



Farabaugh Engineering and Testing Inc.

Project No. T140-20

Report Date: February 19, 2020

No. Pages: 17 (inclusive)

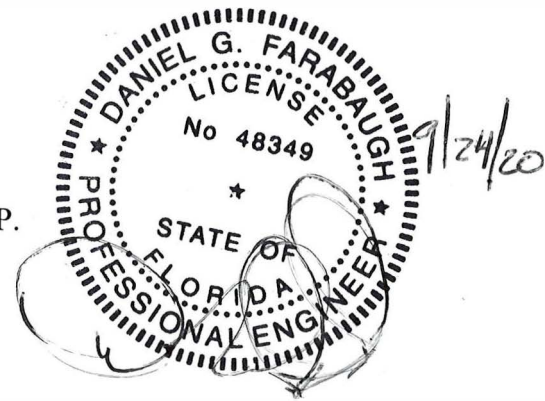
Revision Date: 9/24/2020

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

BOX RIB – 4 PANEL 12” WIDE X 24 GA. STEEL

FOR

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



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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

2/6/2020 Test #1 – 5 spans @ 5'
2/17/2020 Test #2 – 12 spans @ 2'

Test Specimen

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

Specimen: Box Rib – 4 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 DP1 Concealor self drill fasteners (2 fasteners per clip). 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: 2-6-20

Test Specimen: Box Rib – 4 Panel, 12” wide (Coverage), 24 ga. steel (w/ Clip Leg)

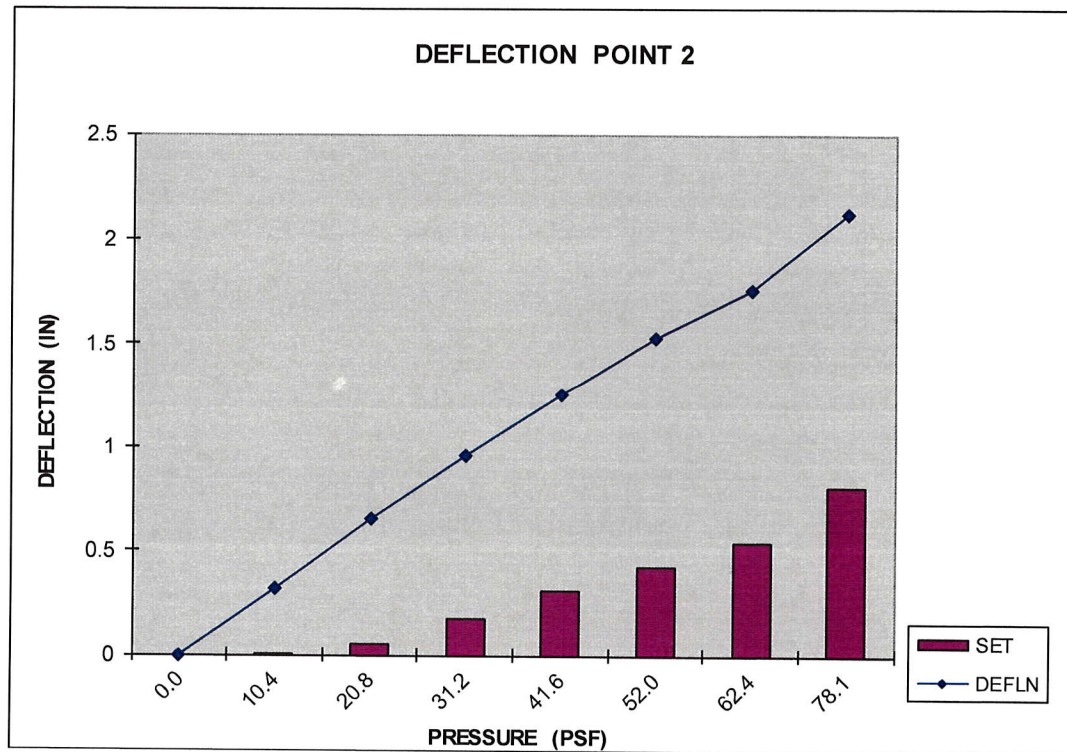
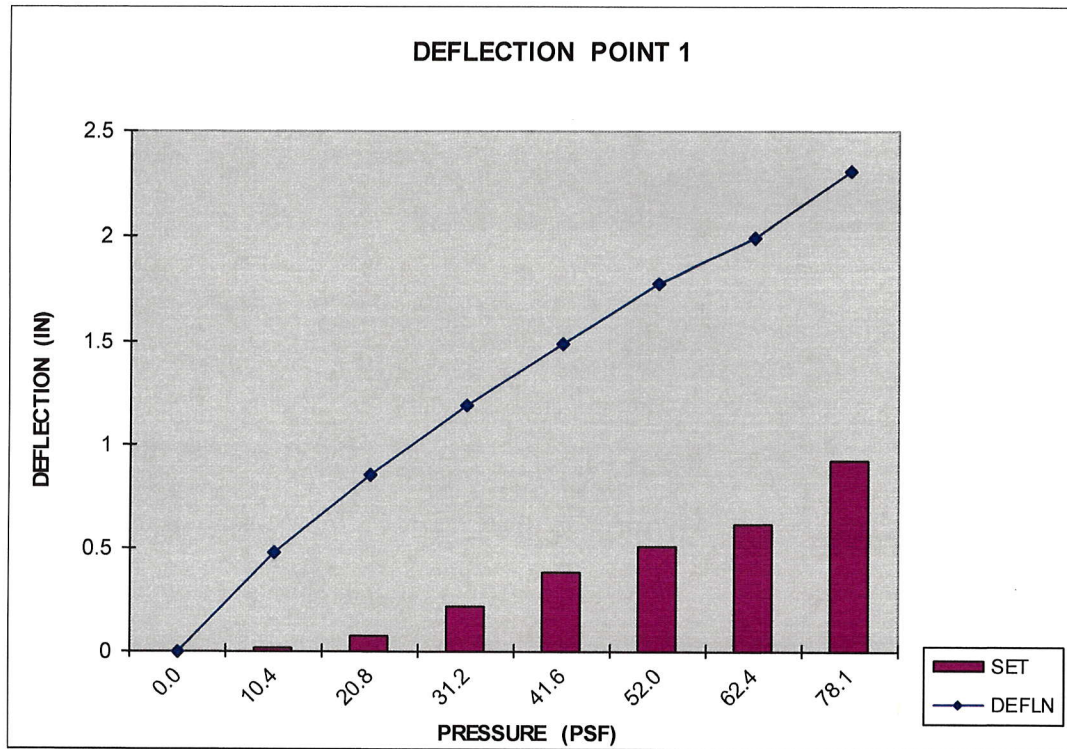
Support Spacing: 5’ o/c

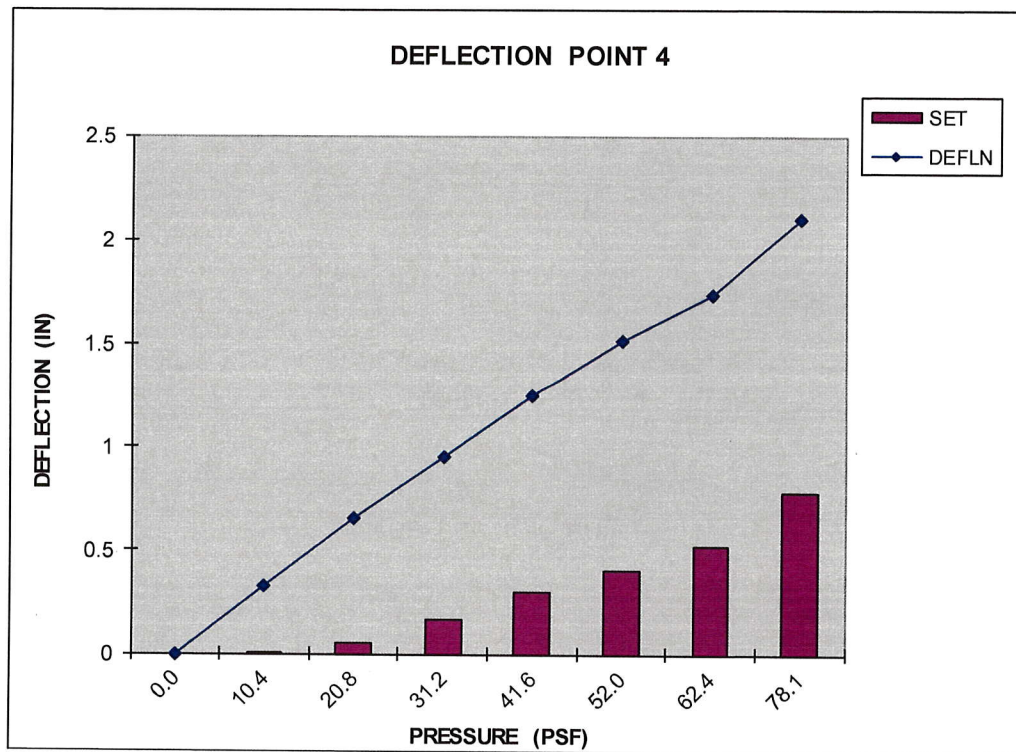
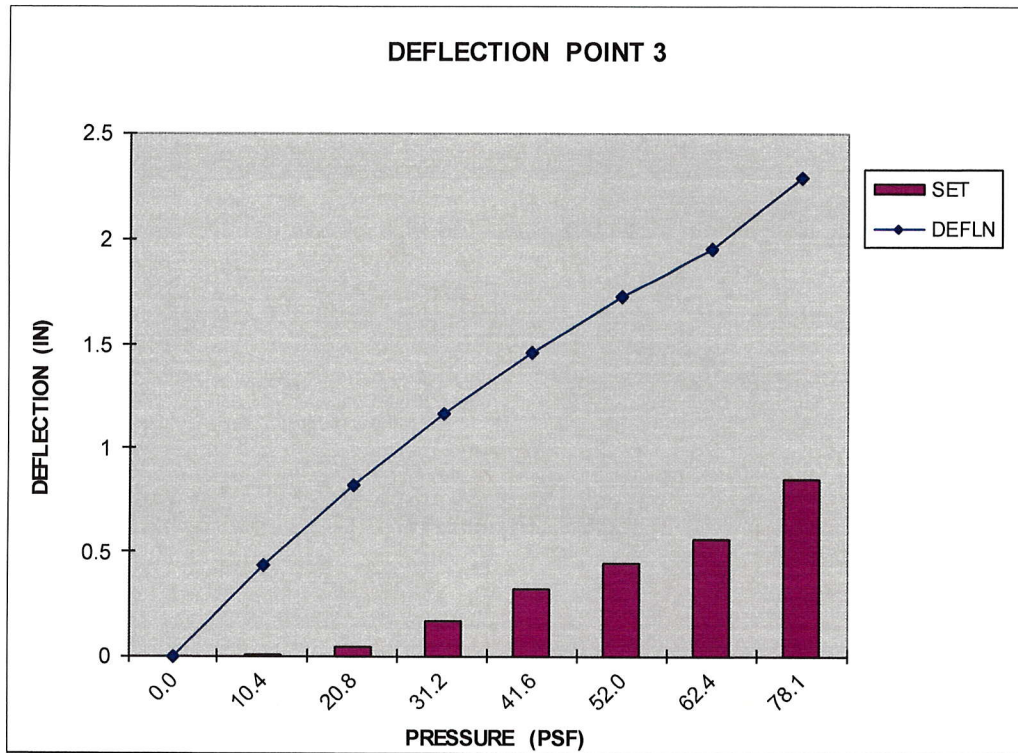
NEGATIVE (UPLIFT) TEST PRESSURE

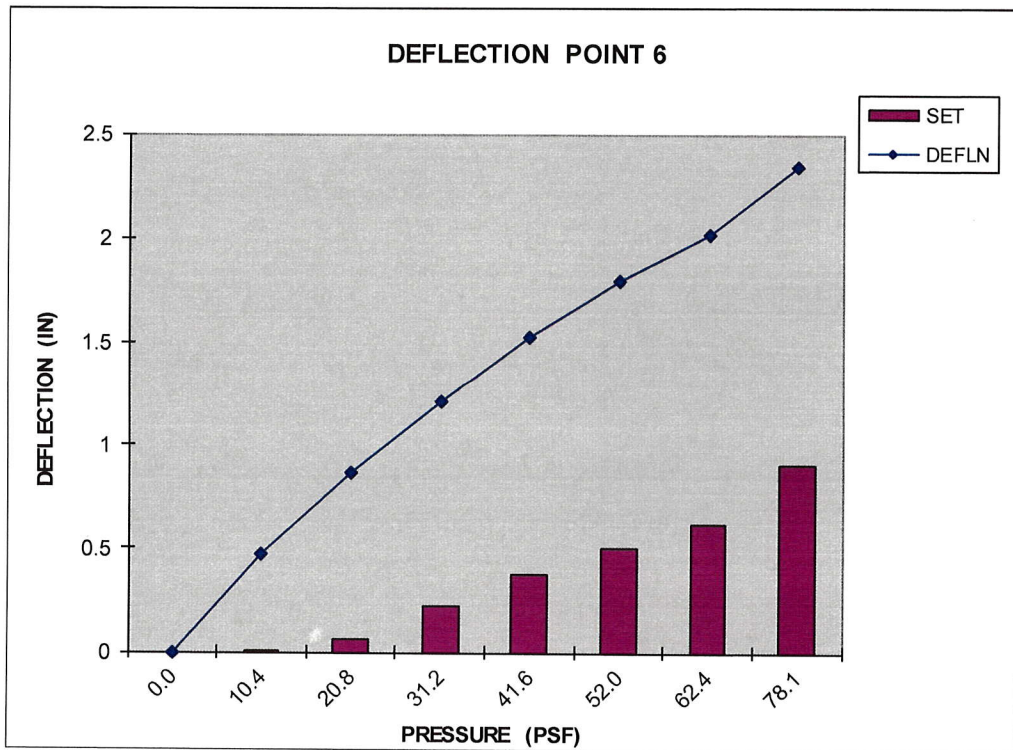
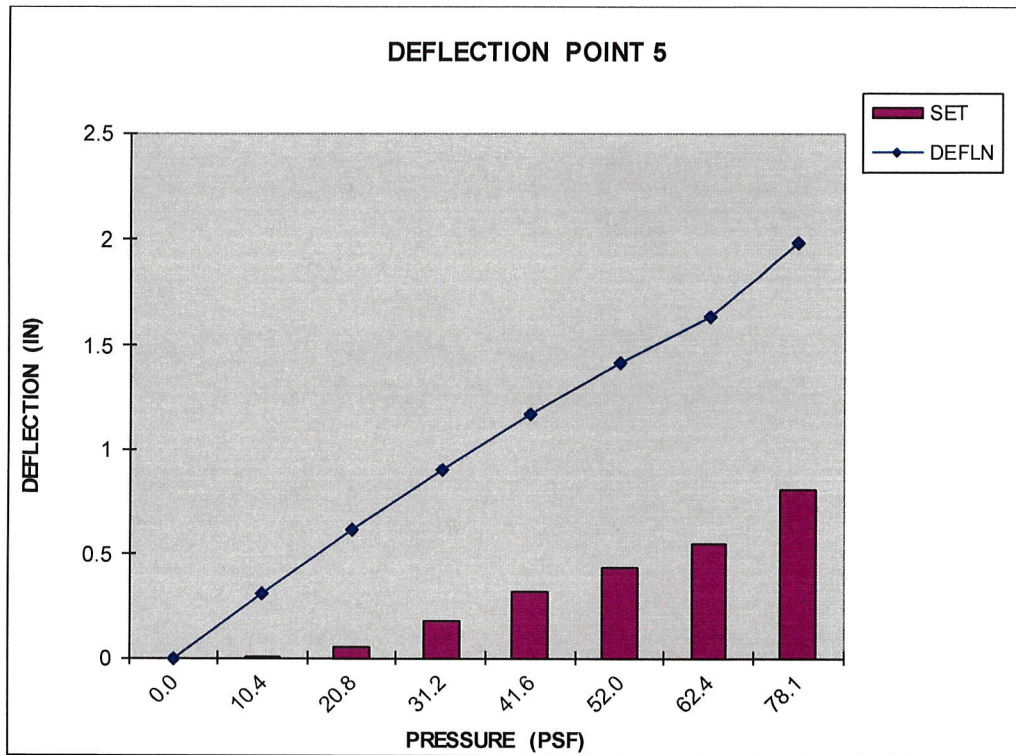
PETERSEN BOX RIB-4 PANEL 12" W X 24 GA. STEEL (5 SPANS @ 5')						
DEFLECTION DIAL READINGS (INCHES)						
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6
0.0	0.000	0.000	0.000	0.000	0.000	0.000
10.4	0.475	0.318	0.433	0.326	0.310	0.477
0.0	0.010	0.007	0.006	0.006	0.006	0.009
20.8	0.856	0.650	0.819	0.652	0.619	0.865
0.0	0.068	0.054	0.046	0.052	0.053	0.065
31.2	1.189	0.961	1.160	0.958	0.903	1.208
0.0	0.218	0.173	0.169	0.163	0.177	0.221
41.6	1.483	1.258	1.465	1.251	1.166	1.525
0.0	0.376	0.313	0.324	0.302	0.316	0.376
52.0	1.778	1.527	1.733	1.515	1.415	1.794
0.0	0.503	0.426	0.441	0.411	0.431	0.502
62.4	1.986	1.757	1.948	1.743	1.632	2.017
0.0	0.615	0.535	0.560	0.524	0.544	0.614
78.1	2.304	2.124	2.284	2.098	1.975	2.341
0.0	0.915	0.804	0.848	0.783	0.810	0.909

RESULTS:

Maximum Test Load = 87.3 psf (Panel side-joint disengaged)







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TEST #2

Test Date: 2-17-20

Test Specimen: Box Rib – 4 Panel, 12” wide (Coverage), 24 ga. steel (w/ Clip Leg)

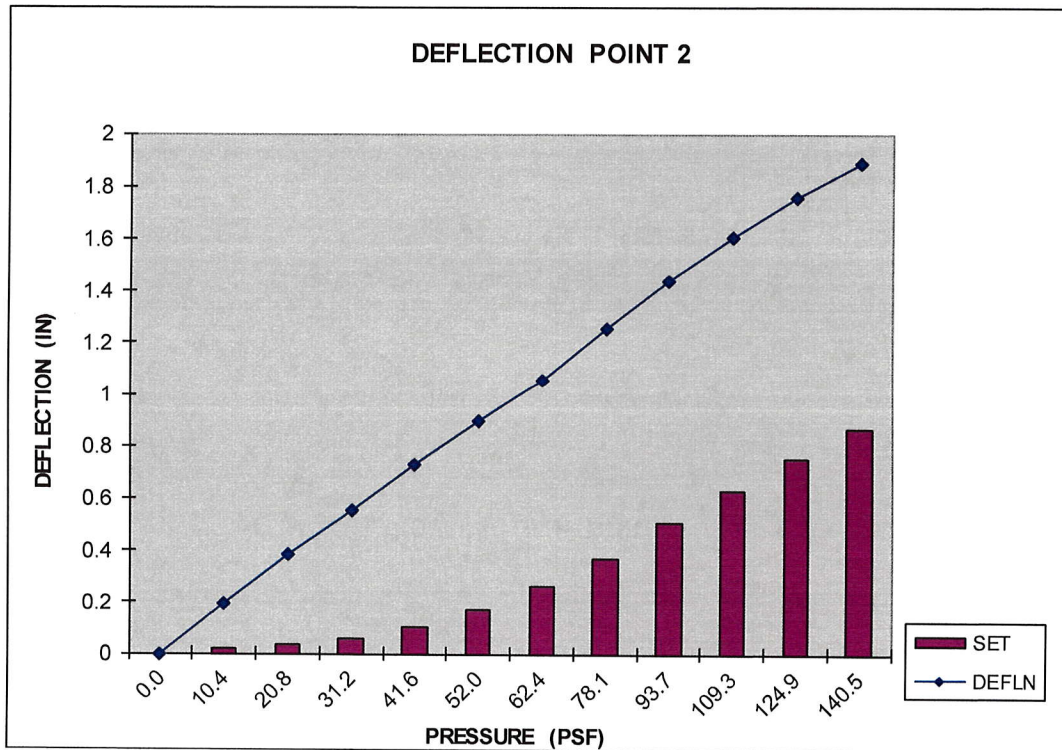
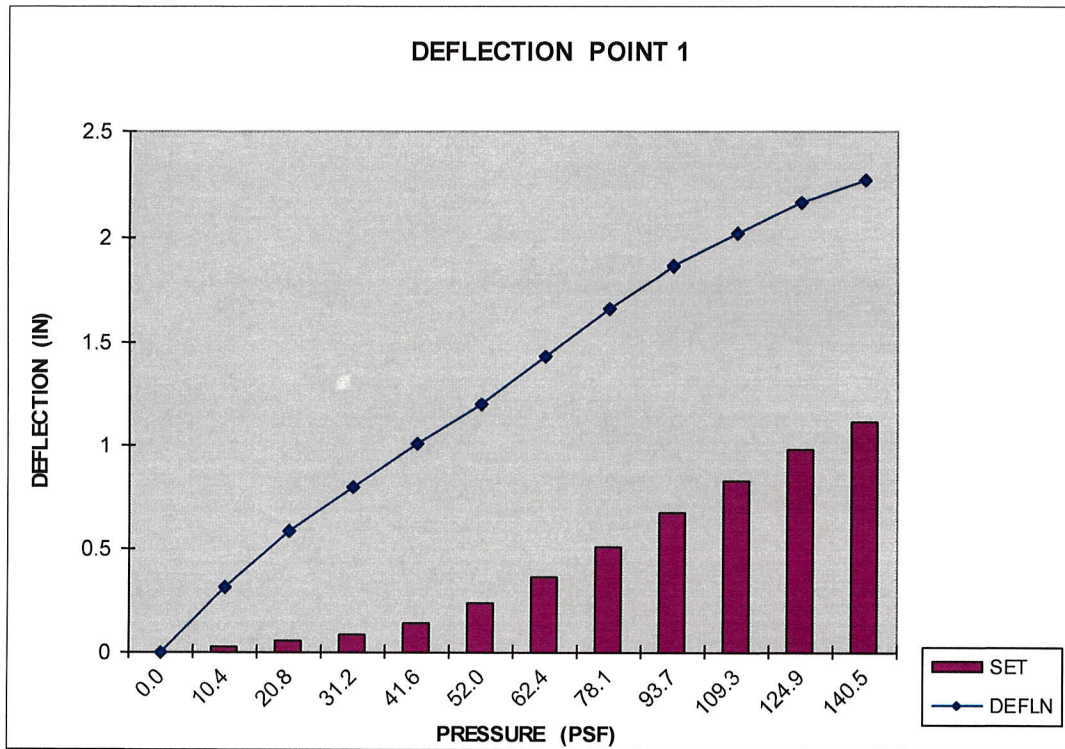
Support Spacing: 2’ o/c

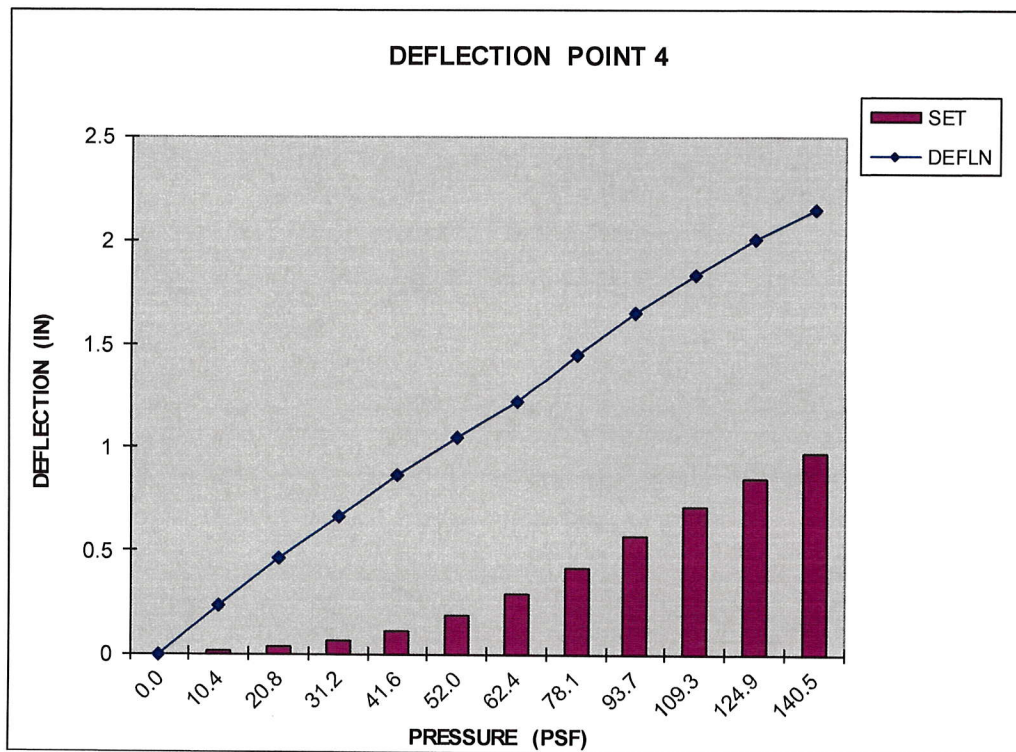
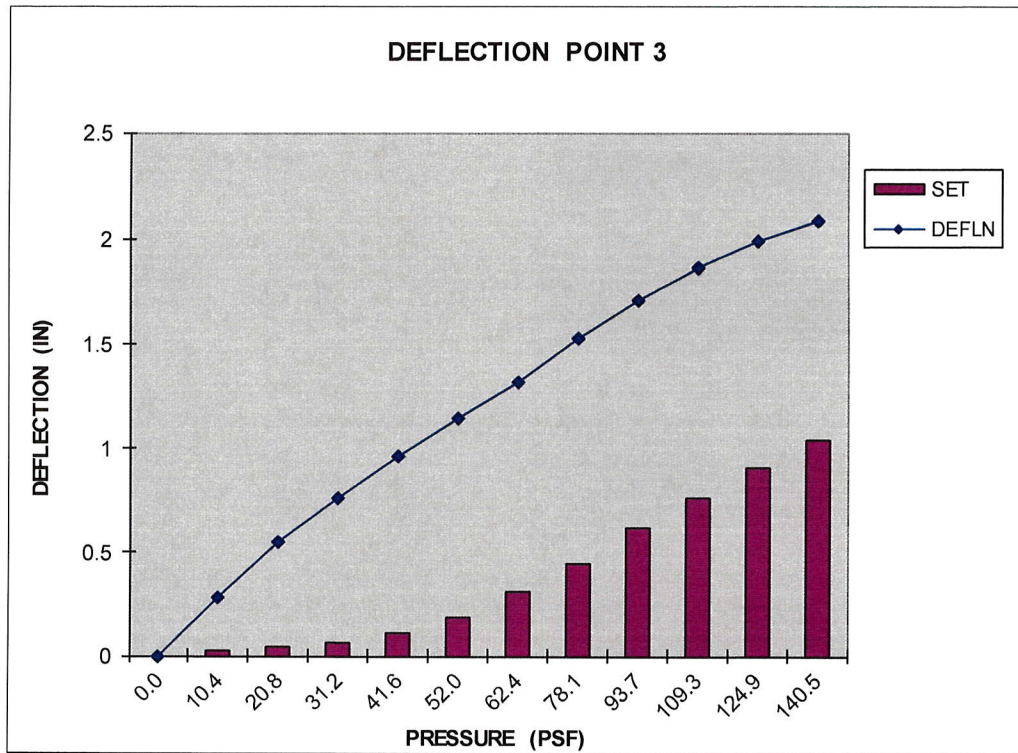
NEGATIVE (UPLIFT) TEST PRESSURE

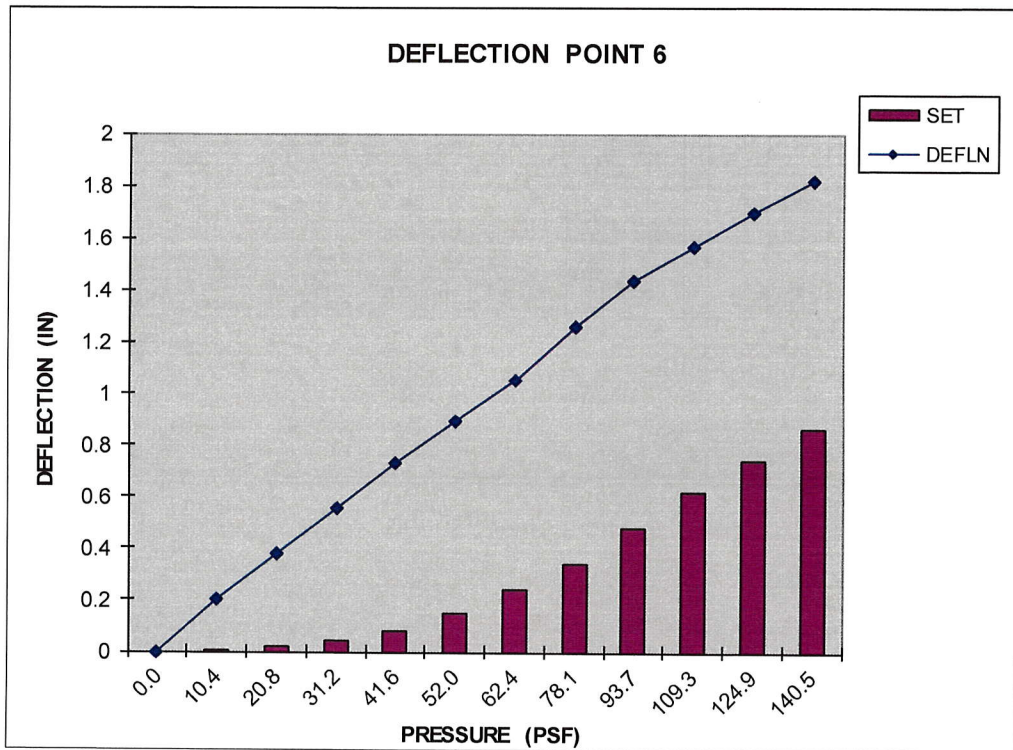
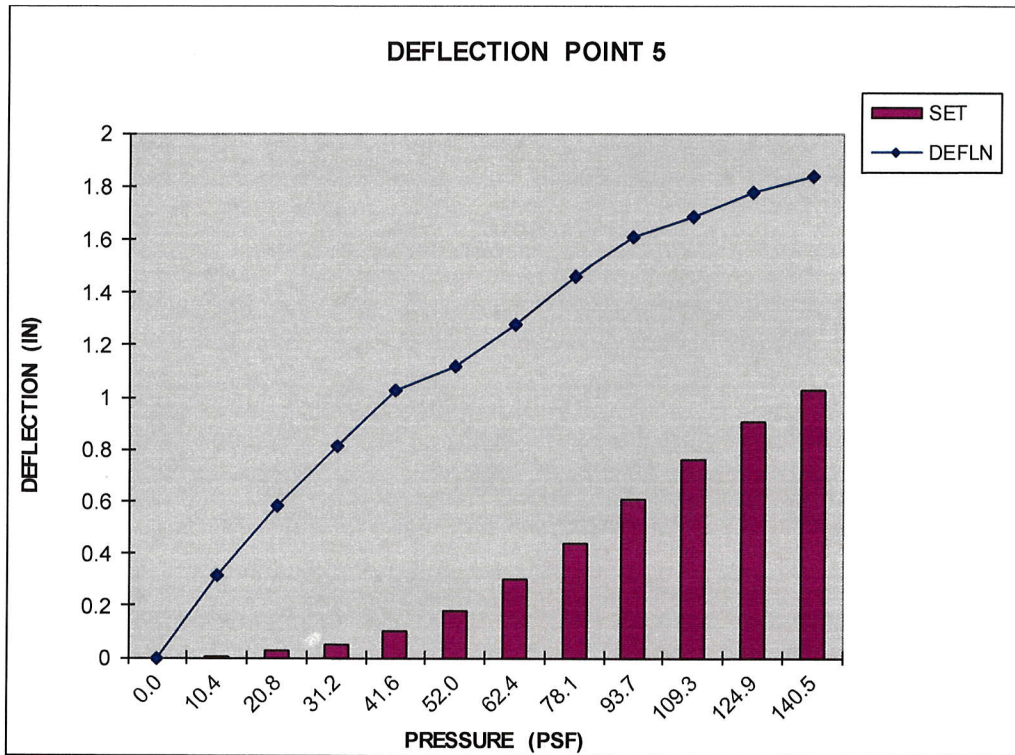
PETERSEN BOX RIB-4 PANEL 12" W X 24 GA. STEEL (12 SPANS @ 2')						
DEFLECTION DIAL READINGS (INCHES)						
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6
0.0	0.000	0.000	0.000	0.000	0.000	0.000
10.4	0.314	0.192	0.287	0.238	0.319	0.202
0.0	0.025	0.017	0.021	0.017	0.005	0.003
20.8	0.582	0.383	0.550	0.464	0.582	0.383
0.0	0.052	0.036	0.041	0.037	0.028	0.021
31.2	0.793	0.552	0.762	0.662	0.810	0.556
0.0	0.080	0.060	0.064	0.066	0.053	0.046
41.6	1.006	0.732	0.966	0.863	1.024	0.733
0.0	0.136	0.101	0.106	0.108	0.101	0.081
52.0	1.196	0.895	1.147	1.045	1.115	0.896
0.0	0.236	0.168	0.186	0.185	0.181	0.150
62.4	1.432	1.058	1.322	1.224	1.275	1.055
0.0	0.364	0.263	0.311	0.292	0.304	0.243
78.1	1.662	1.259	1.531	1.448	1.460	1.263
0.0	0.501	0.372	0.446	0.413	0.441	0.343
93.7	1.856	1.440	1.710	1.651	1.605	1.437
0.0	0.673	0.506	0.614	0.566	0.609	0.482
109.3	2.018	1.606	1.859	1.837	1.687	1.566
0.0	0.827	0.629	0.765	0.710	0.762	0.613
124.9	2.157	1.760	1.987	2.006	1.771	1.700
0.0	0.972	0.751	0.907	0.848	0.903	0.741
140.5	2.261	1.887	2.083	2.150	1.833	1.818
0.0	1.108	0.863	1.036	0.977	1.030	0.860

RESULTS:

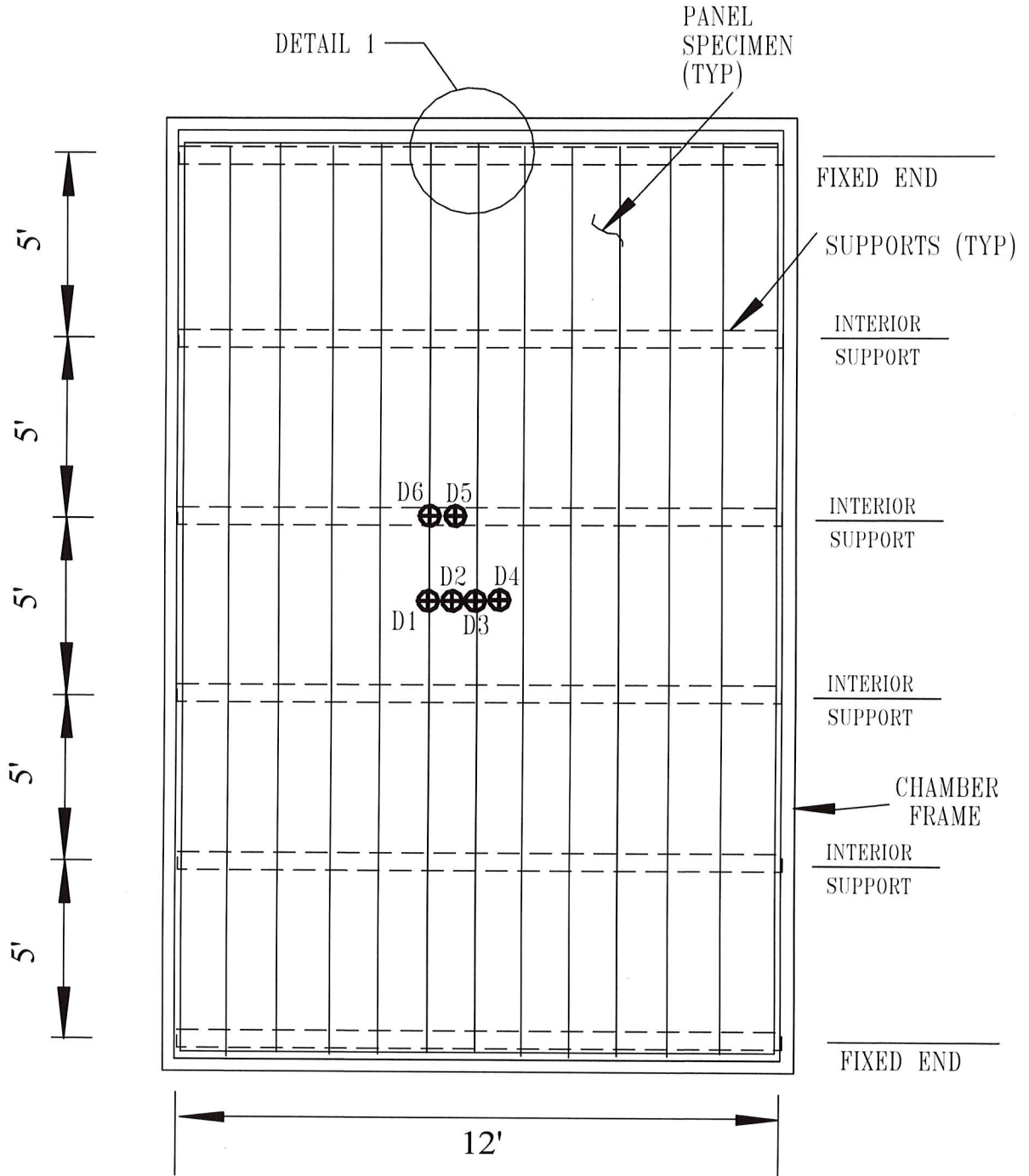
Maximum Test Load = 210.4 psf (Panel side-joint disengaged)







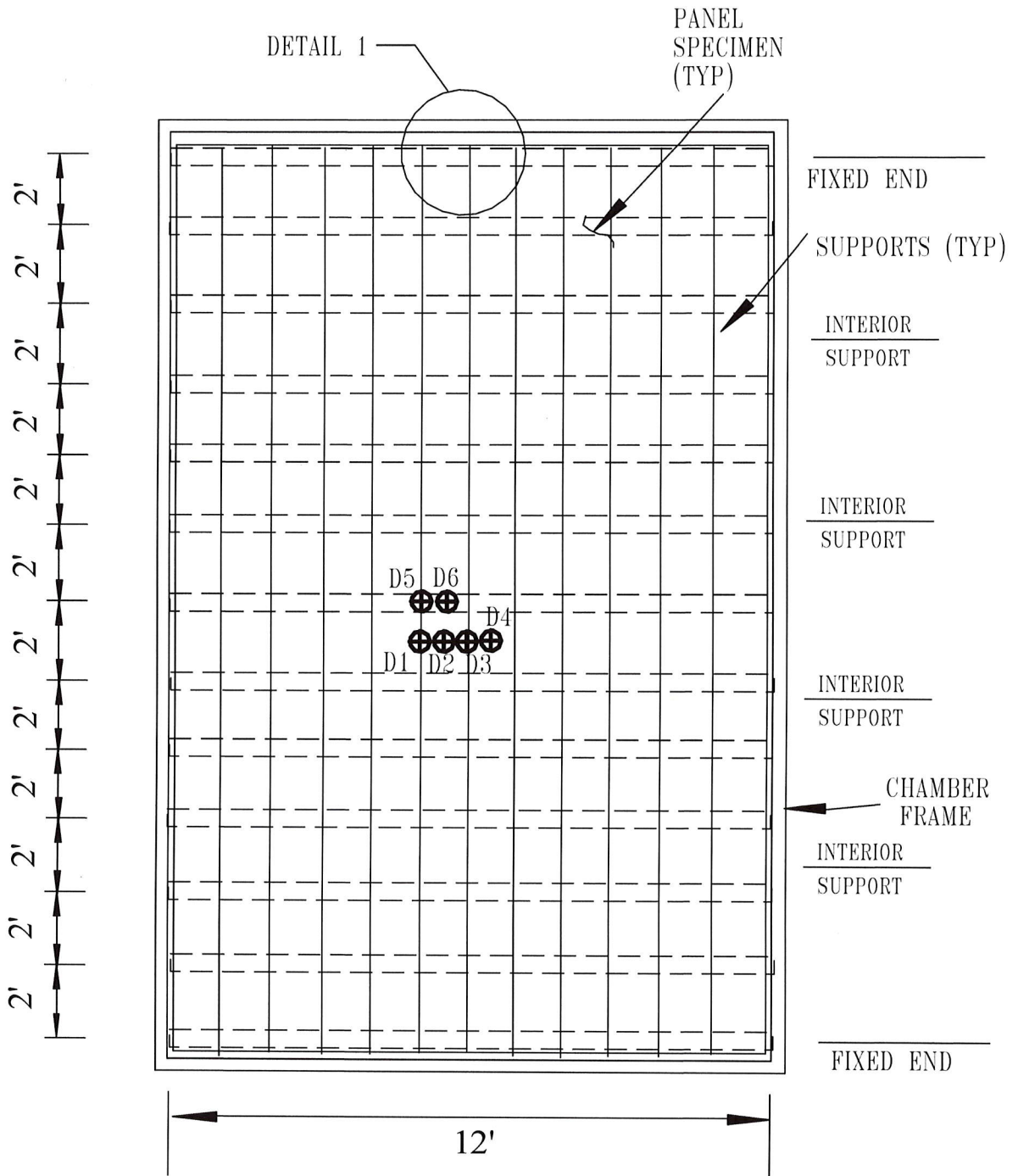
TEST #1



PLAN VIEW

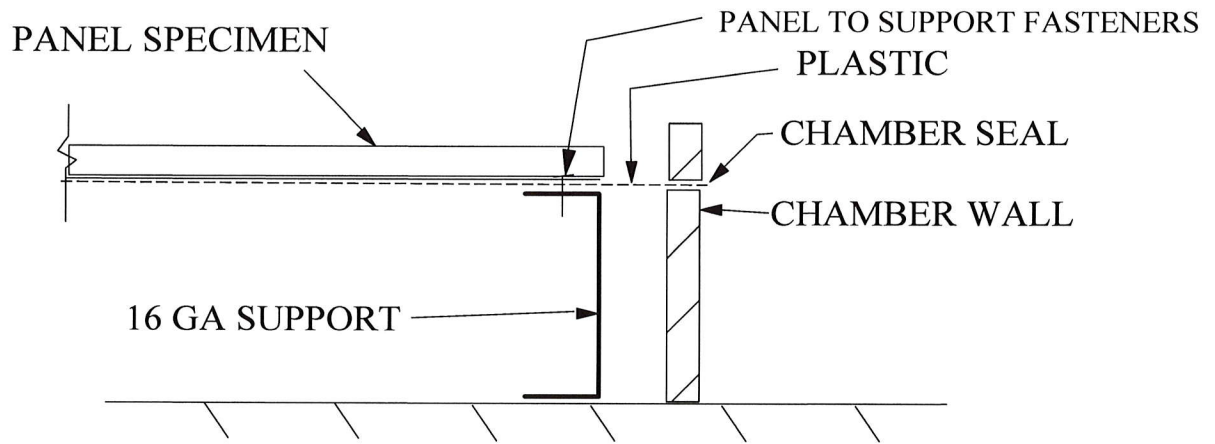
⊕ DEFLECTION POINT

TEST #2

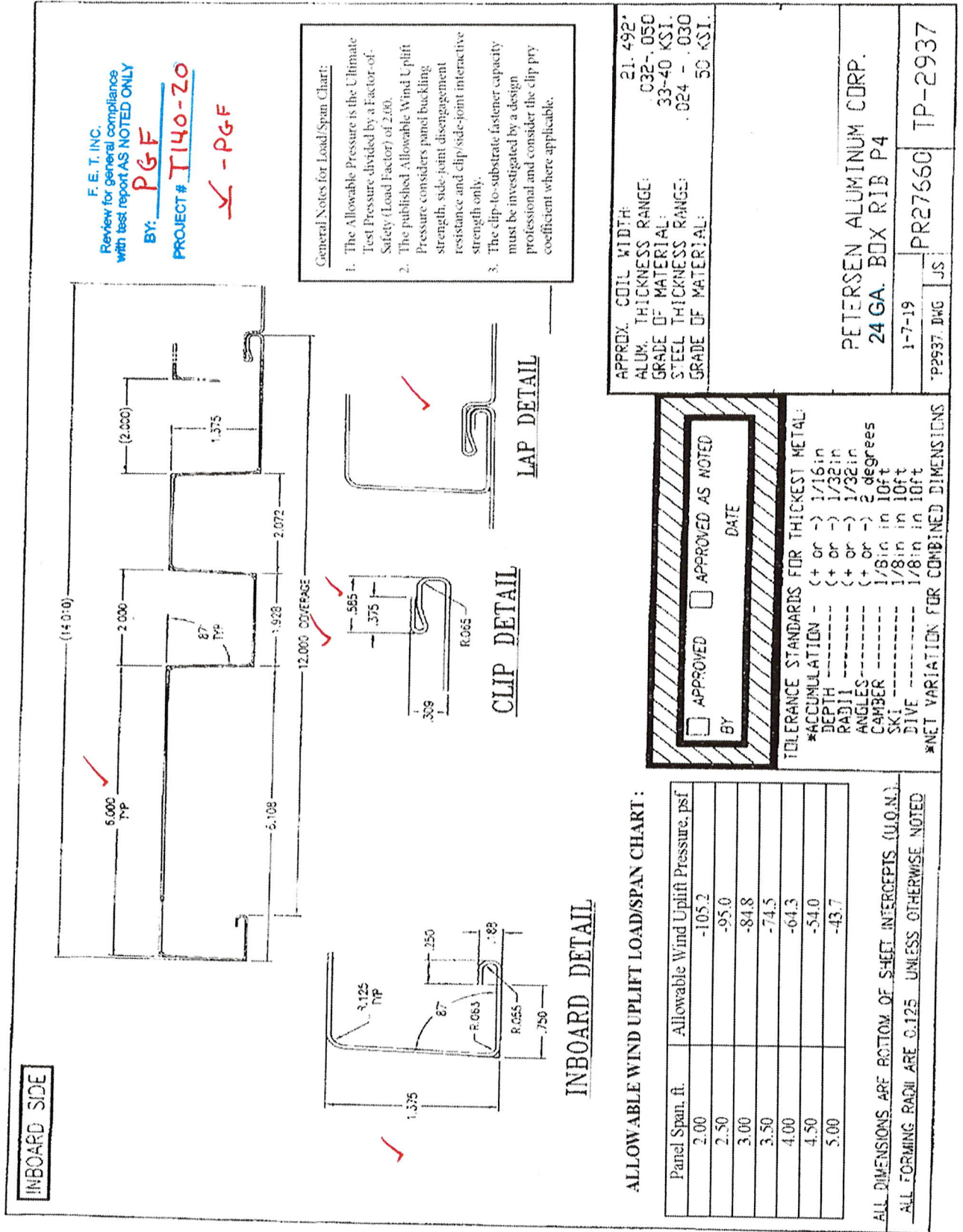


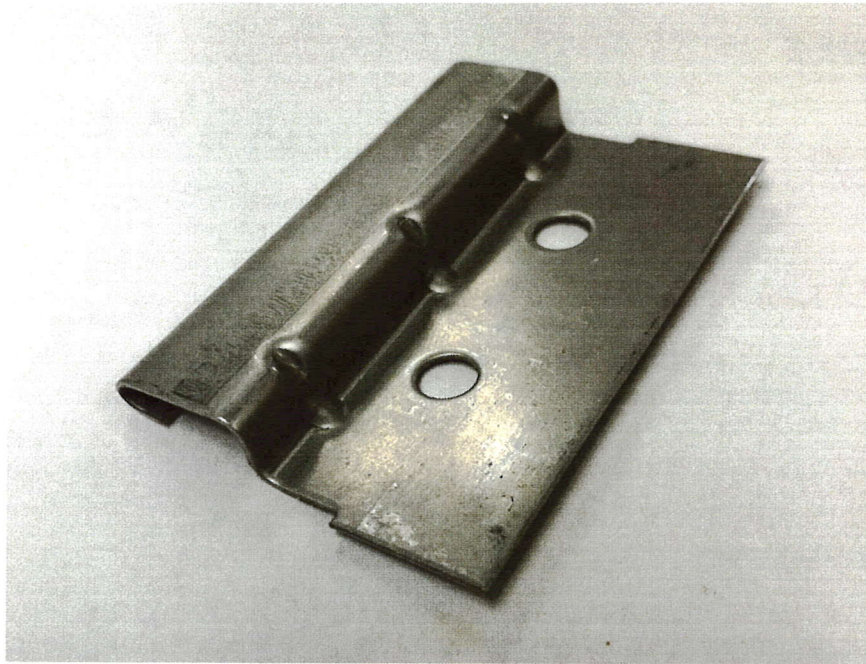
PLAN VIEW

⊕ DEFLECTION POINT



DETAIL 1





PANEL CLIP

Project No. T140-20

TENSILE TEST REPORT

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

Test Date: February 4, 2020

Test Method: ASTM A370-10-10

Material Description: Box Rib – P4 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)
20022	0.506	0.023	635.5	730.9	54,604	62,801	26.4

Equipment Used: Tensile Machine #QT7-061196-020
Caliper #1074379
Extensometer #10311744D
Micrometer #110596927