PETERSEN ALUMINUM CORP.
7.2 ROOF PANEL
24 GA STEEL

NEGATIVE DESIGN LOADS

SPAN	TEST LOAD*	NEGATIVE DESIGN LOAD (FS = 2.0)**	NEGATIVE DESIGN LOAD (FS = 1.65)***
5'	157.7 psf	78.8 psf	95.5 psf
4'	211.6 psf	105.8 psf	128.2 psf
3'	265.5 psf	132.7 psf	160.9 psf
2'	319.4 psf	159.7 psf	193.5 psf

* Negative (Uplift) Test Pressure from ASTM E1592 testing. See Farabaugh Engineering and Testing, Inc. Test Report Project No. T277-08 for test data and details.
** Negative Design Load obtained using a factor of safety of 2.0
*** Negative Design Load obtained using a factor of safety of 1.65

- All values for 4' and 3' spans are interpolated.
- Design Engineer shall use appropriate Factor of Safety based on required building codes and project specifications.
- These values do not consider fastener pullout or pullover which must be evaluated by the Design Engineer.

Farabaugh Engineering and Testing Inc.

Project No. T277-08

Report Date: October 21, 2008

Total Pages (inclusive): 18

ASTM E 1592
STANDARD TEST METHOD FOR
STRUCTURAL PERFORMANCE OF SHEET METAL ROOF AND SIDING
SYSTEMS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE

7.2 ROOF PANEL
36" WIDE X 24 GA

FOR

PETERSEN ALUMINUM CORP.
1005 TONNE RD.
ELK GROVE VILLAGE, IL 60007

Report Prepared By:

Patrick J. Farabaugh, PE

Reviewed and Approved By:

Daniel G. Farabaugh, PE

DANIEL G. FARABAUGH, P.E.
255 Saunders Station Rd.
Trafford, PA 15085
(412) 373-9238

10/24/08

Project No. T277-08

ASTM E1592-01
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 Date

Test #1 (Specimen "A") – 10/13/08

Test #2 (Specimen "B") – 10/20/08

Test Specimen

Manufacturer: Petersen Aluminum Corp.
1005 Tonne Rd.
Elk Grove Village, IL 60007

Panel: 7.2 Roof Panel, 36" wide (coverage), 24 ga steel

Panel Length: as shown

Testing Apparatus

Test Chamber: Vacuum Chamber Composed of Wood

Mounting Frame: Hat Shape Subgirts fastened to W6 X 15 Wide Flange Beams

Pressure Indicator: Digital Pressure Indicator from Micro-Pneumatic Logic, Inc.

Caliper: Mitutoyo Digital Caliper, Model No. CD-12" CP

Installation

- The panels were installed on to 16 ga supports using ¼"-14 X 1-1/4" long hex head self drill fasteners with 5/8" seal washer located at every low cell of the panel. The panel side-joints were overlapping suing #12-14 X 1" long hex head self drill fasteners with 5/8" seal washer located at 18" o.c. .

- 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.

The test was conducted according to the procedure in ASTM E-1592-01 and as noted herein. In our opinion the tape and plastic had no influence on the results of the test.

Project No. T277-08

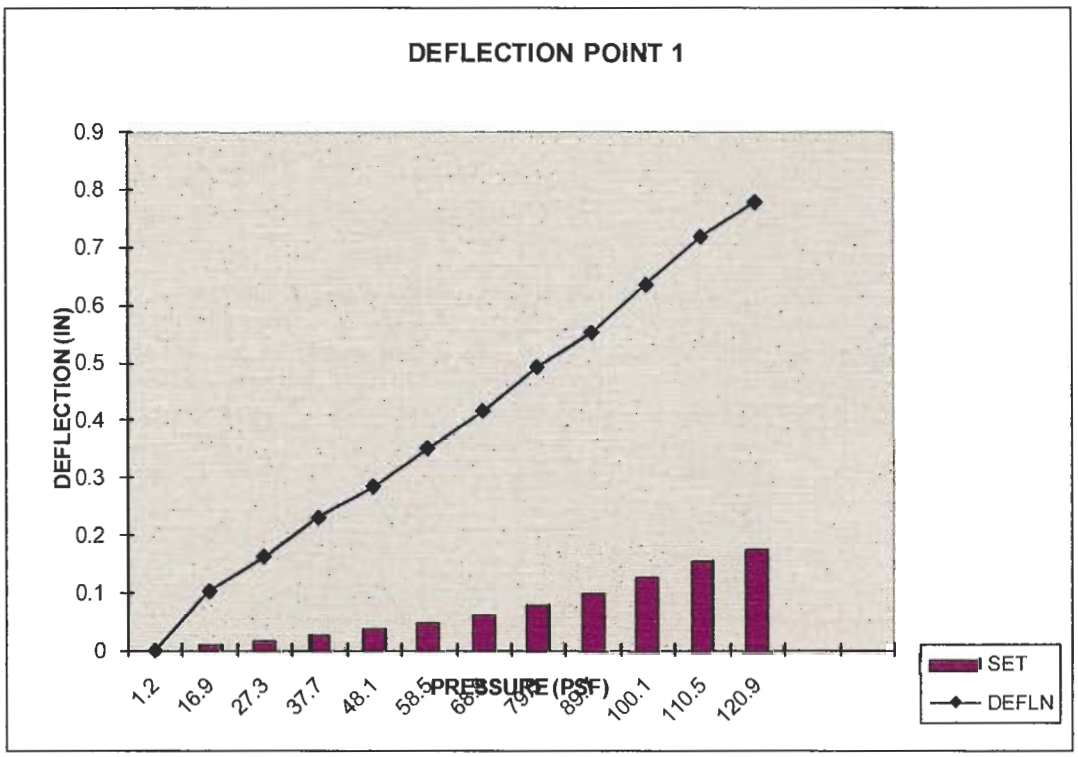
TEST #1

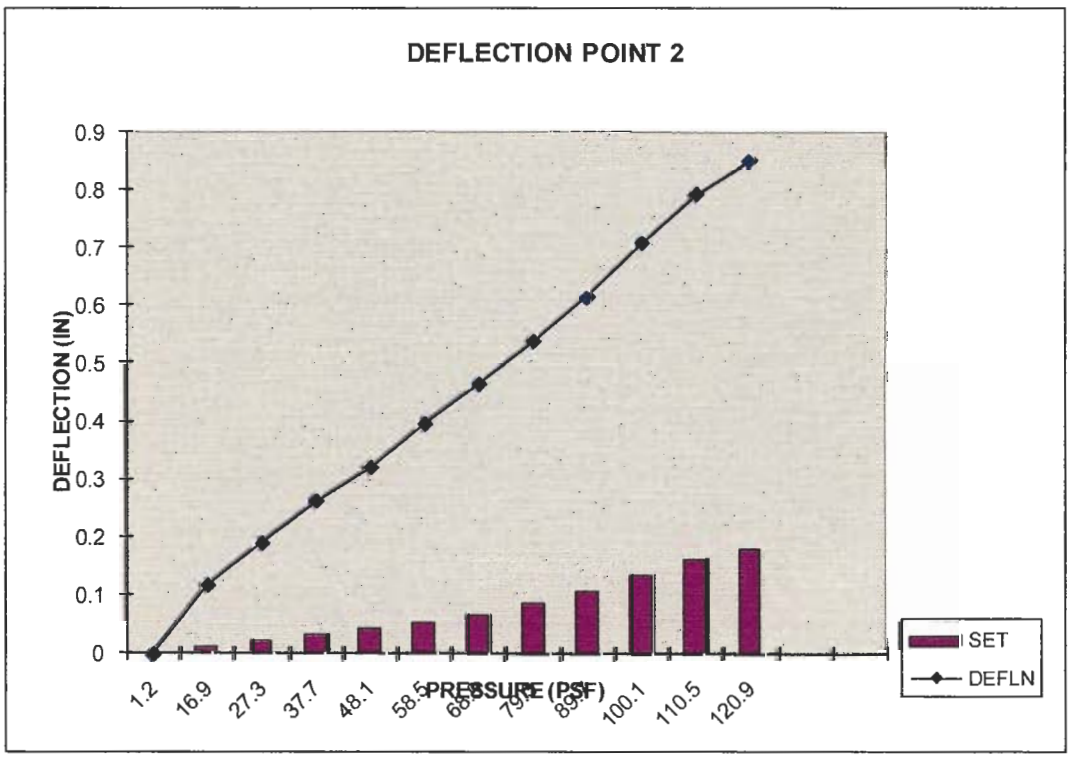
NEGATIVE (UPLIFT) PRESSURE

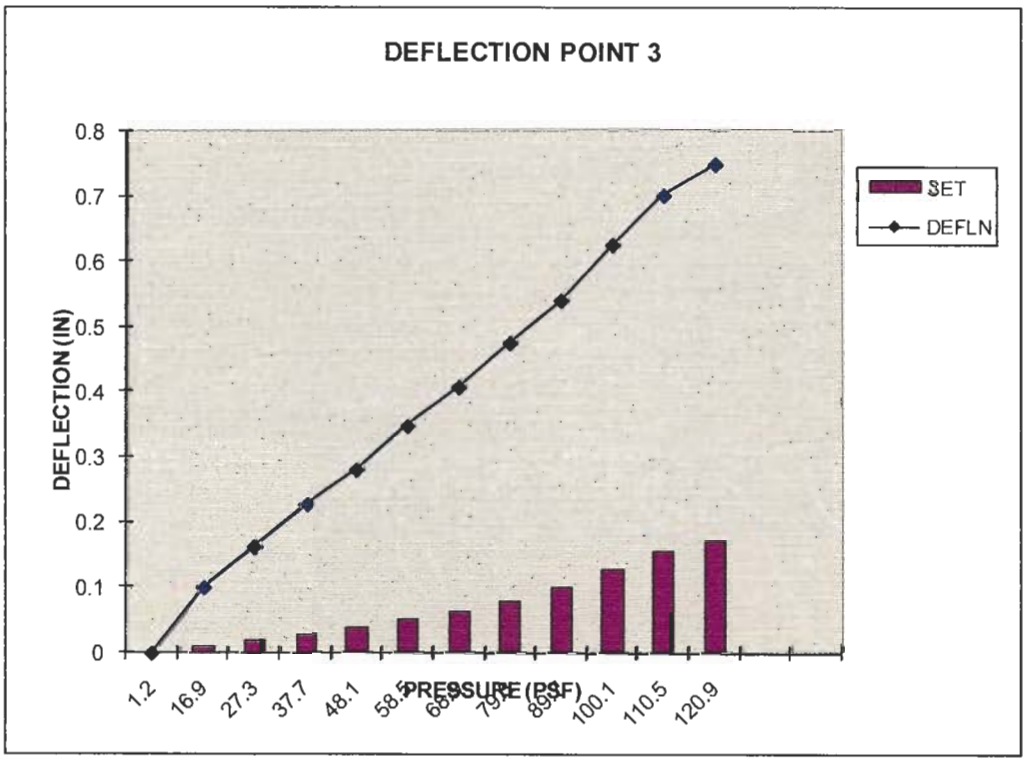
	PAC 7.2 ROOF PANEL , 36" W X 24 GA (SPECIMEN A) 3 SPANS @ 5 '-0" oc								
	DEFLECTION DIAL READINGS (INCHES)								
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	REMARKS
1.2	0	0	0	0	0	0	0	0	PANEL WT.
16.9	0.103	0.118	0.101	0.103	0.349	0.116	0.055	0.069	
1.2	0.01	0.012	0.01	0.011	0.253	0.011	0.008	0.009	PANEL WT.
27.3	0.163	0.19	0.163	0.163	0.405	0.174	0.09	0.112	
1.2	0.019	0.022	0.019	0.016	0.264	0.024	0.015	0.016	PANEL WT.
37.7	0.23	0.263	0.228	0.225	0.463	0.232	0.124	0.149	
1.2	0.029	0.032	0.027	0.022	0.276	0.037	0.021	0.021	PANEL WT.
48.1	0.284	0.321	0.281	0.279	0.516	0.288	0.156	0.187	
1.2	0.038	0.041	0.038	0.028	0.29	0.051	0.025	0.025	PANEL WT.
58.5	0.35	0.396	0.348	0.341	0.575	0.347	0.186	0.22	
1.2	0.049	0.051	0.048	0.035	0.308	0.068	0.03	0.03	PANEL WT.
68.9	0.415	0.465	0.408	0.395	0.636	0.408	0.218	0.254	
1.2	0.062	0.065	0.06	0.043	0.331	0.09	0.036	0.035	PANEL WT.
79.3	0.491	0.539	0.476	0.463	0.704	0.481	0.254	0.294	
1.2	0.081	0.085	0.078	0.058	0.362	0.12	0.043	0.043	PANEL WT.
89.7	0.551	0.616	0.541	0.524	0.772	0.552	0.288	0.33	
1.2	0.102	0.106	0.099	0.074	0.395	0.154	0.052	0.052	PANEL WT.
100.1	0.633	0.709	0.626	0.6	0.854	0.631	0.325	0.37	
1.2	0.129	0.135	0.127	0.098	0.44	0.199	0.064	0.065	PANEL WT.
110.5	0.716	0.793	0.701	0.675	0.934	0.714	0.362	0.41	
1.2	0.156	0.162	0.154	0.12	0.484	0.244	0.074	0.077	PANEL WT.
120.9	0.776	0.851	0.748	0.723	0.972	0.741	0.396	0.443	
1.2	0.177	0.18	0.169	0.132	0.512	0.267	0.086	0.087	PANEL WT.

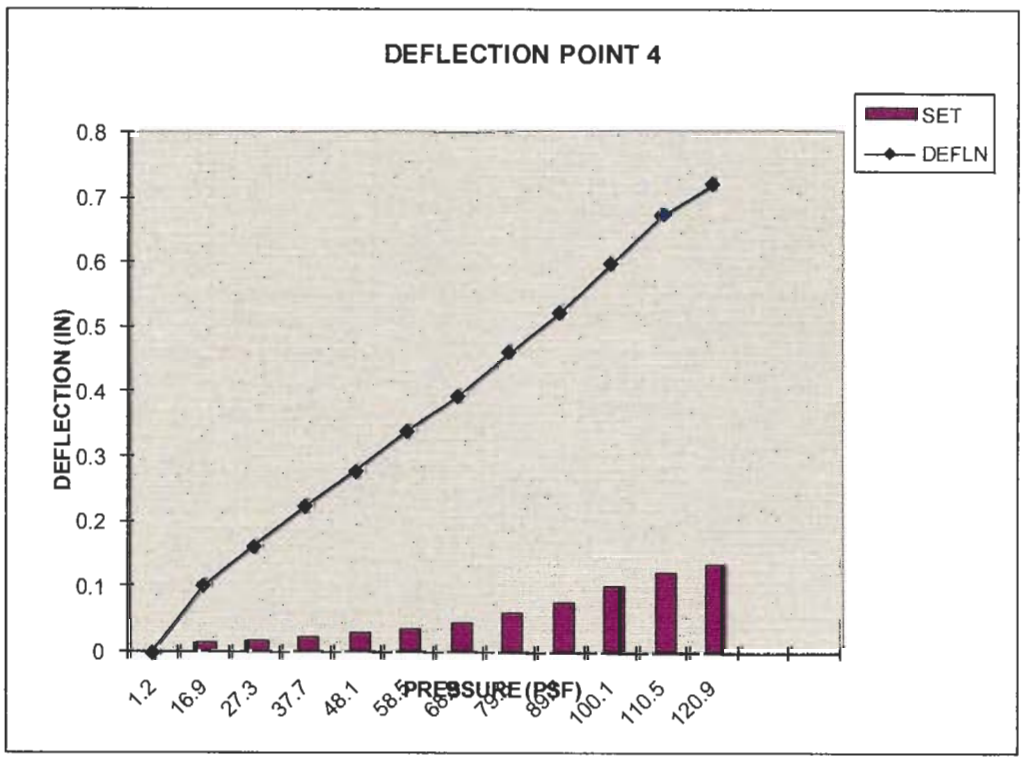
RESULTS:

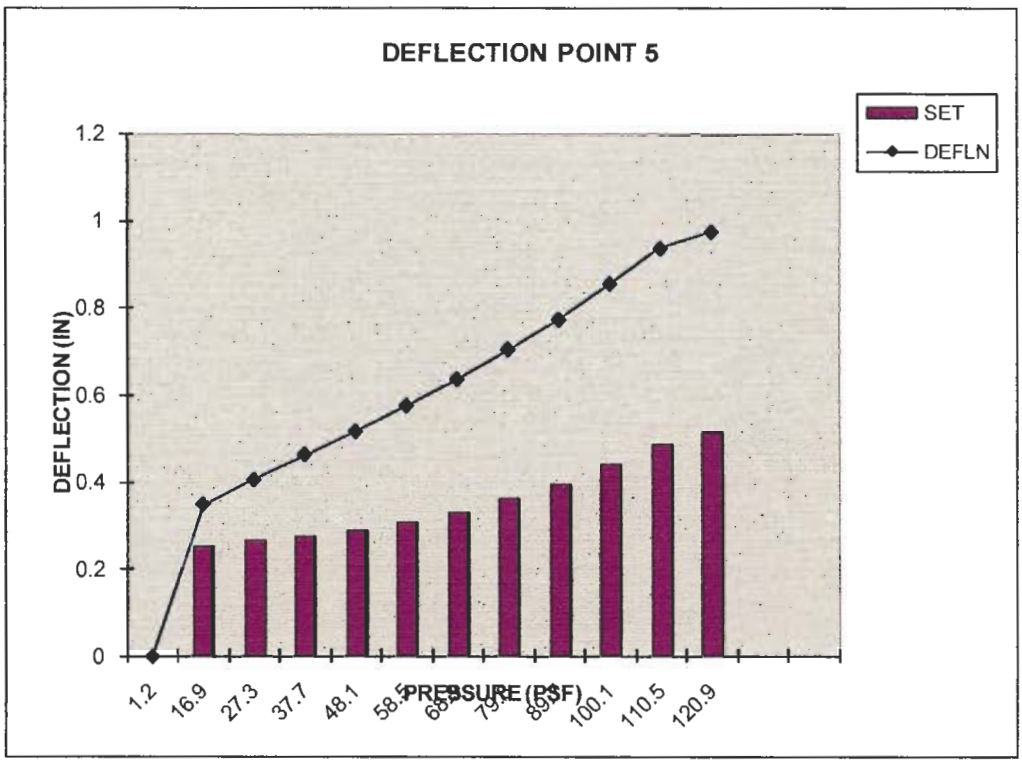
ULTIMATE TEST LOAD = 157.7 PSF
(PANEL FASETNERS PULLED OUT OF 16 GA SUPPORTS)

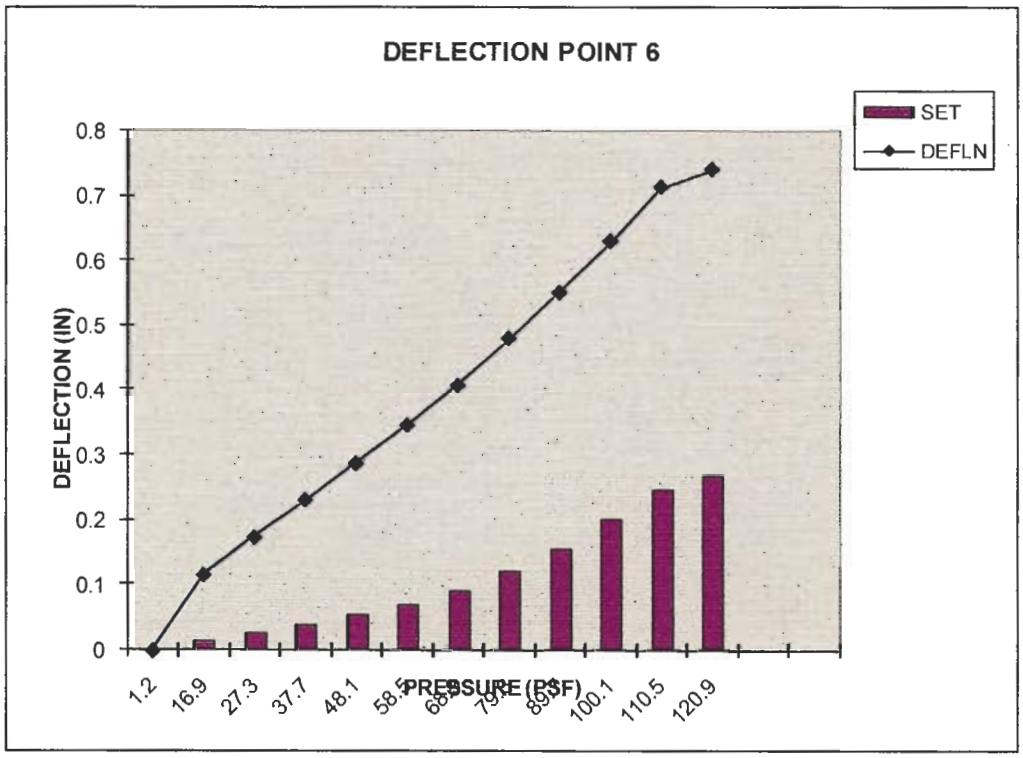

DEFLECTION POINT 1
DEFLECTION (IN)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1.2
16.9
27.3
37.7
48.1
58.5
100.1
110.5
120.9
PRESSURE (PSF)
SET
DEFLN

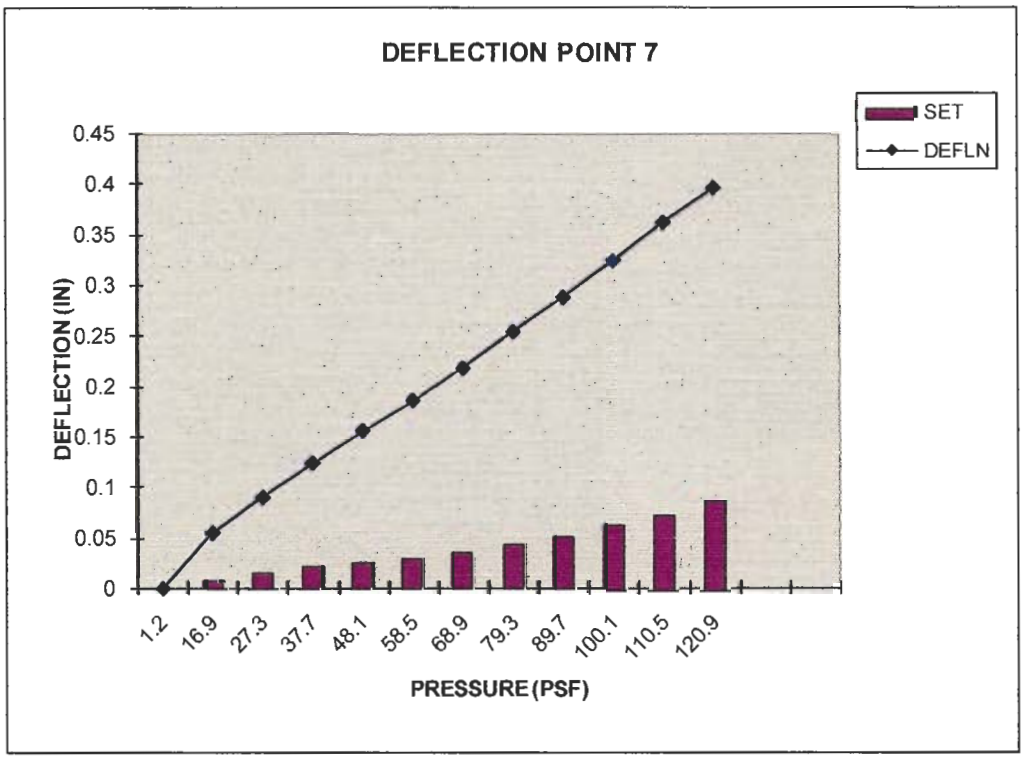

DEFLECTION POINT 2
DEFLECTION (IN)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1.2
16.9
27.3
37.7
48.1
58.5
100.1
110.5
120.9
PRESSURE (PSF)
SET
DEFLN

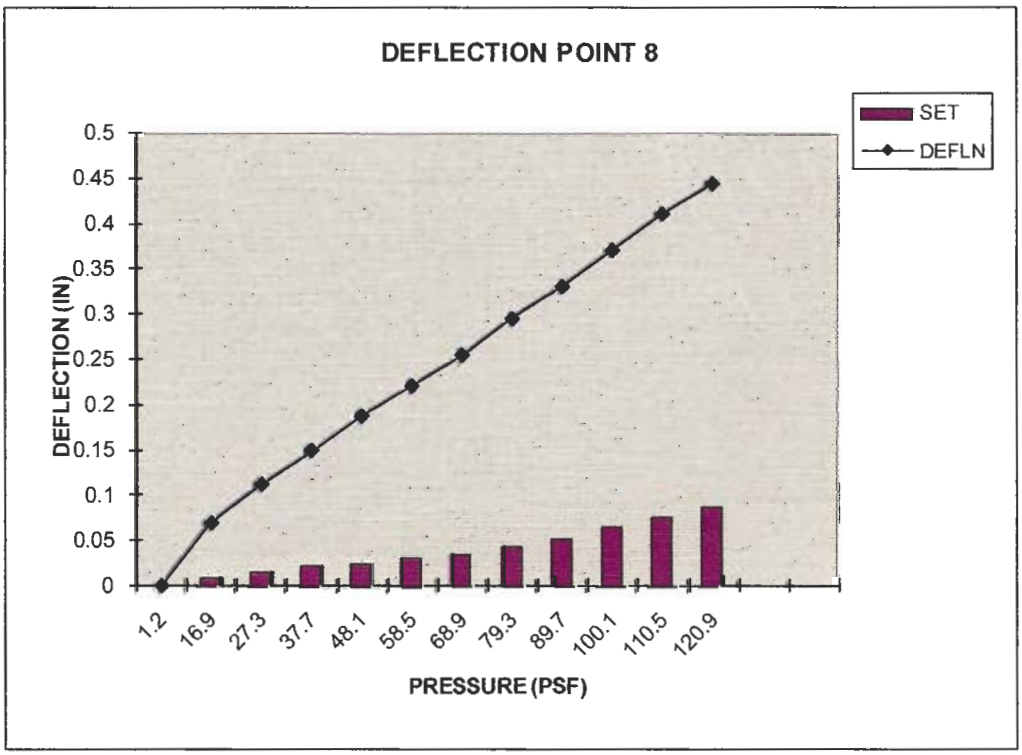

DEFLECTION POINT 3
DEFLECTION (IN)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
SET
DEFLN
1.2
16.9
27.3
37.7
48.1
58.5
68.9
79.3
89.7
100.1
110.5
120.9
PRESSURE (PSF)


DEFLECTION POINT 4
DEFLECTION (IN)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
SET
DEFLN
1.2
16.9
27.3
37.7
48.1
58.5
68.9
79.3
89.7
100.1
110.5
120.9
PRESSURE (PSF)


DEFLECTION POINT 5
SET
DEFLN
DEFLECTION (IN)
1.2
1
0.8
0.6
0.4
0.2
0
1.2
16.9
27.3
37.7
48.1
100.1
110.5
120.9
PRESSURE (PSF)


DEFLECTION POINT 6
SET
DEFLN
DEFLECTION (IN)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1.2
16.9
27.3
37.7
48.1
100.1
110.5
120.9
PRESSURE (PSF)


DEFLECTION POINT 7
SET
DEFLN
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
DEFLECTION (IN)
1.2
16.9
27.3
37.7
48.1
58.5
68.9
79.3
89.7
100.1
110.5
120.9
PRESSURE (PSF)


DEFLECTION POINT 8
SET
DEFLN
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
DEFLECTION (IN)
1.2
16.9
27.3
37.7
48.1
58.5
68.9
79.3
89.7
100.1
110.5
120.9
PRESSURE (PSF)

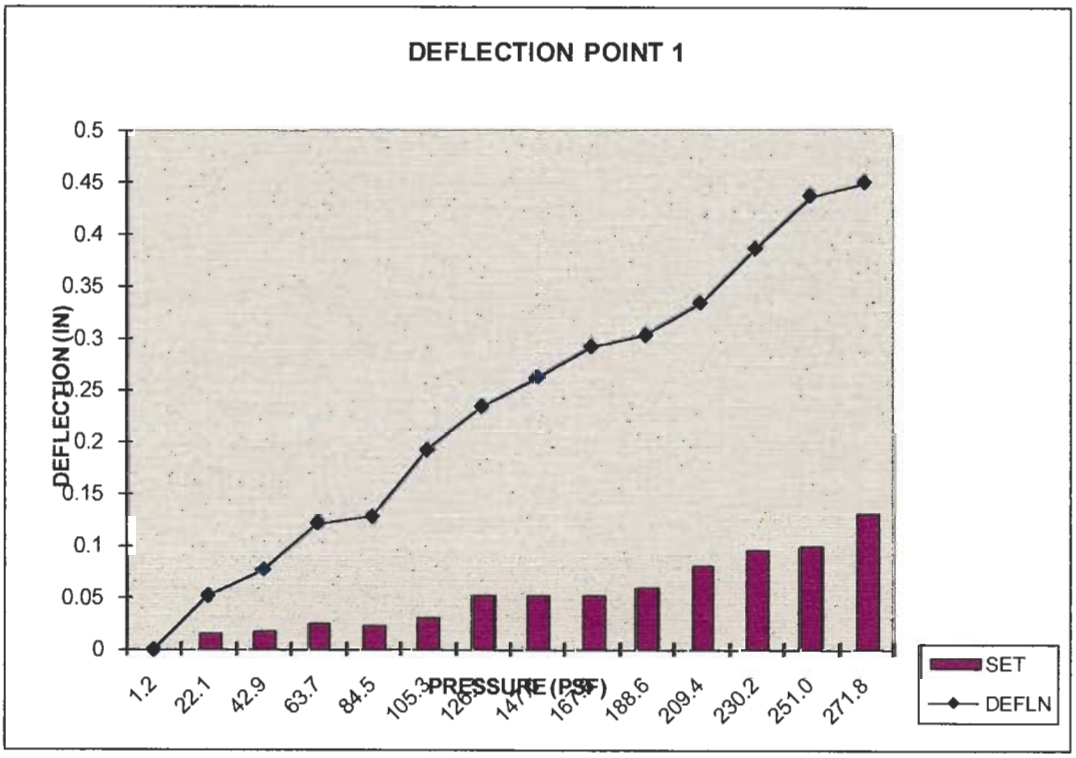
TEST #2

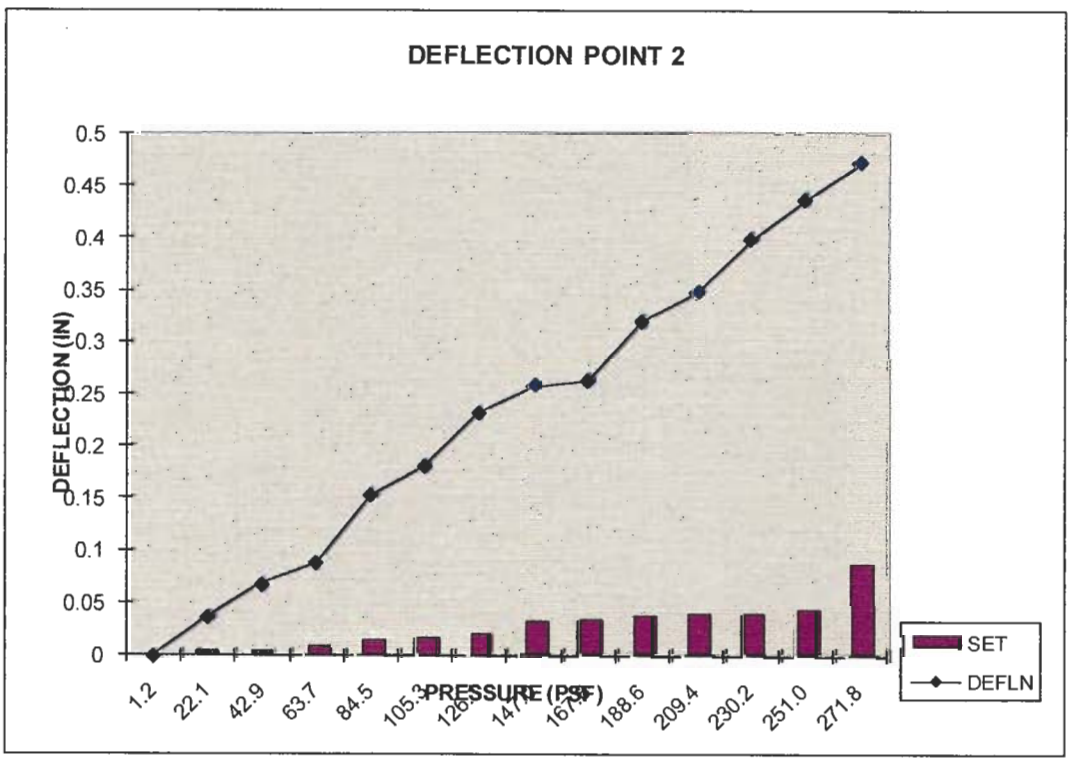
NEGATIVE (UPLIFT) PRESSURE

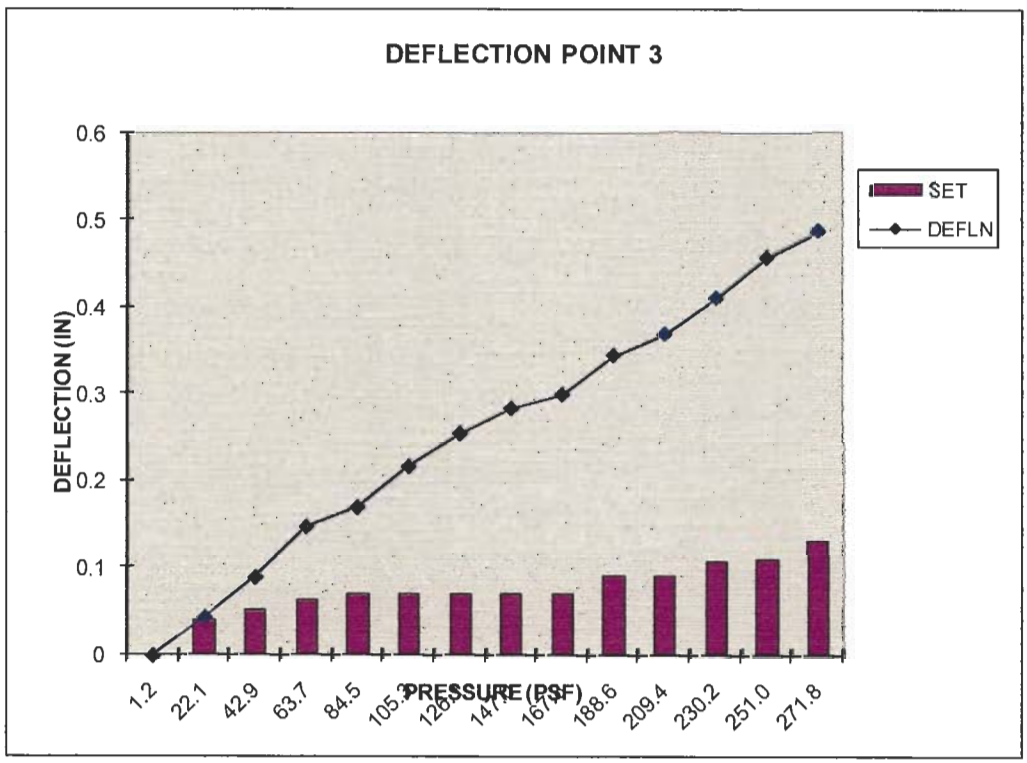
PAC 7.2 ROOF PANEL, 36" W X 24 GA (SPECIMEN B) 6 SPANS @ 2 '-0" oc									
	DEFLECTION DIAL READINGS (INCHES)								
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	REMARKS
1.2	0	0	0	0	0	0	0	0	PANEL WT.
22.1	0.052	0.037	0.044	0.005	0.001	0.025	0.071	0.028	
1.2	0.015	0.004	0.04	0.017	0.001	0.023	0.049	0.021	PANEL WT.
42.9	0.077	0.068	0.09	0.075	0.021	0.049	0.081	0.032	
1.2	0.017	0.004	0.05	0.022	-0.001	0.038	0.054	0.021	PANEL WT.
63.7	0.122	0.089	0.148	0.109	0.048	0.078	0.119	0.043	
1.2	0.025	0.008	0.063	0.025	0.01	0.049	0.06	0.021	PANEL WT.
84.5	0.128	0.154	0.17	0.135	0.05	0.08	0.121	0.079	
1.2	0.024	0.014	0.07	0.024	0.024	0.049	0.065	0.034	PANEL WT.
105.3	0.192	0.182	0.217	0.168	0.065	0.094	0.139	0.137	
1.2	0.03	0.015	0.068	0.027	0.029	0.049	0.066	0.034	PANEL WT.
126.1	0.234	0.233	0.255	0.202	0.071	0.112	0.153	0.156	
1.2	0.052	0.019	0.069	0.028	0.03	0.051	0.066	0.035	PANEL WT.
147.0	0.261	0.259	0.284	0.237	0.093	0.116	0.155	0.158	
1.2	0.052	0.031	0.069	0.035	0.03	0.052	0.066	0.036	PANEL WT.
167.8	0.292	0.264	0.3	0.262	0.095	0.137	0.162	0.16	
1.2	0.052	0.032	0.069	0.036	0.03	0.053	0.079	0.036	PANEL WT.
188.6	0.303	0.321	0.345	0.284	0.097	0.152	0.185	0.174	
1.2	0.06	0.037	0.089	0.046	0.031	0.054	0.086	0.037	PANEL WT.
209.4	0.334	0.349	0.369	0.318	0.102	0.167	0.205	0.185	
1.2	0.08	0.038	0.09	0.051	0.04	0.059	0.089	0.044	PANEL WT.
230.2	0.386	0.4	0.41	0.338	0.107	0.183	0.212	0.186	
1.2	0.094	0.039	0.106	0.066	0.041	0.064	0.092	0.055	PANEL WT.
251.0	0.437	0.438	0.457	0.383	0.173	0.193	0.223	0.218	
1.2	0.098	0.042	0.108	0.068	0.05	0.067	0.076	0.059	PANEL WT.
271.8	0.45	0.473	0.487	0.436	0.189	0.219	0.244	0.24	
1.2	0.128	0.086	0.128	0.097	0.071	0.08	0.112	0.065	PANEL WT.

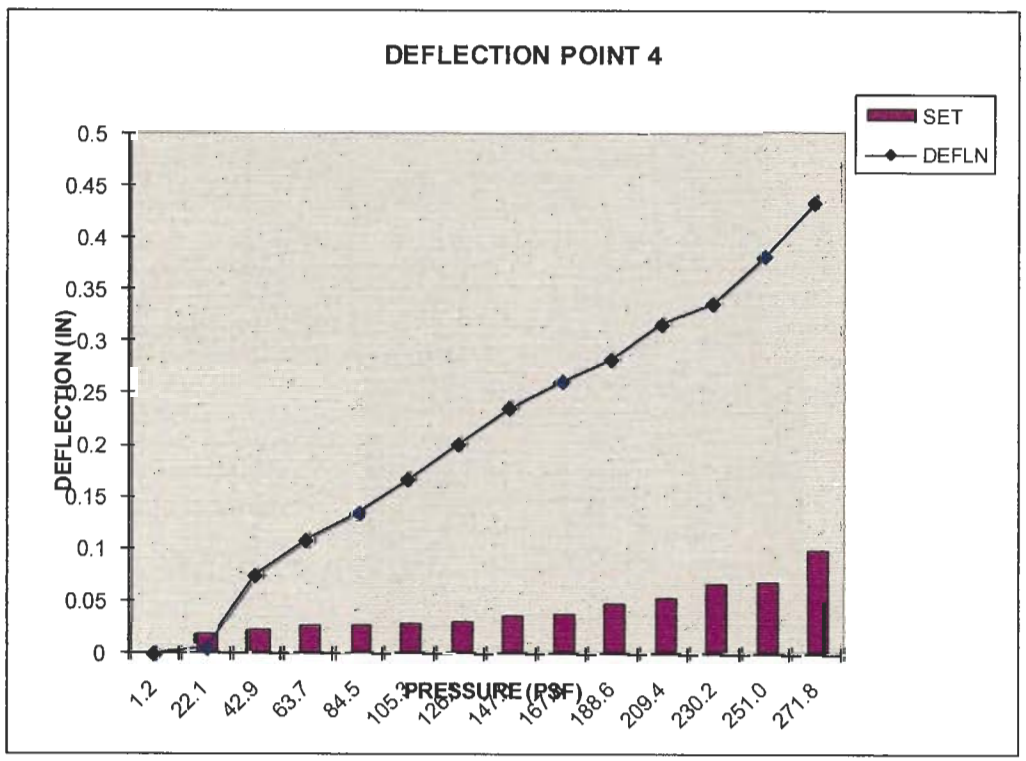
RESULTS:

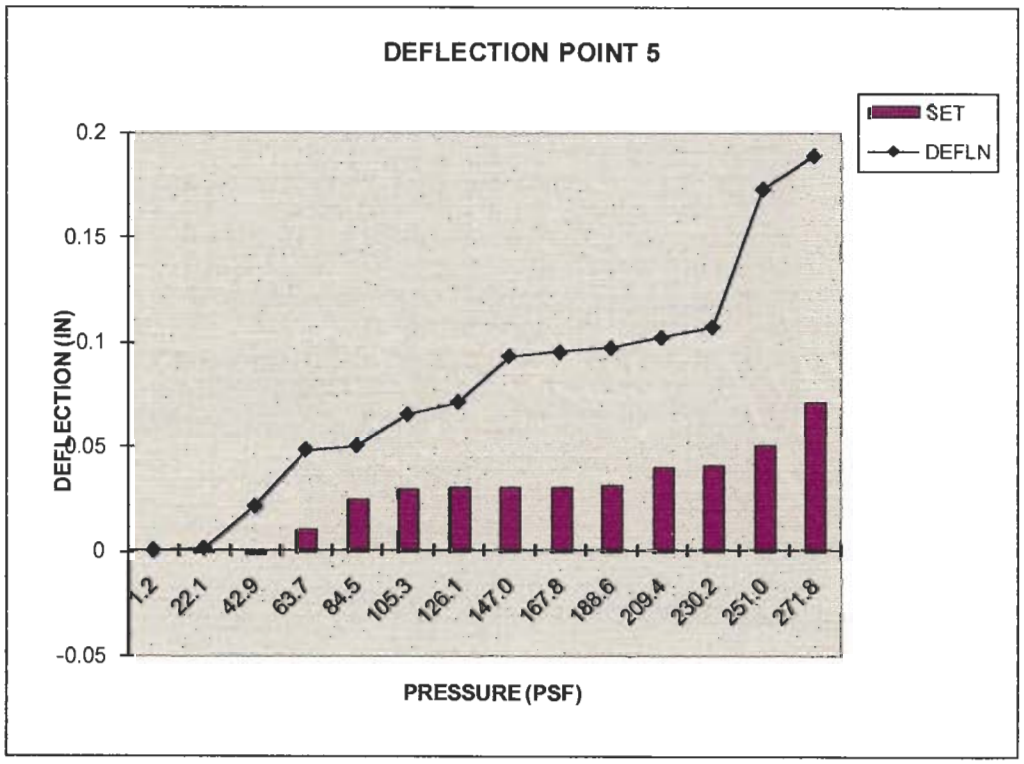
ULTIMATE TEST LOAD = 319.4 PSF (NO FAILURE)

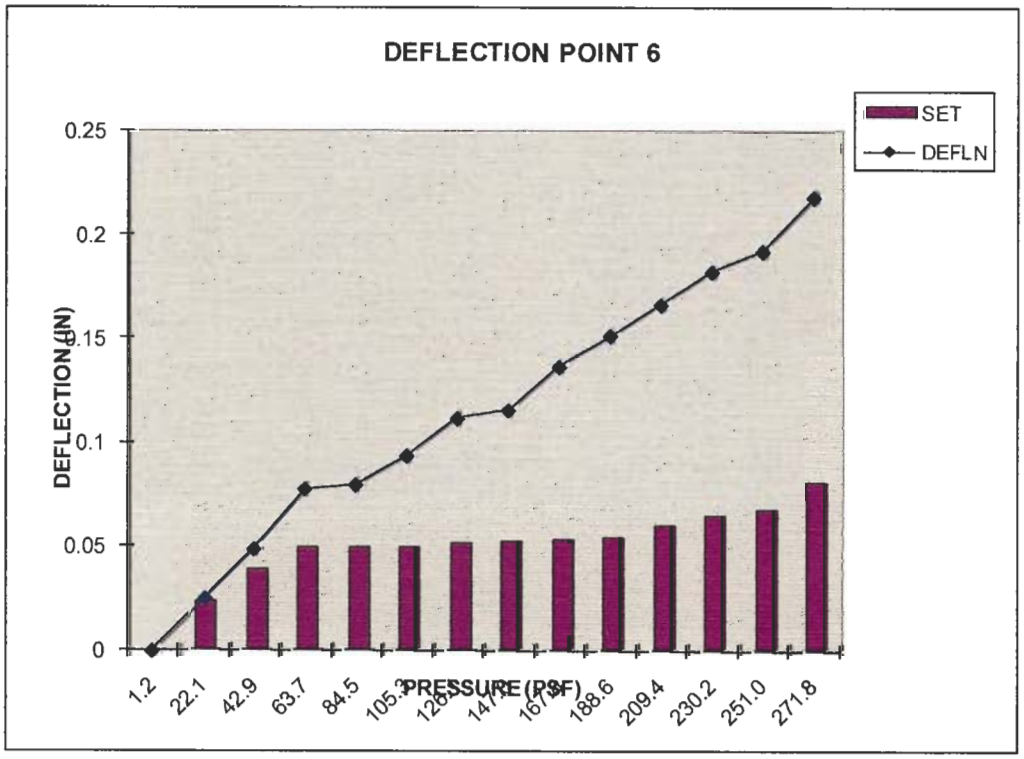

DEFLECTION POINT 1
DEFLECTION (IN)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1.2
22.1
42.9
63.7
84.5
105.3
188.6
209.4
230.2
251.0
271.8
SET
DEFLN

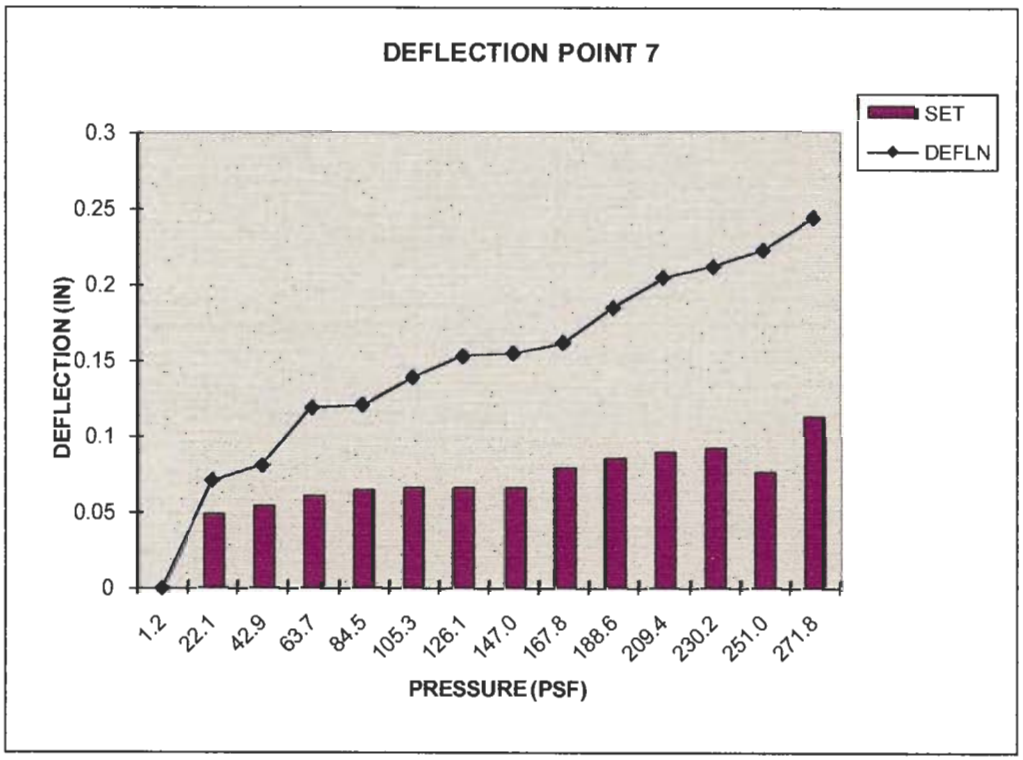

DEFLECTION POINT 2
DEFLECTION (IN)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1.2
22.1
42.9
63.7
84.5
105.3
188.6
209.4
230.2
251.0
271.8
SET
DEFLN

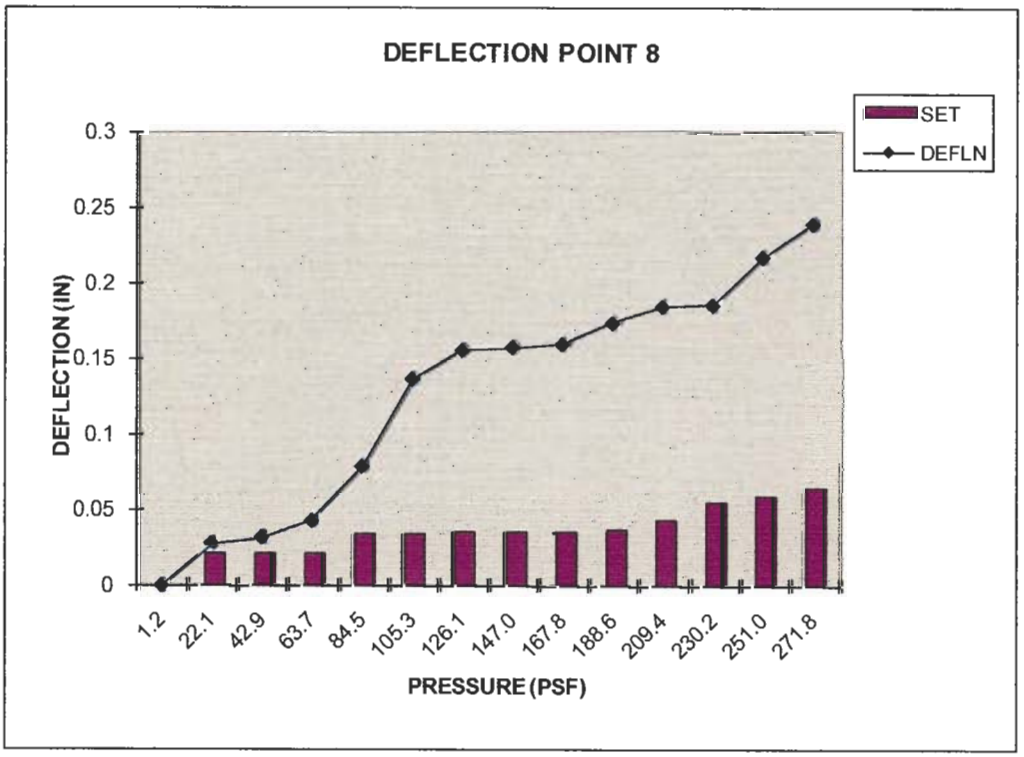

DEFLECTION POINT 3
SET
DEFLN
DEFLECTION (IN)
0.6
0.5
0.4
0.3
0.2
0.1
0
1.2
22.1
42.9
63.7
84.5
105.3
PRESSURE (PSF)
188.6
209.4
230.2
251.0
271.8


DEFLECTION POINT 4
SET
DEFLN
DEFLECTION (IN)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1.2
22.1
42.9
63.7
84.5
105.3
PRESSURE (PSF)
188.6
209.4
230.2
251.0
271.8


DEFLECTION POINT 5
SET
DEFLN
0.2
0.15
0.1
0.05
0
-0.05
DEFLECTION (IN)
1.2
22.1
42.9
63.7
84.5
105.3
126.1
147.0
167.8
188.6
209.4
230.2
251.0
271.8
PRESSURE (PSF)

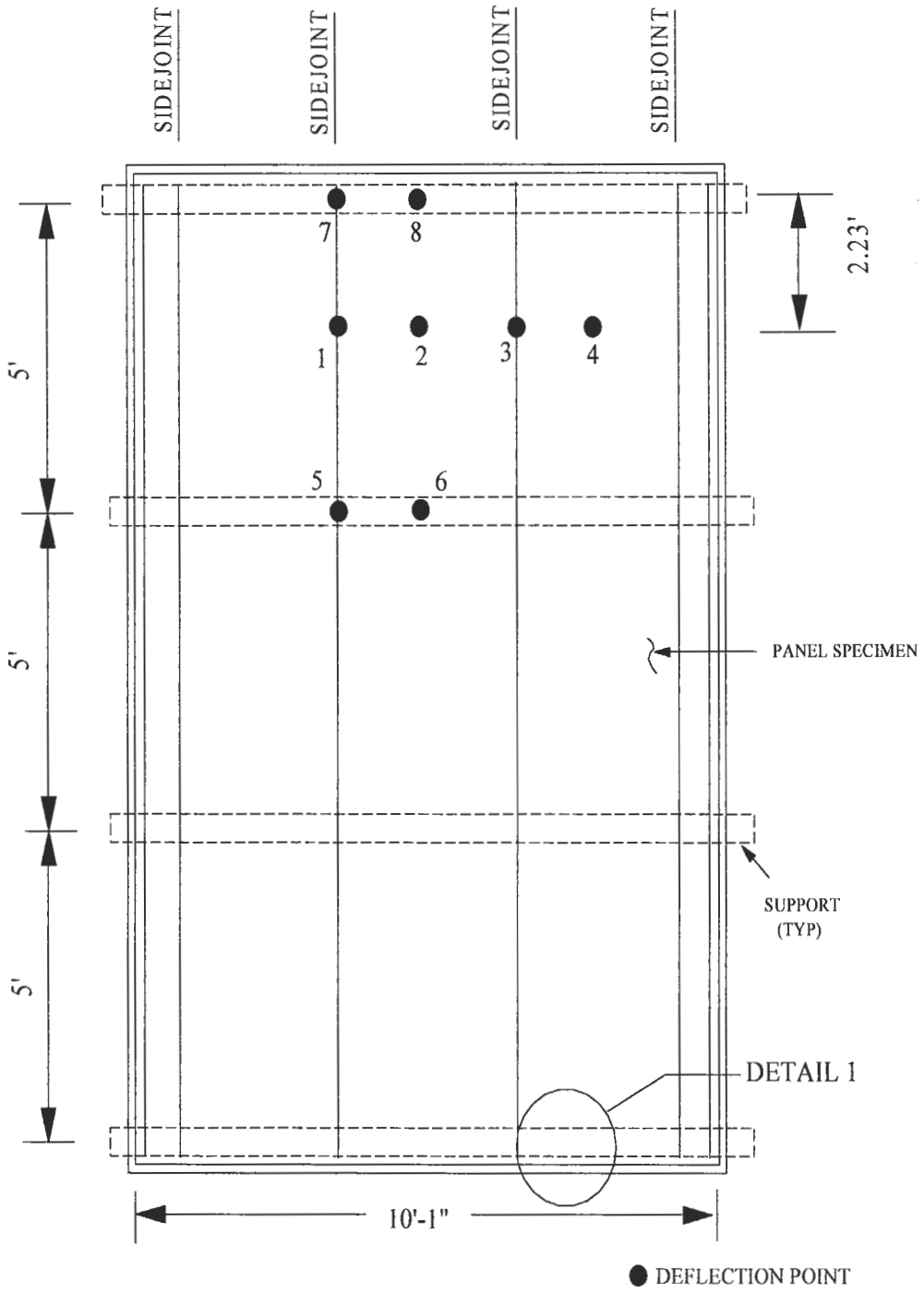

DEFLECTION POINT 6
SET
DEFLN
0.25
0.2
0.15
0.1
0.05
0
DEFLECTION (IN)
1.2
22.1
42.9
63.7
84.5
105.3
126.1
147.0
167.8
188.6
209.4
230.2
251.0
271.8
PRESSURE (PSF)


DEFLECTION POINT 7
SET
DEFLN
0.3
0.25
0.2
0.15
0.1
0.05
0
DEFLECTION (IN)
1.2
22.1
42.9
63.7
84.5
105.3
126.1
147.0
167.8
188.6
209.4
230.2
251.0
271.8
PRESSURE (PSF)


DEFLECTION POINT 8
SET
DEFLN
0.3
0.25
0.2
0.15
0.1
0.05
0
DEFLECTION (IN)
1.2
22.1
42.9
63.7
84.5
105.3
126.1
147.0
167.8
188.6
209.4
230.2
251.0
271.8
PRESSURE (PSF)

Project No. T277-08

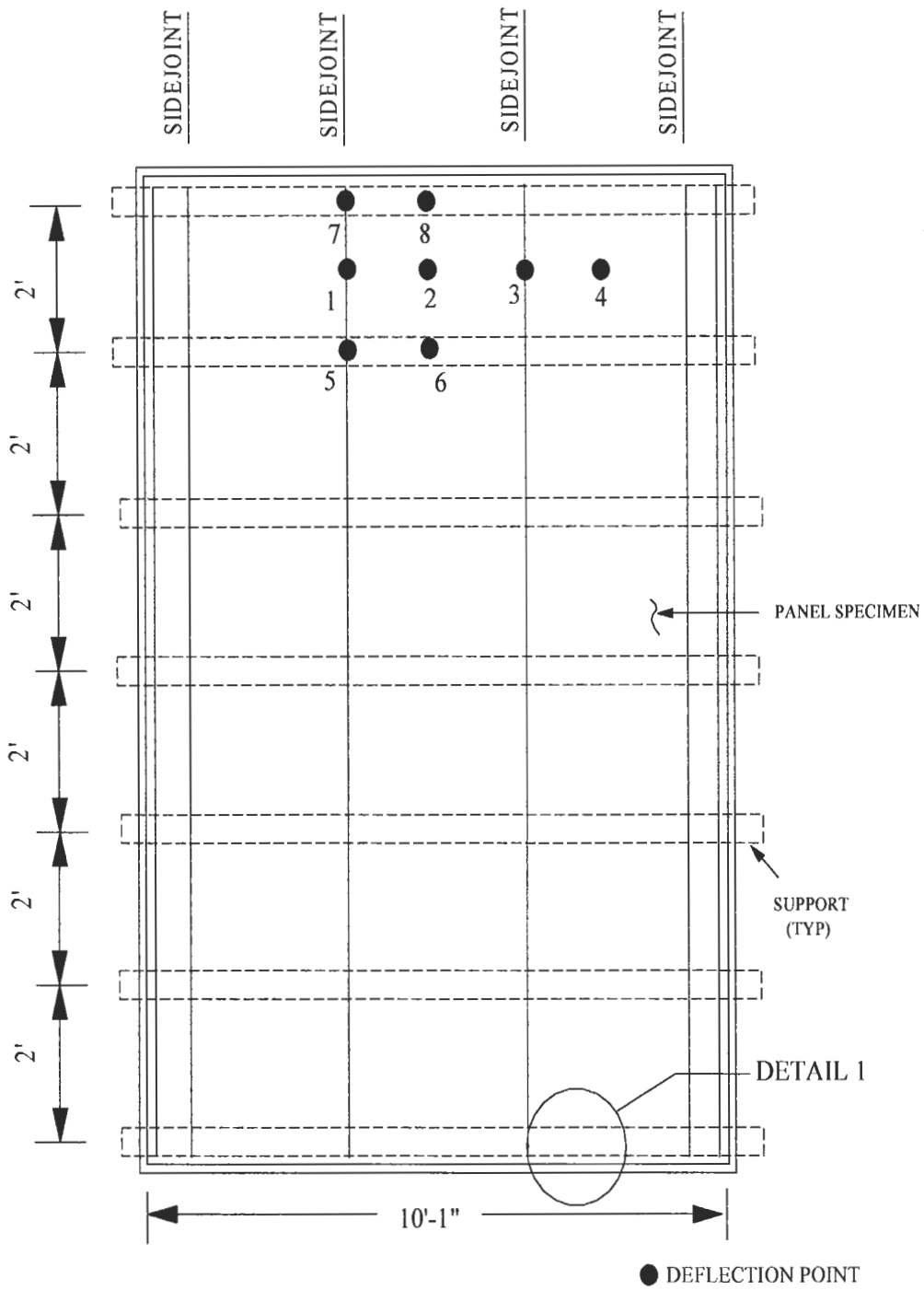
TEST #1



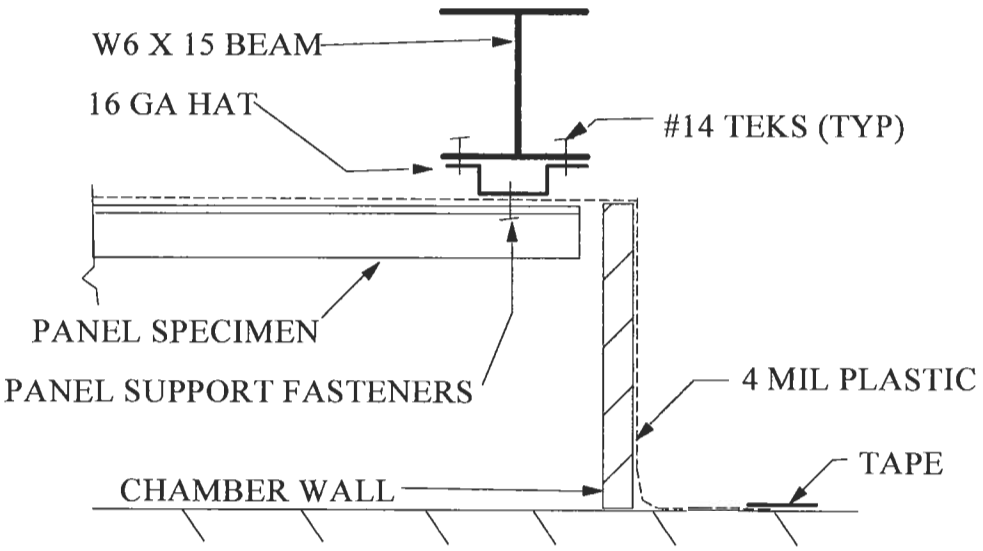
PLAN VIEW

Project No. T277-08

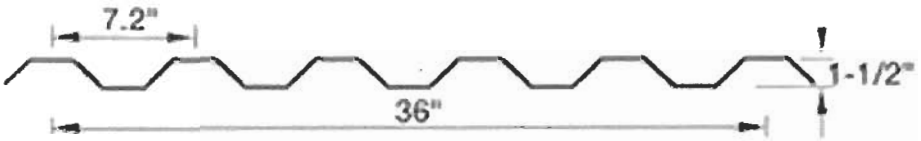
TEST #2



PLAN VIEW


W6 X 15 BEAM
16 GA HAT
#14 TEKS (TYP)
PANEL SPECIMEN
PANEL SUPPORT FASTENERS
4 MIL PLASTIC
TAPE
CHAMBER WALL

DETAIL 1



7.2 ROOF PANEL

Project No. T277-08

West Penn Material Evaluation

1010 Industrial Blvd, New Kensington, PA 15068
Voice: (724)334-1900 Fax:(724)334-9785

Summary Page: Tensile Strength Testing

Date: 24-Oct-08
Page No.: 1 of 1

Client: Farabaugh Engineering & Machining

PIN #	Dimensions (in.) Width x Thickness	Area (sq.- in.)	Yield Point (lbs.)	Tensile Strength (lbs.)	Yield Strength (psi.)	Tensile Strength (psi.)	Elongation (% in 2 in.)	n-Value
Peterson AlumZ2 Rib Panel 24 ga.	**0.4979 x 0.0228**	**0.0114**	**553**	**637**	**48500**	**55900**	**30.2**	

Test Method: WPME Q2300.04, ASTM E-8 (Yield Point by 0.2 % offset)
Equipment Used: Satec Vertex/60 HLV #1602, Extensometer # SE2-12.5/12
Test Performed by: S. Baughman

Respectfully Submitted,

Technical Manager
WEST PENN MATERIAL EVALUATION