

**TEST REPORT**

**Report No.:** A9814.01-109-44

**Rendered to:**

BAMCO INC.  
Middlesex, New Jersey

**PRODUCT TYPE:** Wall Cladding System

**SERIES/MODEL:** Dry Concept

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

**Test Dates:** 05/06/11

**Through:** 05/12/11

**Report Date:** 05/24/11

**Test Record Retention Date:** 05/12/15

**1.0 Report Issued To:** Bamco Inc.  
30 Baekeland Avenue  
Middlesex, New Jersey 08846-2601

**2.0 Test Laboratory:** Architectural Testing, Inc.  
130 Derry Court  
York, Pennsylvania 17406-8405  
717-764-7700

**3.0 Project Summary:**

**3.1 Product Type:** Wall Cladding System

**3.2 Series/Model:** Dry Concept

**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:** 05/06/2011 - 05/12/2011

**3.5 Test Location:** Architectural Testing, Inc. test facility in York, Pennsylvania.

**3.6 Test Sample Source:** The test specimen was provided by the client. Representative samples of the test specimen(s) will be retained by Architectural Testing for a minimum of four years from the test completion date.

**3.7 Drawing Reference:** The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Architectural Testing per the drawings located in Appendix C. Any deviations are documented herein or on the drawings.

**3.8 List of Official Observers:**

<u>Name</u>	<u>Company</u>
Thomas Lawlor	Architectural Testing, Inc.
Michael D. Stremmel, P.E.	Architectural Testing, Inc.
Scott Gill	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 (6.2 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<sup>2</sup>.

**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 (6.2 psf) for a 15 minute duration. Water was applied to the mock-up at a minimum rate of 5 gal/hr/ft<sup>2</sup>.

#### 5.0 Test Specimen Description:

##### 5.1 Product Sizes:

Overall Area: 5.9 m <sup>2</sup> (64.0 ft <sup>2</sup> )	Width		Height	
	millimeters	inches	millimeters	inches
Overall size	2438	96	2438	96
#1 panel	1203	47-3/8	445	17-1/2
#2 panel	1203	47-3/8	597	23-1/2
#3, #5, and #8 panel	1203	47-3/8	610	24
#4, #6, and #7 panel	1203	47-3/8	457	18
#9 and #10 panel	1203	47-3/8	203	8

**General Note:** Refer to Elevation Drawing for panel locations.

## 5.0 Test Specimen Description: (Continued)

### 5.2 Panel Construction:

The wall was constructed of 10 panels that measured 2 mm (0.075") thick aluminum. The panels utilized a 1-1/4" long, 90° inward bend. The top edge of each panel also incorporated an additional 2-3/4" long 90° upward bend. The bottom edge of the panels utilized a 3/4" long, 90° upward bend. The corners of all panels were welded.

### 5.3 Test Wall Construction:

The 96" wide by 96" high test wall was constructed of 16 gauge, 6" galvanized steel studs. The steel studs were spaced 16" on center inside a 2x10 wood buck. The stud wall was covered with 1/8" thick clear lexan, 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 lexan 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. The exterior of the test unit was sealed to the wood buck with silicone.

**5.4 Reinforcement:** No reinforcement was utilized.

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

A 4" by 2-5/8" by 0.050" thick aluminum base flash was utilized at the base of the wall, secured with #10 x 3/4" pan head screws, spaced 16" on center at each stud location. The sides and top of the wall utilized a 4" by 2-5/8" by 0.050" thick aluminum termination flash, secured with #10 x 3/4" pan head screws, spaced 16" on center. The corners where the base flash met the termination flash were sealed with butyl back flashing tape. A 7/8" by 16 gauge vertical steel Z-Girt was utilized at each steel stud secured through the lexan with #10-16 x 1-1/2" TEK 3 HWH screws, located 1" from each end and spaced 24" on center (Reference Drawing #SK-D-1F, Detail 2 D-1F).

## 5.0 Test Specimen Description: (Continued)

### 5.5 Installation: (Continued)

An aluminum clip extrusion was utilized at the base of the wall and secured with #10-16 x 1" TEK 3 HWH screws at each Z-girt (Reference Drawing #SK-D-3F, Detail 5 D-3F). The bottom of the bottom panels were secured under the clip extrusion and a clip extrusion and the top of the panels were secured with #10-16 x 1 LG. TEK 3 HWH screws at each Z-girt (Reference Drawing #SK-D-2F, Detail 4-D-2F). The top panels were set into the clip extrusions of the panel below (Reference Drawing #SK-D-2F, Detail 4-D-2F) and the extruded aluminum vertical joint clip (Reference Drawing #SK-D-2F, Detail 3-D-2F). The vertical clip was overlapped, sealed, and welded at each horizontal joint and secured by spot welding to one side of the panels.

The bottom edge of each panel utilized three 1/4" diameter weepholes, located 12" from each end and midspan. The weepholes were covered with open cell foam which was secured to the interior of the panel with silicone. The vertical joint allowed for a 96" high by 1/8" wide ventilation joint.

**5.6 Cavity Depth:** 54 mm (2-1/8")

**5.7 Air Cavity Volume to Vent Area Ratio:** 36.9 m<sup>3</sup>/m<sup>2</sup> (121 ft<sup>3</sup>/ft<sup>2</sup>)

**6.0 Test Results:** The temperature during testing was 22°C (72°F). The results are tabulated as follows:

**Air Leakage Calibration (Infiltration per ASTM E 283)**

Pressure	Results	Allowed	Note
75 Pa (1.57 psf)	0.6 L/s/m <sup>2</sup> (0.12 cfm/ft <sup>2</sup> )	0.6 L/s/m <sup>2</sup> (0.11 cfm/ft <sup>2</sup> ) min. 0.7 L/s/m <sup>2</sup> (0.13 cfm/ft <sup>2</sup> ) 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	<0.01sec.	0.08 sec. max.	2, 3
Cycle Pressure Difference	<0.5 Pa (<0.01 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)	0.001 m <sup>2</sup> (0.01 ft <sup>2</sup> )	0.30 m <sup>2</sup> (3.20 ft <sup>2</sup> )	4, 5
PASS	PASS		

**Dynamic Water Penetration (per AAMA 501.1)**

Pressure	Results	Allowed	Note
300 Pa (6.24 psf)	0.21 m <sup>2</sup> (2.26 ft <sup>2</sup> )	0.30 m <sup>2</sup> (3.20 ft <sup>2</sup> )	4, 5
PASS	PASS		

## 6.0 Test Results: (Continued)

*Note #1: The calibrated leakage was achieved with sixty one, 1/8" diameter holes were drilled through the polycarbonate. All holes were evenly distributed in each stud cavity and located 6" above the bottom and the midspan of the wall.*

*Note #2: Pressure tap was attached through the air barrier at (center of the #6 panel).*

*Note #3: Reference Pressure Cycling graph in Appendix A.*

*Note #4: Water percolated at the bottom of the panel at the weeps. Water was visibly present on the polycarbonate.*

*Note #5: Water on the polycarbonate air/water barrier surface was 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 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.

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Scott Gill  
Senior Technician

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Michael D. Stremmel, P.E.  
Senior Project Engineer

SG:dem

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)



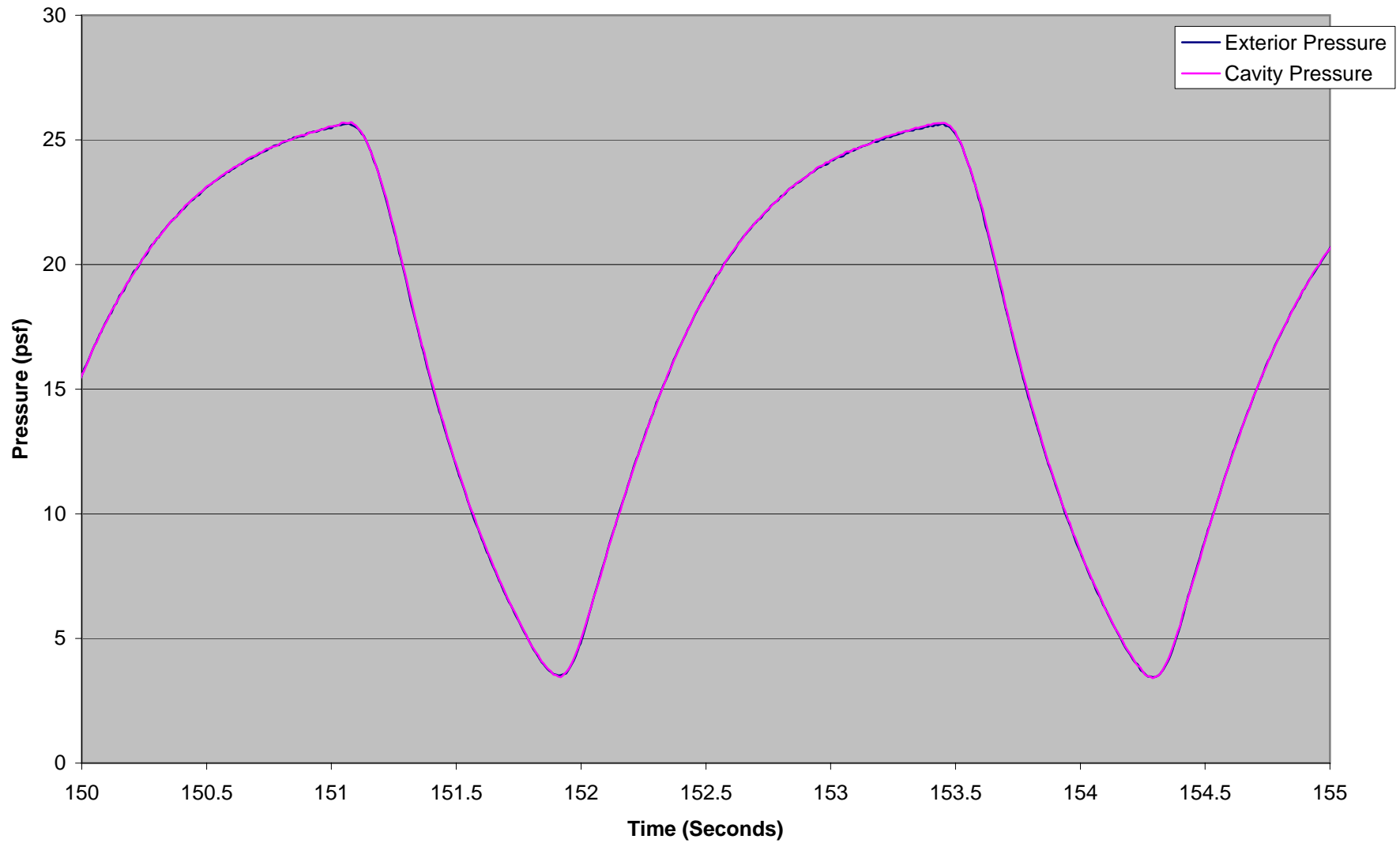


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## **Appendix A**

### **Graph**

### AAMA 508 Pressure Cycling



## Appendix B Photographs



**Photo No. 1  
Exterior View of Tested Wall System**



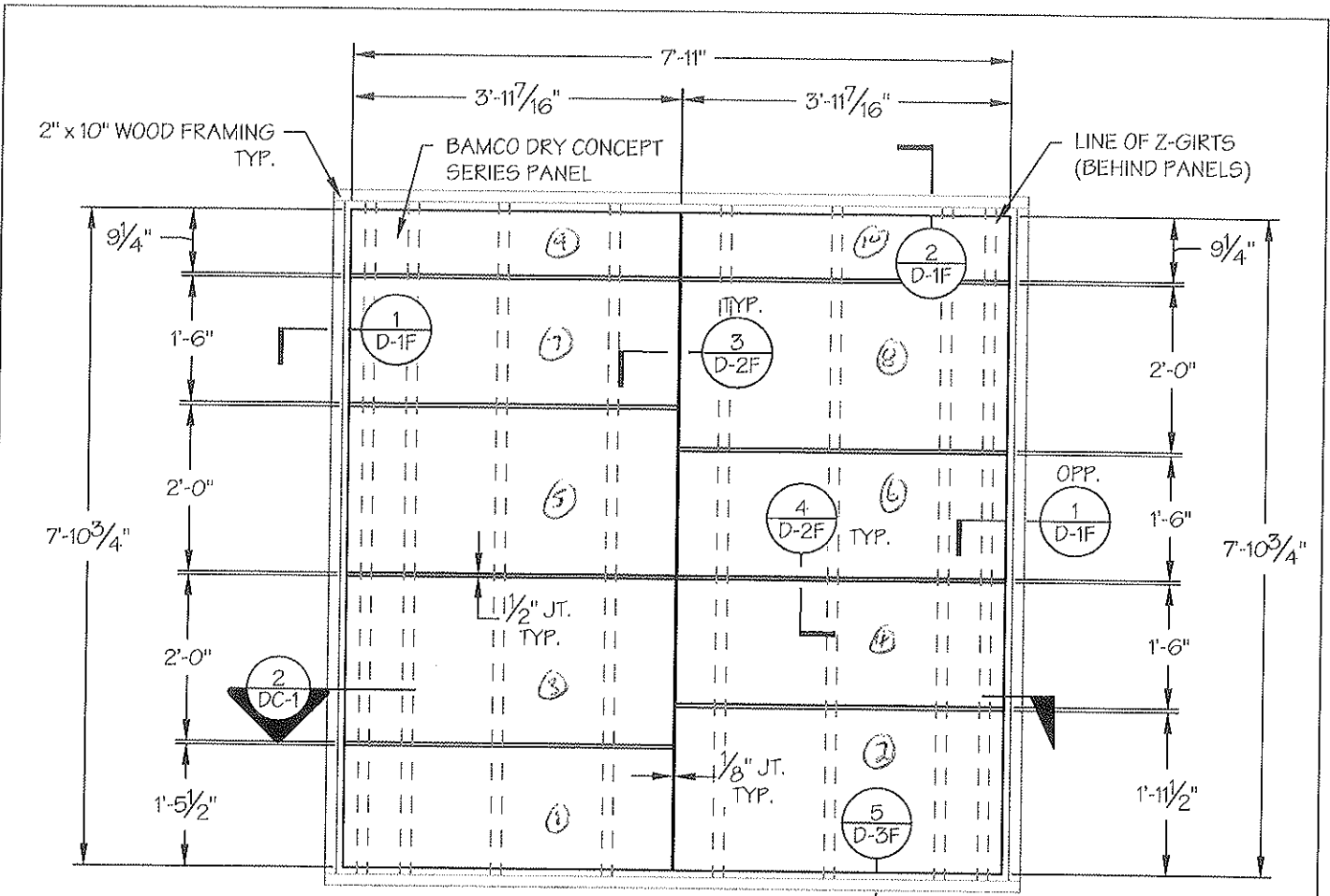
**Photo No. 2  
Interior View of Tested Wall System**



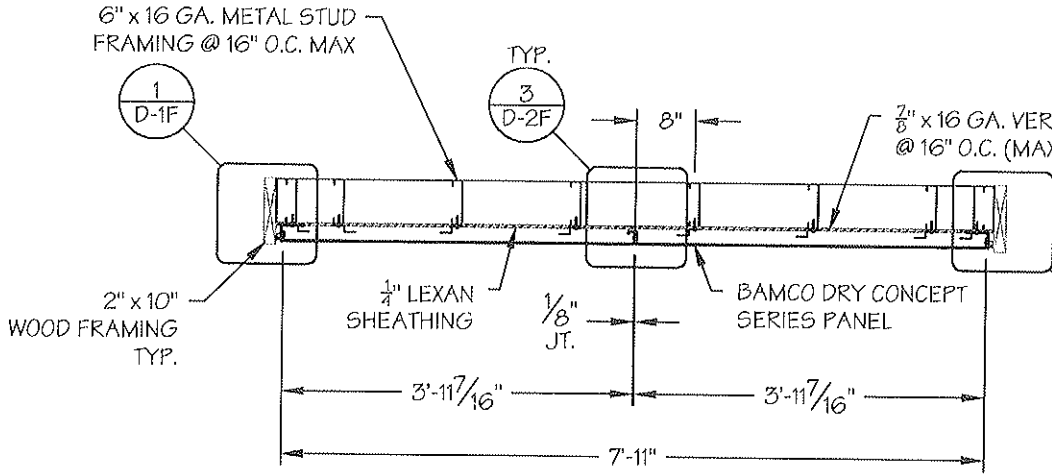
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## **Appendix C**

### **Drawings**



1 ELEVATION DRY CONCEPT  
DC-1 1/2" = 1'-0" Re: N/A



2 FLOOR PLAN DRY CONCEPT  
DC-1 1/2" = 1'-0" Re: N/A

Architectural Testin.  
Test sample complies with these details.  
Deviations are noted.  
Report# A9814  
Date 6/5/12/11  
Tech. S. G. ...

STIFFENER SPACING TO BE DETERMINED

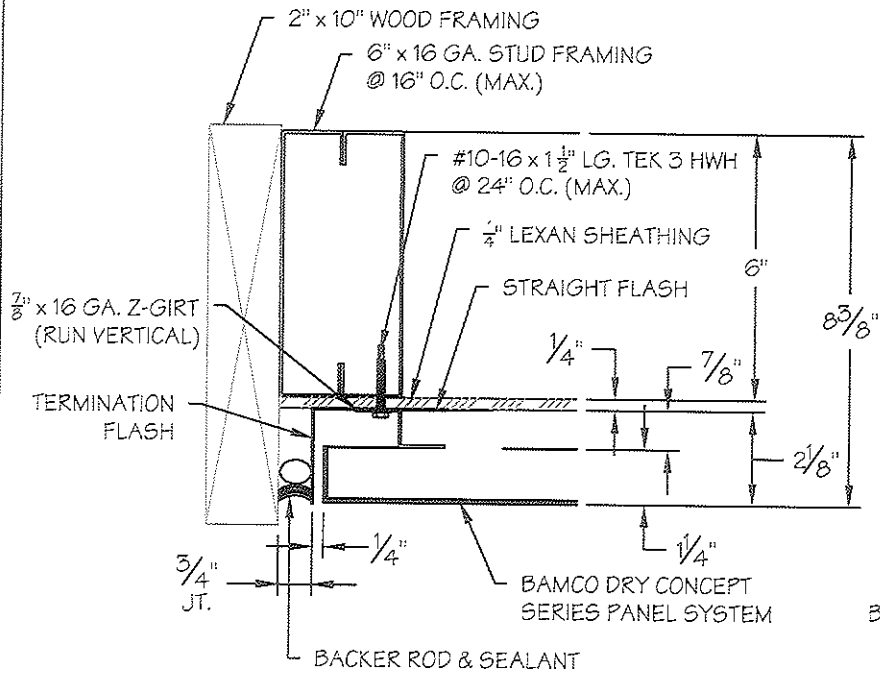
**8'-0" X 8'-0" PAGE 1 OF 4**  
**SYSTEM TEST - DRY CONCEPT**

**BAMCO inc.**  
30 Backland Avenue, Middlesex, NJ 08846

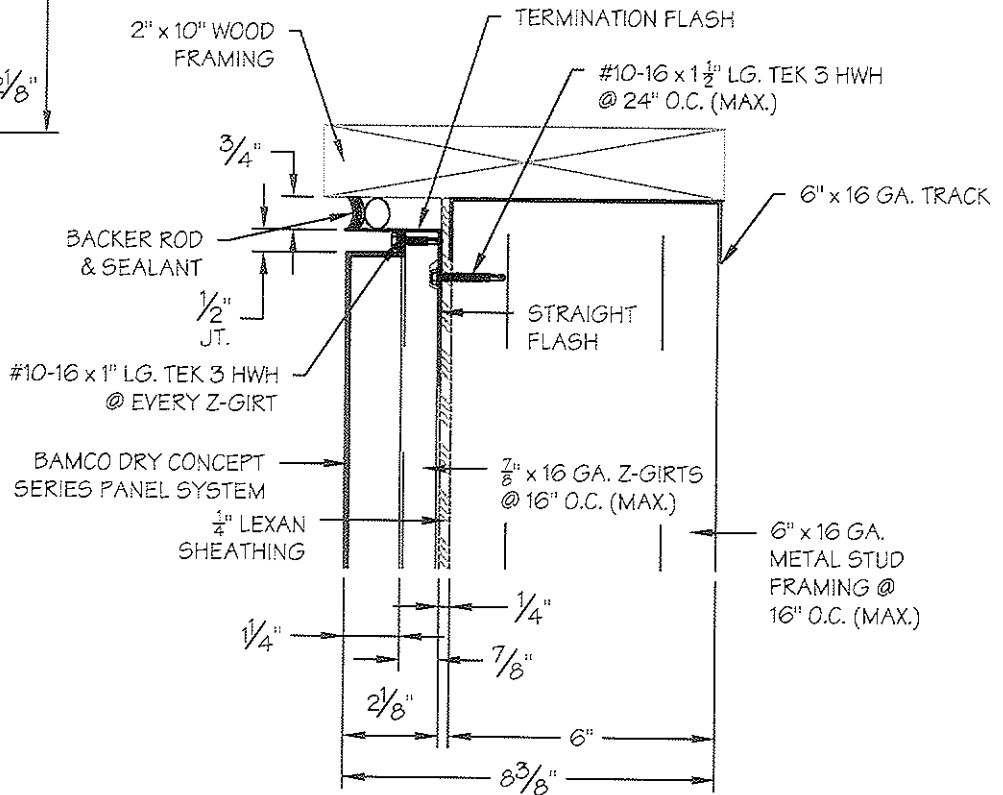
PHONE: (732) 302-0889 FAX: (732) 302-8458	Project Name/Address: SYSTEM TEST 2011	Drawing No.
	General Contractor: PRESSURE EQUALIZED TEST DRY CONCEPT SYSTEM	SK-
BAMCO Project No.:	Drawn By: GB	DC-1
	Date: 4/12/11	Scale: 1/2" = 1'-0"

**Architectural Testing**  
 Test sample complies with these details.  
 Deviations are noted.

Report# A9814  
 Date 05/17/11 Tech S. G. ...



**1 VERTICAL TERMINATION**  
 D-1F 3" = 1'-0" Re: N/A



**2 HORIZONTAL TERMINATION**  
 D-1F 3" = 1'-0" Re: N/A

**DETAILS - TERM.**

**BAMCO inc.**

30 Baekeland Avenue, Middlesex, NJ 08846

PHONE: (732) 302-0889  
 FAX: (732) 302-9486

Project Name/Address: SYSTEM TEST 2011

General Contractor: DRY CONCEPT SERIES SYSTEM DETAILS

BAMCO Project No:

Drawn By: GB

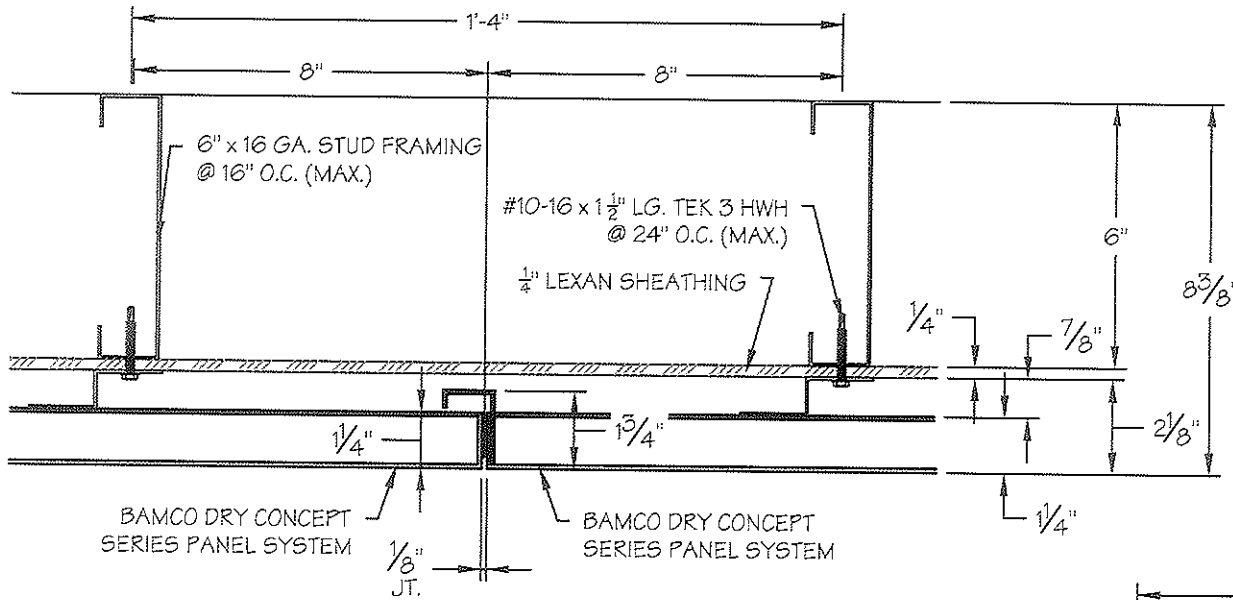
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Scale: 3" = 1'-0"

Drawing No.

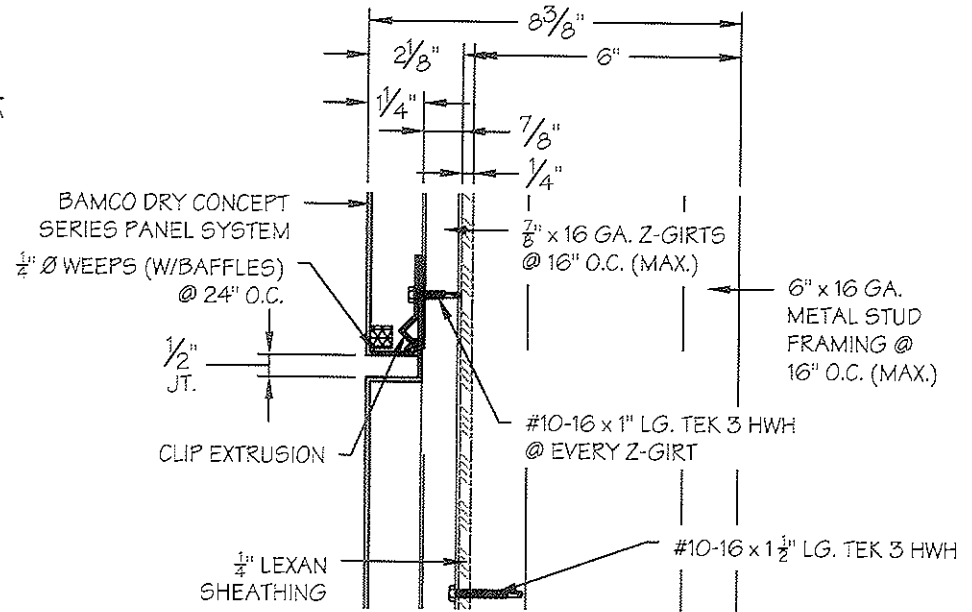
SK-

D-1F



3 VERTICAL JOINT DRY CONCEPT  
 D-2F 3" = 1'-0" Re: N/A

**Architectural Testing**  
 Test sample complies with these details.  
 Deviations are noted.  
 Report# A9814  
 Date 05/17/11  
 Tech S. GUY



4 HORIZONTAL JOINT DRY CONCEPT  
 D-2F 3" = 1'-0" Re: N/A

**DETAILS - JOINTS**

**BAMCO inc.**

PHONE: (732) 302-0889  
 FAX: (732) 302-9456

30 Backeland Avenue, Middlesex, NJ 08846

Project Name/Address: SYSTEM TEST 2011

General Contractor: DRY CONCEPT SERIES SYSTEM DETAILS

BAMCO Project No:

Drawn By: GB

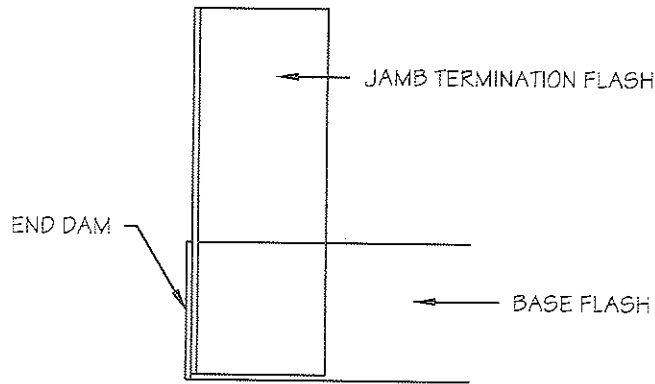
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Scale: 3" = 1'-0"

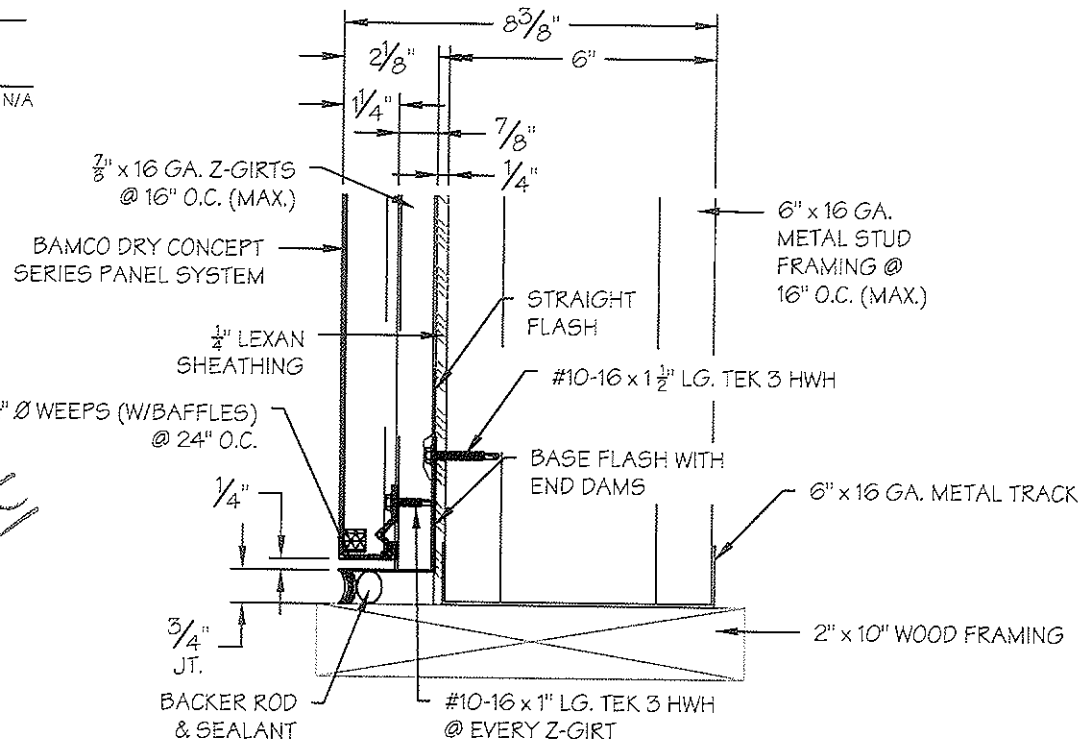
Drawing No.

SK-

D-2F



6 End Dam Detail  
 D-3F 3" = 1'-0" Re: N/A



5 HORIZONTAL BASE TERMINATION  
 D-3F 3" = 1'-0" Re: N/A

Architectural Testing  
 Test sample complies with these details.  
 Deviations are noted.  
 Report# A9514  
 Date 05/10/11 Tech S.G.W.C.

<b>DETAILS - BASE TERM.</b>	<b>BAMCO inc.</b> 30 Backland Avenue, Middlesex, NJ 08846	PHONE: (732) 302-0889	Project Name/Address: SYSTEM TEST 2011		Drawing No. SK- D-3F
		FAX: (732) 302-9436	General Contractor: DRY CONCEPT SERIES SYSTEM DETAILS		
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