Farabaugh Engineering and Testing Inc.

Project No. T232-15

Report Date: July 24, 2015

Total Pages (inclusive): 13

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

GEORGIA RIB ROOF PANEL
36" WIDE X 29 GA

FOR

GEORGIA METALS, INC.
60 INDUSTRIAL BLVD.
NAHUNTA, GA 31553

DANIEL G. FARABAUGH LICENSE No 46349 STATE OF FLORIDA PROFESSIONAL ENGINEER

8/4/15

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Project No. T232-15

ASTM E1592-05
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

7/22/15.

Test Specimen

Manufacturer. Georgia Metals, Inc.
60 Industrial Blvd.
Nahunta, GA 31553

Panel: Georgia Rib Roof Panel, 36" wide, 29 ga. galv. steel

Panel to Support Fastener: #12-14 X 1" Self Drill Hex Head Fastener with 5/8" dia. Steel Seal Washer

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.

Installation

- The panels were installed on to 16 ga supports using #12-14 X 1" hex head self drill fasteners with 5/8" steel seal washer located as shown on the attached drawings.
- 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-1592-05 and as noted herein. In our opinion the tape and plastic had no influence on the results of the test.

Project No. T232-15

TEST #1

Specimen: Georgia Rib Roof Panel 36" wide, 29 ga. steel

Support Spacing: 2'-0" o/c

NEGATIVE (UPLIFT) TEST PRESSURE

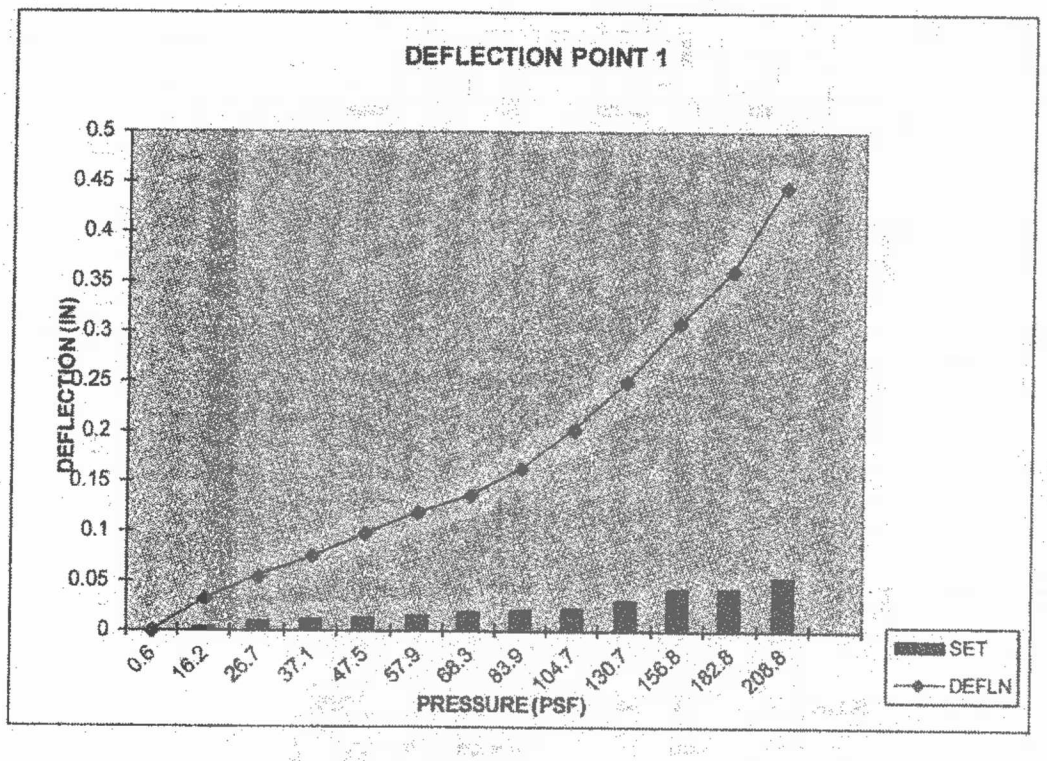
DEFLECTION DIAL READINGS (INCHES)									
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	REMARKS
0.6	0	0	0	0	0	0	0	0	PANEL WT.
16.2	0.032	0.066	0.025	0.043	0.033	0.028	0.023	0.042	
0.6	0.002	0.003	0.001	0.001	0.013	0.01	0.001	0.001	PANEL WT.
26.7	0.054	0.103	0.044	0.077	0.075	0.051	0.04	0.067	
0.6	0.008	0.009	0.005	0.005	0.064	0.026	0.004	0.003	PANEL WT.
37.1	0.075	0.138	0.063	0.107	0.11	0.074	0.056	0.087	
0.6	0.01	0.012	0.007	0.006	0.086	0.031	0.006	0.005	PANEL WT.
47.5	0.098	0.171	0.081	0.132	0.125	0.094	0.072	0.104	
0.6	0.012	0.014	0.009	0.008	0.096	0.041	0.007	0.006	PANEL WT.
57.9	0.119	0.203	0.099	0.16	0.158	0.115	0.089	0.125	
0.6	0.015	0.018	0.012	0.01	0.105	0.05	0.01	0.008	PANEL WT.
68.3	0.136	0.23	0.116	0.184	0.181	0.135	0.104	0.143	
0.6	0.019	0.023	0.014	0.013	0.111	0.056	0.013	0.01	PANEL WT.
83.9	0.163	0.272	0.141	0.22	0.214	0.162	0.126	0.168	
0.6	0.021	0.027	0.017	0.016	0.114	0.063	0.015	0.012	PANEL WT.
104.7	0.202	0.326	0.177	0.268	0.25	0.198	0.158	0.204	
0.6	0.022	0.031	0.019	0.021	0.117	0.075	0.018	0.016	PANEL WT.
130.7	0.25	0.39	0.223	0.326	0.288	0.241	0.2	0.24	
0.6	0.03	0.042	0.024	0.031	0.126	0.089	0.023	0.024	PANEL WT.
156.8	0.309	0.453	0.277	0.38	0.33	0.289	0.25	0.29	
0.6	0.042	0.069	0.035	0.05	0.14	0.111	0.03	0.036	PANEL WT.
182.8	0.361	0.517	0.331	0.436	0.371	0.338	0.293	0.33	
0.6	0.042	0.076	0.038	0.059	0.146	0.134	0.034	0.045	PANEL WT.
208.8	0.445	0.585	0.384	0.492	0.414	0.392	0.336	0.371	
0.6	0.053	0.105	0.047	0.082	0.159	0.169	0.041	0.064	PANEL WT.

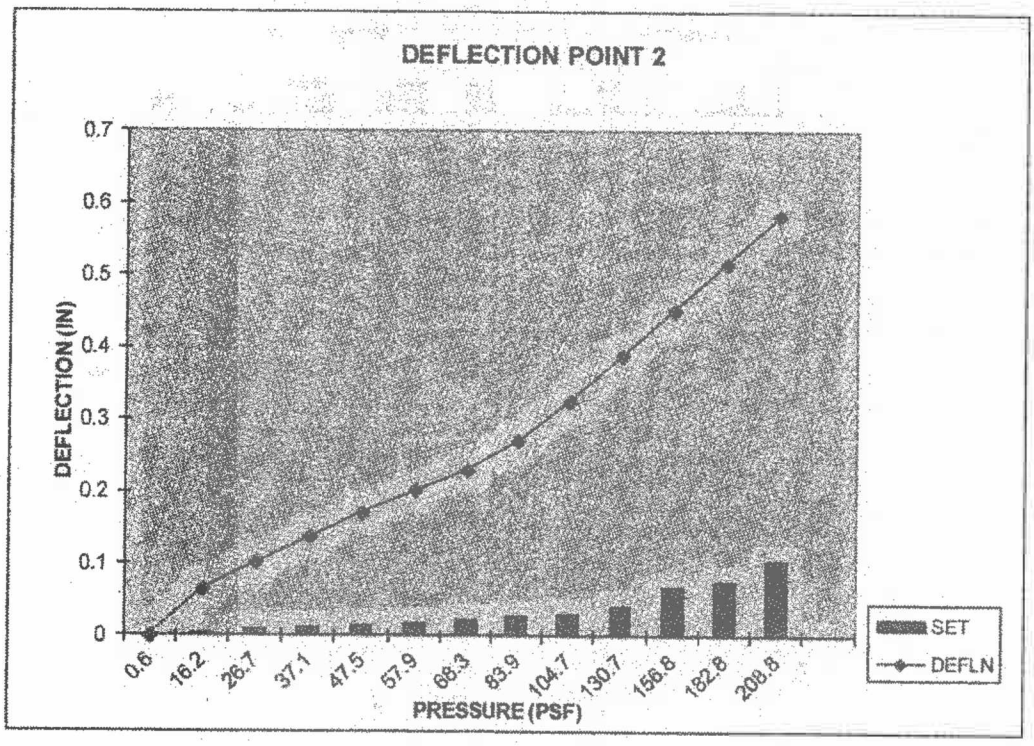
RESULTS:

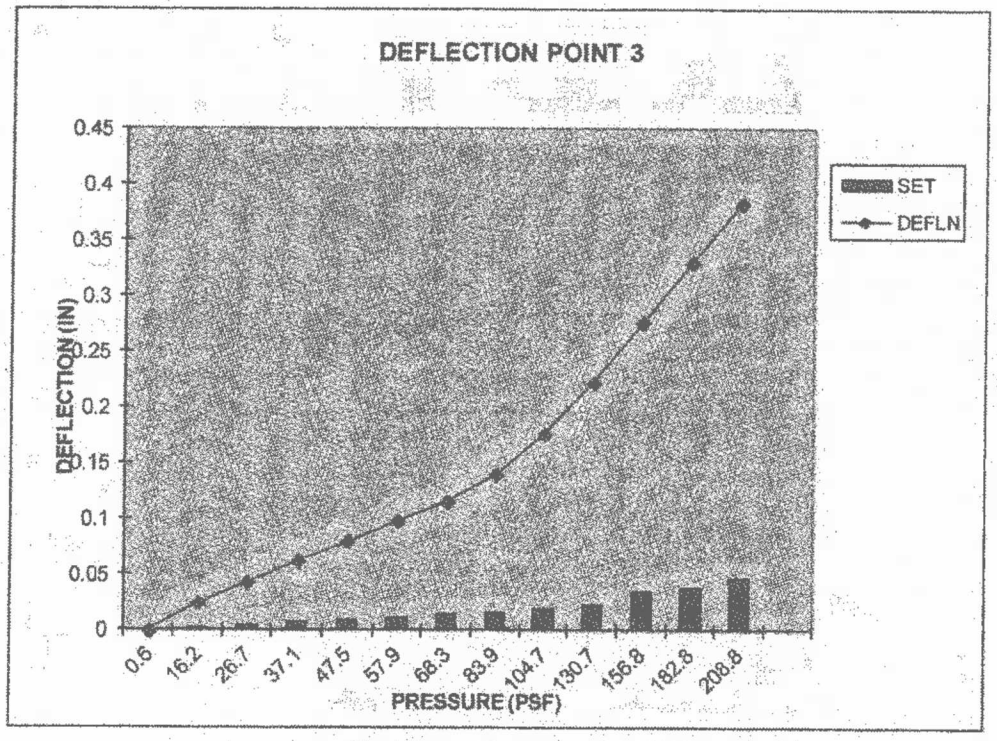
Maximum Test Load (held for 1 min. without failure) = 250.2* psf

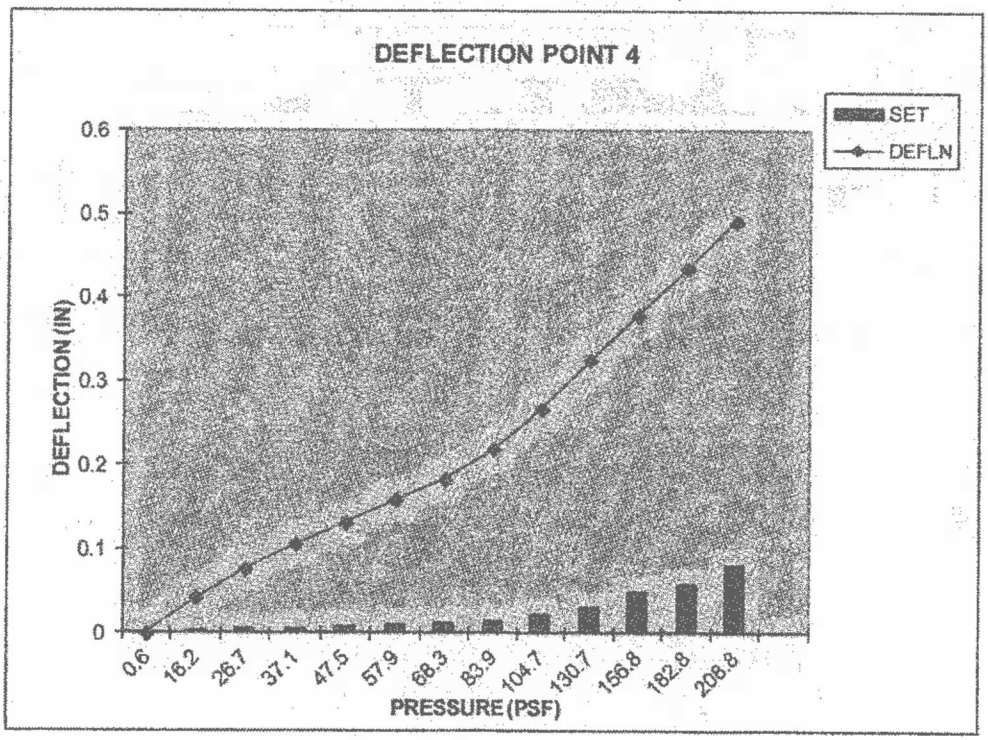
Ultimate Test Load (at failure) = 253.8 psf* (Panel Buckling)

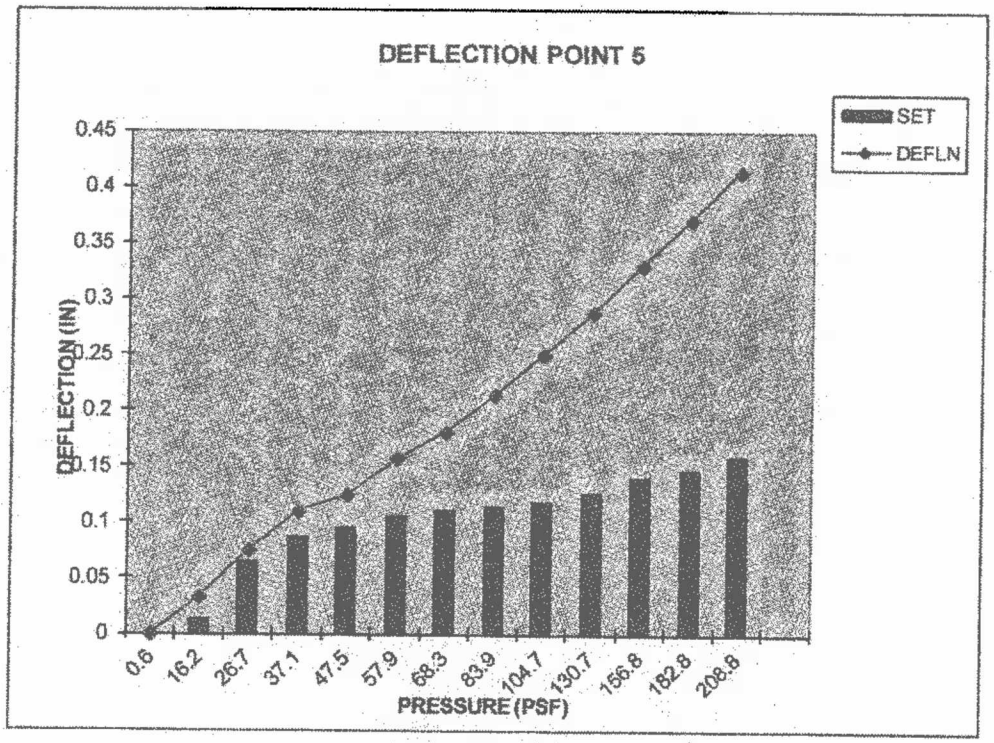
* Includes panel dead load.

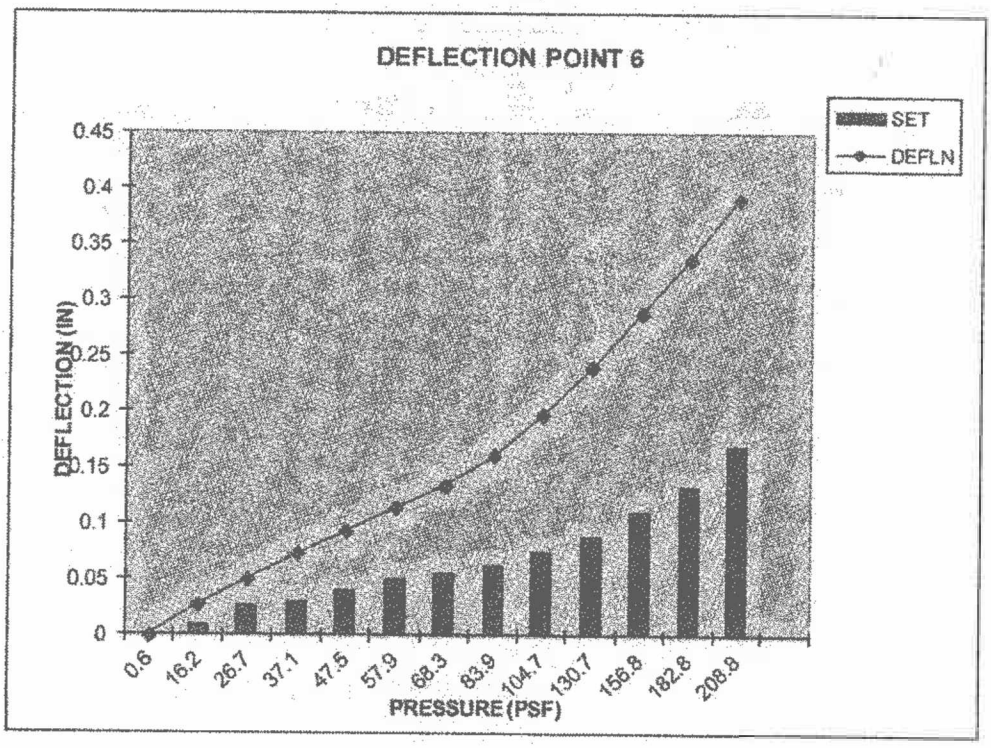

DEFLECTION POINT 1
DEFLECTION (IN)
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.6
16.2
26.7
37.1
47.5
57.9
68.3
83.9
104.7
130.7
156.8
182.8
208.8
PRESSURE (PSF)
SET
DEFLN

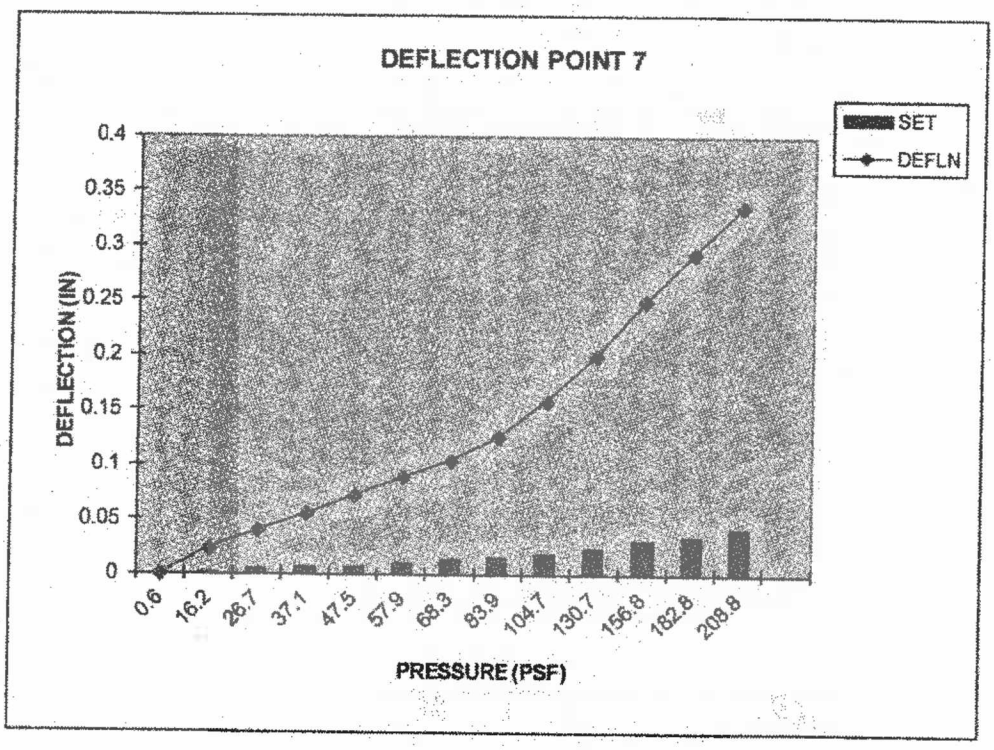

DEFLECTION POINT 2
DEFLECTION (IN)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0.6
16.2
26.7
37.1
47.5
57.9
68.3
83.9
104.7
130.7
156.8
182.8
208.8
PRESSURE (PSF)
SET
DEFLN

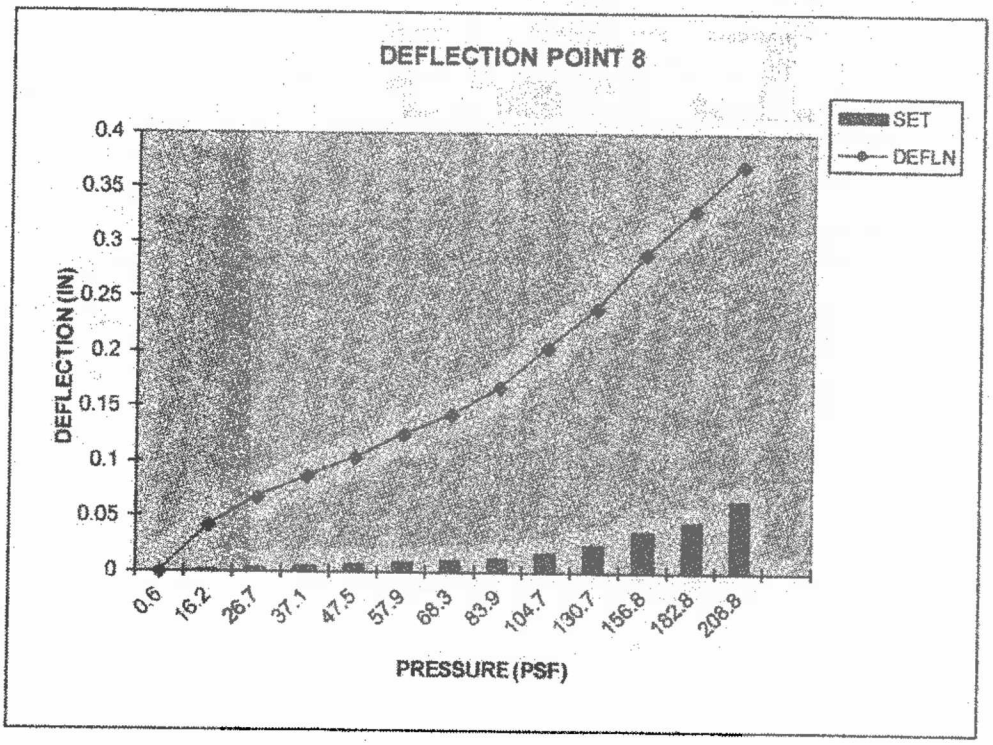

DEFLECTION POINT 3
DEFLECTION (IN)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
SET
DEFLN
0.6
16.2
26.7
37.1
47.5
57.9
68.3
83.9
104.7
130.7
156.8
182.8
208.8
PRESSURE (PSF)

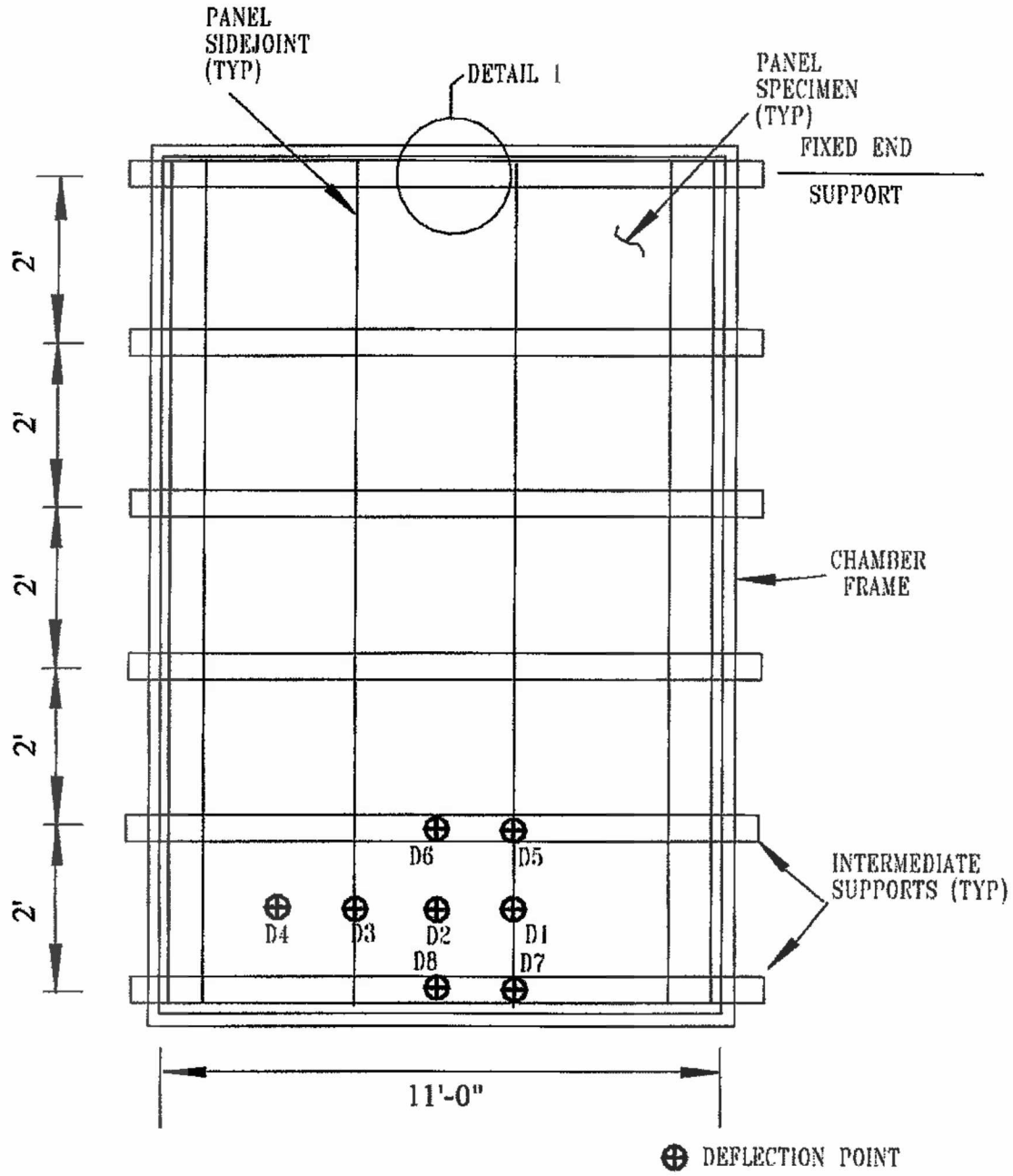

DEFLECTION POINT 4
DEFLECTION (IN)
0.6
0.5
0.4
0.3
0.2
0.1
0
SET
DEFLN
0.6
16.2
26.7
37.1
47.5
57.9
68.3
83.9
104.7
130.7
156.8
182.8
208.8
PRESSURE (PSF)


DEFLECTION POINT 5
SET
DEFLN
DEFLECTION (IN)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.6
16.2
26.7
37.1
47.5
57.9
68.3
83.9
104.7
130.7
156.8
182.8
208.8
PRESSURE (PSF)

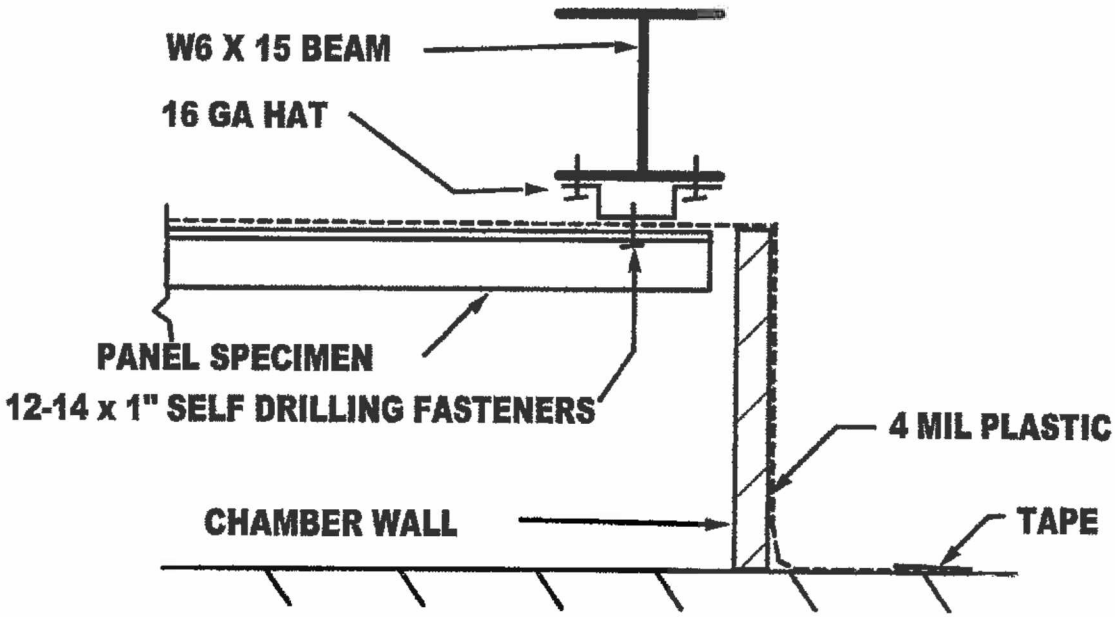

DEFLECTION POINT 6
SET
DEFLN
DEFLECTION (IN)
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.6
16.2
26.7
37.1
47.5
57.9
68.3
83.9
104.7
130.7
156.8
182.8
208.8
PRESSURE (PSF)


DEFLECTION POINT 7
SET
DEFLN
DEFLECTION (IN)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.6
16.2
26.7
37.1
47.5
57.9
68.3
83.9
104.7
130.7
156.8
182.8
208.8
PRESSURE (PSF)

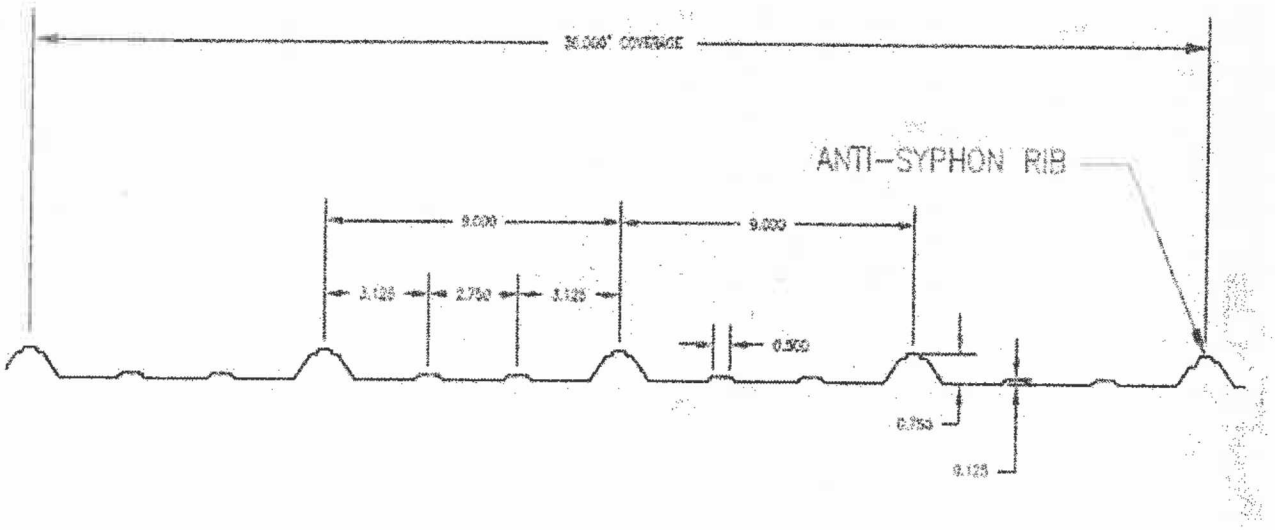

DEFLECTION POINT 8
SET
DEFLN
DEFLECTION (IN)
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0.6
16.2
26.7
37.1
47.5
57.9
68.3
83.9
104.7
130.7
156.8
182.8
208.8
PRESSURE (PSF)


PANEL
SIDEJOINT
(TYP)
DETAIL 1
PANEL
SPECIMEN
(TYP)
FIXED END
SUPPORT
2'
2'
2'
2'
2'
CHAMBER
FRAME
D6
D5
D4
D3
D2
D1
D8
D7
INTERMEDIATE
SUPPORTS (TYP)
11'-0"
DEFLECTION POINT

PLAN VIEW


W6 X 15 BEAM
16 GA HAT
PANEL SPECIMEN
12-14 x 1" SELF DRILLING FASTENERS
4 MIL PLASTIC
CHAMBER WALL
TAPE

DETAIL 1



PANEL DETAIL

FASTENING DETAIL AT
FIXED END SUPPORT

FASTENING DETAIL AT
INTERIOR SUPPORTS

Project No. T232-15

TENSILE TEST REPORT

Client: Georgia Metals, Inc.
60 Industrial Blvd.
Nahunta, GA 31553

Test Date: July 24, 2015

Test Method: ASTM A370-10

Material Description: Georgia Rib Roof Panel, 36" wide, 29 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)
0065-15	0.506	0.015	671.9	671.9	88,525	88,525	0.604

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

GEORGIA METALS, INC

GEORGIA RIB ROOF PANEL
36" WIDE X 29 GA STEEL

NEGATIVE DESIGN LOADS

PANEL	GAUGE	SPAN	TEST LOAD (psf)	NEGATIVE DESIGN LOAD (psf)
GEORGIA RIB	29	2'-0"	250.2	125.1 psf

Notes:

1) The Test Load was derived from uplift tests done in accordance with ASTM E1592 per **Farabaugh Engineering and Testing, Inc.** Test Report T232-15. (See test report for specific assembly details and test data.)
2) Negative Design Load contains a 2.0 Factor of Safety.
3 These values do not consider fastener pullout or pullover which must be evaluated by the Design Engineer.