



Farabaugh Engineering and Testing Inc.

Project No. T295-20

Report Date: August 17, 2020

No. Pages: 16 (inclusive)

Revision Date: 9/24/2020

ASTM E1592 STANDARD TEST METHOD FOR STRUCTURAL PERFORMANCE OF SHEET METAL ROOF AND SIDING SYSTEMS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE

BOX RIB – 2 PANEL 12” WIDE X 24 GA. STEEL

FOR

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



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Project No. T295-20

ASTM E1592-05(2017)
STANDARD TEST METHOD FOR
STRUCTURAL PERFORMANCE OF SHEET METAL ROOF AND SIDING SYSTEMS BY
UNIFORM STATIC AIR PRESSURE DIFFERENCE

Purpose

This test method covers the evaluation of the structural performance of Sheet Metal Panels and Anchor to Panel Attachments for roof or siding systems under uniform static air pressure difference.

Test Dates

7/24/20 Test #1 – 5 spans @ 5'
7/29/20 Test #2 – 12 spans @ 2'

Test Specimen

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

Specimen: Box Rib – 2 Panel, 12” wide (Coverage), 24 ga. steel (w/ Clip Leg)

Panel Clip: One Piece Stainless Steel Clip – 2-1/2” Long X 0.034” Thick

Testing Apparatus

A vacuum test chamber was used with two static pressure taps located at diagonally opposite corners. A controlled blower provided a vacuum to uniformly load the specimen mock-up. Calibrated manometers were used to measure the pressure at each pressure tap. The uniform load pressure was performed in the negative direction to monitor wind uplift on the panel specimen mock-up. Calibrated deflectometers were attached to monitor panel deformation as shown.

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Installation

- The panels were installed on to 16 ga supports with #14-13 X 1-1/2” long DP2 Concealor self drill fasteners (2 fasteners per clip). The panel sidejoints were a interlocking sliding seam. The panel fixed ends used the same fasteners in the low cells of the panel into the 16 ga. supports.
- Plastic (4 mil thick) was employed loosely between the panels and subgirts and in the side joints to create a vacuum seal.

Procedure

- The specimen was checked for proper adjustment and all vents closed in the pressure measuring lines.
- The required deflection measuring apparatus were installed at their specified locations.
- A nominal initial pressure was applied equal to at least four times but not more than ten times the dead weight of the specimen. This nominal pressure was used as the reference zero and initial deflection readings were recorded.
- At each load increment, pressure was maintained for a period of not less than 60 seconds and until the deflection gages indicated no further increase in deflections.
- Successive increments were achieved as above until failure or ultimate load was reached.
- Plastic (4 mil thick) was employed loosely between the panels and subgirts and in the side joints to create a vacuum seal.

The test was conducted according to the procedure in ASTM E-1592-05(2017) and as noted herein. In our opinion the tape and plastic had no influence on the results of the test.

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TEST #1

Test Date: 7-24-20

Test Specimen: Box Rib – 2 Panel, 12” wide (Coverage), 24 ga. steel (w/ Clip Leg)

Support Spacing: 5’ o/c

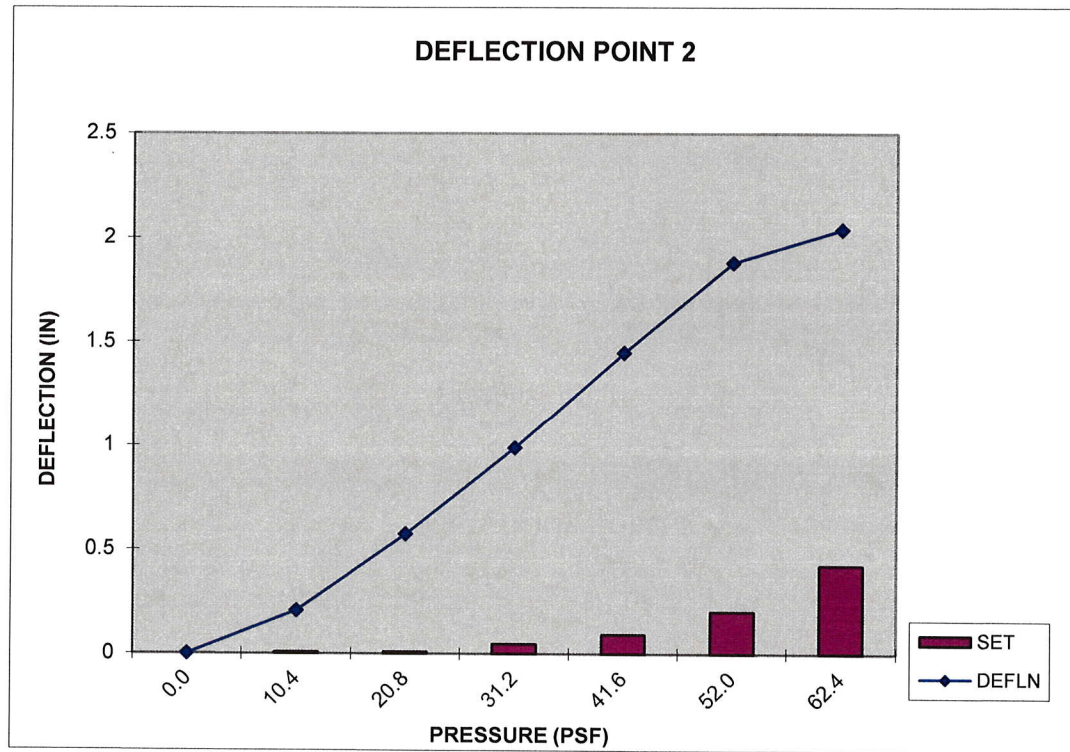
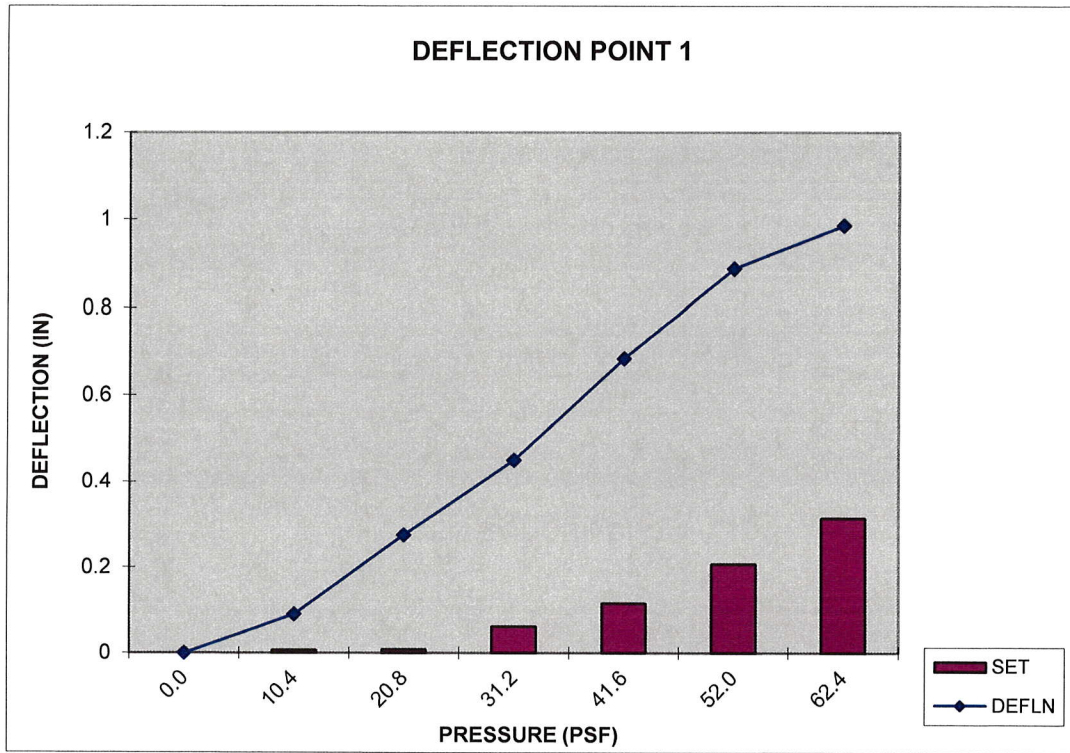
NEGATIVE (UPLIFT) TEST PRESSURE

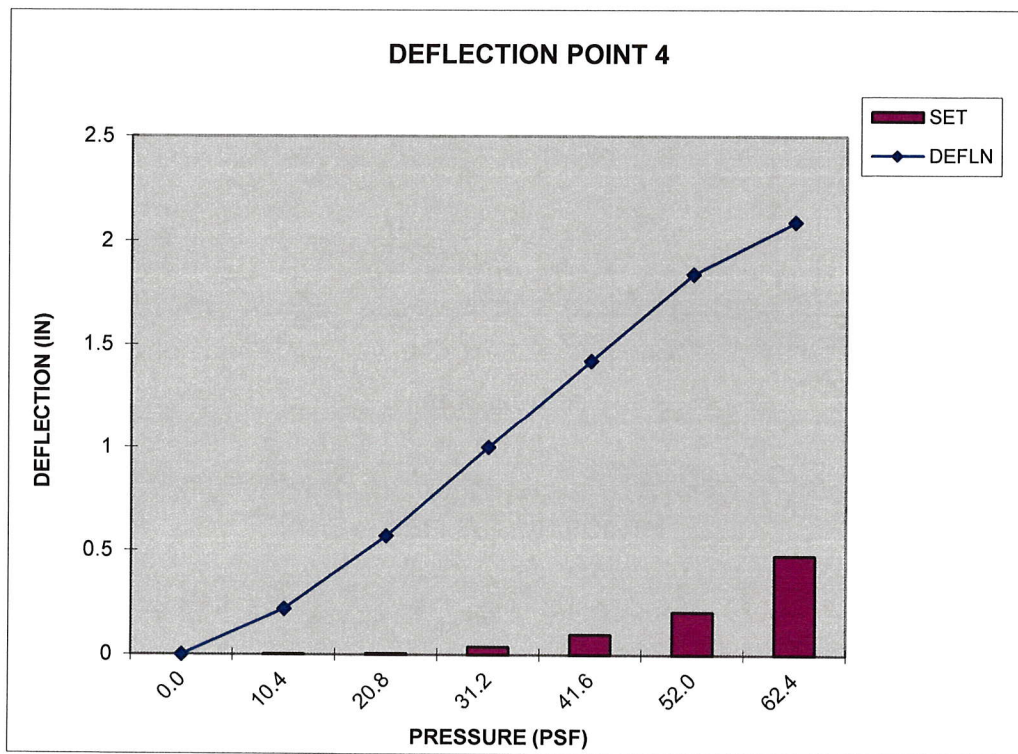
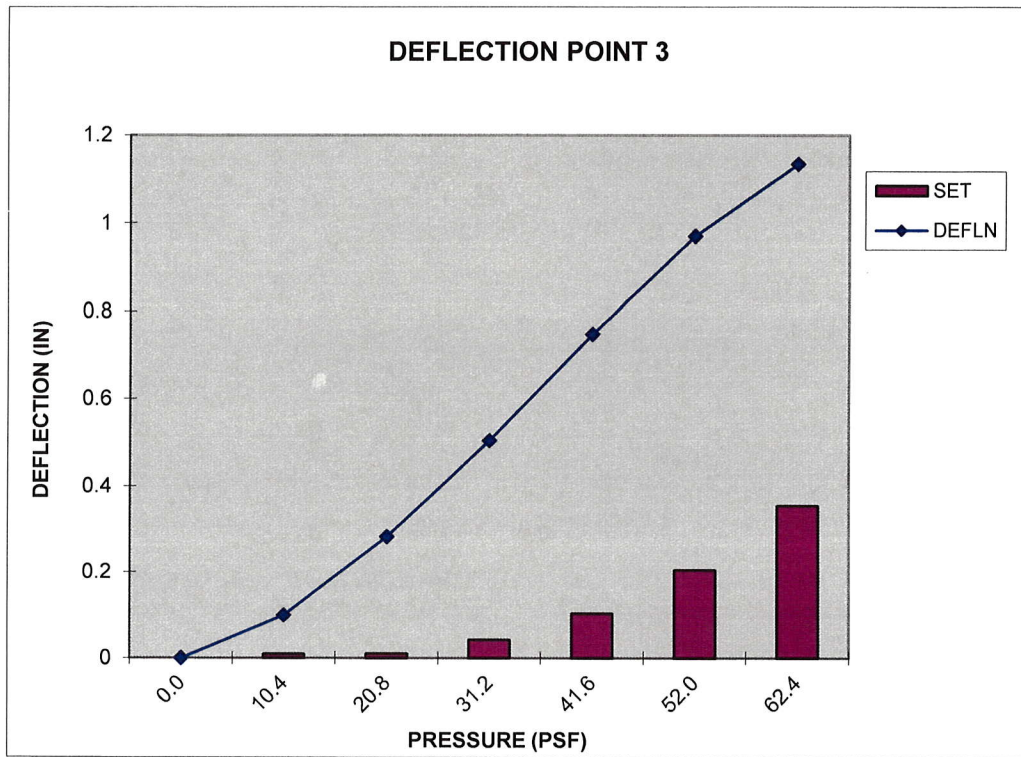
PETERSEN BOX RIB-2 PANEL 12" W X 24 GA. STEEL (5 SPANS @ 5')						
DEFLECTION DIAL READINGS (INCHES)						
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6
0.0	0.000	0.000	0.000	0.000	0.000	0.000
10.4	0.091	0.207	0.100	0.220	0.044	0.184
0.0	0.007	0.008	0.009	0.002	0.004	0.007
20.8	0.275	0.574	0.282	0.569	0.133	0.516
0.0	0.008	0.009	0.010	0.005	0.006	0.008
31.2	0.450	0.991	0.505	1.002	0.289	0.949
0.0	0.062	0.047	0.042	0.037	0.026	0.025
41.6	0.684	1.450	0.747	1.423	0.478	1.401
0.0	0.116	0.092	0.103	0.098	0.059	0.061
52.0	0.888	1.882	0.970	1.841	0.642	1.810
0.0	0.207	0.202	0.204	0.206	0.102	0.141
62.4	0.986	2.041	1.134	2.091	0.849	2.017
0.0	0.315	0.426	0.354	0.477	0.211	0.377

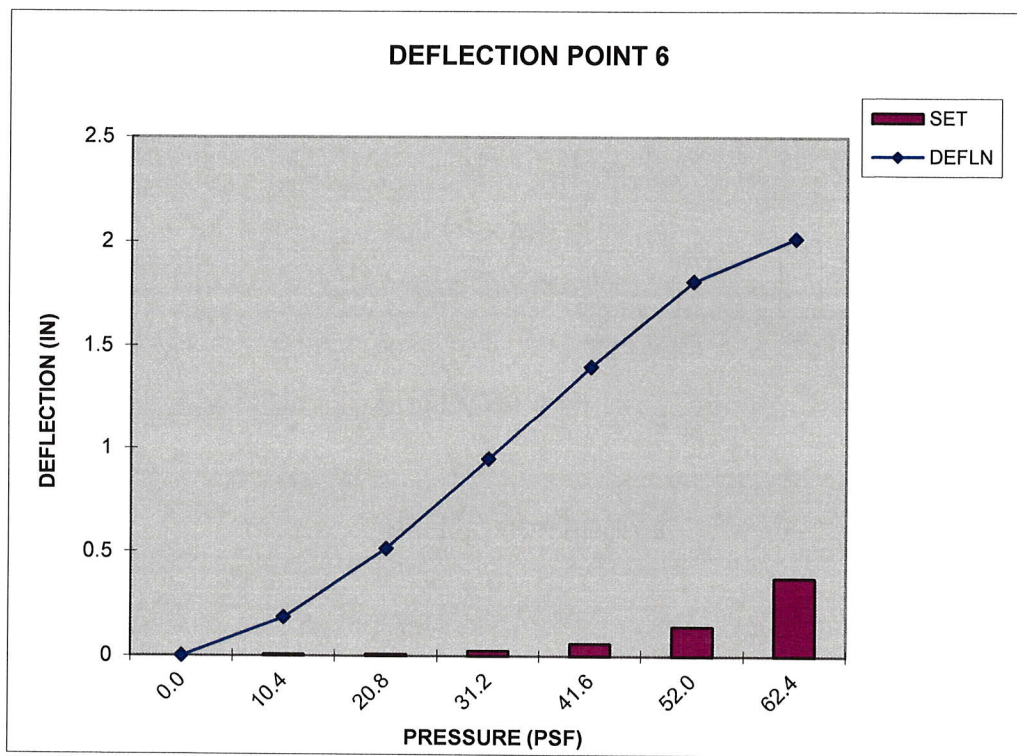
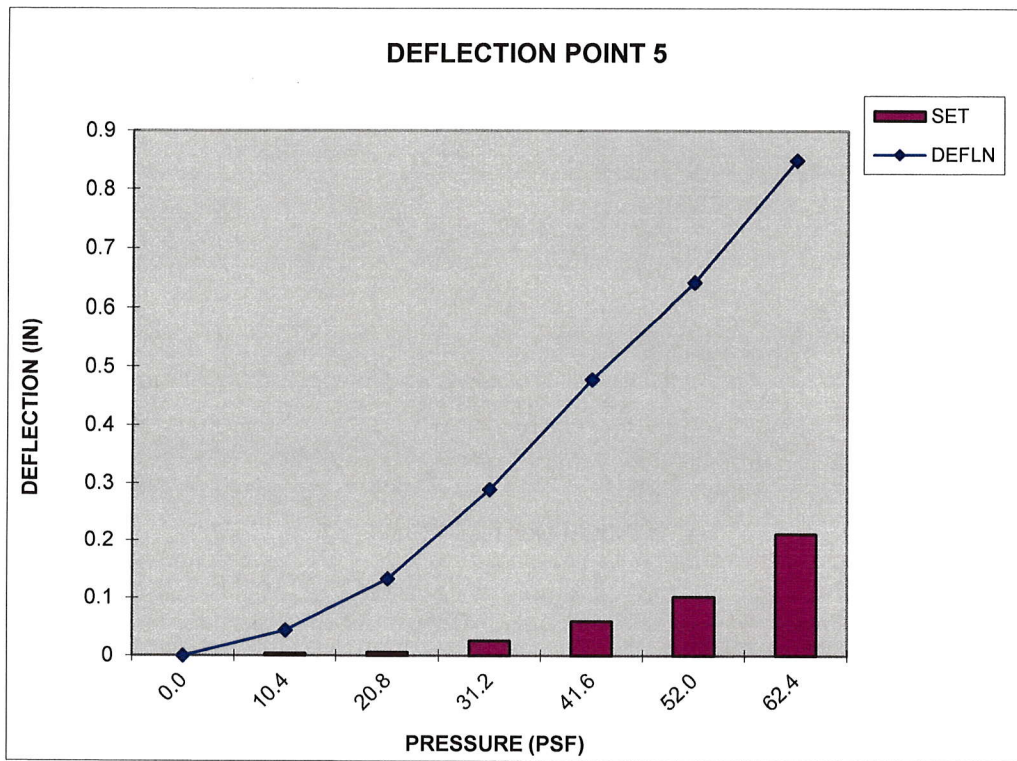
RESULTS:

Load held for 1 minute = 73.0 psf

Maximum Test Load = 77.5 psf (Panel seam disengagement)







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TEST #2

Test Date: 7-29-20

Test Specimen: Box Rib – 2 Panel, 12” wide (Coverage), 24 ga. steel (w/ Clip Leg)

Support Spacing: 2’ o/c

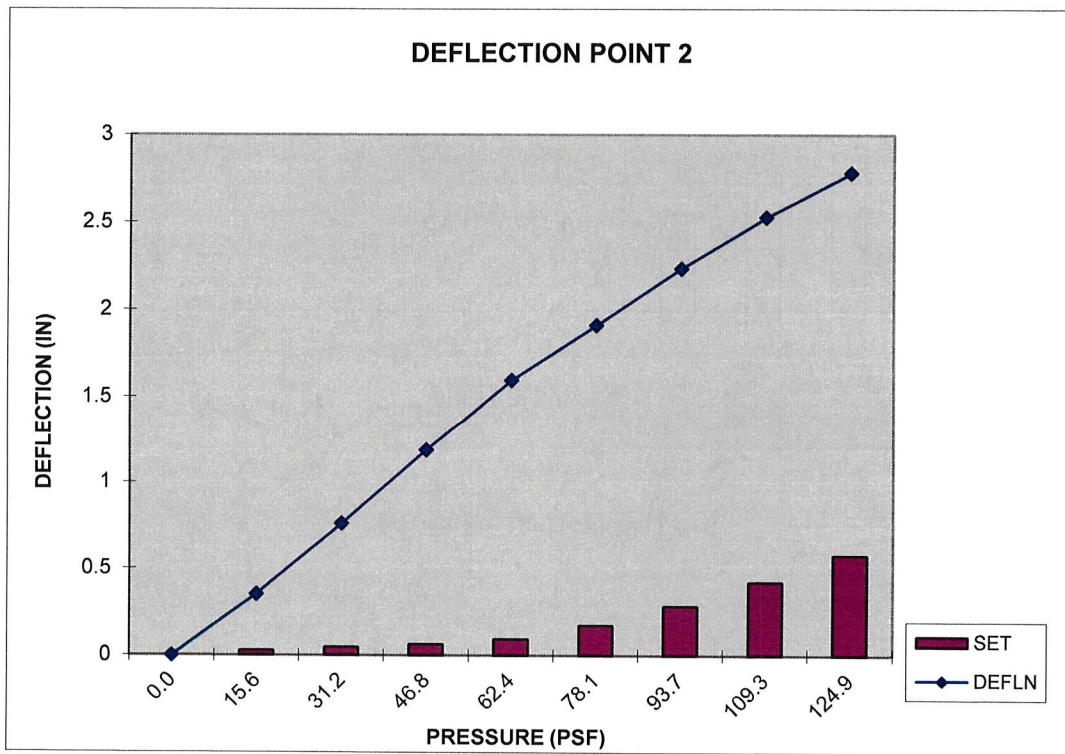
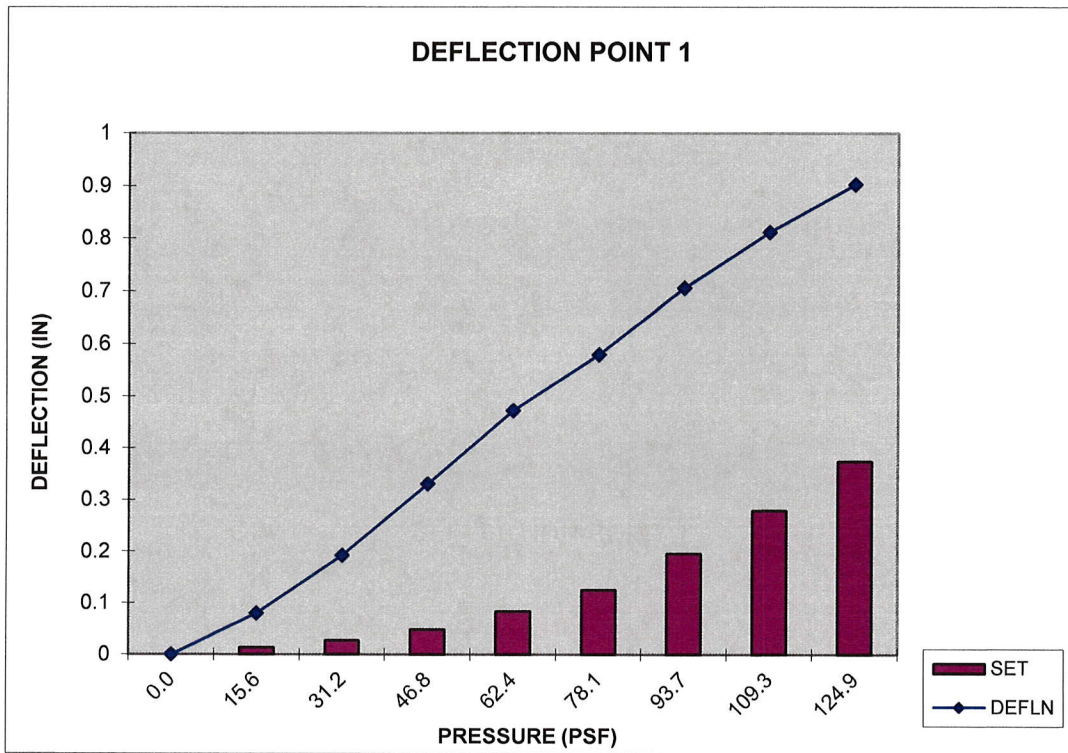
NEGATIVE (UPLIFT) TEST PRESSURE

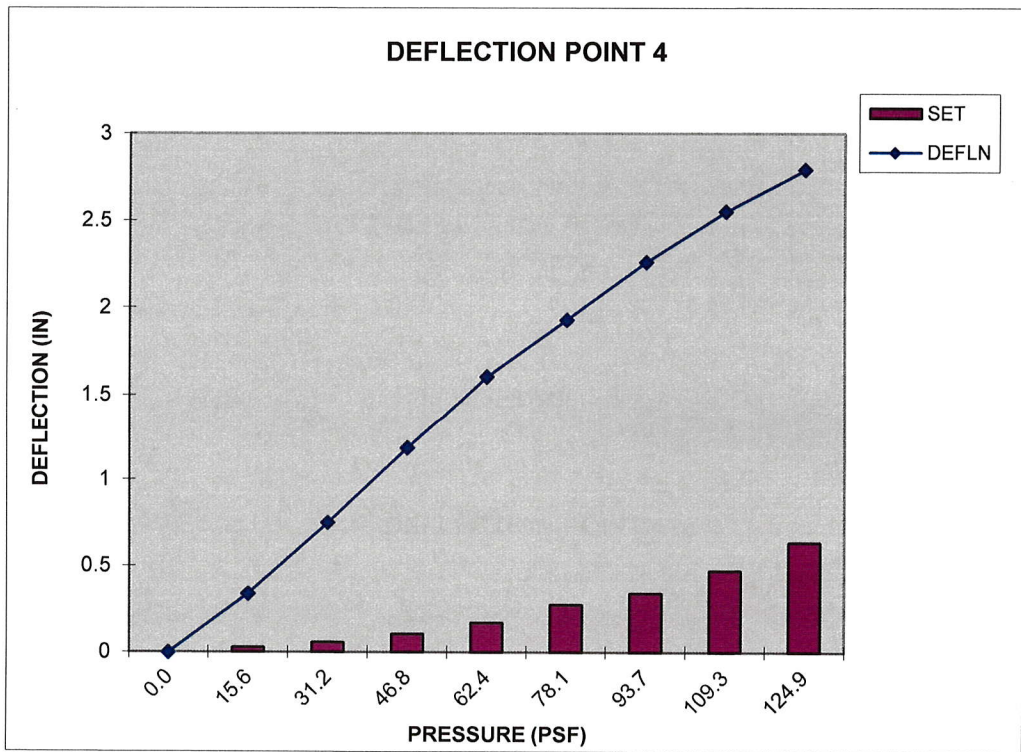
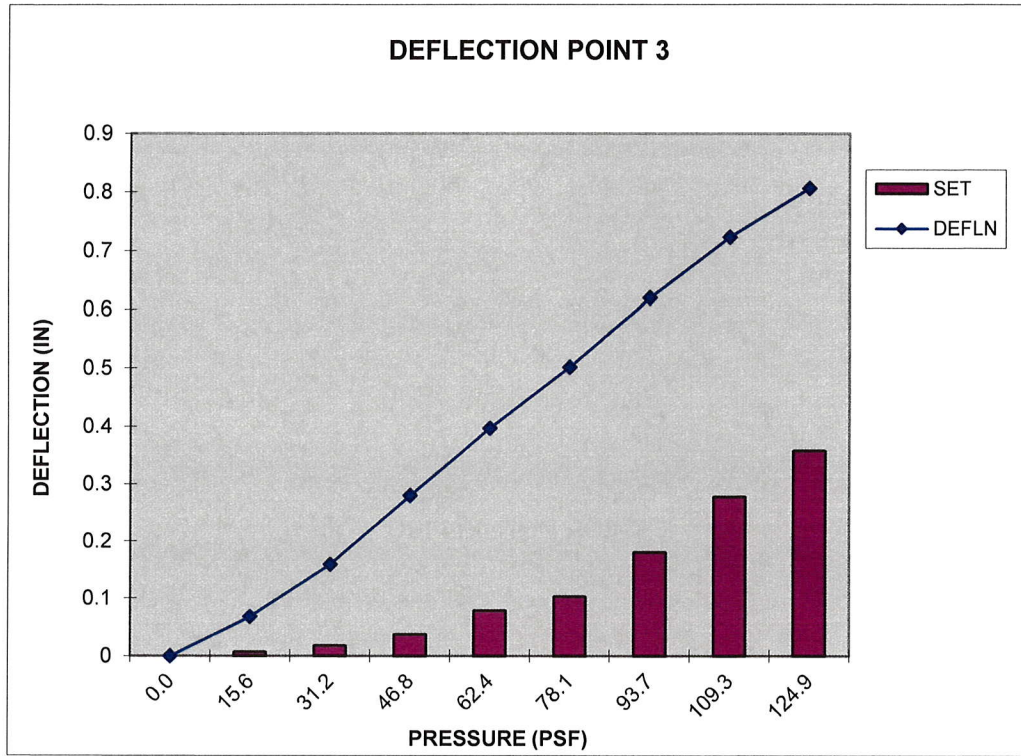
PETERSEN BOX RIB-2 PANEL 12" W X 24 GA. STEEL (12 SPANS @ 2')						
DEFLECTION DIAL READINGS (INCHES)						
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6
0.0	0.000	0.000	0.000	0.000	0.000	0.000
15.6	0.080	0.354	0.068	0.338	0.053	0.365
0.0	0.014	0.027	0.007	0.026	0.006	0.033
31.2	0.193	0.762	0.160	0.750	0.142	0.764
0.0	0.027	0.046	0.018	0.057	0.015	0.051
46.8	0.331	1.188	0.280	1.186	0.255	1.158
0.0	0.048	0.062	0.037	0.103	0.030	0.065
62.4	0.473	1.598	0.397	1.604	0.381	1.550
0.0	0.083	0.092	0.078	0.169	0.061	0.103
78.1	0.580	1.912	0.502	1.930	0.499	1.866
0.0	0.125	0.170	0.103	0.274	0.102	0.183
93.7	0.706	2.237	0.619	2.261	0.603	2.175
0.0	0.195	0.281	0.180	0.340	0.169	0.279
109.3	0.812	2.530	0.723	2.551	0.702	2.451
0.0	0.279	0.420	0.277	0.471	0.243	0.416
124.9	0.903	2.783	0.806	2.792	0.785	2.687
0.0	0.374	0.579	0.357	0.635	0.321	0.567

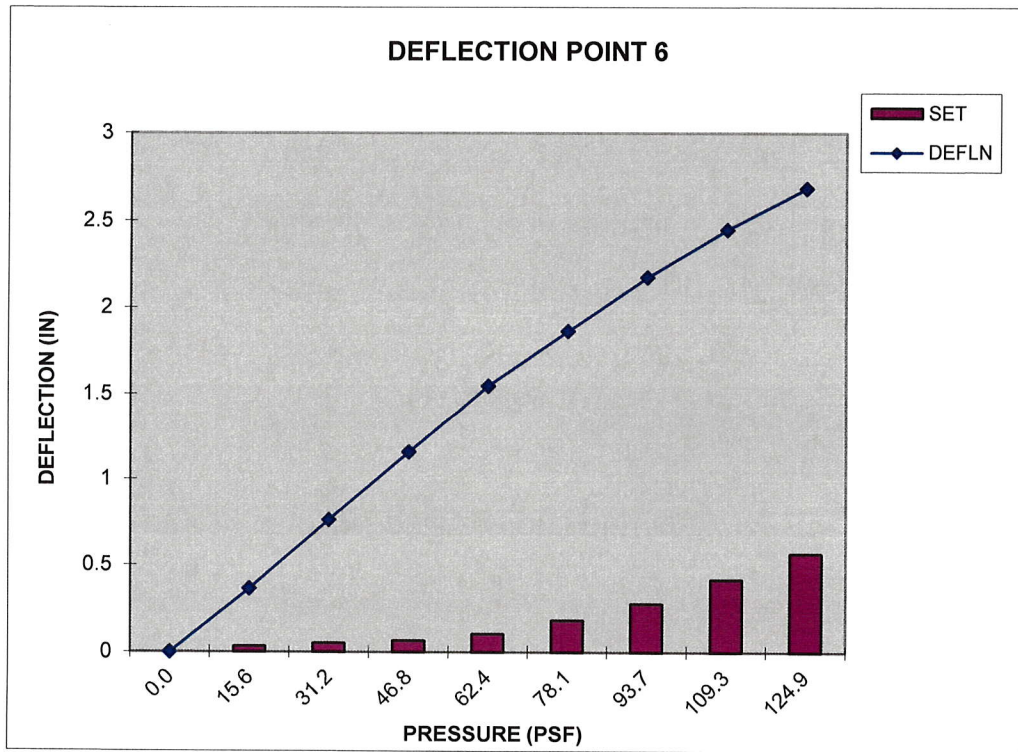
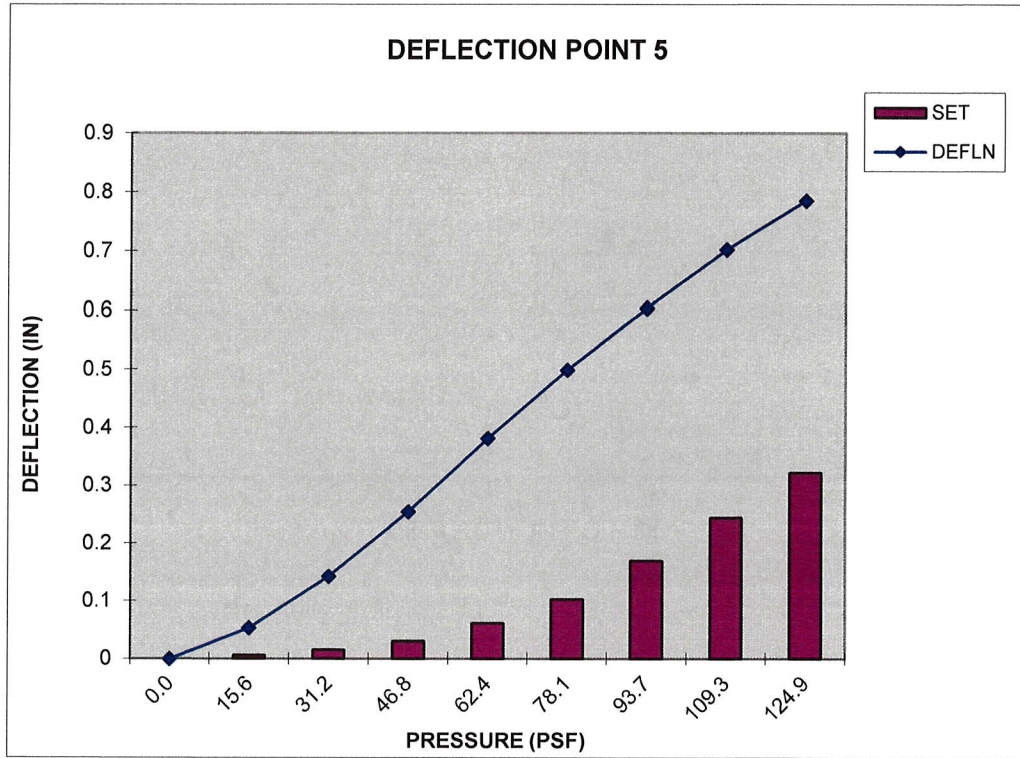
RESULTS:

Load held for 1 minute = 177.0 psf

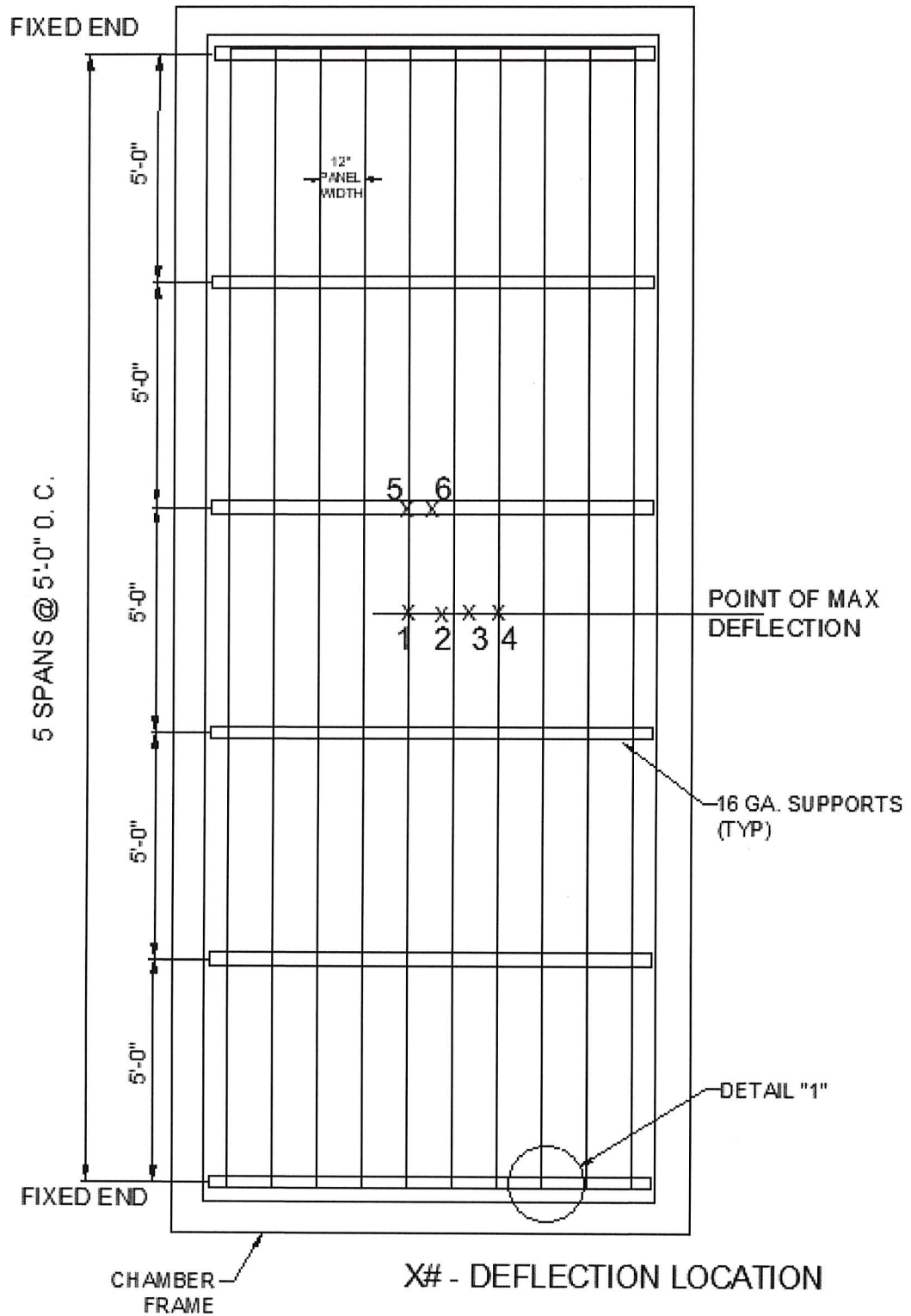
Maximum Test Load = 180.0 psf (panel seam disengagement)





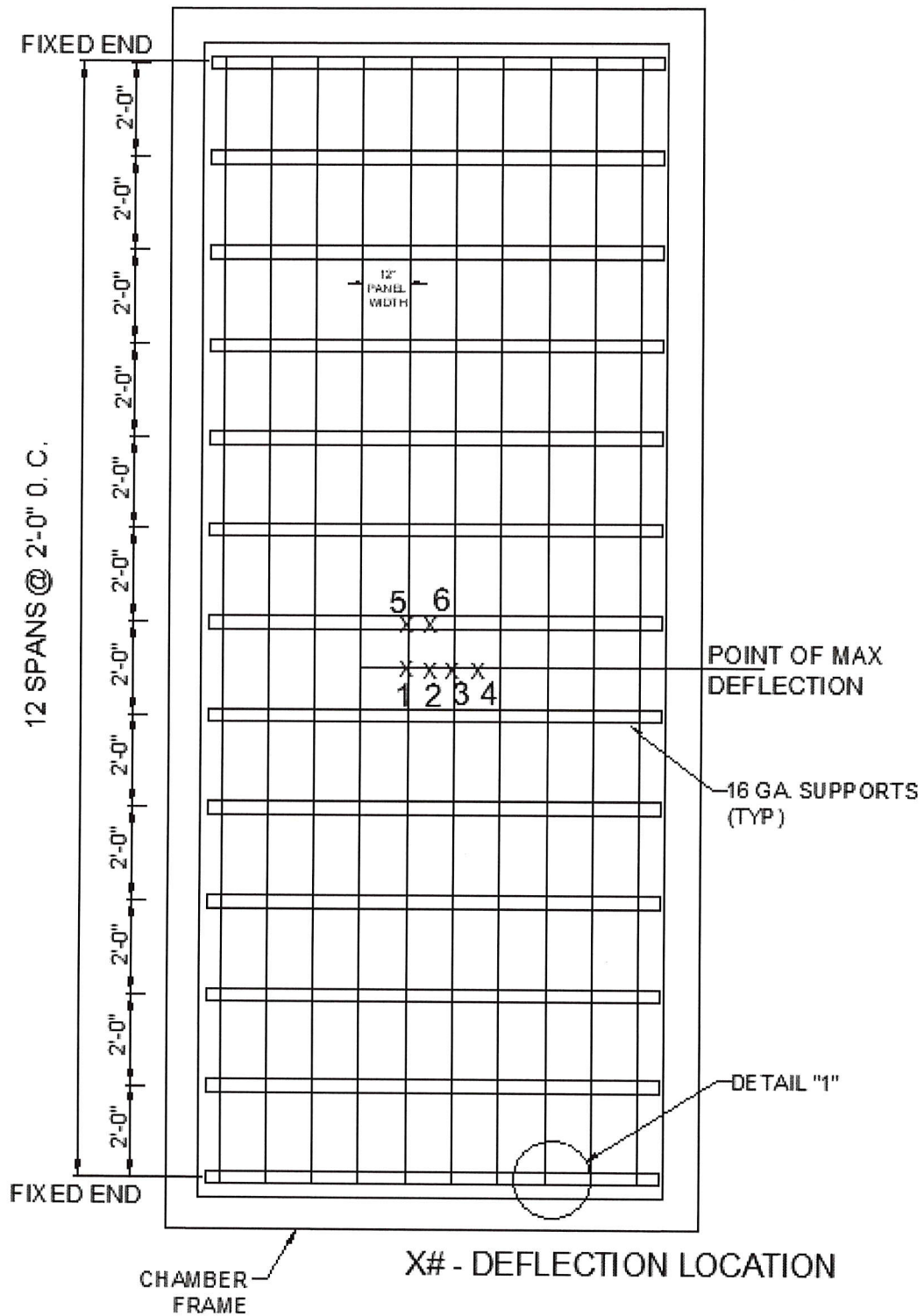


TEST #1

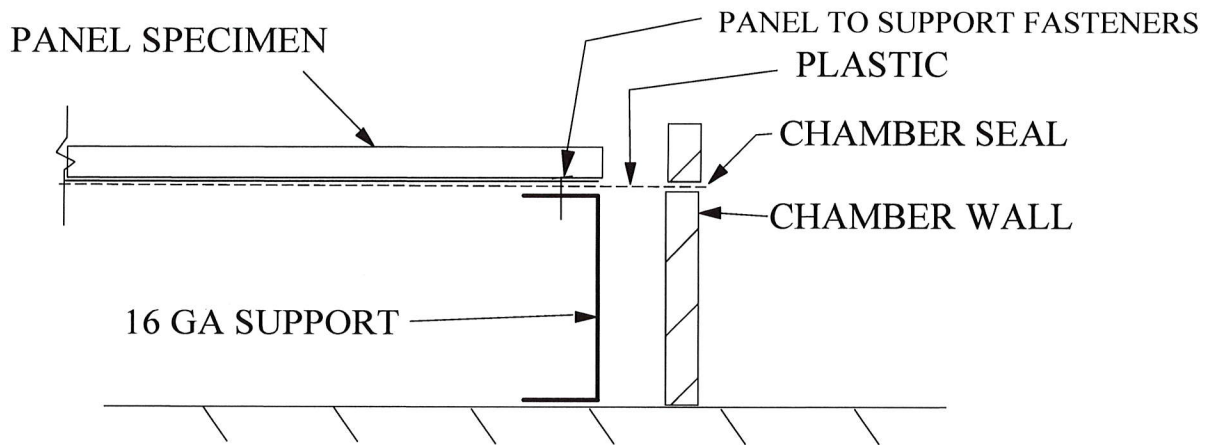


PLAN VIEW

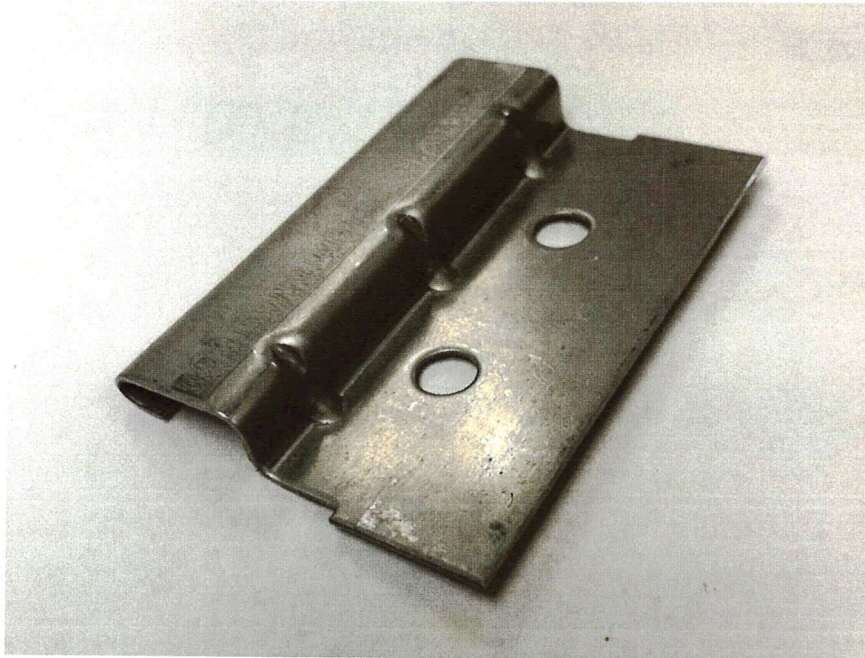
TEST #2



PLAN VIEW

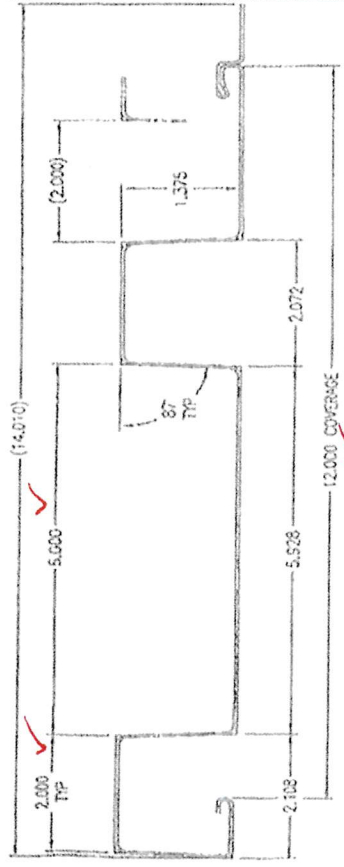


DETAIL 1



PANEL CLIP

INBOARD SIDE

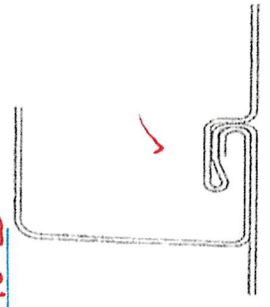


-PGF

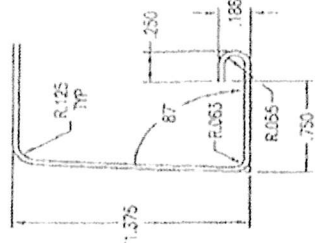
F. E. T. INC.
 Review for general compliance
 with test report AS NOTED ONLY
 BY: **PGF**
 PROJECT # **T 295-20**

General Notes for Load/Span Chart:

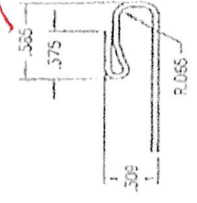
1. The Allowable Pressure is the Ultimate Test Pressure divided by a Factor-of-Safety (Load Factor) of 2.00.
2. The published Allowable Wind Uplift Pressure considers panel buckling strength, side-joint disengagement resistance and clip/side-joint interactive strength only.
3. The clip-to-substrate fastener capacity must be investigated by a design professional and consider the clip pry coefficient where applicable.



LAP DETAIL



INBOARD DETAIL



CLIP DETAIL

ALLOWABLE WIND UPLIFT LOAD/SPAN CHART:

Panel Span, ft.	Allowable Wind Uplift Pressure, psf
2.00	-88.5
2.50	-79.8
3.00	-71.2
3.50	-62.5
4.00	-53.8
4.50	-45.2
5.00	-36.5

ALL DIMENSIONS ARE BOTTOM OF SHEET INTERCEPTS (U.O.N.)
 ALL FORMING RADI ARE 0.125 UNLESS OTHERWISE NOTED

APPROX. COIL WIDTH: 21.492'
 ALUM. THICKNESS RANGE: .032-.050
 GRADE OF MATERIAL: 33-40 KSI.
 STEEL THICKNESS RANGE: .024 - .030
 GRADE OF MATERIAL: 50 KSI.

APPROVED APPROVED AS NOTED

BY: _____ DATE: _____

TOLERANCE STANDARDS FOR THICKEST METAL:

*ACCUMULATION - (+ or -) 1/16 in
 DEPTH - (+ or -) 1/32 in
 RADI - (+ or -) 1/32 in
 ANGLES - (+ or -) 2 degrees
 CAMBER - 1/8 in in 10ft
 SKI - 1/8 in in 10ft
 DIVE - 1/8 in in 10ft

*NET VARIATION FOR COMBINED DIMENSIONS

PETERSEN ALUMINUM CORP.
 24 GA. BOX RIB P2
 1-7-19
 TP2935.DWG JS
 PR27660 TP-2935

Project No. T295-20

TENSILE TEST REPORT

Client: Petersen Aluminum Corp.
10551 PAC Rd.
Tyler, TX 75707

Test Date: August 17, 2020

Test Method: ASTM A370-10

Material Description: Box Rib – P2 Panel, 12” wide (Coverage), 24 ga. steel

Sample No.	Width (in)	Thickness (in)	Yield Load (lb)	Max. Load (lb)	0.2% Offset Yield Strength (psi)	Tensile Strength (psi)	Elongation (% in 2 inches)
20125	0.492	0.023	608.2	678.9	53,750	59,993	22.4

Equipment Used: Tensile Machine #QT7-061196-020
Caliper #14682489
Extensometer #10311744D
Micrometer #110596927