Farabaugh Engineering and Testing Inc.

Project No. T207-21

Report Date: June 29, 2021

No. Pages: 15 (Inclusive)

6/29/21

DANIEL G. FARABAUGH LICENSE No 48349 STATE OF FLORIDA PROFESSIONAL ENGINEER

PERFORMANCE REPORT

AAMA 508-07
RAIN SCREEN SYSTEM TESTING

ON

MODULARAL METAL PANEL
24" WIDE COVERAGE X 0.050" ALUMINUM

FOR

PETERSEN ALUMINUM CORP.
10551 PAC RD.
TYLER, TX. 75707

DANIEL G. FARABAUGH, P.E.
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Approved by:

Daniel G. Farabaugh

RAIN SCREEN SYSTEM TESTING

Purpose

The purpose of this test is to establish Air and Water Infiltration Rates and the Pressure Equalization Behavior on the referenced Pressure Equalized Rain Screen Wall Cladding System in general accordance with AAMA 508-07 "Voluntary Test Method and Specification for Pressure Equalized Rain Screen Wall Cladding Systems".

Test Completion Date

May 19, 2021

Test Specimen

Manufacturer: Petersen Aluminum Corp.
10551 Pac Rd.
Tyler, TX. 75707

Panel Specimen: ModularAL Metal Panel 24" wide coverage x 0.050" Aluminum
(See Dwg. A105 for panel construction.)

Mock-up Size: 96" wide X 96 high (nominal) consisting of 12 panels x 24" wide x various lengths of 0.050" thick aluminum panels.

Mock up -Installation

- The test setup consisted of a 96" wide x 96" high mock-up that used 6" x 16 ga. vertical channel studs spaced at 24" o.c that were attached to the top and bottom horizontal 16 ga. channel track.

- 1/4" thick polycarbonate panel was supported by the vertical stud supports.

- The aluminum panel support consisted of 16 ga. Zee horizontal supports attached thru the polycarbonate panel and into 16 ga. vertical channel supports using #12 x 1" long wafer-head self -drilling screws. Additional vertical Zee supports were used at the panel clip locations.

- A 16 ga. lower "J" channel was along the bottom and two sides of the mock-up. The "J" channel had predrilled holes thru the top leg and a #12 -14 x 1-1/2" long wafer-head self-drilling screws spaced at 22" o.c. secured the lower "J" channel into the 16 ga. stud/channel track. The lower "J" channel secured the ends of the zee supports.

- A starter clip was attached to the Zee support using #12 x 1" lg. wafer-head, self-drilling screws. A minimum of two fasteners per starter clip or 12" o.c max. spacing per clip based on length of clip.

- The starter panel engaged into a starter clip and was top-fastened with #12 x 1" lg. Stainless Steel Cap head w/EPDM Sealing washer fasteners at the predrilled holes spaced at 8" o.c. max. spacing.

- The vertical edge of the panel had two (2) clips to attach that edge to the 16 ga. vertical Zee supports using (2) #12 x 1" lg. wafer-head, self-drilling screws at each clip.
- A 0.08" aluminum "J" face trim was along the bottom and sides of the mock-up that sat on top of the lower "J" trim. The face trim was secured thru the lower 16 ga. trim and into stud supports with #14 x 3" lg. wafer-head, self-drilling screw spaced at 24" o.c..
- See installation details for location of fasteners at supports and attachment of each panel.

Air Barrier System

- The test setup consisted of a 96" wide by 96" high metal stud wall system with metal panels attached to the face of system with horizontal Zee supports for the panel system.
- Between the wall panels and the metal studs a 1/4" thick polycarbonate sheeting was attached to the supporting metal studs with Zee supporting fasteners. The 16 ga. metal studs spaced at 24" o.c to support the 1/4" polycarbonate. The stud wall with the polycarbonate panel is to simulate an air/water barrier.
- The perimeter of the polycarbonate was sealed with flashing tape to the exterior perimeter of the buck.
- A multiple number of 1/8" diameter holes were equally distributed on the air/water barrier in a uniform horizontal pattern located at 6" above each horizontal seam and 6" above the base of the mock-up. The polycarbonate wall was then calibrated to a pre-determined air leakage rate.
- The panel system was then mounted to the wood buck and sealed around the exterior perimeter of the specimen to the wood buck. Silicone sealant was along the sides and top of specimen and the bottom sat on foam tap at lower "J" trim location.
- Pressure taps were placed in the upper and bottom half of the chamber. See installation drawings for attachment of panels to air barrier system.

Test Procedure

The tests were conducted in accordance with AAMA 508-07 as shown in the following:

- ASTM E 283 " Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen",
- ASTM 1233, "Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
- ASTM E 331," Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference"
- AAMA 501.1, " Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure."

- - All tests are as modified by AAMA 508-07 - -

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

ASTM E-283
AIR LEAKAGE TEST (On Air/Water Barrier)

Test Specimen: ModularAL Metal Panel
Manufacturer: Petersen Aluminum Corp.
Air/Water Barrier = 64 sf
Specimen Area = 64 sf

Static Pressure Differential (psf)	Air Infiltration Rate (cfm/sf)	Allowable Air Leakage (cfm/sf)
1.57	0.11	0.108 (MIN) 0.132 (MAX)

Note: The calibrated air leakage was achieved with forty-two 1/8" diameter holes drilled thru the 3/16" polycarbonate.

ASTM E1233
PRESSURE CYCLIC TEST

Min. Test Pressure (psf)	Max Test Pressure (psf)	Cyclic Period (sec)	Total Cycles	Peak Pressure Time Shift ≤ 0.08 sec ?	Peak Pressure Differentials <50 %
5	25	3	100	Yes	Yes

See Pressure Cycling Graph

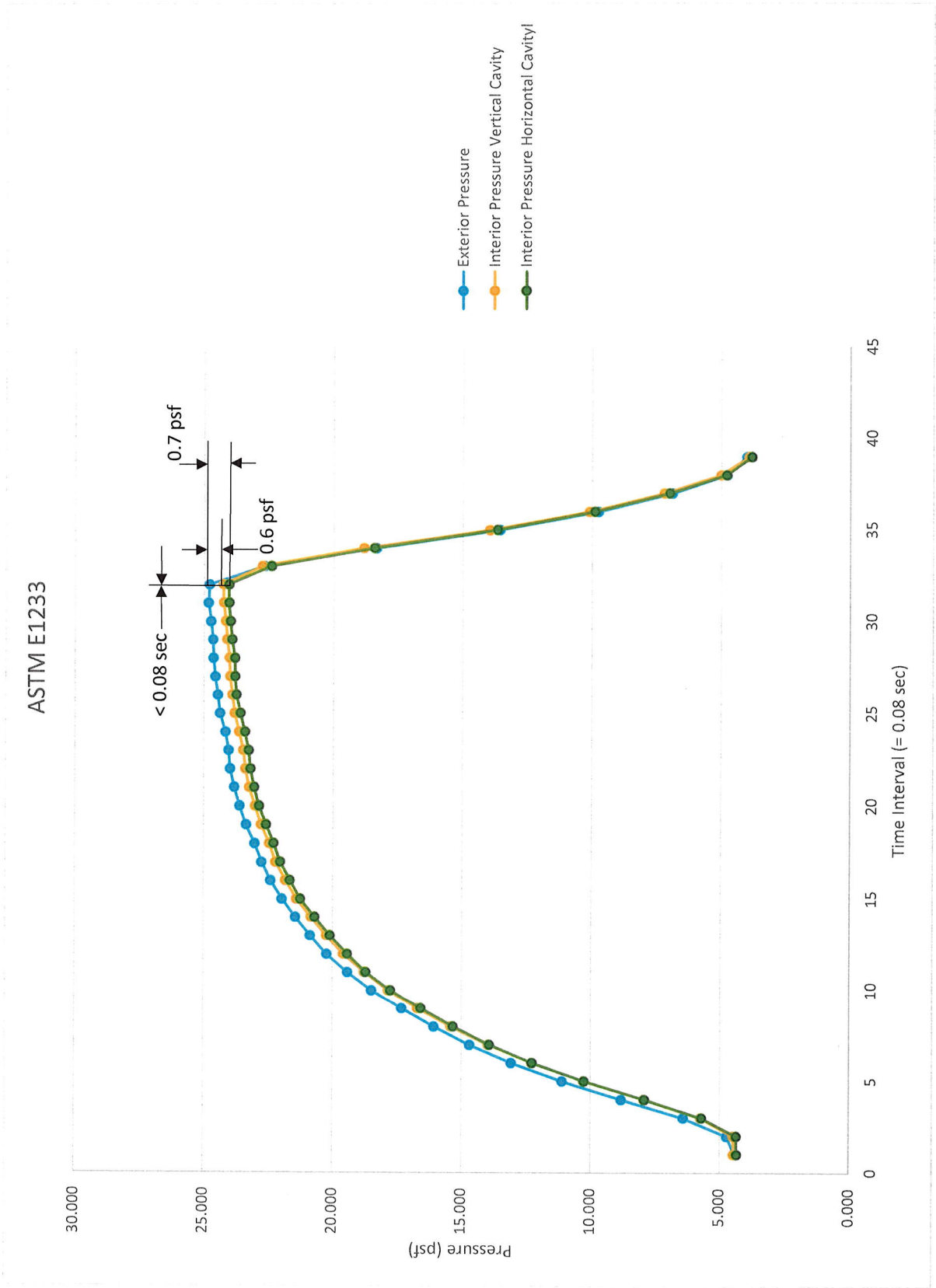
ASTM E-331
STATIC WATER PENETRATION TEST

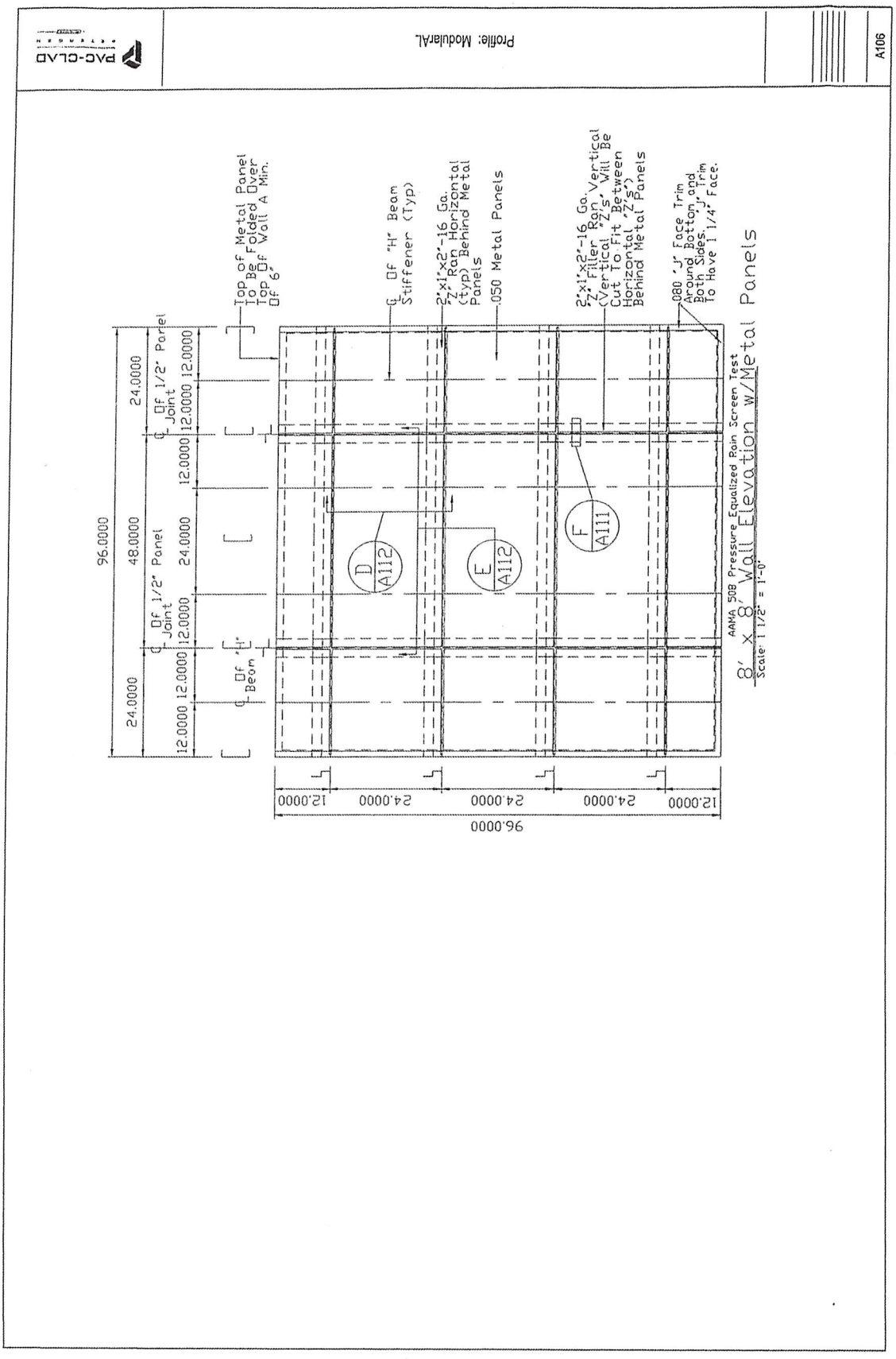
Static Pressure Differential (psf)	Spray Rate (gal/hr/sf)	% Water Droplets on Air/Water Barrier	Allowable % of Water Droplets on Air/Water Barrier	Location of any Streaming Water on Air/Water Barrier
6.24	5	< 5	5.0	None

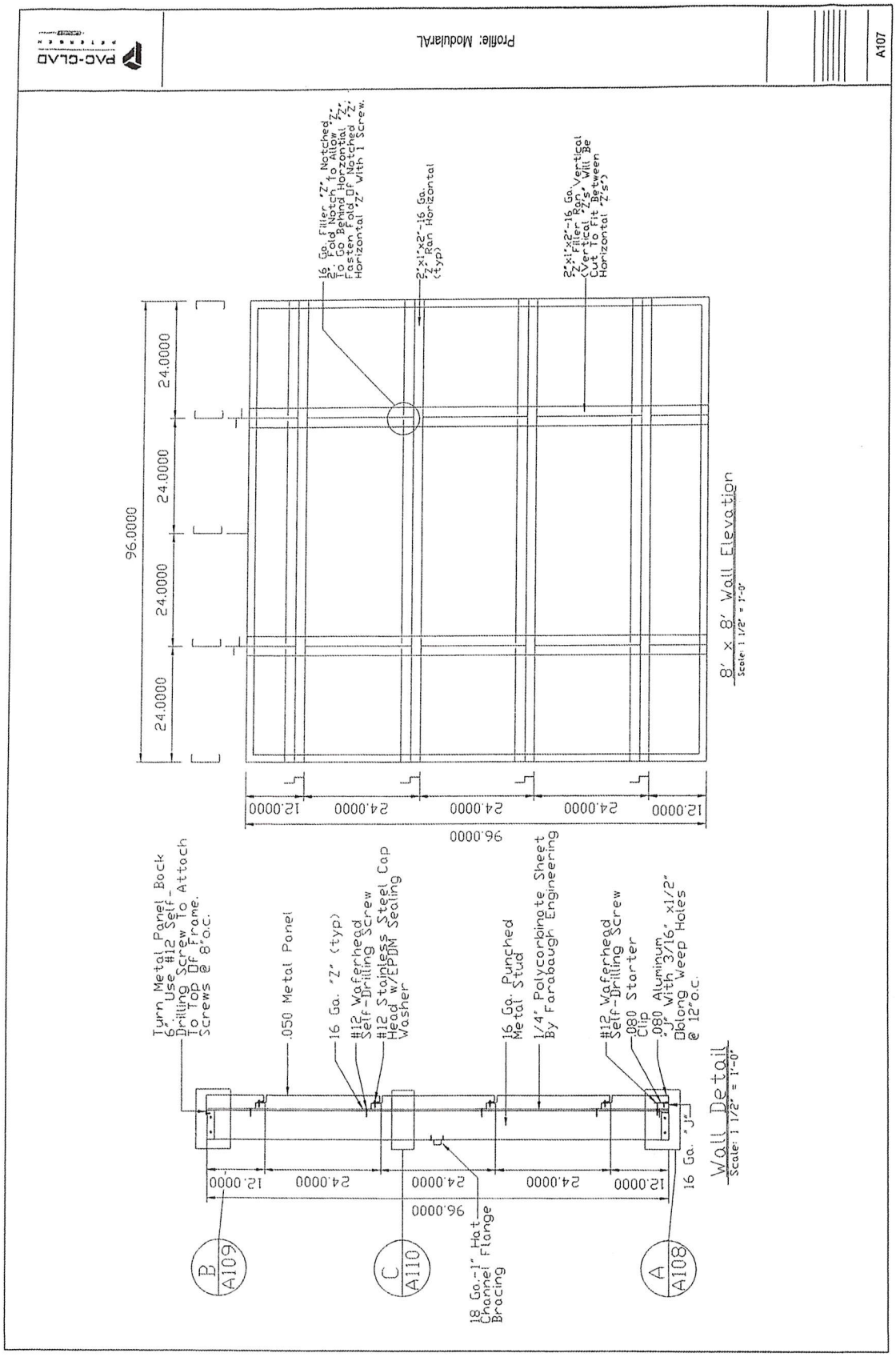
AAMA 501.1
DYNAMIC WATER PENETRATION TEST

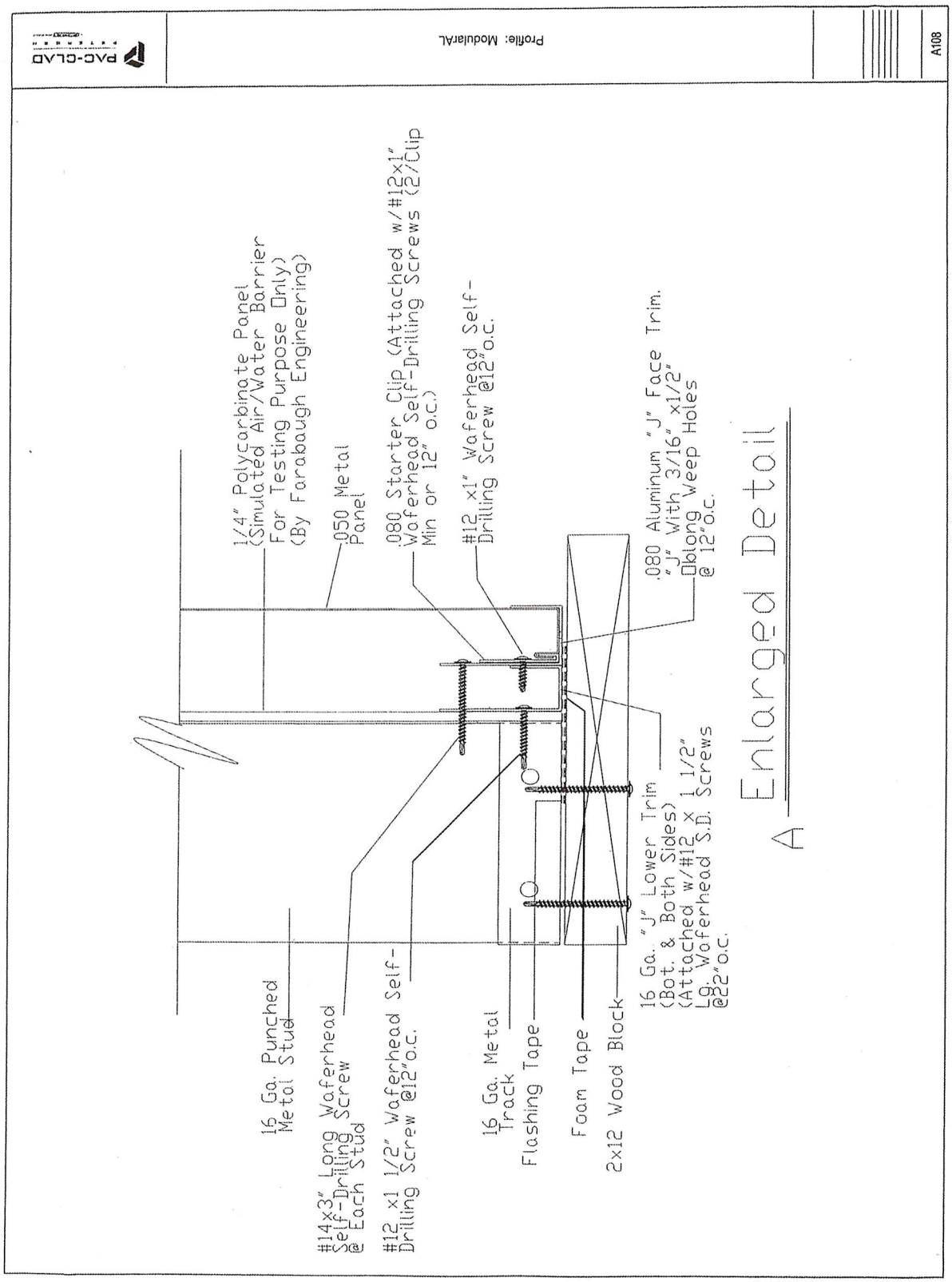
Static Pressure Differential (psf)	Spray Rate (gal/hr/sf)	% Water Droplets on Air/Water Barrier	Allowable % of Water Droplets on Air/Water Barrier	Location of any Streaming Water on Air/Water Barrier
6.24	5	< 5	5.0	None

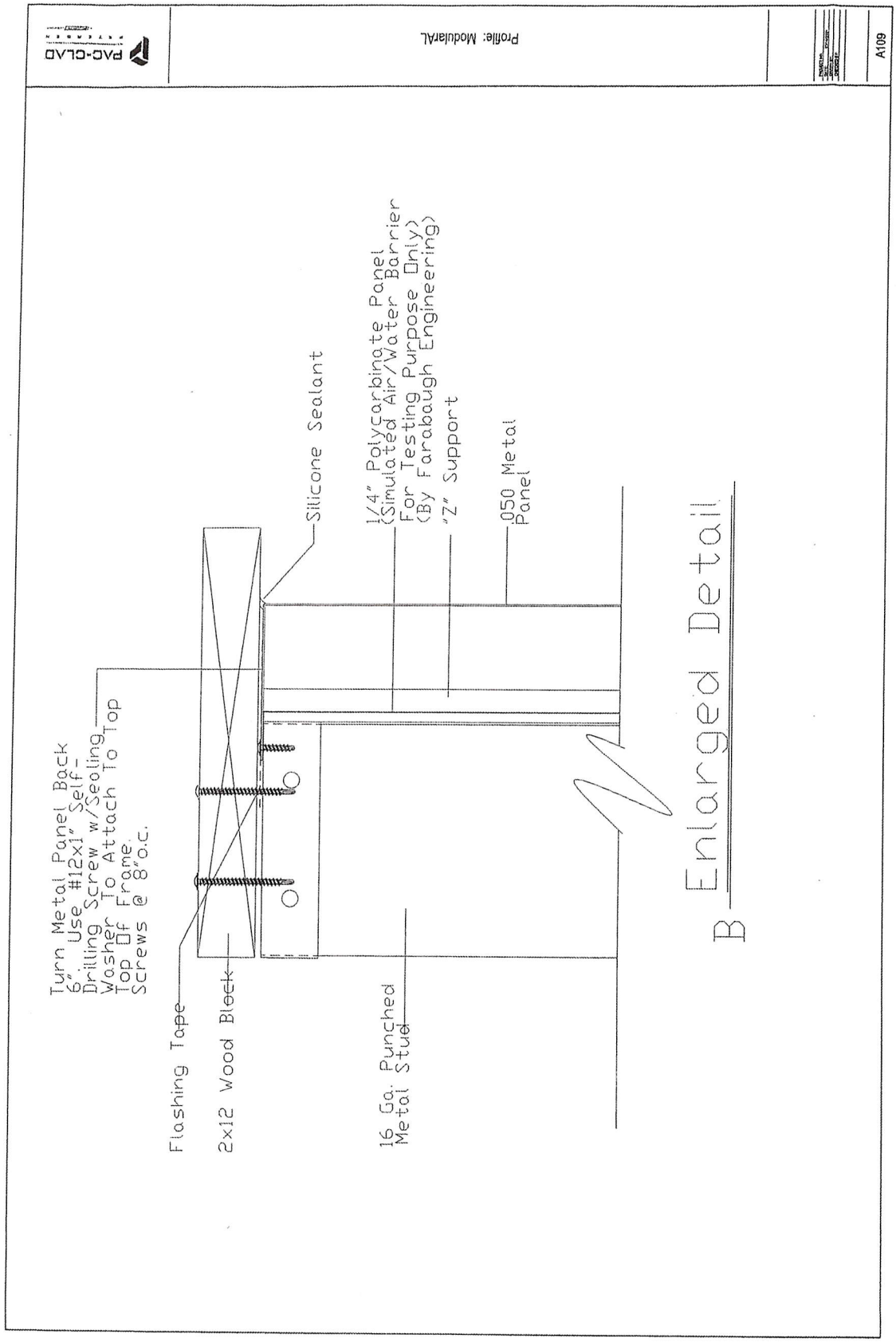
Results: As a result of the test data shown above, the test specimen meets the performance requirements of the AAMA 508-07 Test Standard.

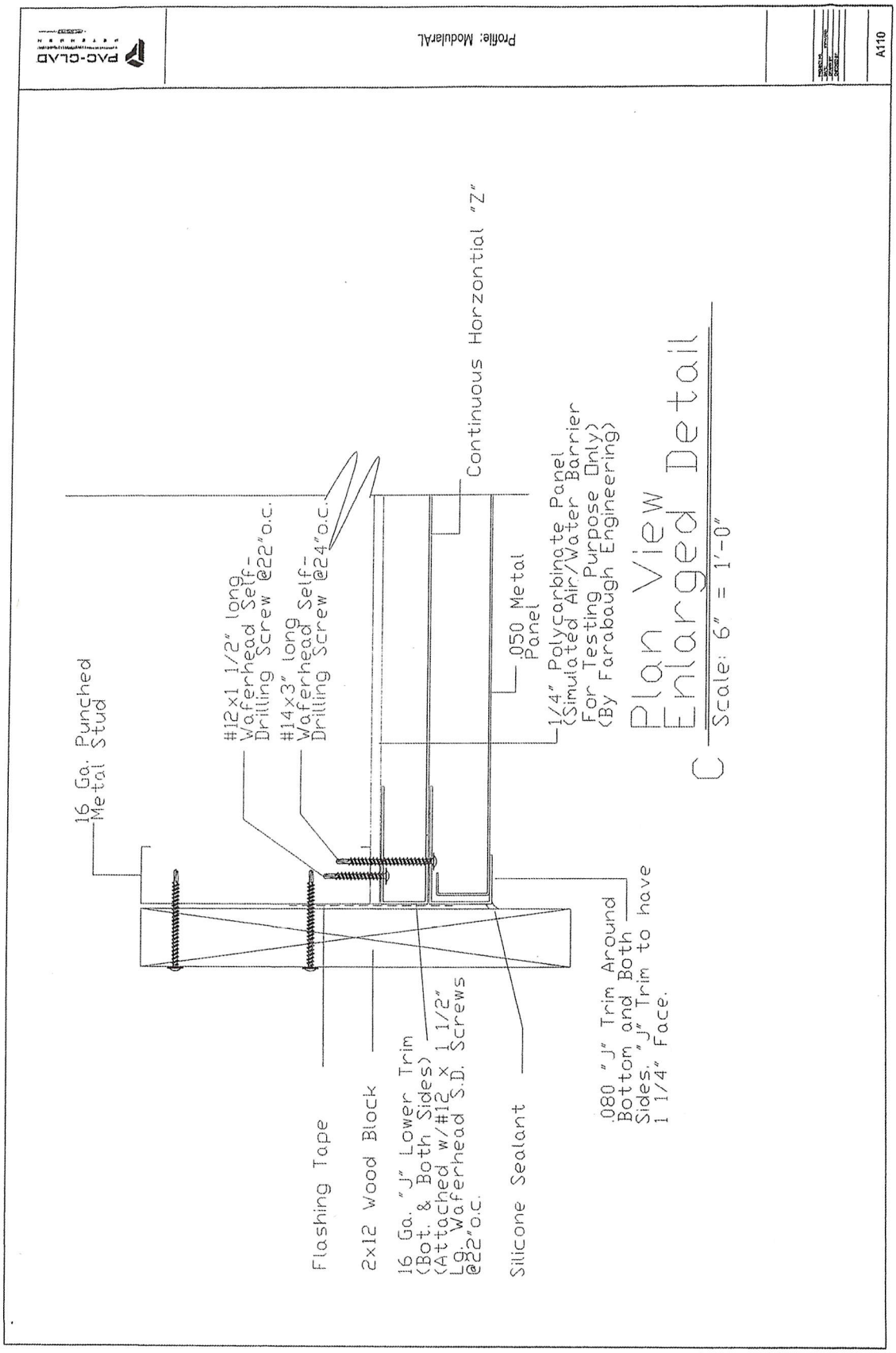

ASTM E1233
< 0.08 sec
0.7 psf
0.6 psf
Exterior Pressure
Interior Pressure Vertical Cavity
Interior Pressure Horizontal Cavity
Pressure (psf)
30.000
25.000
20.000
15.000
10.000
5.000
0.000
0
5
10
15
20
25
30
35
40
45
Time Interval (= 0.08 sec)

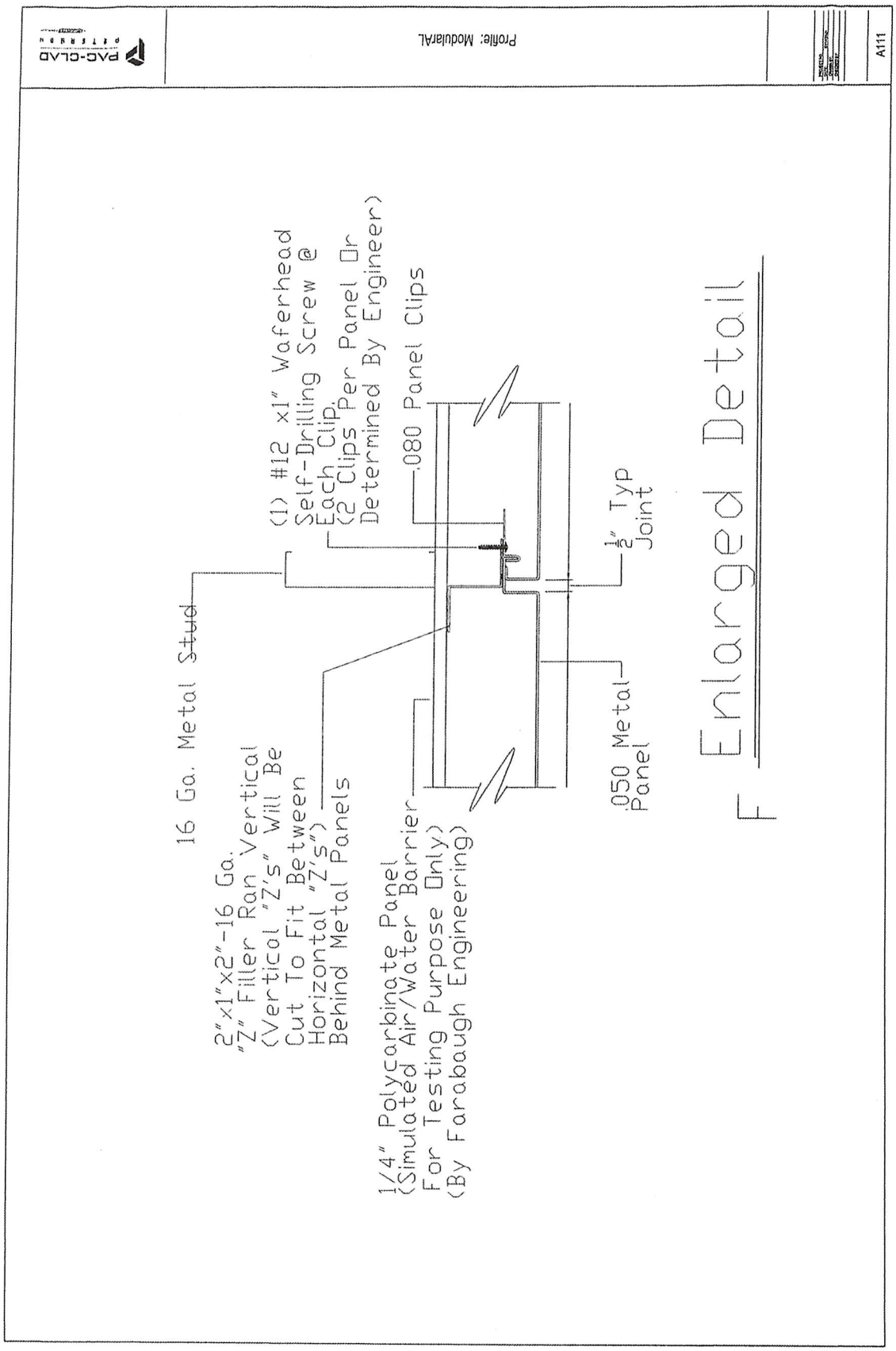

PAC-CLAD
Profile: Modular4L
A106
Top of Metal Panel To Be Folded Over Top Of Wall A Min. Of 6"
℄ Of "H" Beam Stiffener (Typ)
2"x1"x2'-16 Ga. "Z" Ran Horizontal (typ) Behind Metal Panels
.050 Metal Panels
2"x1"x2'-16 Ga. "Z" Filler Ran Vertical (Vertical "Z"s Will Be Cut To Fit Between Horizontal "Z"s) Behind Metal Panels
.080 "J" Face Trim Around Bottom and Both Sides 1" Trim To Have 1 1/4" Face.
℄ Of 1/2" Panel Joint
℄ Of "H" Beam
D A112
E A112
F A111
96.0000
48.0000
24.0000
12.0000
8' x 8' Wall Elevation w/Metal Panels
AAMA 508 Pressure Equalized Rain Screen Test
Scale: 1 1/2" = 1'-0"

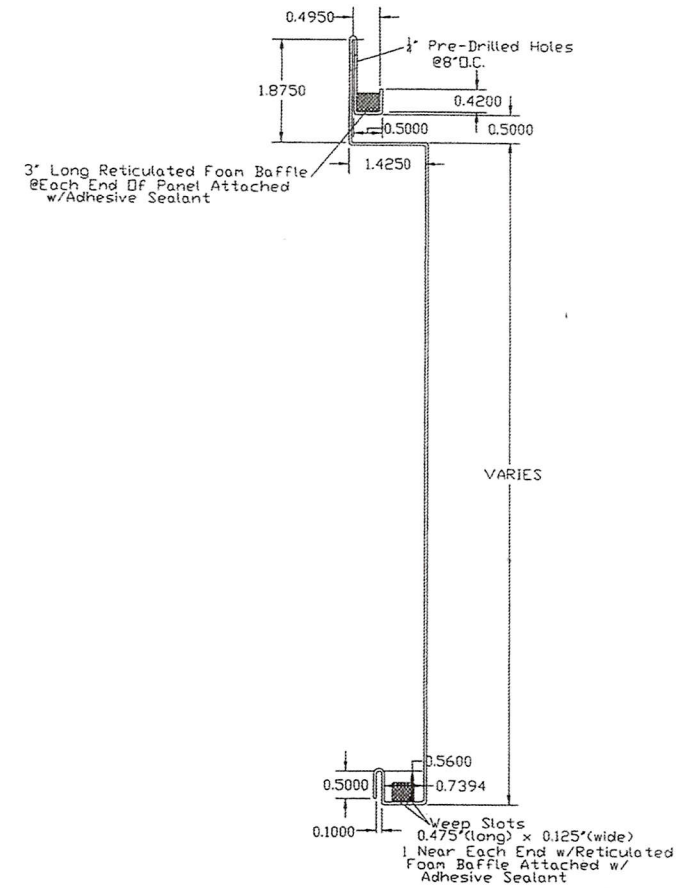

PAC-CLAD
Profile: Modular4L
A107
16 Ga. Filler "Z" Notched 2" Fold Notch to Allow To Go Behind Horizontal "Z" Fasten Fold Of Notched "Z" Horizontal "Z" With 1 Screw.
2"x1"x2"-16 Ga. Z Ran Horizontal (typ)
2"x1"x2"-16 Ga. "Z" Filler Rgn. Vertical Cut To Fit Between Horizontal "Z"s
96.0000
24.0000
24.0000
24.0000
24.0000
12.0000
24.0000
24.0000
24.0000
12.0000
96.0000
8' x 8' Wall Elevation
Scale: 1 1/2" = 1'-0"
Turn Metal Panel Back & Use #12 Self-Drilling Screw To Attach To Top Of Frame. Screws @ 8" o.c.
.050 Metal Panel
16 Ga. "Z" (typ)
#12 Waferhead Self-Drilling Screw
#12 Stainless Steel Cap Head w/EPDM Sealing Washer
16 Ga. Punched Metal Stud
1/4" Polycorbonate Sheet By Farabaugh Engineering
#12 Waferhead Self-Drilling Screw
.080 Starter Clip
.080 Aluminum "J" With 3/16" x1/2" Oblong Weep Holes @ 12" o.c.
16 Ga. "J"
12.0000
24.0000
24.0000
24.0000
12.0000
96.0000
18 Ga. "I" Hat Channel Flange Bracing
B A109
C A110
A A108
Wall Detail
Scale: 1 1/2" = 1'-0"


PAC-CLAD
Profile: Modular/AL
A108
Enlarged Detail A
1/4" Polycarbinate Panel (Simulated Air/Water Barrier For Testing Purpose Only) (By Farabaugh Engineering)
.050 Metal Panel
.080 Starter Clip (Attached w/#12x1" Waferhead Self-Drilling Screws (2/Clip Min or 12" o.c.)
#12 x1" Waferhead Self-Drilling Screw @12"o.c.
.080 Aluminum "J" Face Trim. "J" With 3/16" x1/2" Oblong Weep Holes @ 12"o.c.
16 Ga. Punched Metal Stud
#14x3" Long Waferhead Self-Drilling Screw @ Each Stud
#12 x1 1/2" Waferhead Self-Drilling Screw @12"o.c.
16 Ga. Metal Track
Flashing Tape
Foam Tape
2x12 Wood Block
16 Ga. "J" Lower Trim (Bot. & Both Sides) (Attached w/#12 x 1 1/2" Lg. Waferhead S.D. Screws @22"o.c.

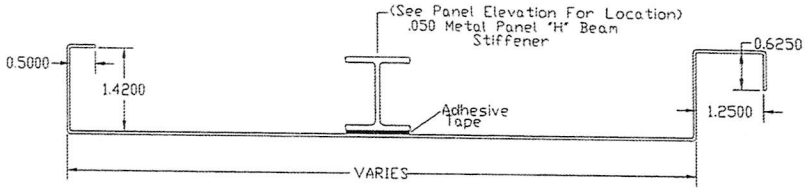

PAC-CLAD
Profile: Modular
A109
Turn Metal Panel Back
6" Use #12x1" Self-
Drilling Screw w/Sealing
Washer To Attach To Top
Top Of Frame
Screws @ 8"o.c.
Flashing Tape
2x12 Wood Block
16 Ga. Punched
Metal Stud
Silicone Sealant
1/4" Polycarbinate Panel
(Simulated Air/Water Barrier
For Testing Purpose Only)
(By Farabaugh Engineering)
"Z" Support
.050 Metal
Panel
B
Enlarged Detail


PAC-CLAD
Profile: Modular
A110
Plan View
Enlarged Detail
C
Scale: 6" = 1'-0"
16 Ga. Punched
Metal Stud
#12x1 1/2" long
Waferhead Self-
Drilling Screw @22"o.c.
#14x3" long
Waferhead Self-
Drilling Screw @24"o.c.
Continuous Horzontial "Z"
.050 Metal
Panel
1/4" Polycarbinate Panel
(Simulated Air/Water Barrier
For Testing Purpose Only)
(By Farabaugh Engineering)
Flashing Tape
2x12 Wood Block
16 Ga. "J" Lower Trim
(Bot. & Both Sides)
(Attached w/#12 x 1 1/2"
Lg. Waferhead S.D. Screws
@22"o.c.
Silicone Sealant
.080 "J" Trim Around
Bottom and Both
Sides. "J" Trim to have
1 1/4" Face.


PAC-CLAD
Profile: Modular
A111
Enlarged Detail
16 Ga. Metal Stud
2"x1"x2"-16 Ga.
"Z" Filler Ran Vertical
(Vertical "Z's" Will Be
Cut To Fit Between
Horizontal "Z's")
Behind Metal Panels
1/4" Polycarbinate Panel
(Simulated Air/Water Barrier
For Testing Purpose Only)
(By Farabaugh Engineering)
(1) #12 x1" Waferhead
Self-Drilling Screw @
Each Clip.
(2 Clips Per Panel Or
Determined By Engineer)
.080 Panel Clips
1/2" Typ
Joint
.050 Metal
Panel



D .050 Metal Panel Vertical Profile



E .050 Metal Panel Horizontal Profile

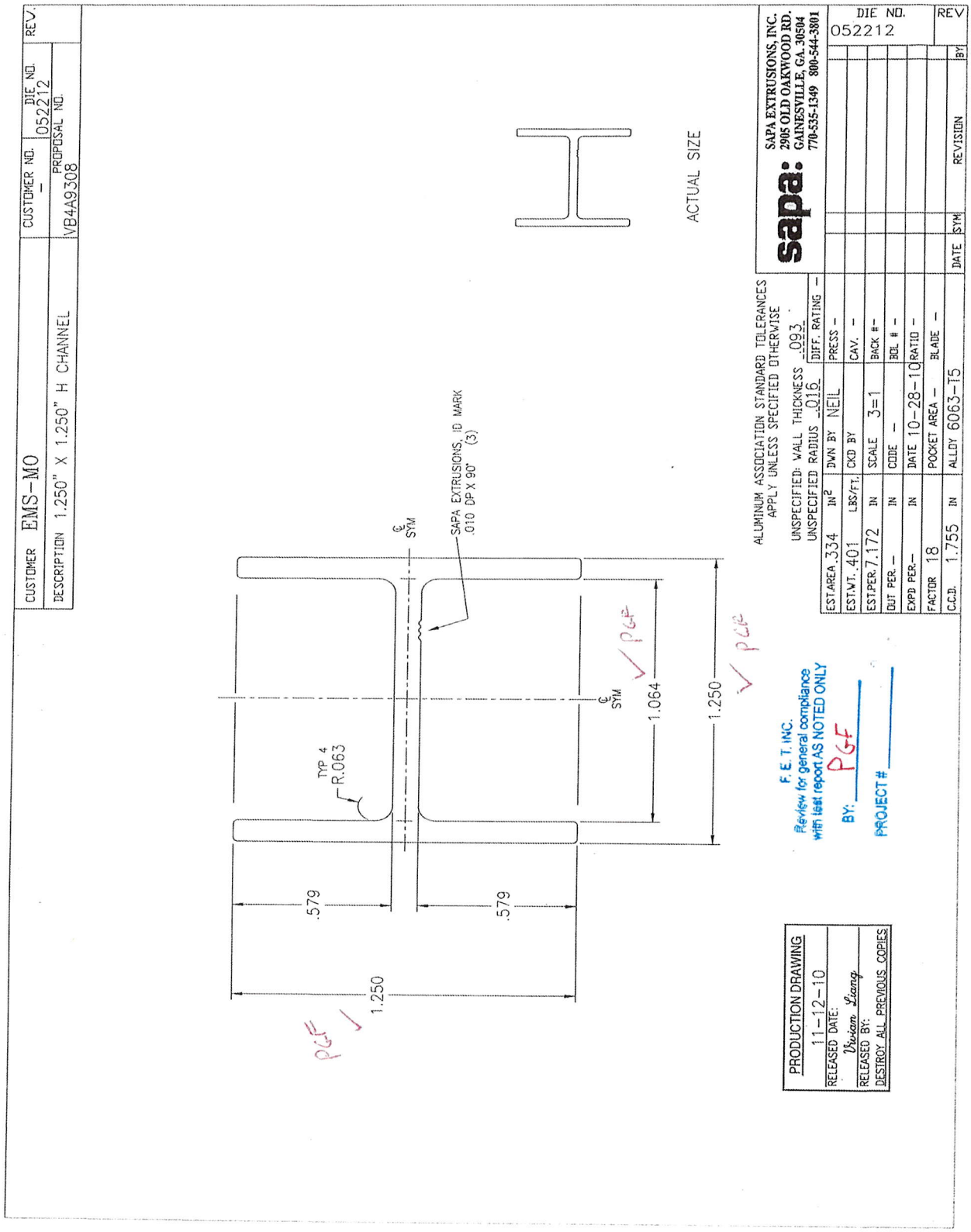
Note:

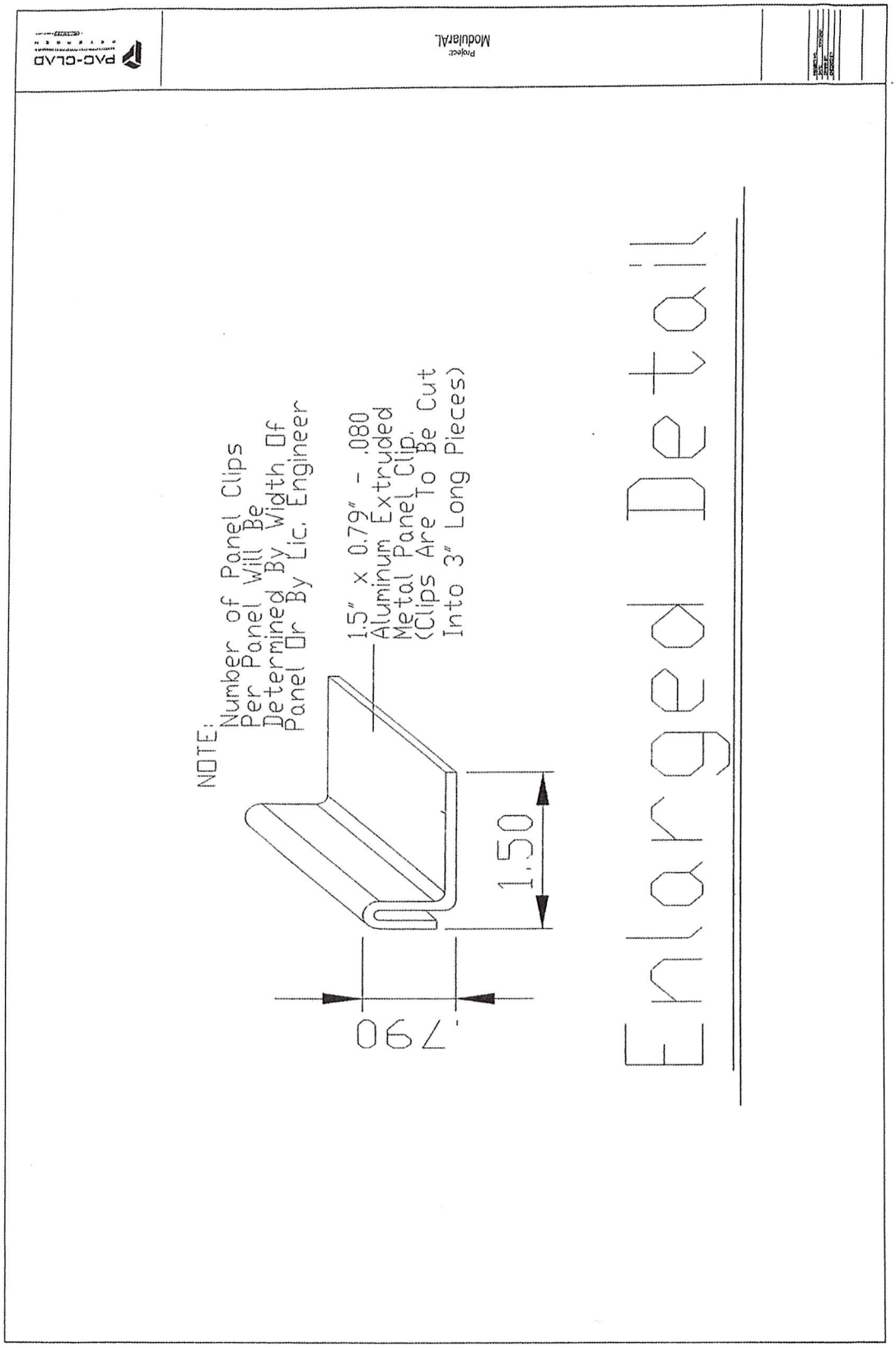
All Panel Dimensions are Nominal.

PAC-CLAD PETERSEN

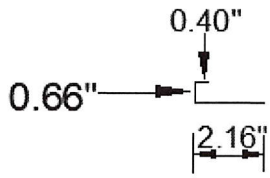
Profile: ModularAL

A112

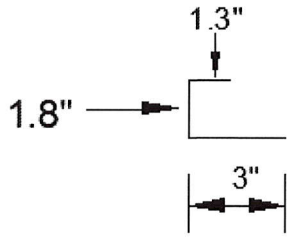

CUSTOMER EMS-MO
CUSTOMER NO. –
DIE NO. 052212
REV.
DESCRIPTION 1.250" X 1.250" H CHANNEL
PROPOSAL NO. VB4A9308
SAPA EXTRUSIONS, INC.
2905 OLD OAKWOOD RD.
GAINESVILLE, GA. 30504
770-535-1349 800-544-3801
DIE NO. 052212
REV
ALUMINUM ASSOCIATION STANDARD TOLERANCES APPLY UNLESS SPECIFIED OTHERWISE
UNSPECIFIED: WALL THICKNESS .093
UNSPECIFIED RADIUS .016
DIFF. RATING –
EST.AREA .334 IN2
EST.WT. .401 LBS/FT.
EST.PER. 7.172 IN
OUT PER. – IN
EXPD PER.– IN
FACTOR 18
C.C.D. 1.755 IN
DWN BY NEIL
CKD BY
SCALE 3=1
CODE –
DATE 10-28-10
POCKET AREA –
ALLOY 6063-T5
PRESS –
CAV. –
BACK #–
BOL # –
RATIO –
BLADE –
DATE SYM REVISION BY
ACTUAL SIZE
SAPA EXTRUSIONS, ID MARK .010 DP X 90° (3)
℄ SYM
TYP 4 R.063
.579
.579
1.064
1.250
1.250
PGF
PGF
PGF
PRODUCTION DRAWING
11-12-10
RELEASED DATE:
Vivian Liang
RELEASED BY:
DESTROY ALL PREVIOUS COPIES
F. E. T. INC.
Review for general compliance with last report AS NOTED ONLY
BY: PGF
PROJECT #


PAC-CLAD
Project:
Modular AL
Enlarged Detail
NOTE:
Number of Panel Clips
Per Panel Will Be
Determined By Width Of
Panel Or By Lic. Engineer
1.5" x 0.79" - .080
Aluminum Extruded
Metal Panel Clip.
(Clips Are To Be Cut
Into 3" Long Pieces)
1.50
.790

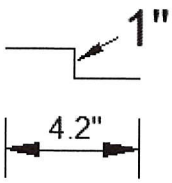
ADDITIONAL SUPPORT AND TRIM EXTRUSIONS



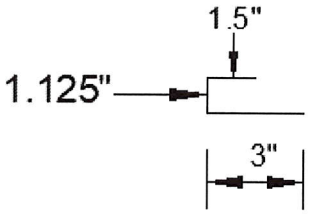
0.080" ALUM.
STARTER CLIP



0.080" ALUM. "J" FACE TRIM
(TESTING PURPOSES ONLY)



16 GA. ZEE SUPPORT



16 GA. "J" LOWER TRIM
(TESTING PURPOSES ONLY)