with an adhesive flexible membrane, which was also adhered to the polycarbonate.

At the horizontal joint, the aluminum extrusions were secured to the studs with #12 by 2-1/2" screws at approximately 813 mm (32") spacing, except that the 508 mm (20") wide panel is secured at the top with two screws at approximately 406 mm (16") spacing. The aluminum panel extrusions interlocked into one another at the vertical and horizontal joints. Around the perimeter of the system, the aluminum extrusions were secured to the 2 x 8 frame with #12 x 2-1/2" screws at approximately 406 mm (16") spacing.

5.6 Cavity Depth: 51 mm (2")

5.7 Vent Area (Weeps): 0.002 m² (3.25 in²)

5.8 Air Cavity Volume to Vent Area Ratio: 151 m³/m² (473 ft³/ft²)

6.0 Test Results: The temperature during testing was approximately 21°C (70°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	0.01 sec.	0.08 sec. max.	2
Cycle Pressure Difference	29 Pa (0.6 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)	0.09 m ² (0.94 ft ²)	0.30 m ² (3.20 ft ²)	3
PASS / FAIL	PASS	-----	

Dynamic Water Penetration (per AAMA 501.1)

Pressure	Results	Allowed	Note
300 Pa (6.24 psf)	0.17 m ² (1.79 ft ²)	0.30 m ² (3.20 ft ²)	4
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 intersection of the sill and vertical joint in the form of mist or droplets.

Note #4: Water on the polycarbonate air/water barrier surface was present at the sill and at the intersection of the horizontal and vertical joints 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 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: Brian L. Rasmussen

Brian L. Rasmussen
Technician


Digitally Signed by: Jeffrey L. Dideon

Jeffrey L. Dideon
Director – Regional Operations

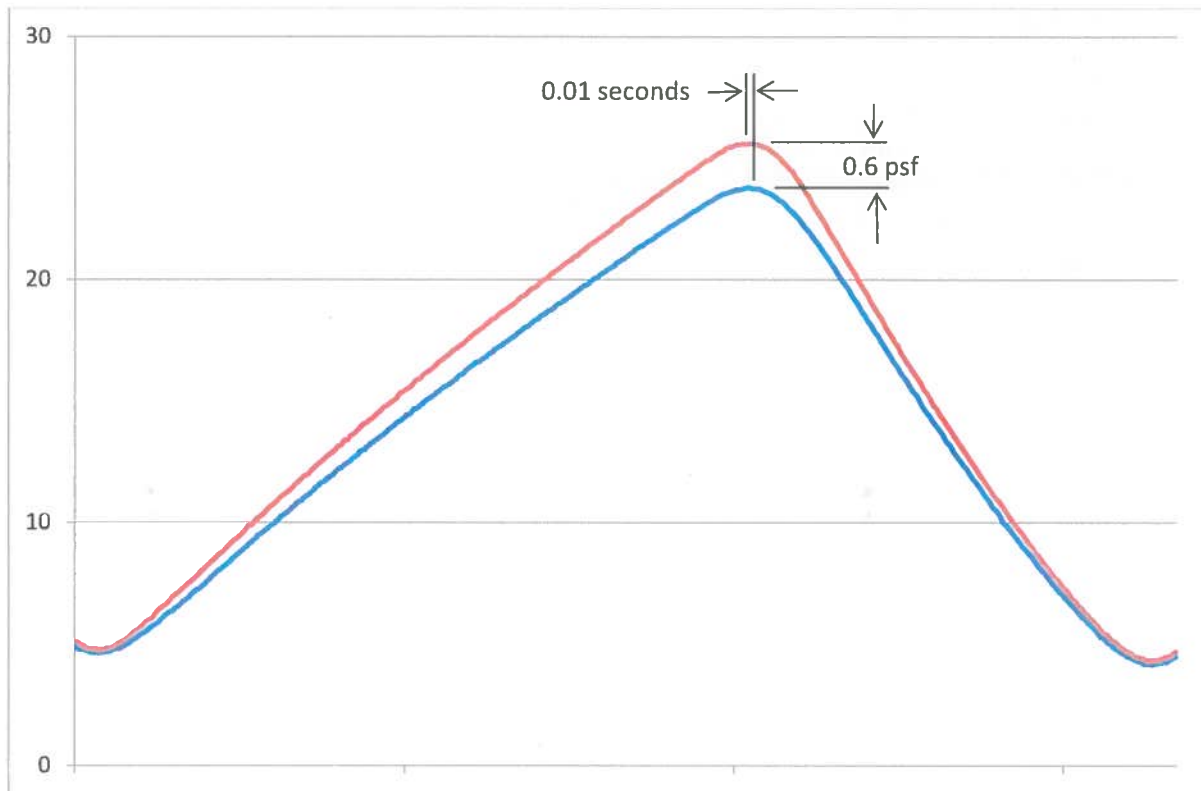
BLR:pac

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Graph (1)
- Appendix-B: Photographs (1)
- Appendix-C: Drawings (4)

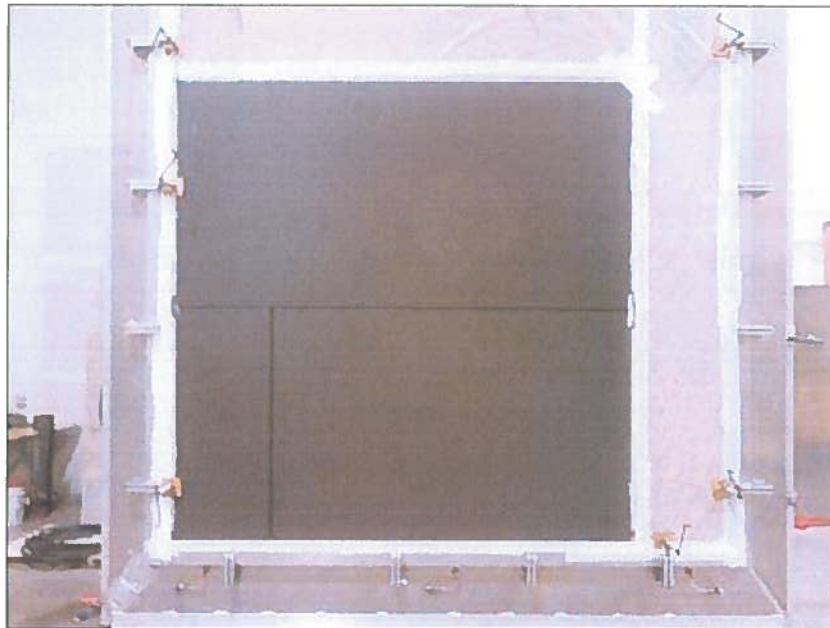
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Appendix A
Graph

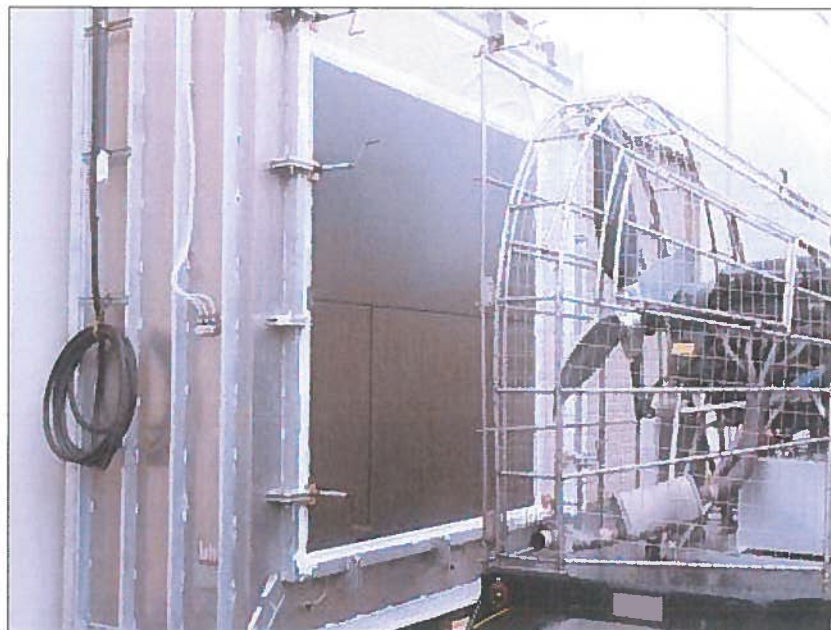


Appendix B

Photographs



Test specimen



Dynamic water test setup

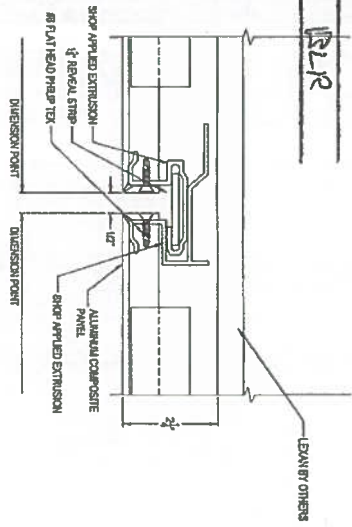
Appendix C
Drawings



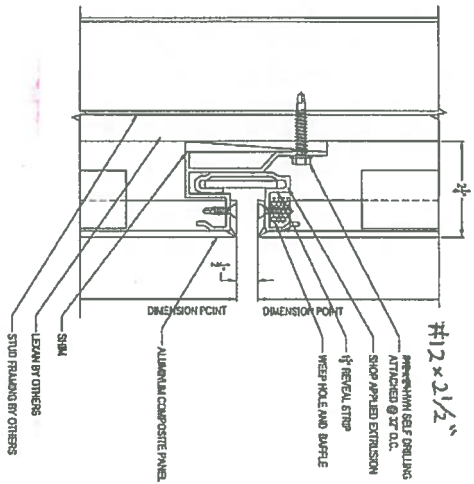
Architectural Testing

Test sample complies with these details.
Deviations are noted.

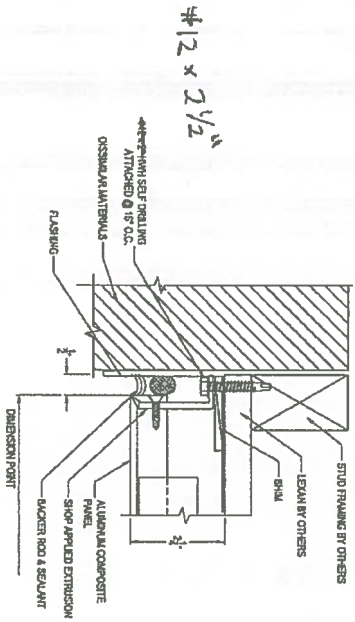
Report# ELS95
Date 11/11/14 Tech DLR



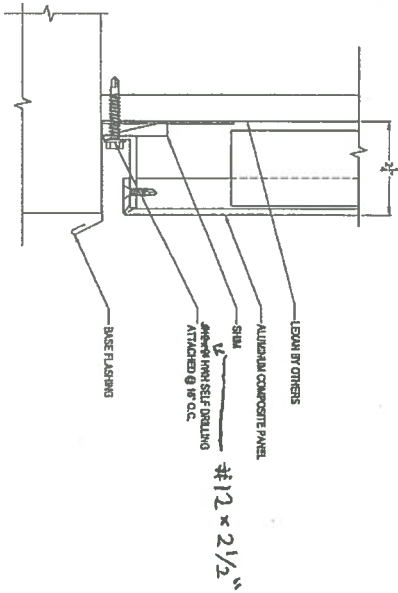
1 VERTICAL JOINT (TYP)
REF:



2 HORIZONTAL JOINT (TYP)
REF:



3 ACM TERMINATION DETAIL
REF:



4 ACM BASE DETAIL
REF:

UNEKE AAMA 508 TESTING



UNEKE -20
FABRICATIONS
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HEBER CITY, UT 84602
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SCALE	DATE	REVISIONS	NO.
BY: JVA	10/14/14		
CHECKED BY: JVA			
APPROVED BY: JVA			

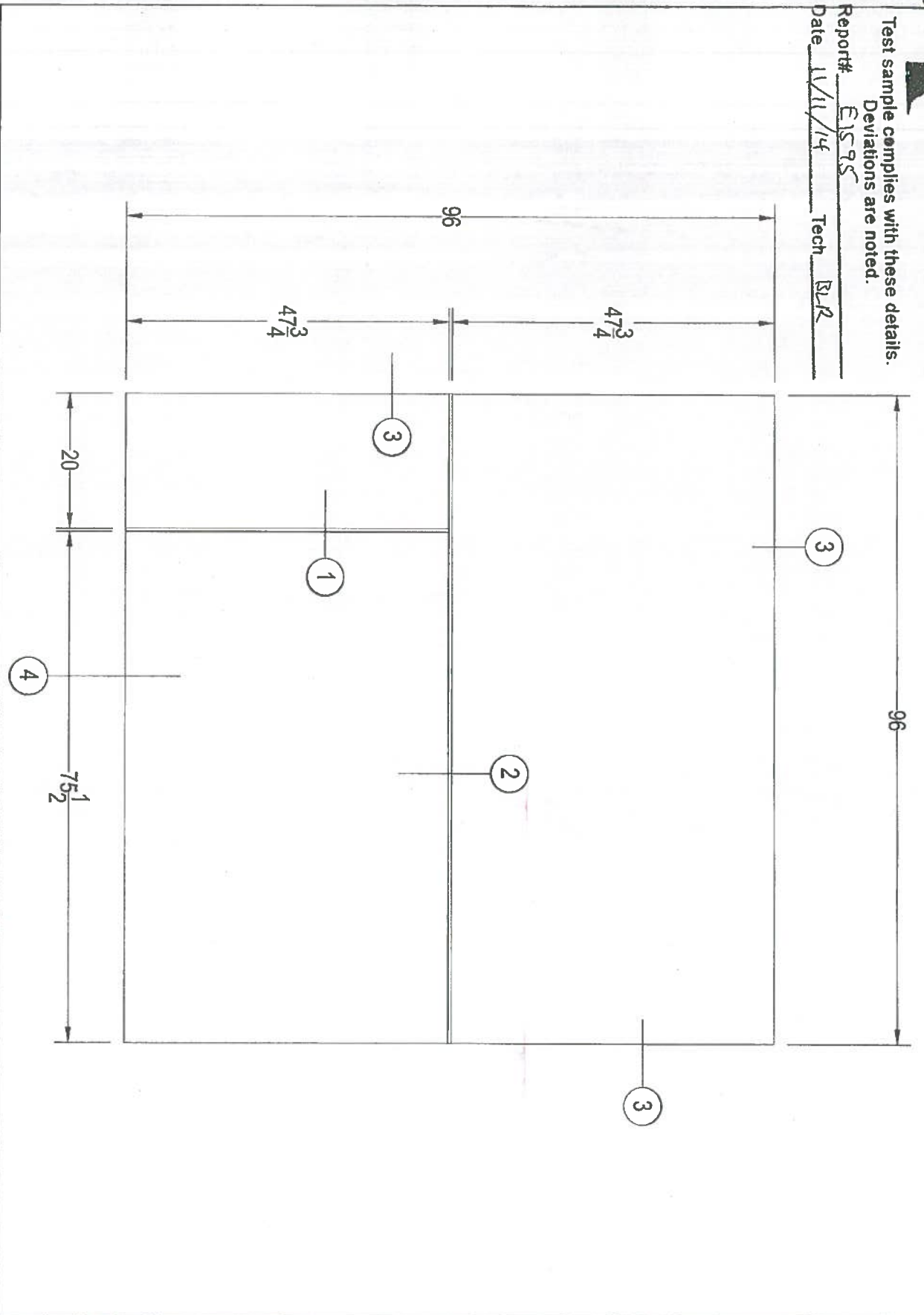
D1



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report# EJ595
Date 11/11/14 Tech BLR



NO.	REVISIONS:	DATE

Scale: _____
 Date: 10/14/14
 Project: JCA
 Location: HEBER CITY, UT 84022
 Designer: _____

UNEKE AAMA 508 TESTING



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ELEVATION