# Farabaugh Engineering and Testing Inc.

Project No. T306-24

Report Date: November 15, 2024

No. Pages: 15 (inclusive)

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

ELITE RIB PANEL
36" WIDE COVERAGE X 26 GA.
(3 SPAN @ 4'-0" O.C. USING 18 GA. HAT CHANNEL SUPPORTS)

FOR

ELITE METAL MANUFACTURING, LLC.
10121 88TH TRACE
LIVE OAK, FL. 32064

11/15/24

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

Prepared by:

Paul G. Farabaugh

Approved by:

Daniel G. Farabaugh, P.E.

DANIEL G. FARABAUGH, P.E.
255 Saunders Station Rd
Trafford, PA 15085
412-417-5153

**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 Completion Date

11/11/2024

## Test Specimen

Manufacturer: Elite Metal Manufacturing LLC.
10121 88th Trace
Live Oak, FL. 32064

Test Specimen: Elite Rib Metal Panel 36” wide coverage x 26 ga.

Supports: 3” wide X 1.5” high X 18 ga. (with 1-1/2” bearing) hat channel supports

## 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 positive and negative direction to monitor pressures on the panel specimen mock-up. Calibrated deflectometers were attached to monitor panel deformation as shown.

## Installation

- The panel were installed onto 18 ga. hat channel supports using #12-14 X 1" long, hex head, self-drilling fasteners with sealing washers at supports. The panel joint was a overlap for the panel lap. See fastening pattern for location of fasteners at ends supports and interior supports.

- 4 mil Plastic Sheeting was placed over top face of panel for the positive direction testing and then the panel had the plastic covering between the supports and the exposed back of the panel and tested in the negative direction

- See attached drawings showing test set-up and assembly details

## 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(2017) and as noted herein. In our opinion the tape and plastic had no influence on the results of the test.

# TEST #1

Test Specimen: Elite Rib Metal Panel 36” wide coverage x 26 ga.

Support & Support Spacing: 18 ga. hat channels. 3 spans @ 4’ o/c

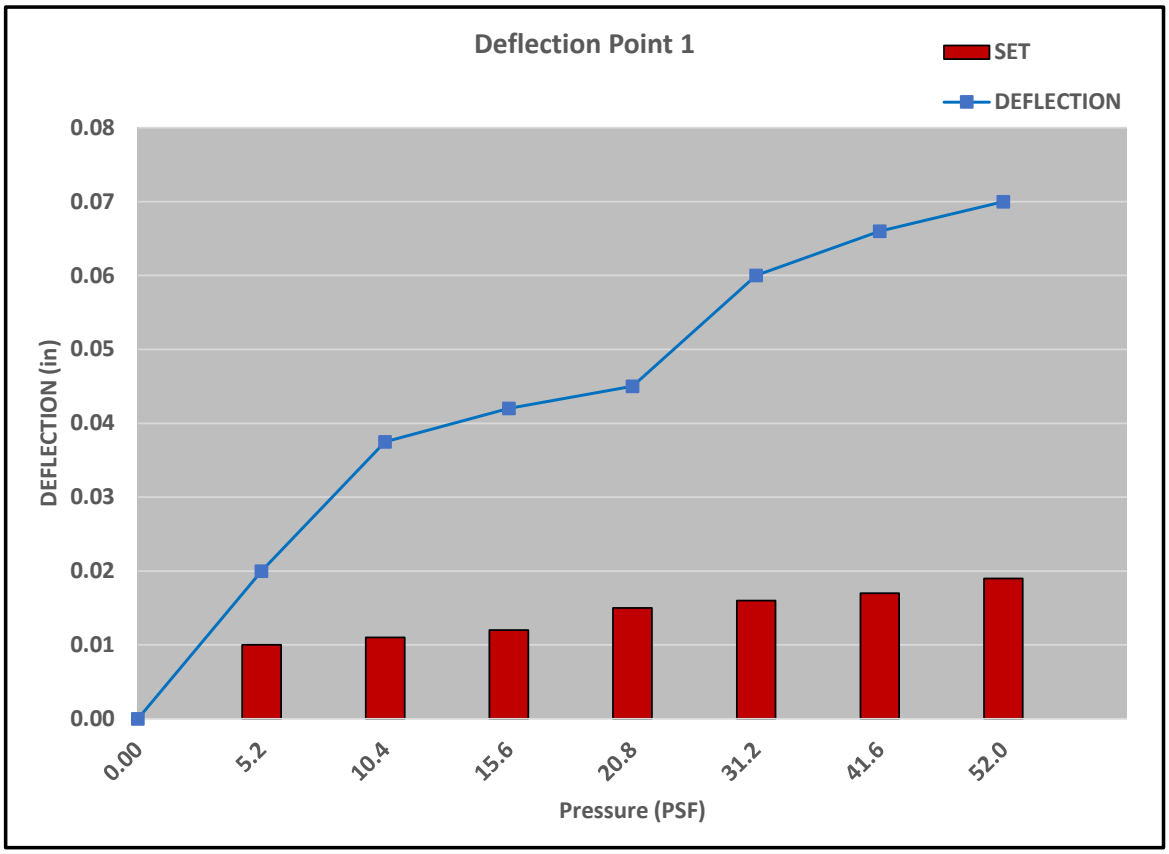
**POSITIVE (DOWNWARD) PRESSURE**

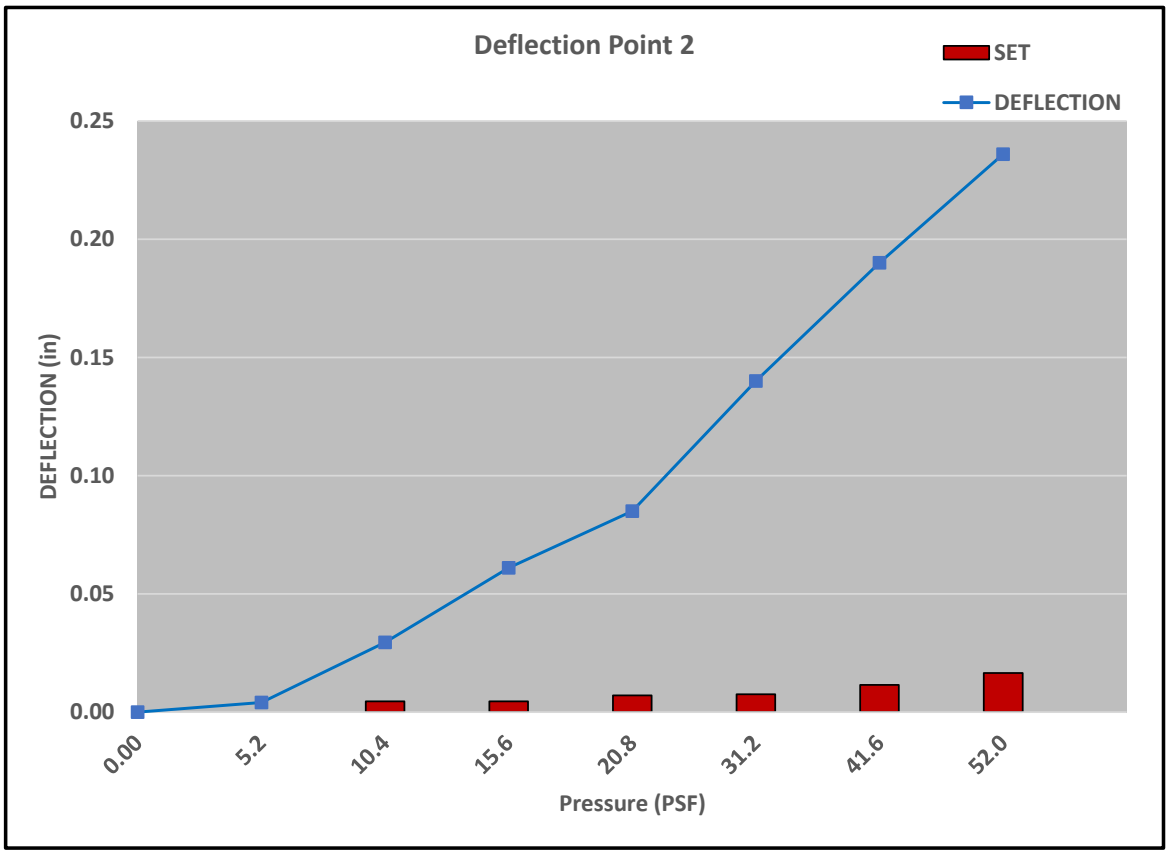
| Load Pressure (in-h20) | Load Pressure (psf) | Deflection #1 (in) | Deflection #2 (in) | Deflection #3 (in) | Deflection #4 (in) | Deflection #5 (in) | Deflection #6 (in) |
|---|---|---|---|---|---|---|---|
| **0** | **0.0** | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **1** | **5.2** | 0.020 | 0.004 | 0.011 | 0.057 | 0.011 | 0.060 |
| **0** | **0.0** | 0.010 | 0.000 | 0.001 | 0.004 | 0.001 | 0.002 |
| **2** | **10.4** | 0.038 | 0.030 | 0.019 | 0.102 | 0.034 | 0.111 |
| **0** | **0.0** | 0.011 | 0.005 | 0.001 | 0.004 | 0.001 | 0.002 |
| **3** | **15.6** | 0.042 | 0.061 | 0.027 | 0.155 | 0.077 | 0.163 |
| **0** | **0.0** | 0.012 | 0.005 | 0.001 | 0.004 | 0.001 | 0.003 |
| **4** | **20.8** | 0.045 | 0.085 | 0.034 | 0.201 | 0.112 | 0.209 |
| **0** | **0.0** | 0.015 | 0.007 | 0.002 | 0.005 | 0.002 | 0.004 |
| **6** | **31.2** | 0.060 | 0.140 | 0.046 | 0.300 | 0.192 | 0.306 |
| **0** | **0.0** | 0.016 | 0.008 | 0.002 | 0.007 | 0.003 | 0.005 |
| **8** | **41.6** | 0.066 | 0.190 | 0.055 | 0.386 | 0.256 | 0.392 |
| **0** | **0.0** | 0.017 | 0.012 | 0.002 | 0.010 | 0.003 | 0.009 |
| **10** | **52.0** | 0.070 | 0.236 | 0.062 | 0.475 | 0.317 | 0.476 |
| **0** | **0.0** | 0.019 | 0.017 | 0.004 | 0.025 | 0.003 | 0.022 |

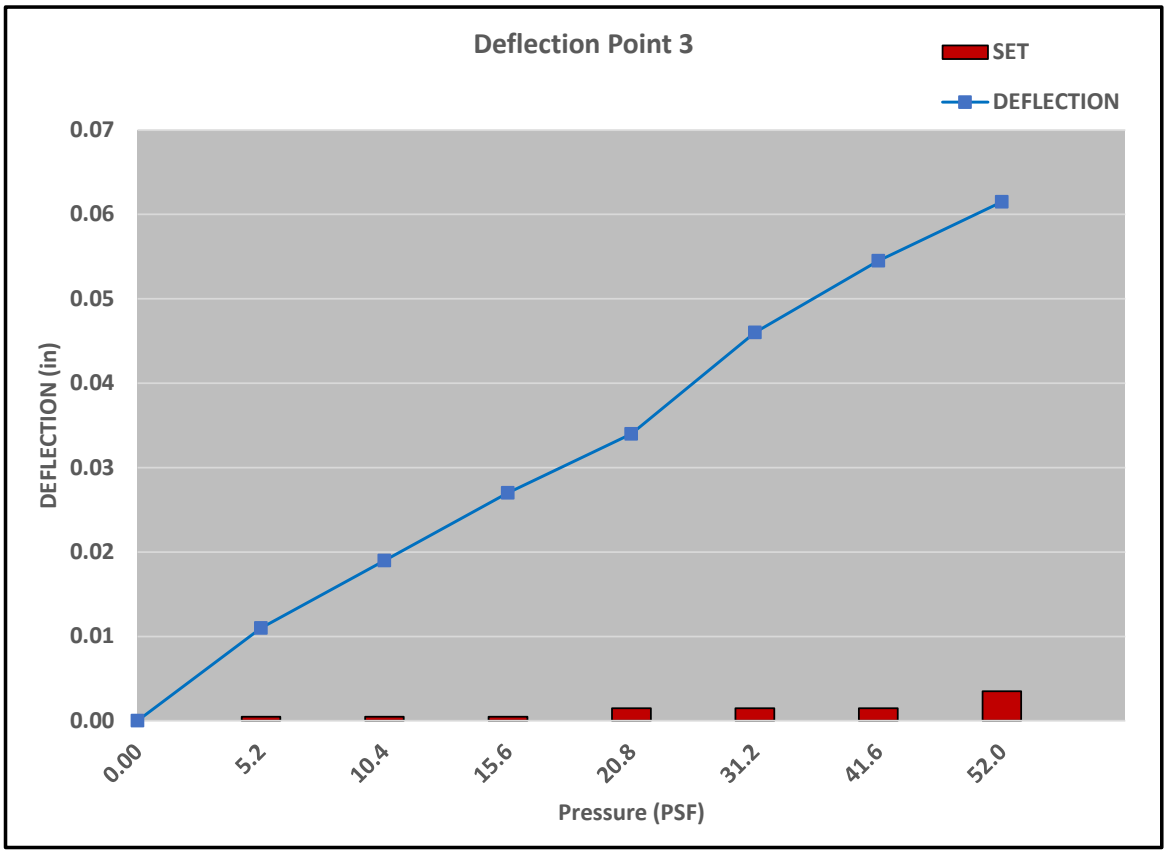
**RESULTS:**

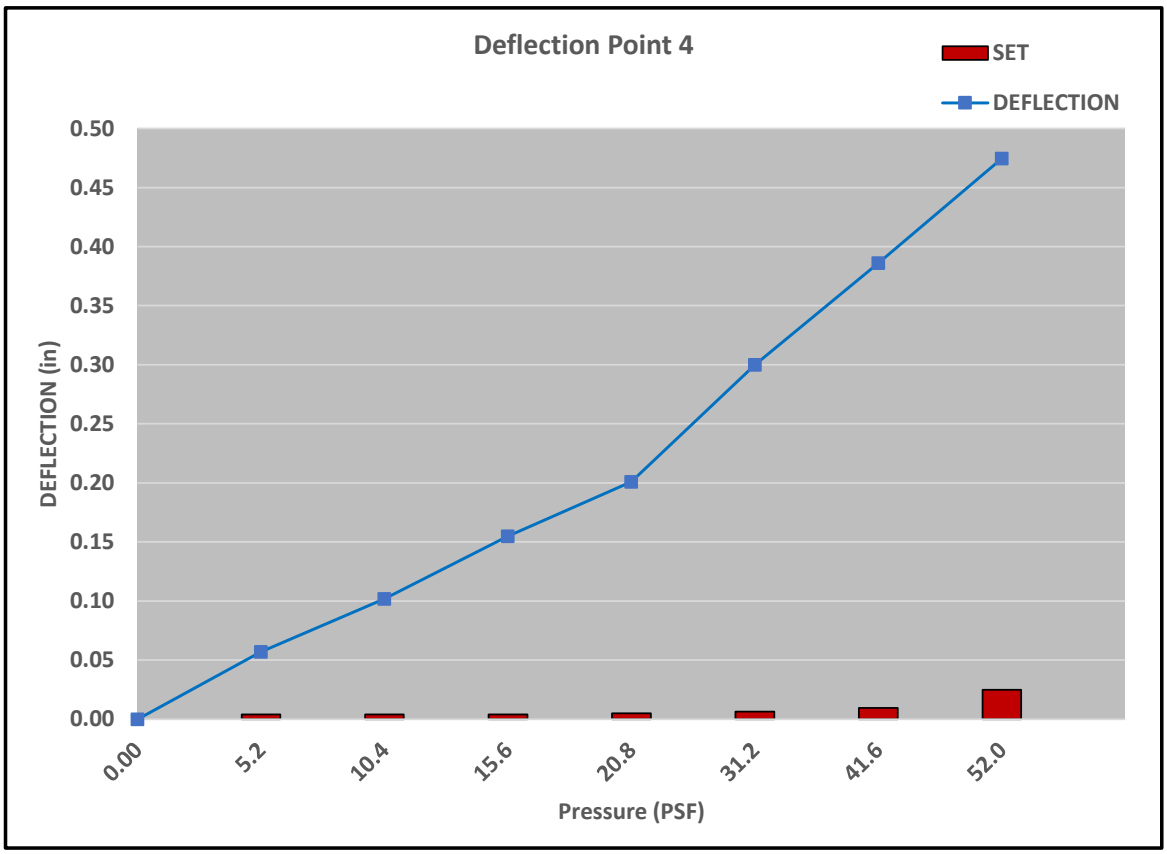
Maximum Load held for 1 minute = 78 psf

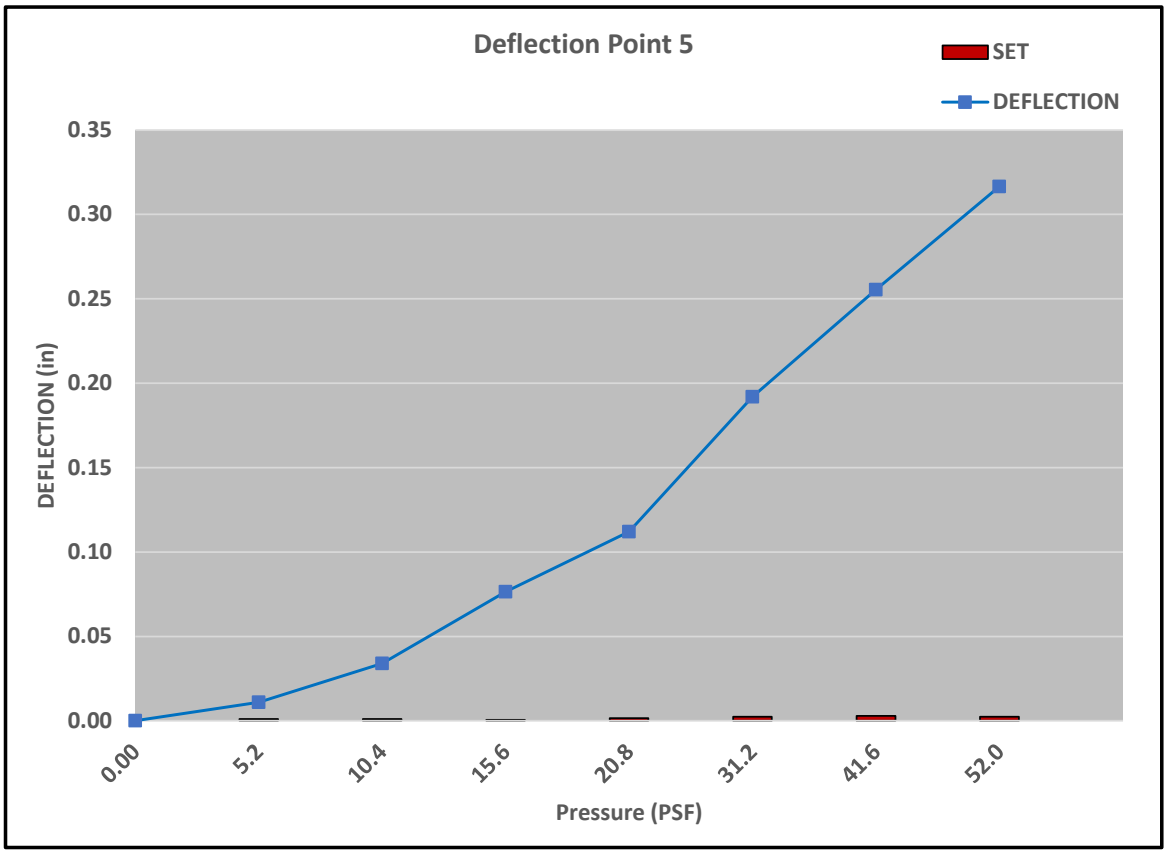
Maximum Test Load at Failure= 83.7 psf (Panel buckling at end span)

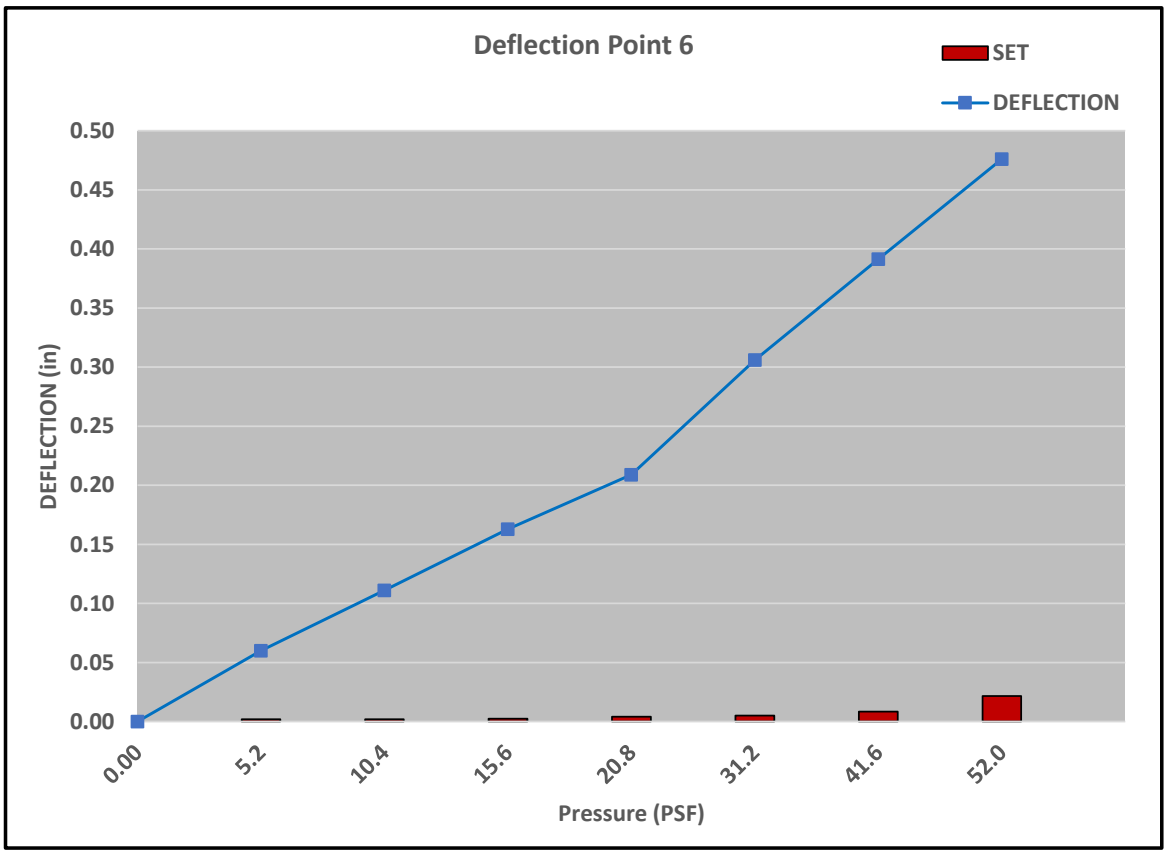

Deflection Point 1
SET
DEFLECTION
DEFLECTION (in)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)


Deflection Point 2
SET
DEFLECTION
DEFLECTION (in)
0.25
0.20
0.15
0.10
0.05
0.00
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)


Deflection Point 3
SET
DEFLECTION
DEFLECTION (in)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)


Deflection Point 4
SET
DEFLECTION
DEFLECTION (in)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)


Deflection Point 5
SET
DEFLECTION
DEFLECTION (in)
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)


Deflection Point 6
SET
DEFLECTION
DEFLECTION (in)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)

# TEST #2

Test Specimen: Elite Rib Metal Panel 36” wide coverage x 26 ga.

Support & Support Spacing: 18 ga. hat channels. 3 spans @ 4’ o/c

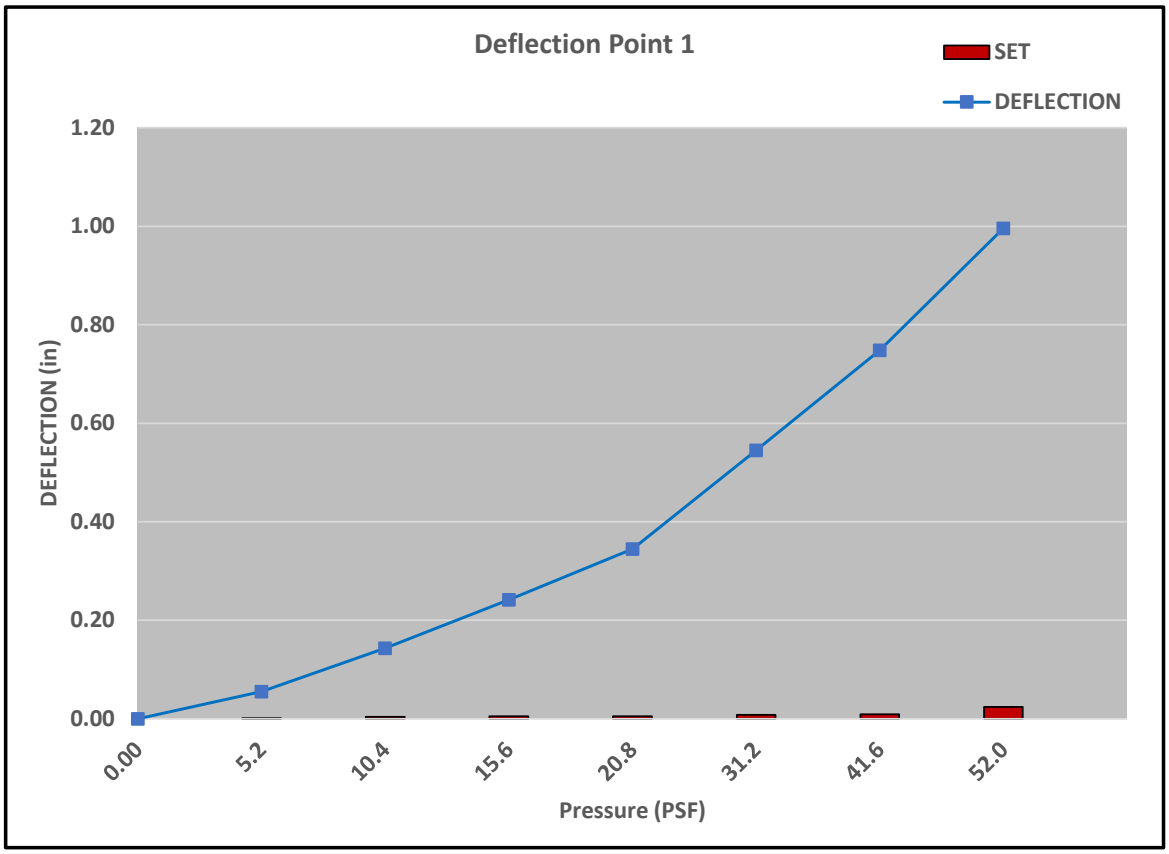
**NEGATIVE (UPLIFT) PRESSURE**

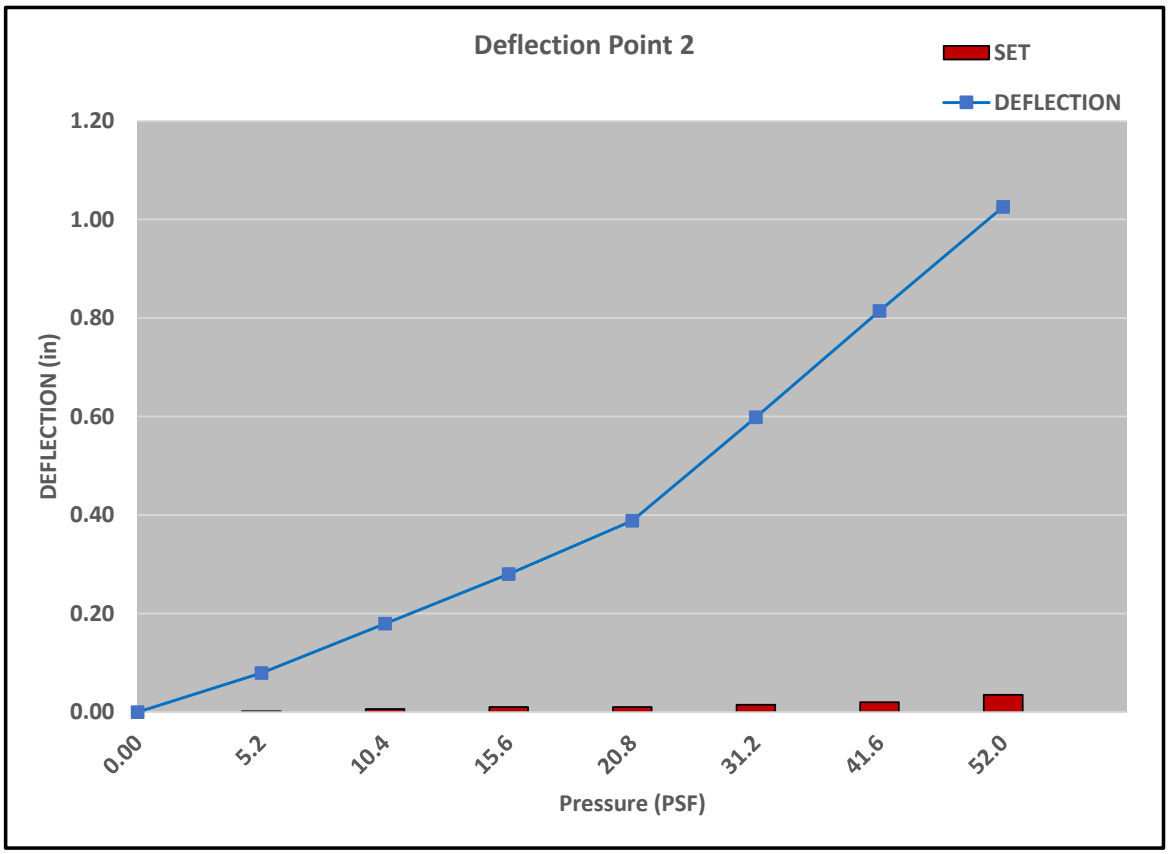
| Load Pressure (in-h20) | Load Pressure (psf) | Deflection #1 (in) | Deflection #2 (in) | Deflection #3 (in) | Deflection #4 (in) | Deflection #5 (in) | Deflection #6 (in) |
|---|---|---|---|---|---|---|---|
| **0** | **0.0** | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **1** | **5.2** | 0.056 | 0.079 | 0.082 | 0.054 | 0.037 | 0.039 |
| **0** | **0.0** | 0.001 | 0.002 | 0.001 | 0.002 | 0.001 | 0.001 |
| **2** | **10.4** | 0.144 | 0.180 | 0.188 | 0.152 | 0.079 | 0.087 |
| **0** | **0.0** | 0.004 | 0.006 | 0.007 | 0.008 | 0.002 | 0.003 |
| **3** | **15.6** | 0.242 | 0.280 | 0.289 | 0.263 | 0.122 | 0.136 |
| **0** | **0.0** | 0.005 | 0.010 | 0.009 | 0.010 | 0.003 | 0.006 |
| **4** | **20.8** | 0.345 | 0.388 | 0.394 | 0.380 | 0.167 | 0.187 |
| **0** | **0.0** | 0.005 | 0.010 | 0.010 | 0.011 | 0.005 | 0.006 |
| **6** | **31.2** | 0.545 | 0.599 | 0.594 | 0.600 | 0.266 | 0.298 |
| **0** | **0.0** | 0.008 | 0.015 | 0.012 | 0.012 | 0.006 | 0.007 |
| **8** | **41.6** | 0.748 | 0.815 | 0.784 | 0.816 | 0.361 | 0.405 |
| **0** | **0.0** | 0.009 | 0.020 | 0.019 | 0.017 | 0.008 | 0.008 |
| **10** | **52.0** | 0.996 | 1.026 | 0.964 | 1.047 | 0.448 | 0.507 |
| **0** | **0.0** | 0.024 | 0.035 | 0.027 | 0.032 | 0.012 | 0.015 |

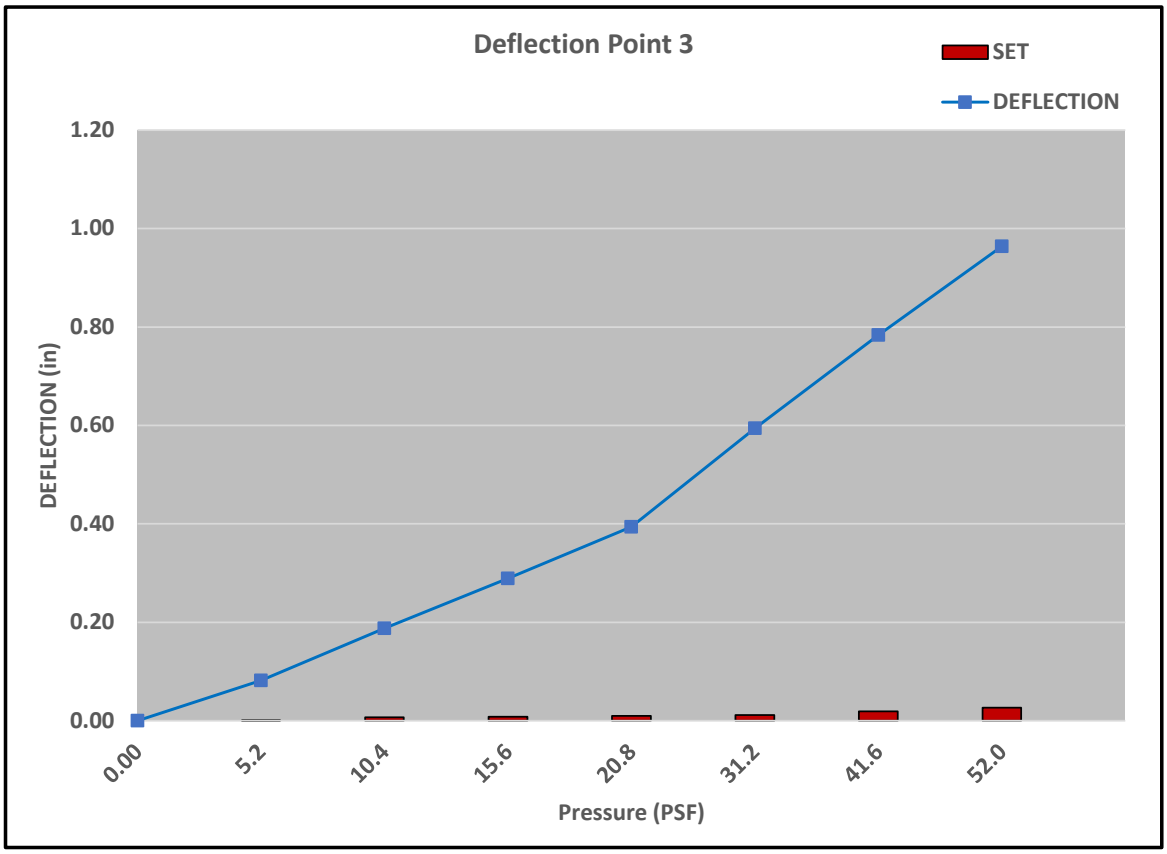
**RESULTS:**

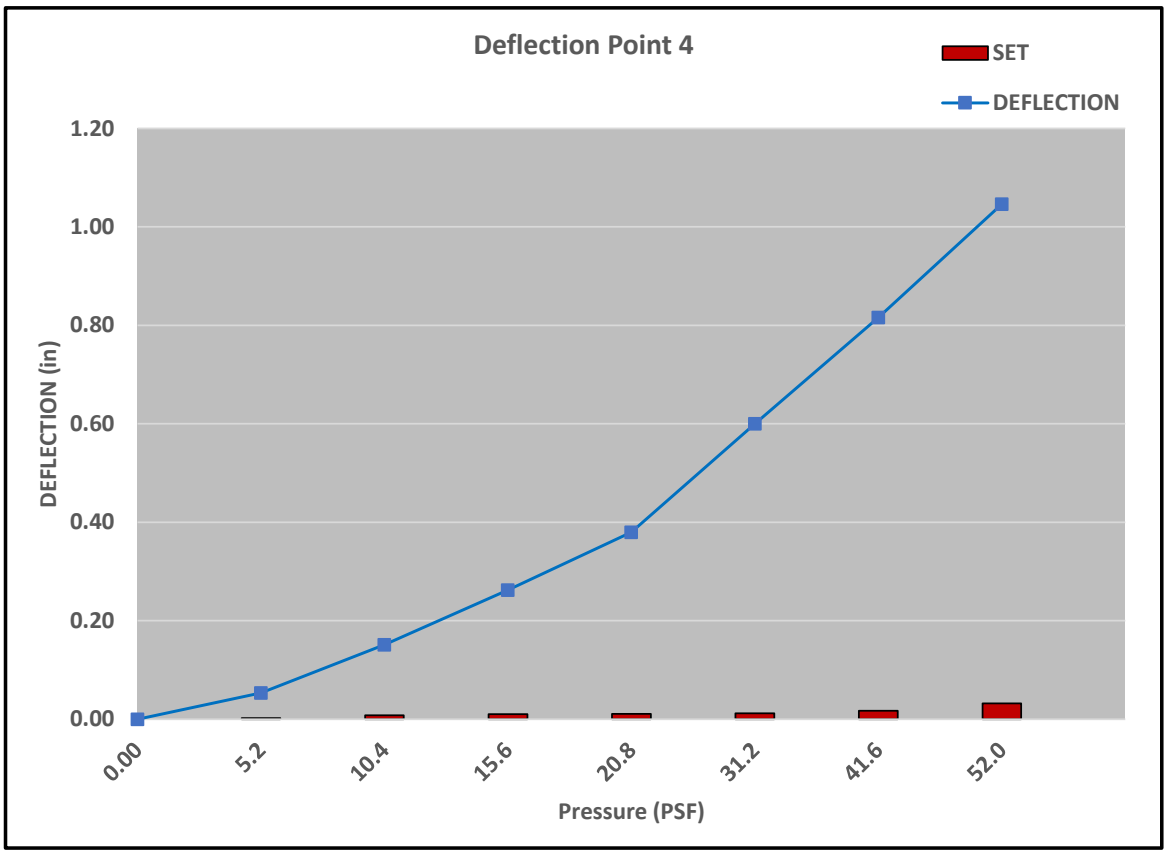
Maximum Load held for 1 minute = 78 psf

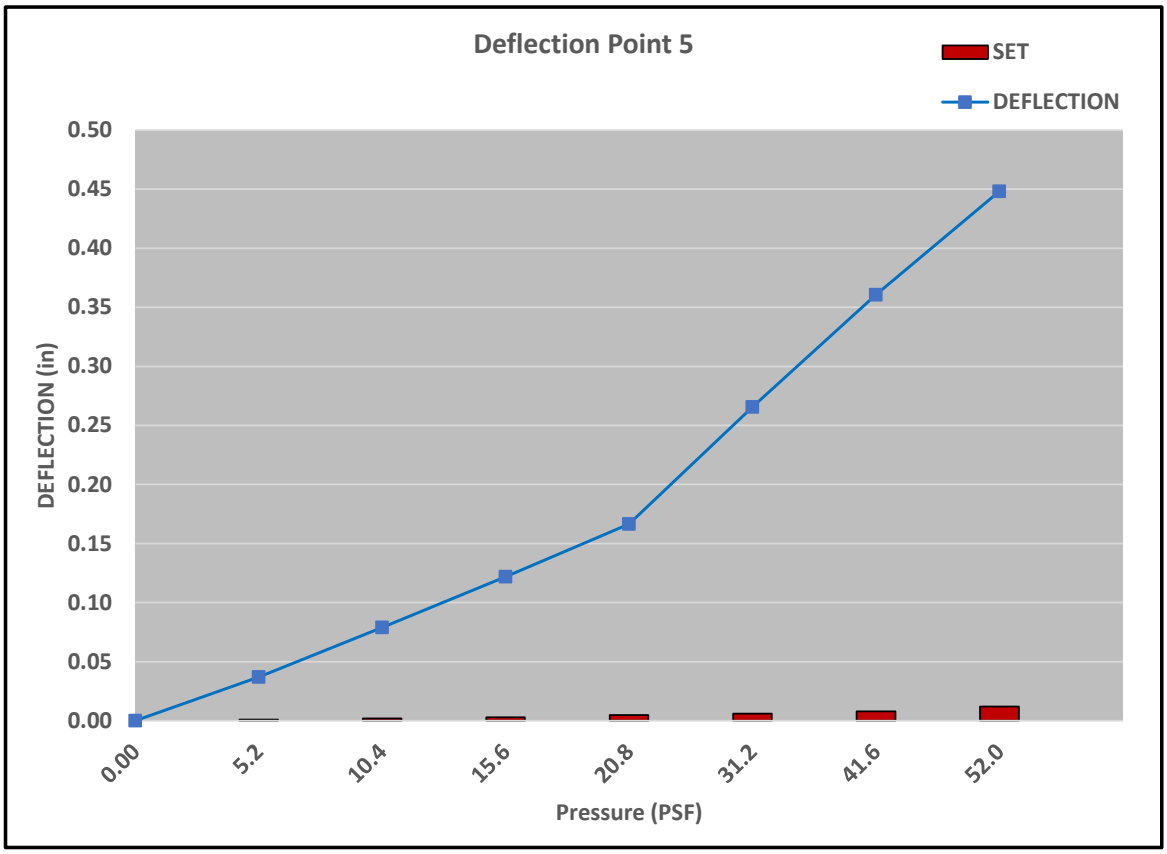
Maximum Test Load at Failure= 84.7 psf (Panel buckling at end span)

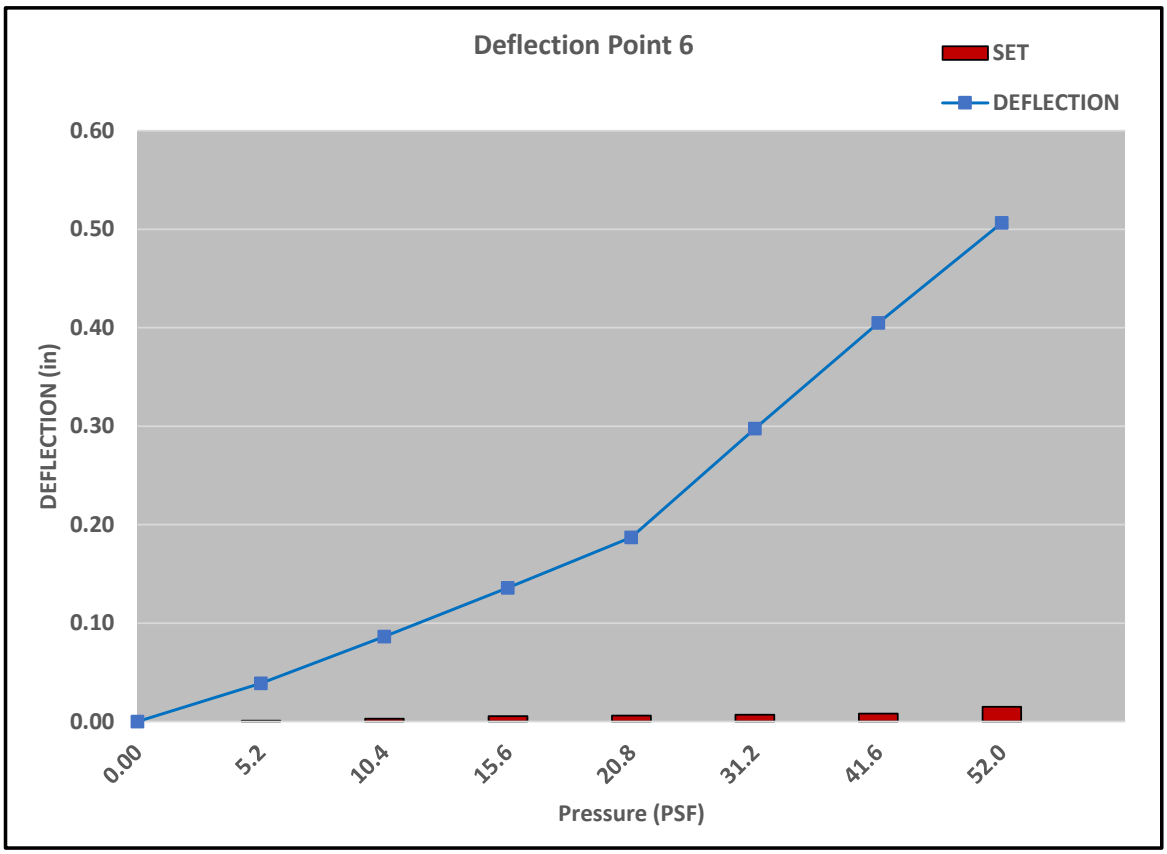

Deflection Point 1
SET
DEFLECTION
1.20
1.00
0.80
0.60
0.40
0.20
0.00
DEFLECTION (in)
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)


Deflection Point 2
SET
DEFLECTION
1.20
1.00
0.80
0.60
0.40
0.20
0.00
DEFLECTION (in)
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)

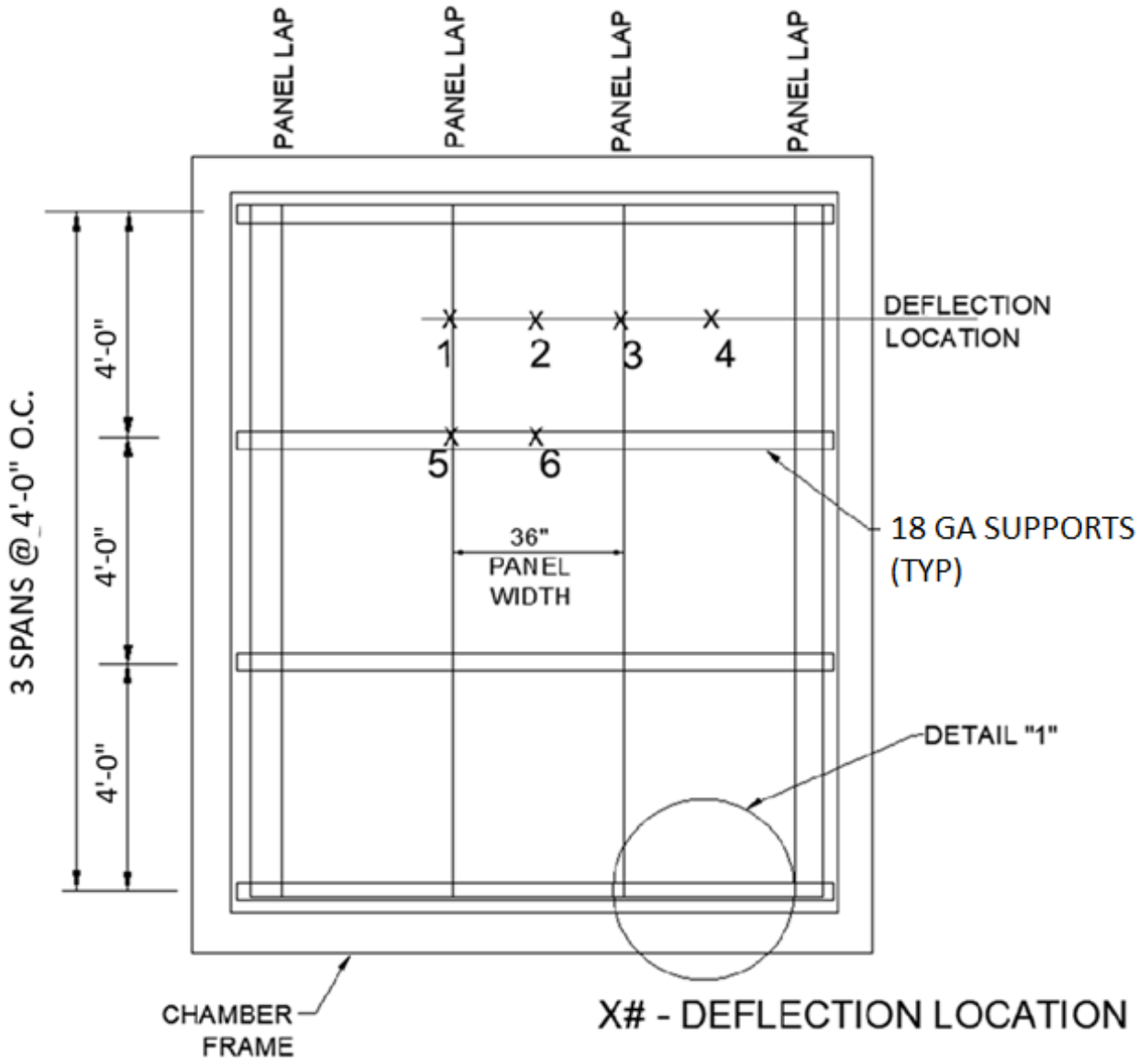

Deflection Point 3
SET
DEFLECTION
1.20
1.00
0.80
0.60
0.40
0.20
0.00
DEFLECTION (in)
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)

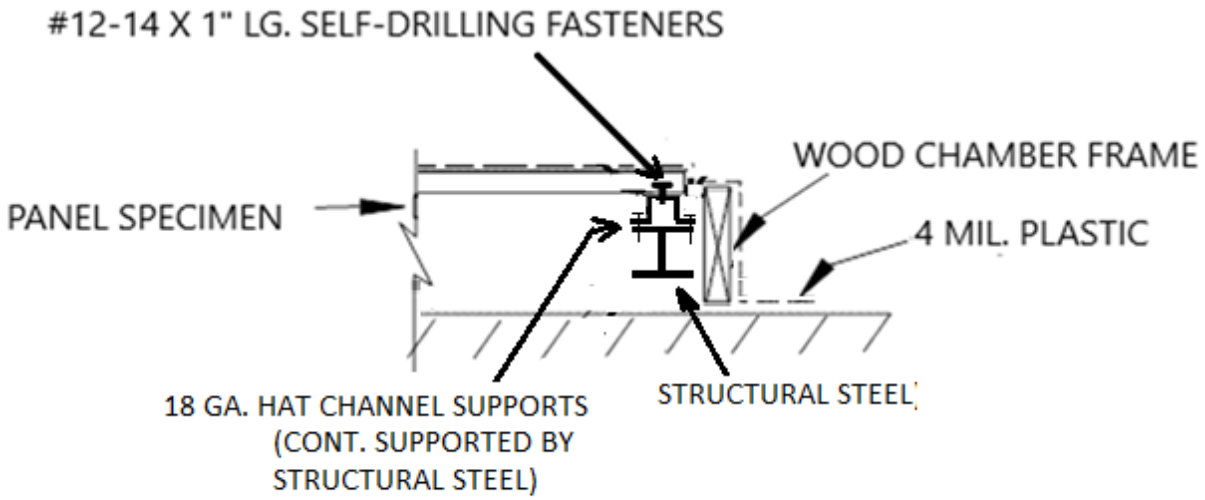

Deflection Point 4
SET
DEFLECTION
1.20
1.00
0.80
0.60
0.40
0.20
0.00
DEFLECTION (in)
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)


Deflection Point 5
SET
DEFLECTION
DEFLECTION (in)
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)


Deflection Point 6
SET
DEFLECTION
DEFLECTION (in)
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.00
5.2
10.4
15.6
20.8
31.2
41.6
52.0
Pressure (PSF)

# TEST SETUP


PANEL LAP
PANEL LAP
PANEL LAP
PANEL LAP
DEFLECTION LOCATION
1
2
3
4
5
6
36" PANEL WIDTH
18 GA SUPPORTS (TYP)
DETAIL "1"
3 SPANS @ 4'-0" O.C.
4'-0"
4'-0"
4'-0"
CHAMBER FRAME
X# - DEFLECTION LOCATION




# DETAIL "1"

## (POSITIVE PRESSURE)

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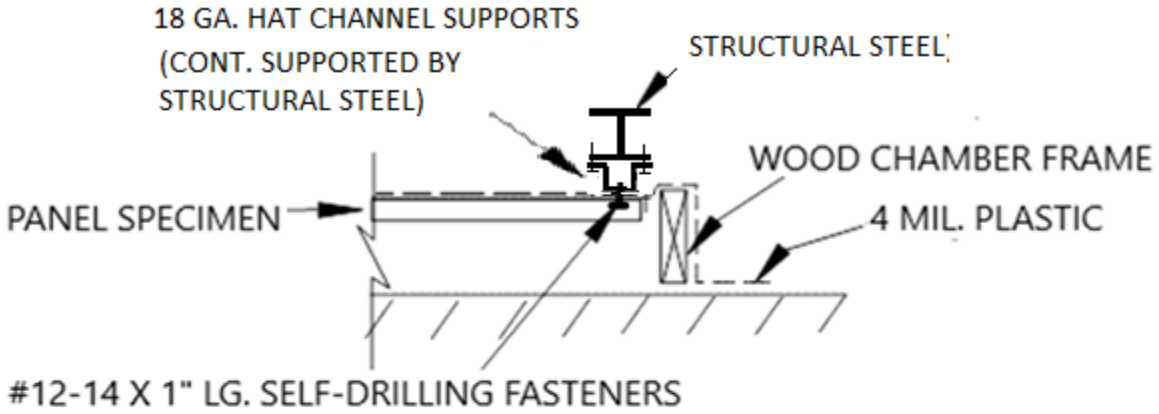
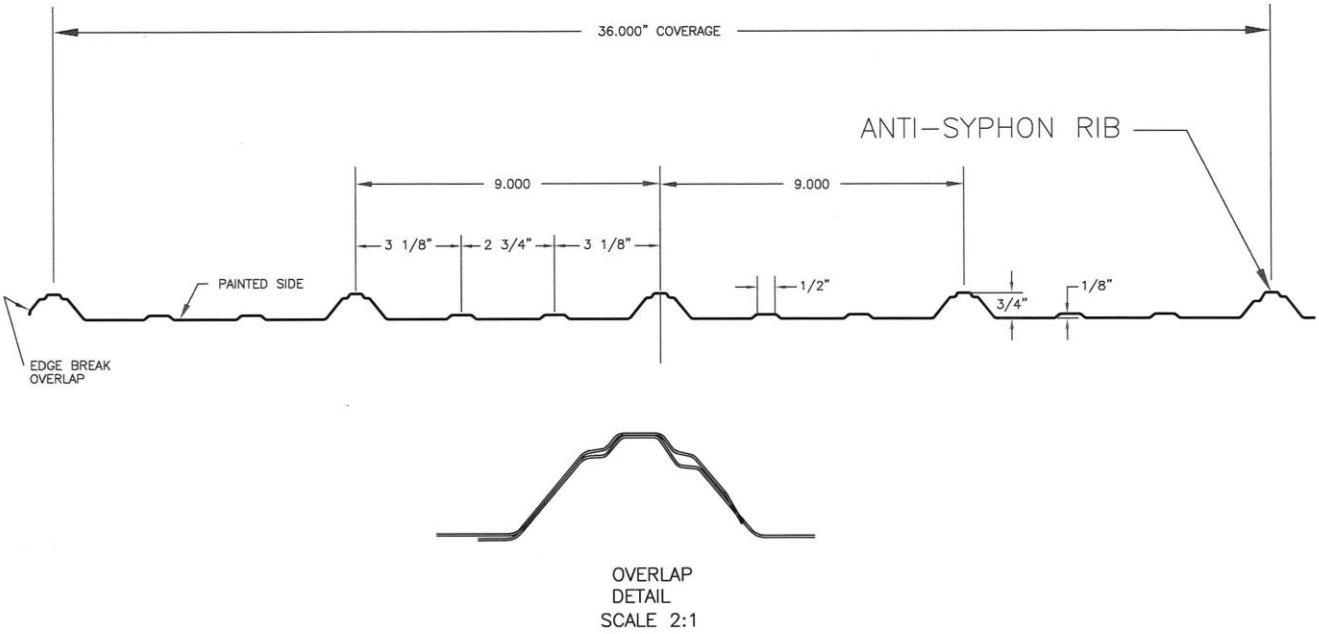



# DETAIL "1"

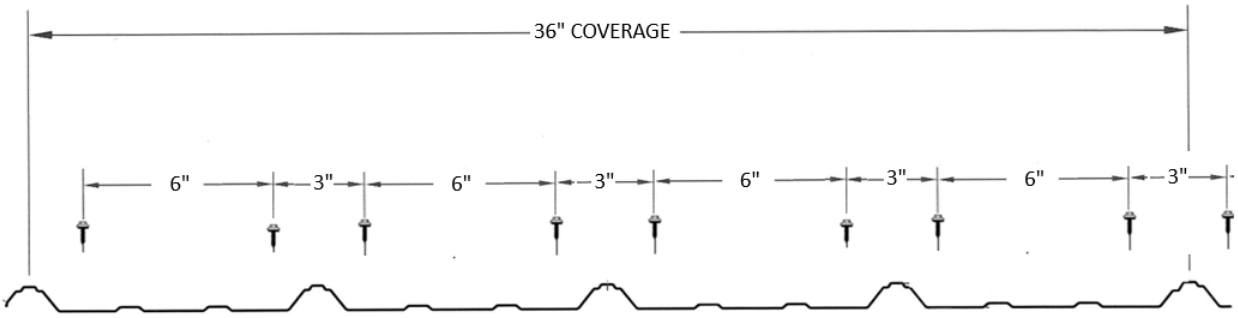
## (NEGATIVE PRESSURE)

# ELITE RIB PANEL

STRIP WIDTH = 40.875




# ELITE RIB PANEL




## 6-3-6-3-6-3-6-3 PATTERN AT ALL SUPPORTS

# TENSILE TEST REPORT

Manufacturer: Elite Metal Manufacturing LLC.
10121 88th Trace
Live Oak, FL. 32064

Test Specimen: Elite Rib Metal Panel 36” wide coverage x 26 ga.

Test Date: November 7, 2024

Test Method: ASTM A370-10

| 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) |
|---|---|---|---|---|---|---|---|
| 24122 | 0.506 | 0.017 | 473.49 | 516.03 | 55,044 | 59,990 | 22.5 |

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

**Revision Log**

| Rev. # | Date | Page(s) | Revision(s) |
|---|---|---|---|
| 0 | 11/15/24 | N/A | Original report issue. |