



Farabaugh Engineering and Testing Inc.

Project No. T287-24

Report Date: November 5, 2024

Total Pages: 17 (inclusive)

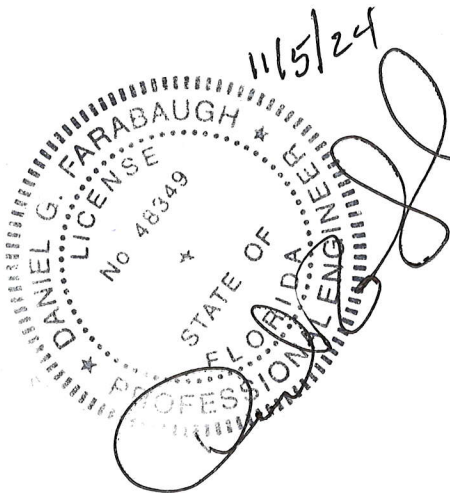
ASTM E 1592
STANDARD TEST METHOD FOR
STRUCTURAL PERFORMANCE OF SHEET METAL ROOF AND SIDING SYSTEMS
BY UNIFORM STATIC AIR PRESSURE DIFFERENCE

ON

SS200-16 WALL PANEL
16" WIDE X 24 GA. STEEL
(4 SPANS @ 6'-0" AND 5 SPANS @ 2'-0")

FOR

BUILTRITE STORAGE SYSTEMS
6014 WRIGHTSVILLE AVENUE, UNIT 120
WILMINGTON, NC. 28403



Prepared by:

Paul G. Farabaugh

Approved by:

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



DADE COUNTY
ACCREDITED
LABORATORY



AAMA
ACCREDITED
LABORATORY



TEXAS
ACCREDITED
LABORATORY



FLORIDA
ACCREDITED
LABORATORY
& QC ENTITY

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

9/30/24

Test Specimen

Manufacturer: Builtrite Storage Systems
6014 Wrightsville Ave., Unit 120
Wilmington, NC. 28403

Panel: SS200-16 Wall Panel, 16" wide x 24 ga. galvanized steel

Clip: 4-1/4" wide 2 piece clip (16 ga. galv. steel base and 22 ga. galv. steel stem)

Testing Apparatus

A vacuum test chamber was used with two static pressure taps located at diagonally opposite corners. A controlled blower provided a pressure 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 with (2)1/4-14 X 1-1/4" long tek 3, self-drill, hex head fasteners per clip at supports. The panel sidejoint were a double lock 180 degree mechanical seam type joint. The panel ends were fastened with (2) 1/4-14 x 1-1/4" long, tek 3, hex head, self- drill fasteners in the panel ends. The outer side panels were fastened with (2)1/4-14 x 1-1/4" long self-drill, hex head fasteners at 16" o.c support along each side of the mock-up. Note: There was NO factory sealant in tested panels.
- 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(2017) and as noted herein. In our opinion the tape and plastic had no influence on the results of the test.

TEST #1

Specimen: SS200-16 Wall Panel, 16" wide x 24 ga. galvanized steel

Clip Spacing: 6 ft o/c

NEGATIVE (UPLIFT) PRESSURE

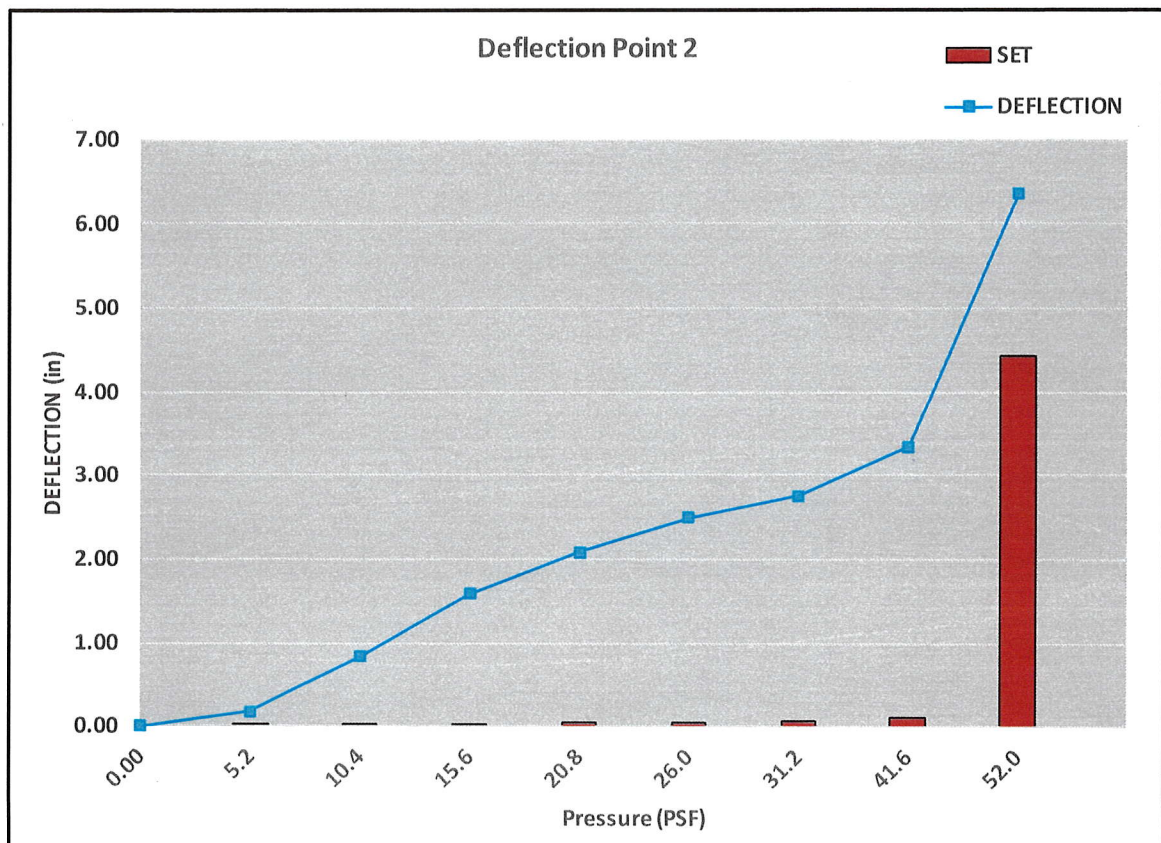
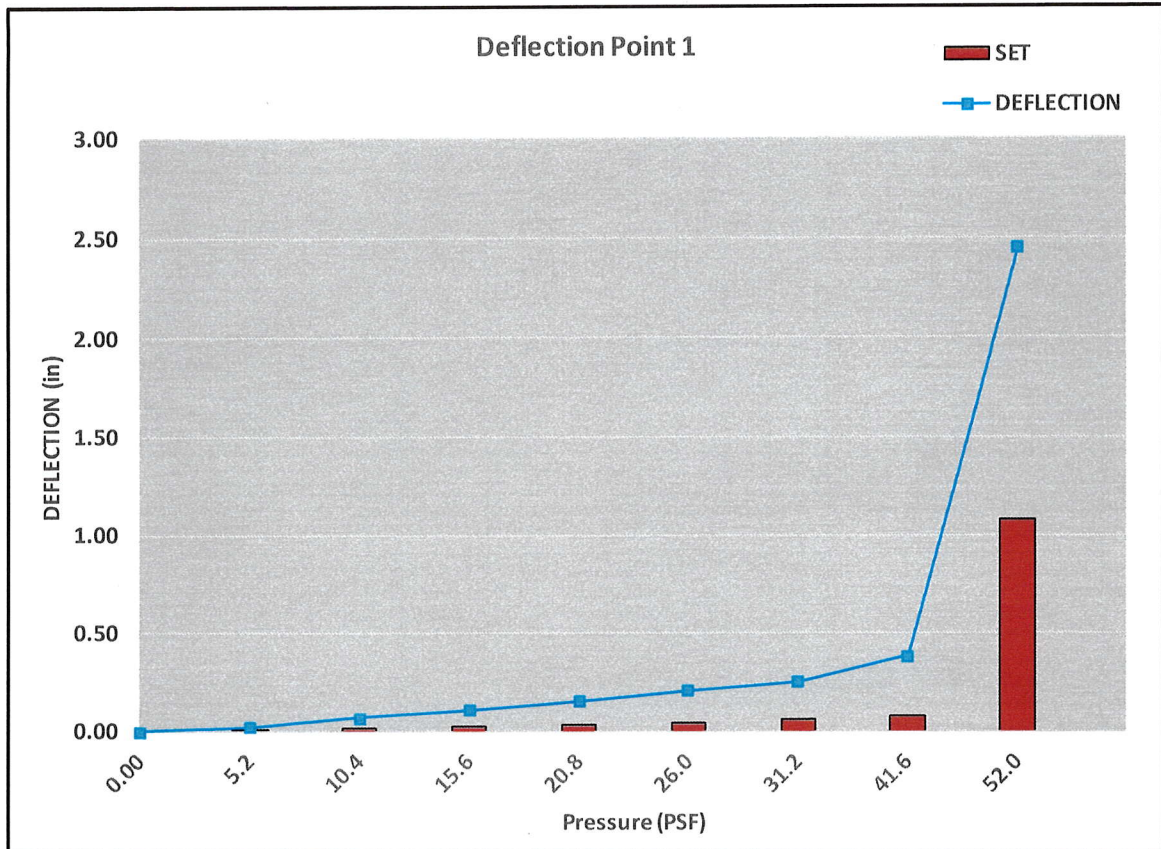
Load Pressure (in-h20)	Load Pressure (psf)	Deflection #1 (in)	Deflection #2 (in)	Deflection #3 (in)	Deflection #4 (in)	Deflection #5 (in)	Deflection #6 (in)
0	0.0	0.000	0.000	0.000	0.000	0.000	0.000
1	5.2	0.021	0.180	0.047	0.612	0.029	0.525
0	0.0	0.006	0.002	0.006	0.006	0.017	0.036
2	10.4	0.073	0.836	0.088	0.961	0.057	0.985
0	0.0	0.014	0.014	0.013	0.013	0.022	0.067
3	15.6	0.112	1.591	0.125	1.521	0.085	1.773
0	0.0	0.022	0.034	0.020	0.034	0.029	0.090
4	20.8	0.155	2.091	0.173	1.998	0.123	2.297
0	0.0	0.031	0.045	0.030	0.070	0.036	0.103
5	26.0	0.209	2.491	0.227	2.397	0.166	2.714
0	0.0	0.044	0.052	0.039	0.097	0.043	0.129
6	31.2	0.257	2.761	0.274	2.658	0.194	2.993
0	0.0	0.056	0.066	0.047	0.133	0.049	0.134
8	41.6	0.385	3.351	0.395	3.214	0.263	3.600
0	0.0	0.078	0.111	0.061	0.184	0.060	0.140
10	52.0	2.452	6.370	2.502	6.299	1.183	6.760
0	0.0	1.078	4.441	1.129	4.243	0.896	4.822

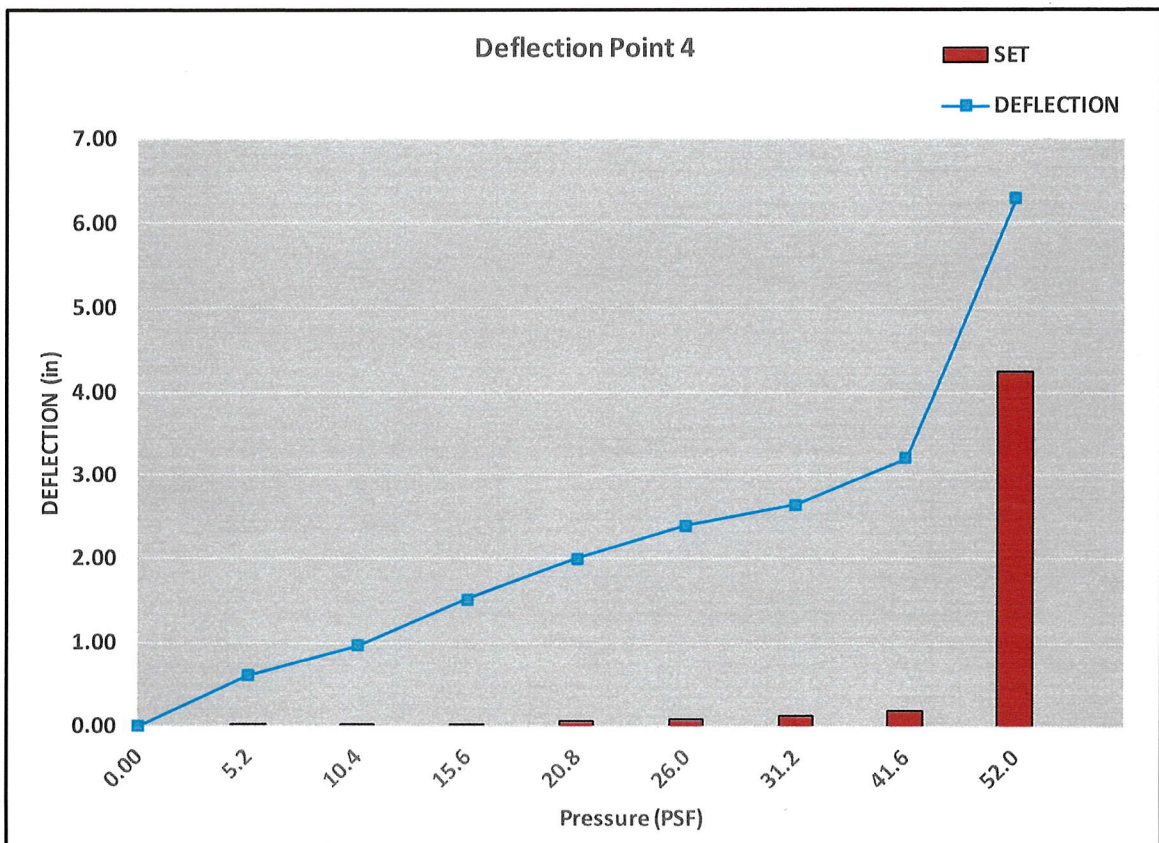
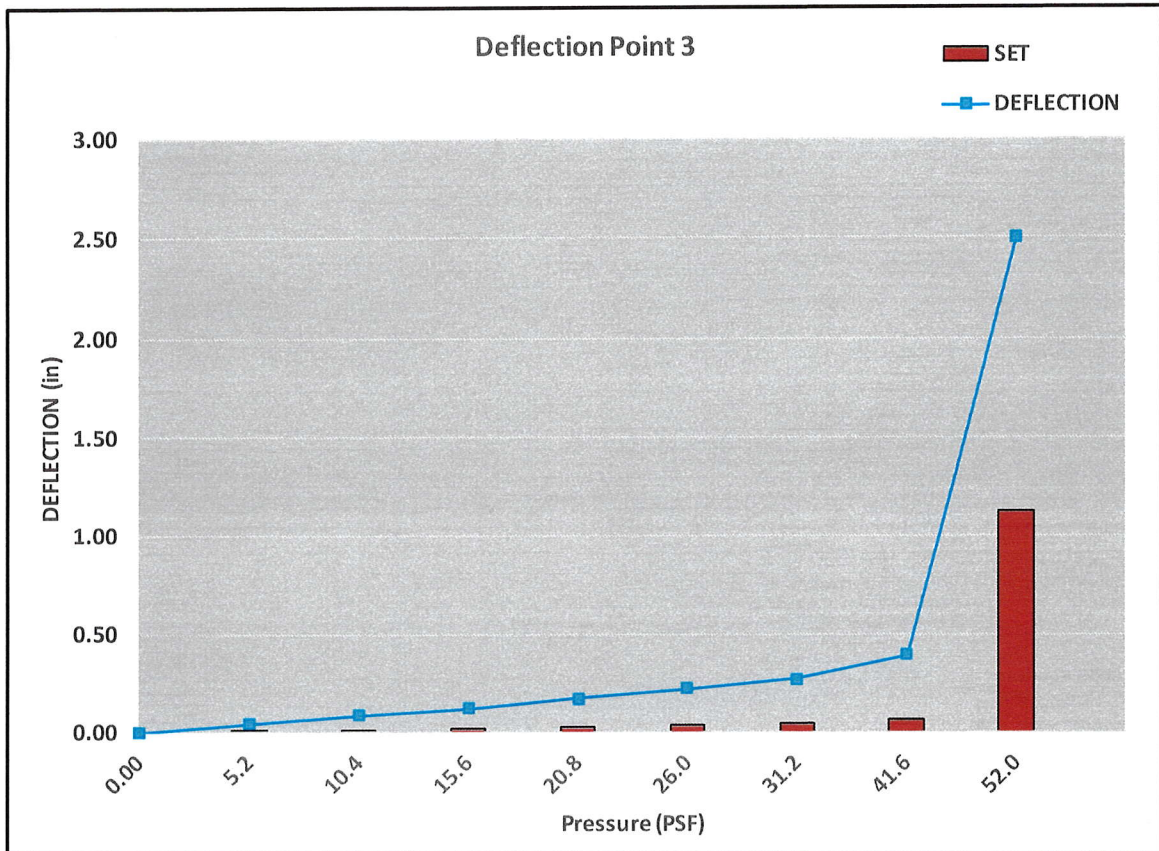
RESULTS:

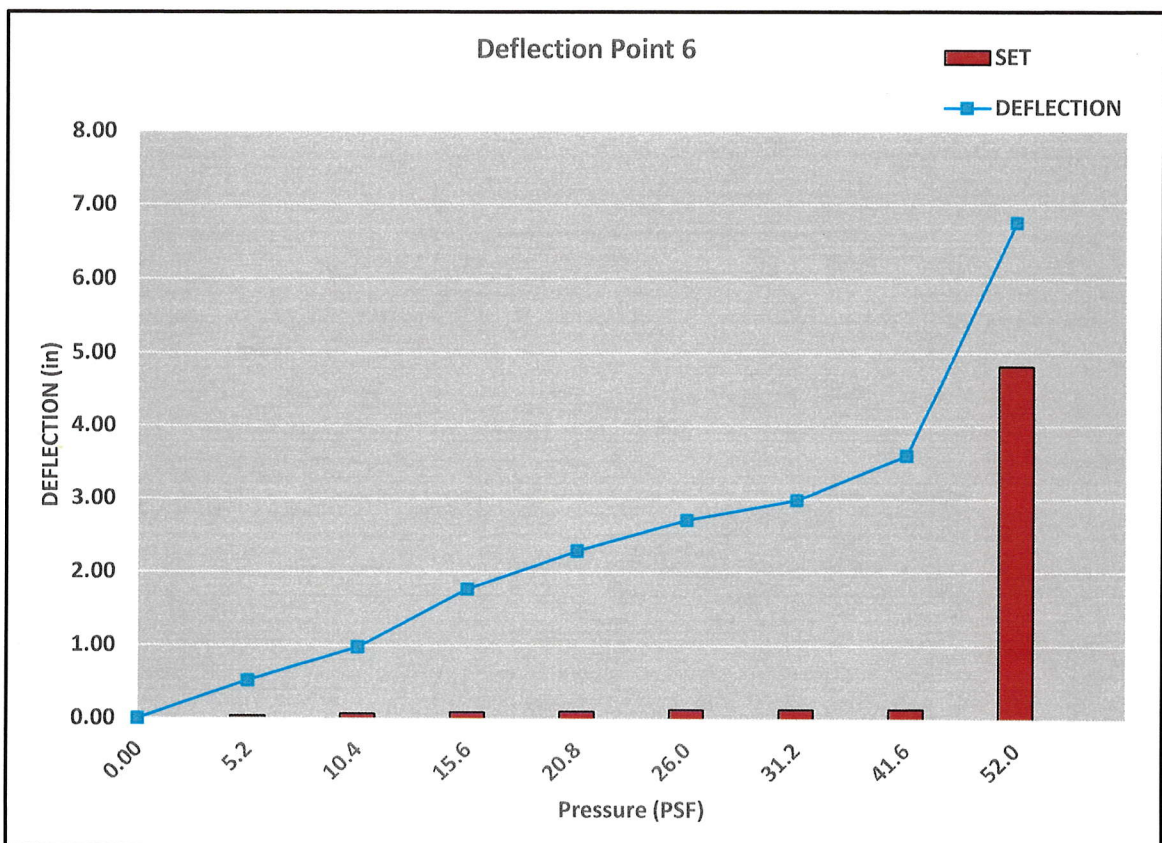
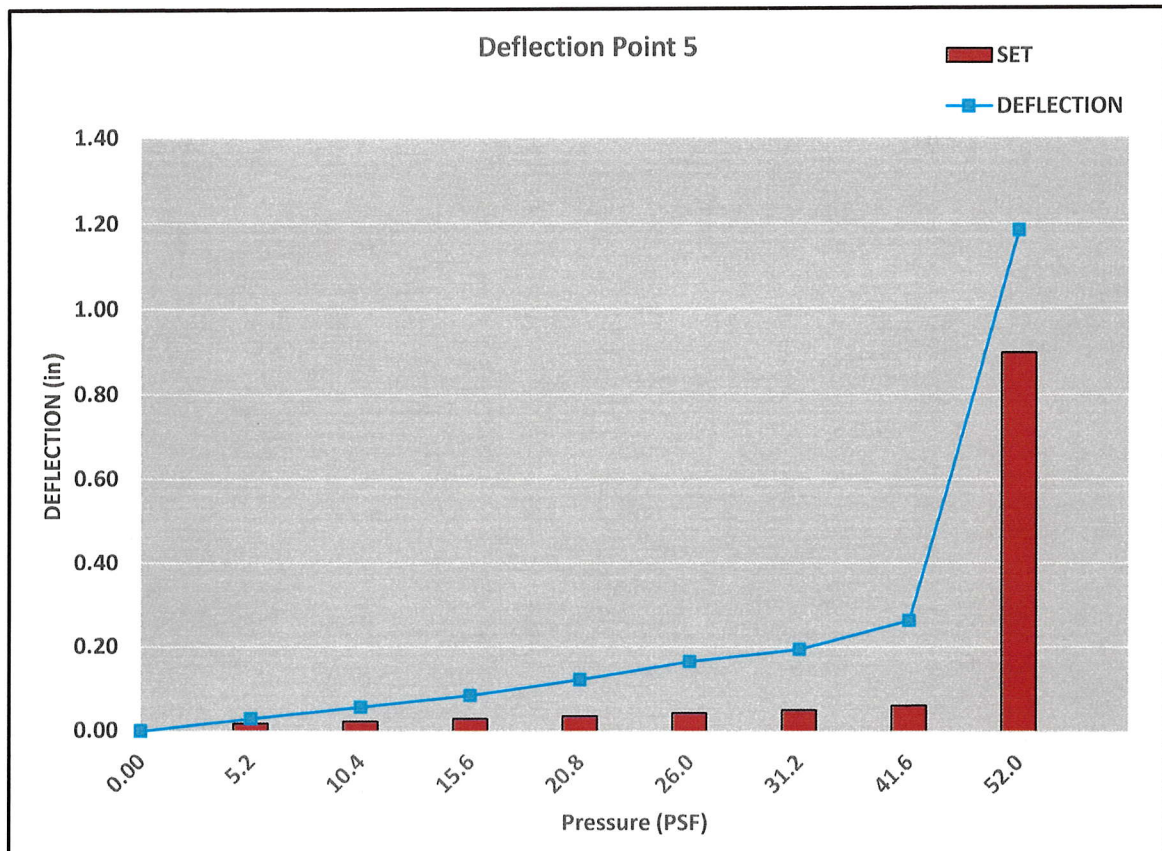
Load held for 1 minute = 62.4 psf

Buckled at 68.12 psf

Panel seam disengaged from clip at 80.1 psf







TEST #2

Specimen: SS200-16 Wall Panel, 16" wide x 24 ga. galvanized steel

Clip spacing: 2 ft o/c

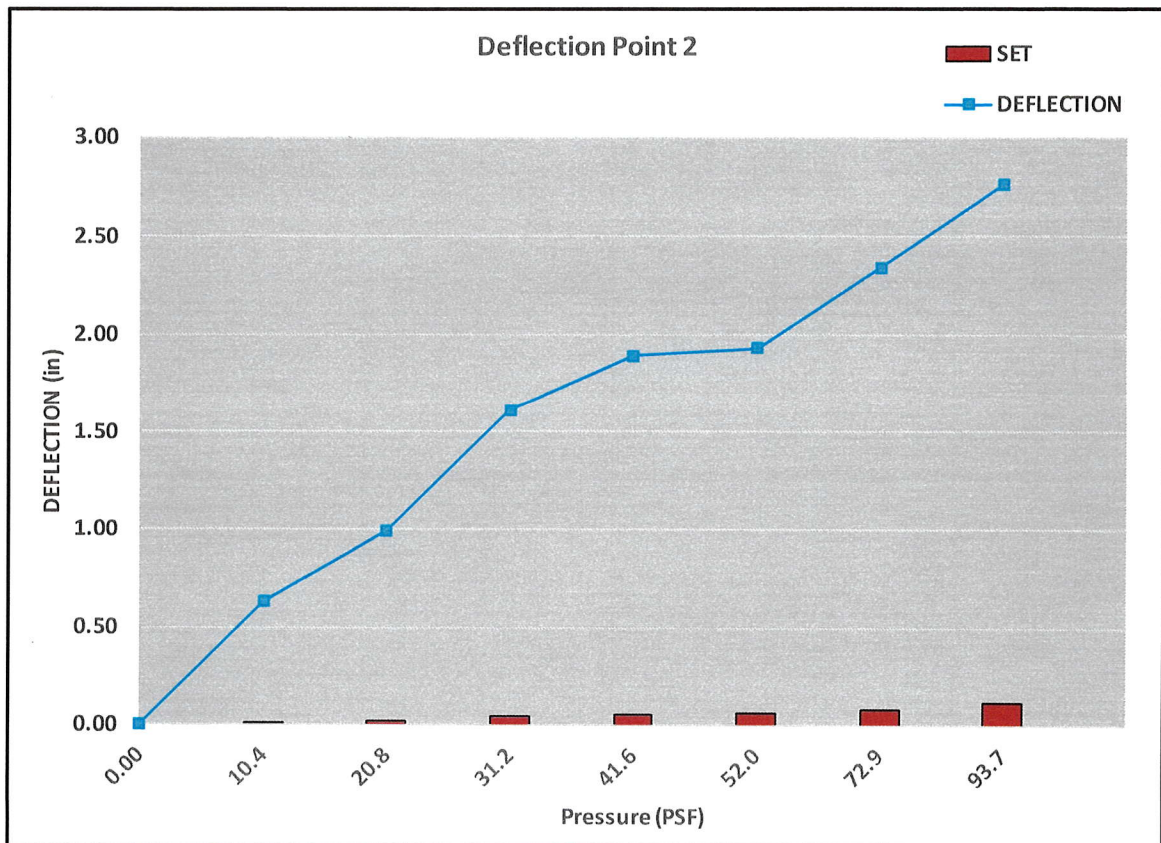
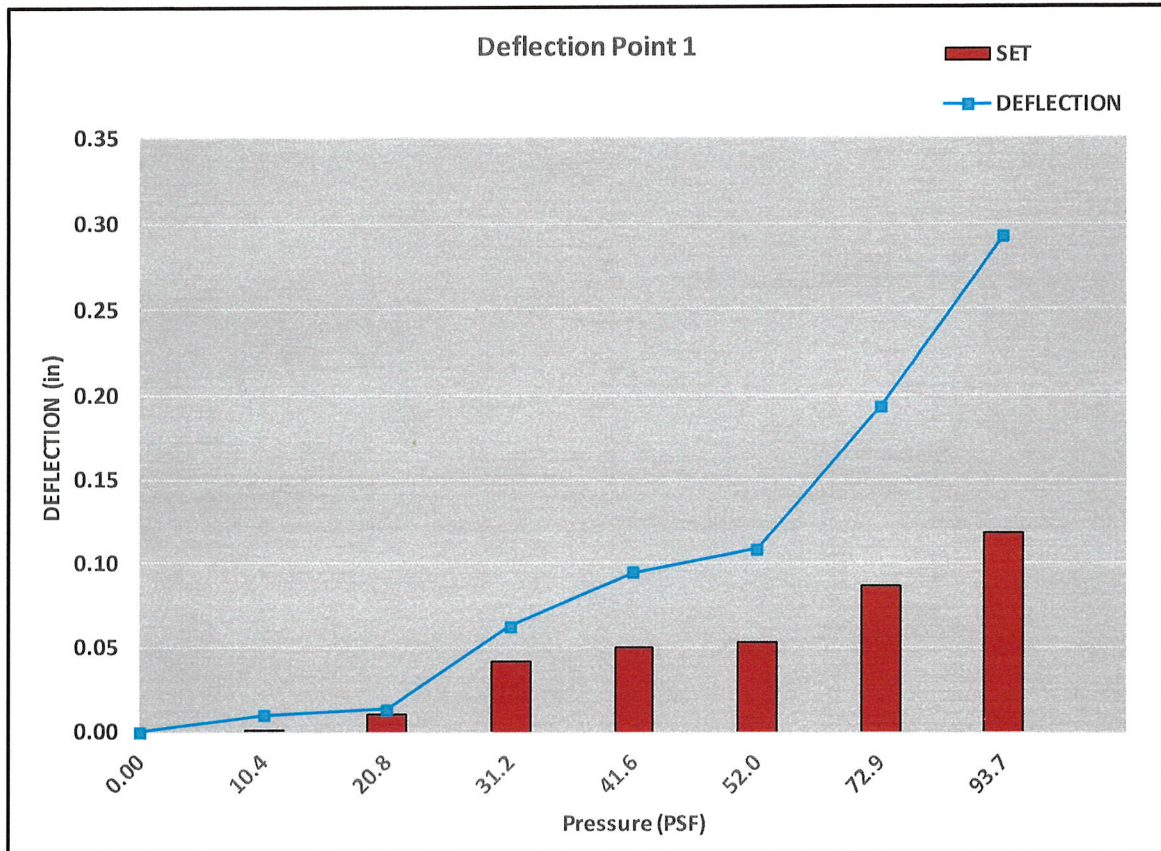
NEGATIVE (UPLIFT) PRESSURE

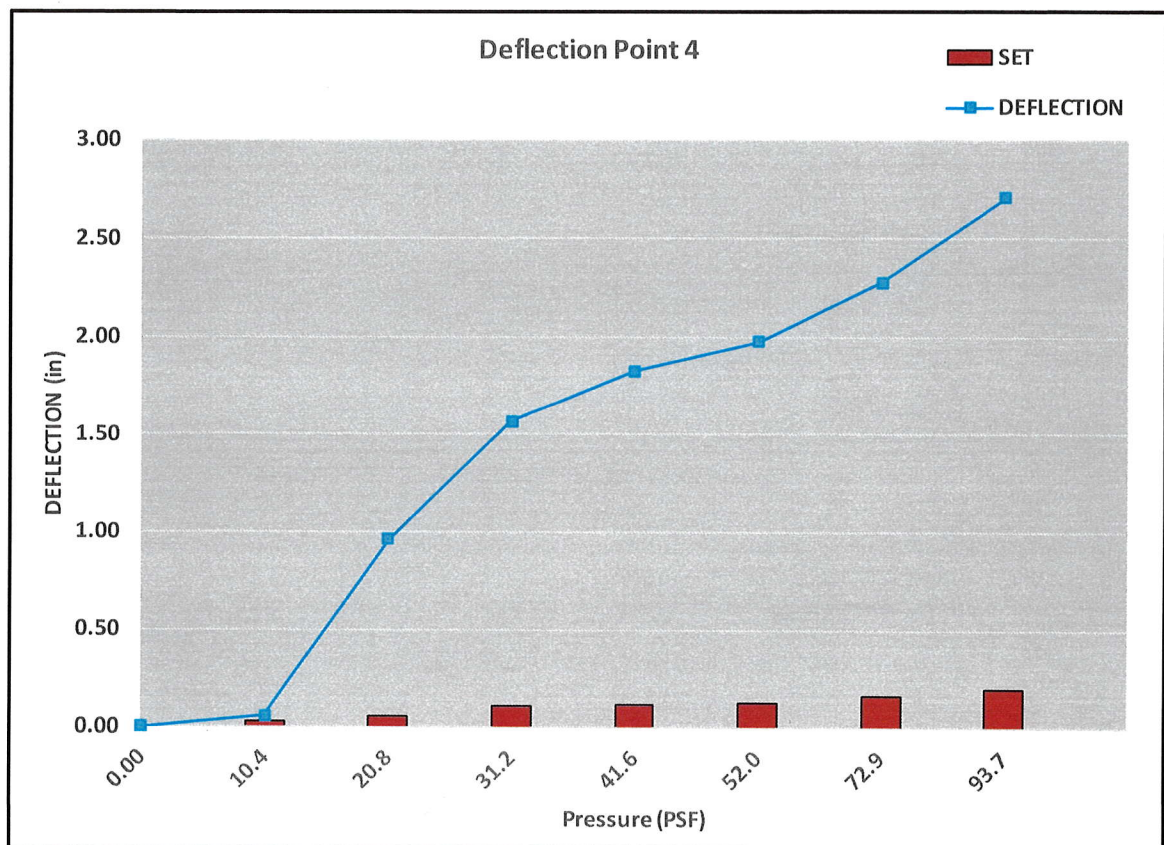
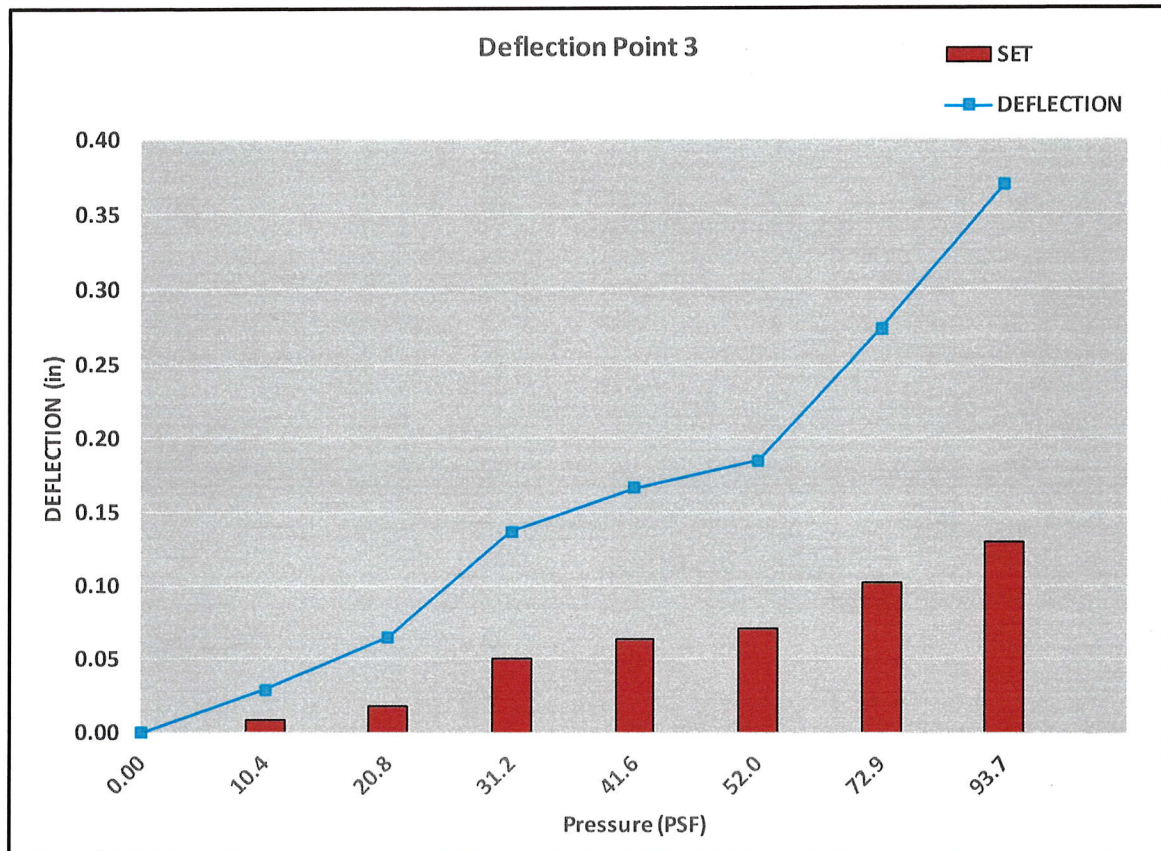
Load Pressure (in-h20)	Load Pressure (psf)	Deflection #1 (in)	Deflection #2 (in)	Deflection #3 (in)	Deflection #4 (in)	Deflection #5 (in)	Deflection #6 (in)
0	0.0	0.000	0.000	0.000	0.000	0.000	0.000
2	10.4	0.010	0.630	0.029	0.059	0.045	0.710
0	0.0	0.001	0.011	0.009	0.032	0.004	0.020
4	20.8	0.013	0.995	0.065	0.963	0.083	1.074
0	0.0	0.010	0.022	0.018	0.058	0.014	0.014
6	31.2	0.063	1.615	0.137	1.571	0.164	1.653
0	0.0	0.042	0.048	0.050	0.110	0.046	0.016
8	41.6	0.095	1.893	0.167	1.831	0.199	1.950
0	0.0	0.050	0.054	0.064	0.120	0.053	0.011
10	52.0	0.109	1.931	0.185	1.977	0.215	1.975
0	0.0	0.054	0.062	0.071	0.128	0.056	0.014
14	72.9	0.193	2.344	0.274	2.278	0.302	2.383
0	0.0	0.087	0.087	0.102	0.165	0.070	0.021
18	93.7	0.293	2.764	0.370	2.705	0.408	2.806
0	0.0	0.118	0.117	0.129	0.195	0.088	0.024

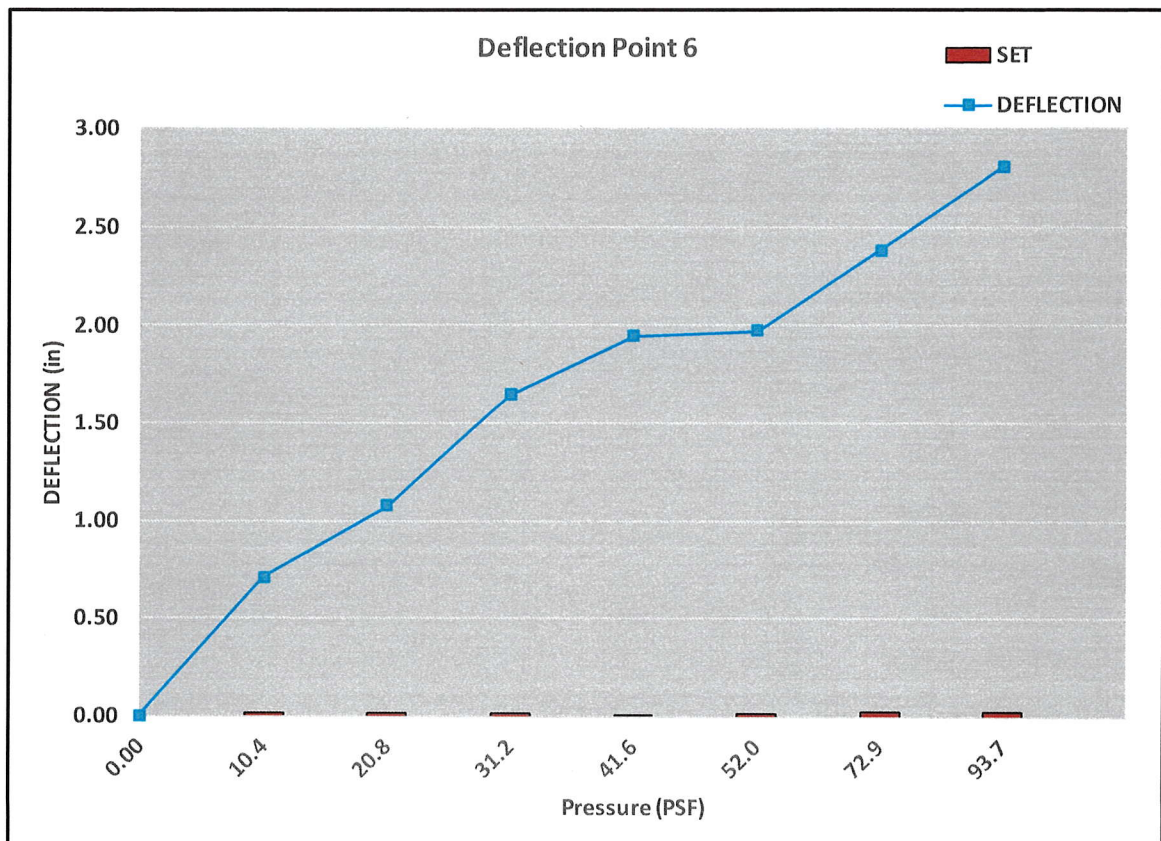
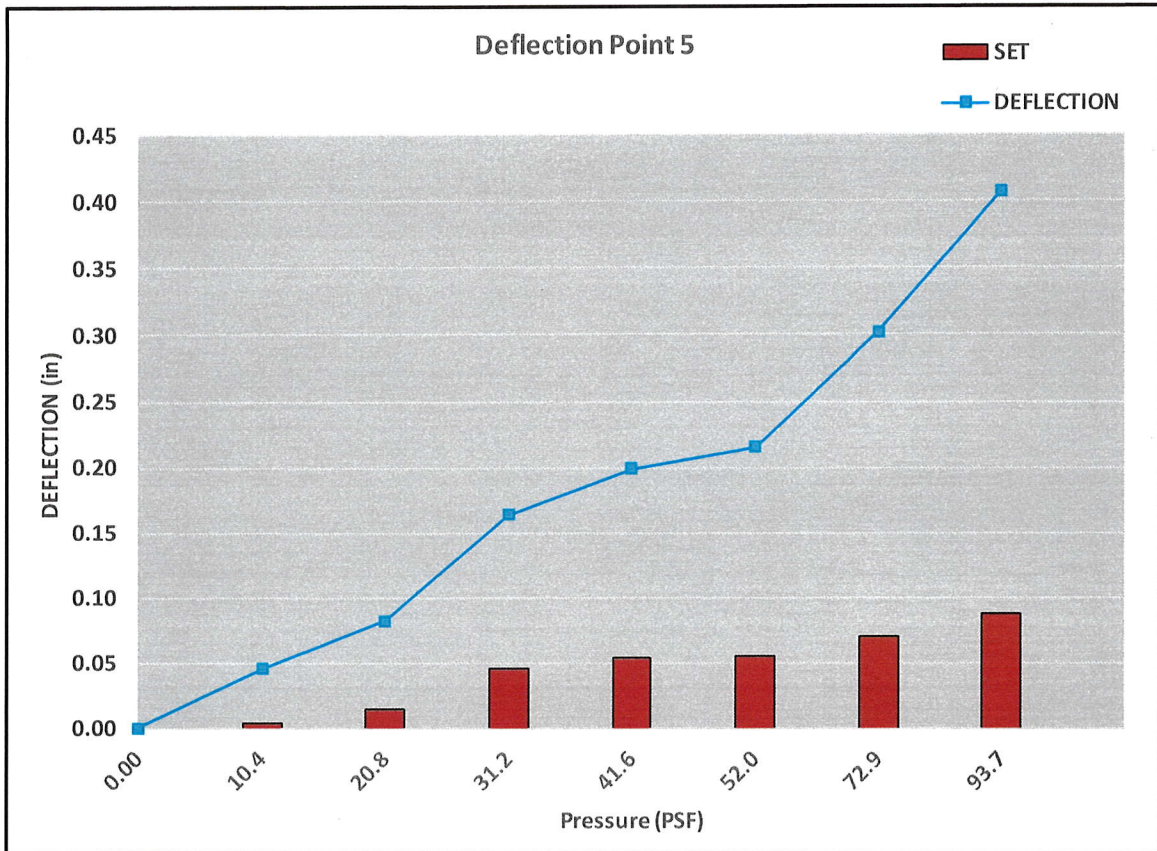
RESULTS:

Load held for 1 minute = 161.2 psf

Maximum Test Load (Failure load) = 169.5 psf (Panel seam disengagement.)

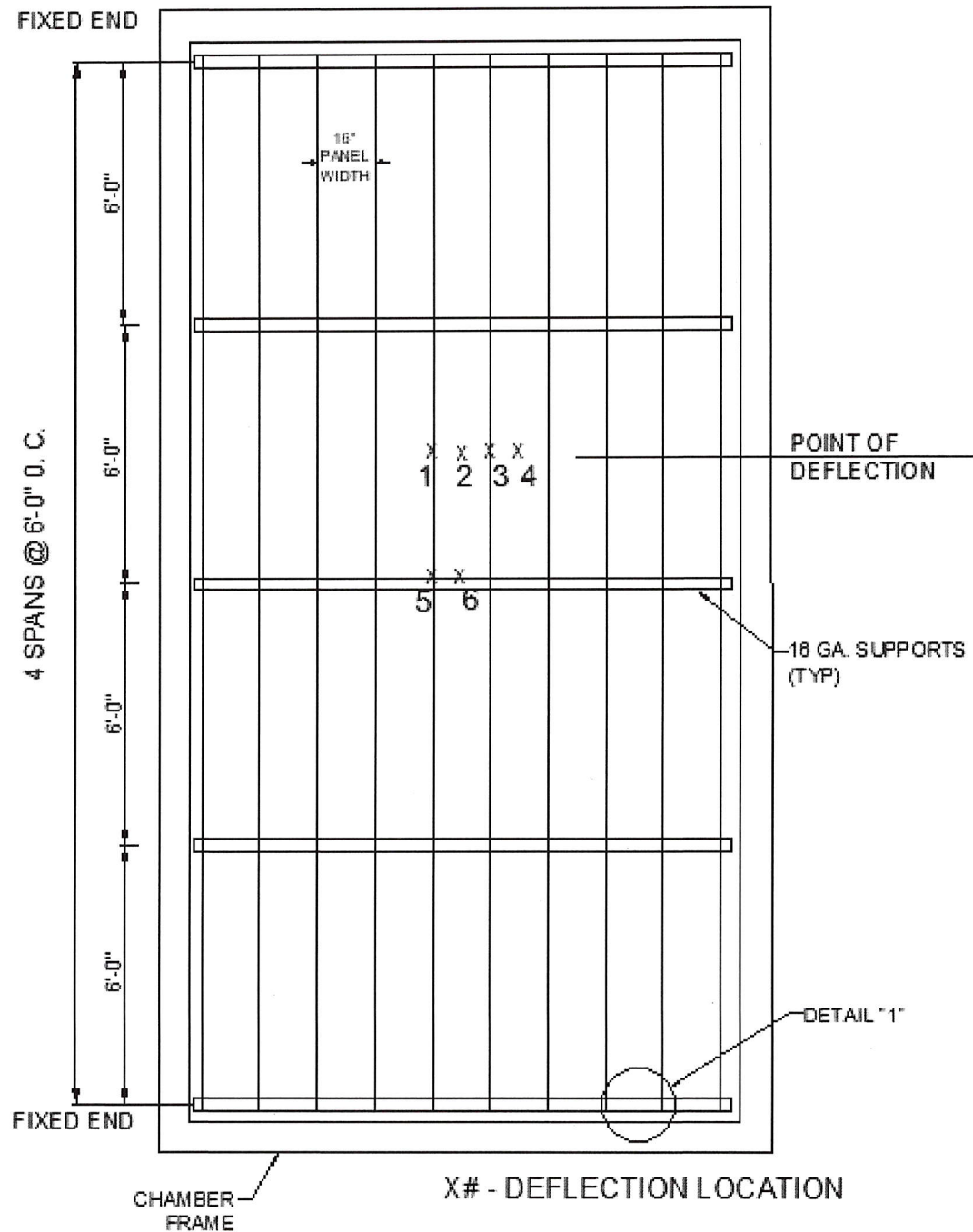






TEST #1

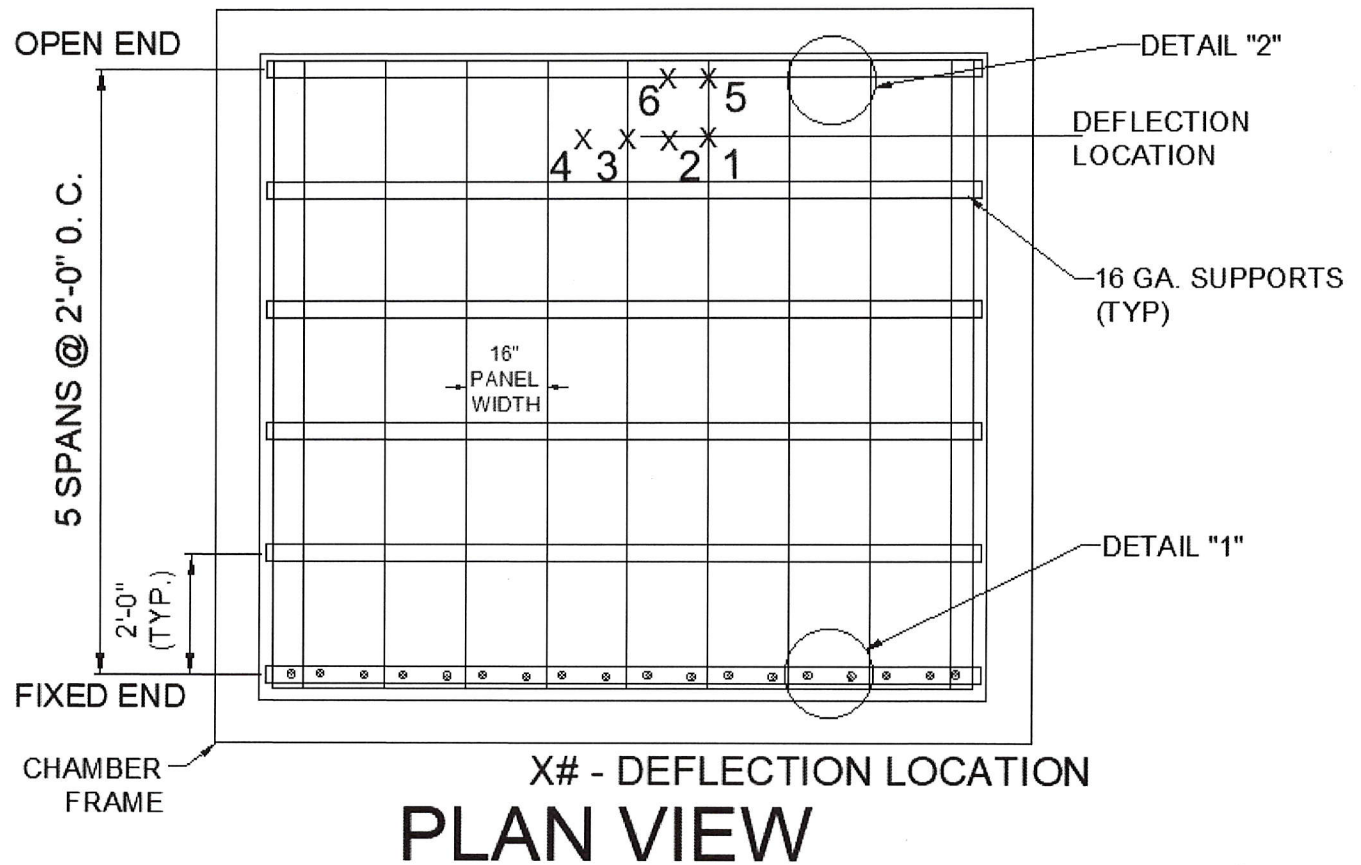
ASTM E1592 NEGATIVE LOAD TEST



PLAN VIEW

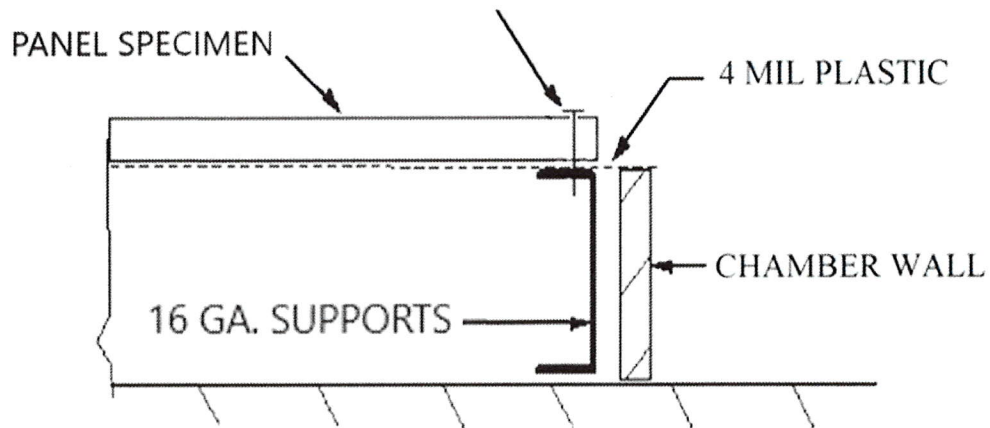
TEST #2

ASTM E1592 NEGATIVE LOAD TEST



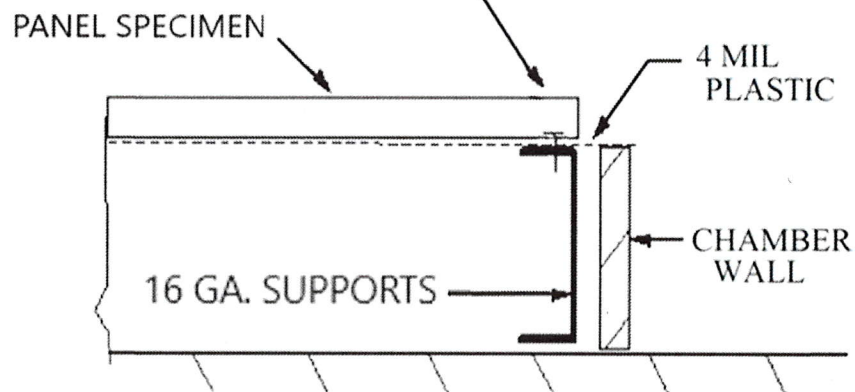
ADDITIONAL FASTENERS

1/4-14 SELF DRILLING FASTENERS
(2 PER PANEL AT FIXED ENDS)



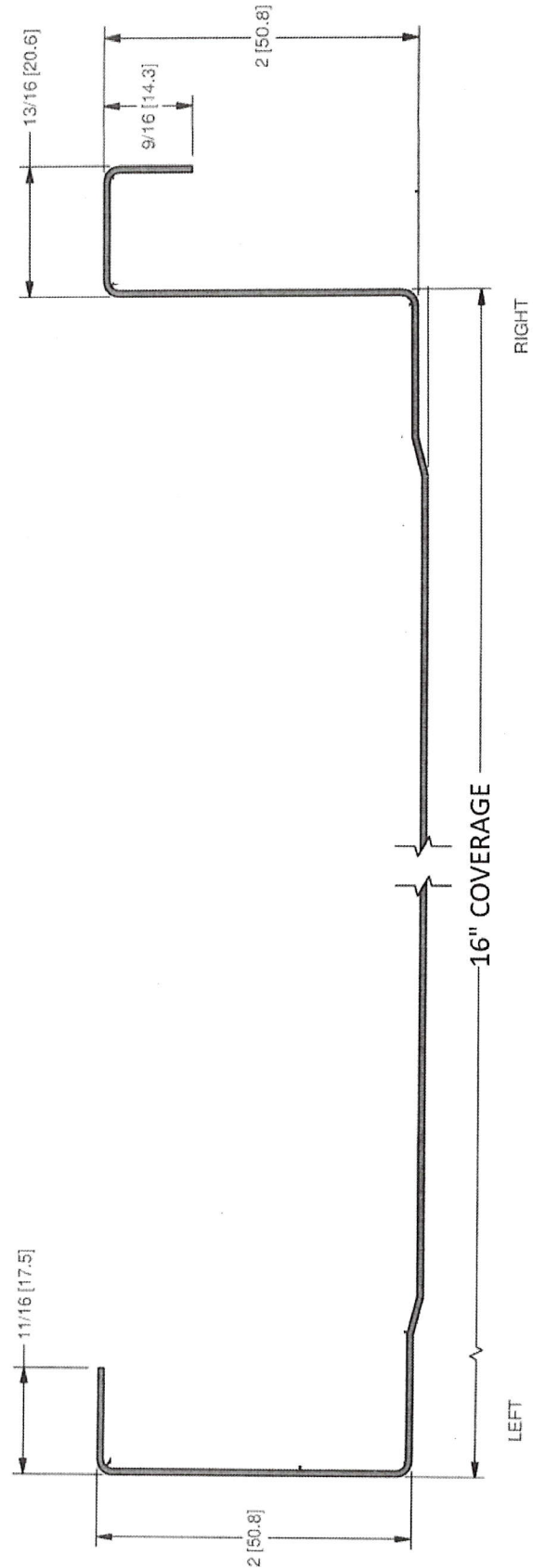
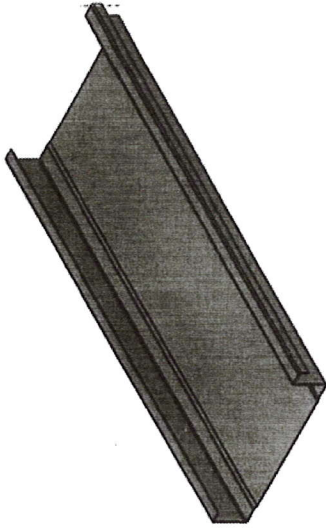
DETAIL 1

NO ADDITIONAL
FASTENERS AT END
EXCEPT FOR CLIP
FASTENERS W/CLIP



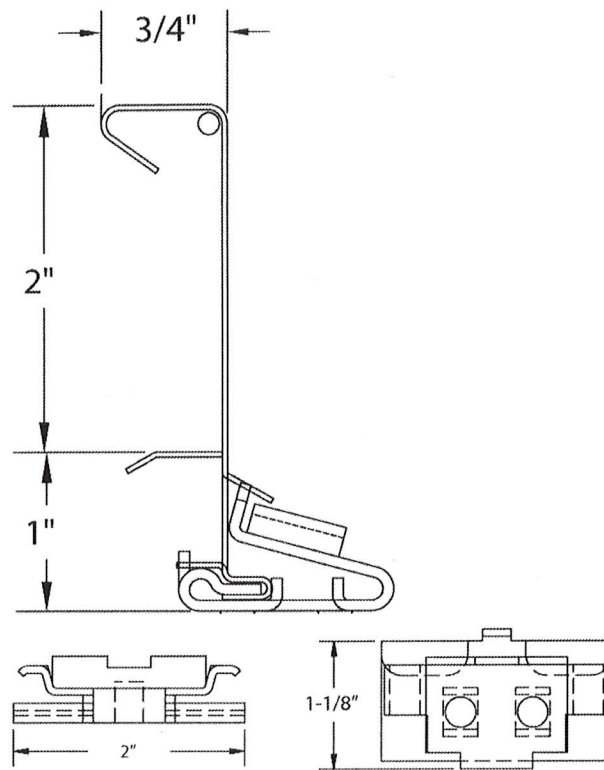
DETAIL 2

SS200 PANEL

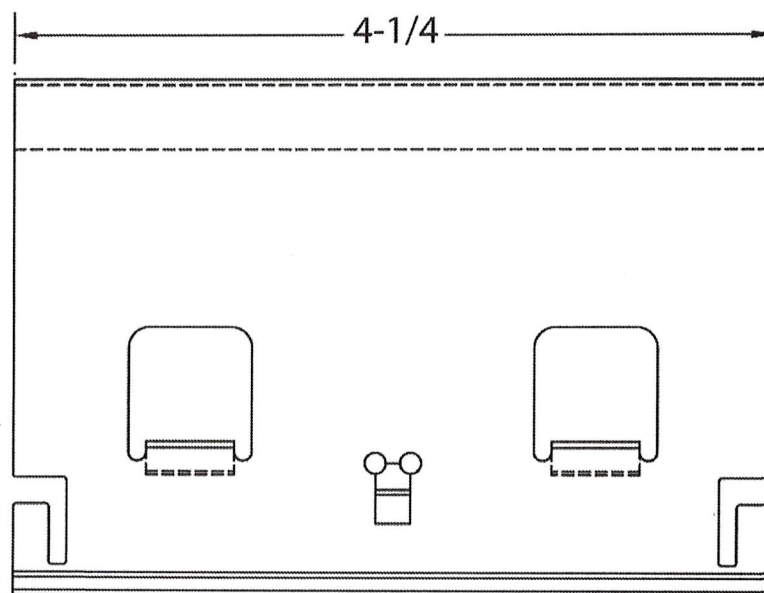


PANEL PROFILE

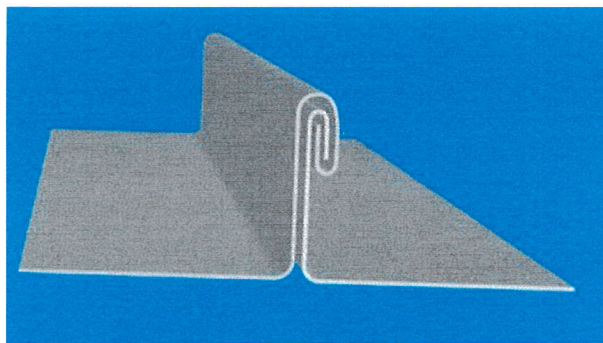
PANEL CLIP



Note: Holes are $\frac{17}{64}$ "



Project No. T287-24



180 DEGREE SEAM DETAIL

TENSILE TEST REPORT

Client: Builtrite Storage Systems
6014 Wrightsville Ave., Unit 120
Wilmington, NC. 28403

Specimen: SS200-16 Wall Panel, 16" wide x 24 ga. galvanized steel

Test Date: October 15, 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)
24096	0.491	0.021	586.07	669.19	56,839	64,901	25.8

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

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	11/5/24	N/A	Original report issue.