



Farabaugh Engineering and Testing Inc.

Project No. T215-21

Report Date: July 20, 2021

No. Pages: 8 (inclusive)

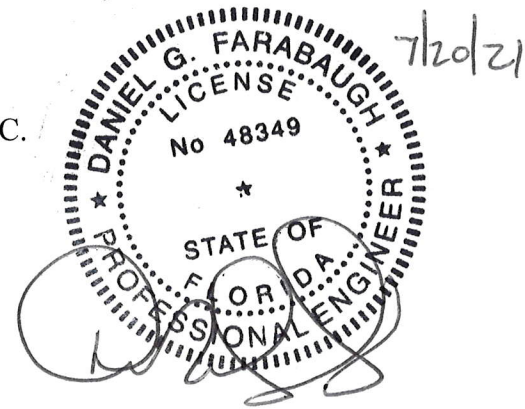
UL 580 / UL1897 UPLIFT RESISTANCE TESTING

ON

**ELITE RIB ROOF PANEL
3'-0" COVERAGE X 29 GA. STEEL
(FASTENERS @ 24" O.C. OVER 15/32" PLYWOOD)**

FOR

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



Prepared by:

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Purpose

This test method covers the evaluation of uplift resistance of roof assemblies per UL 580-06 and UL 1897-12 and as provided herein.

Test Dates:

7/8/21 - Test #1 – Fastener spacing @ 24” o.c.

Test Specimen

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

Test Specimen: Elite Rib Metal Panel 36” wide coverage x 29 ga.

Substrate: 15/32” plywood

Testing Apparatus

Test Chamber: The test chamber consists of three sections: a top section to create a uniform vacuum, a center section in which the roof assembly is constructed, and a bottom section to create a uniform positive pressure.

Pressure Chamber: The air pressure in the pressure chamber was measured at five points. Each of four points were located 42” from chamber corners at a 45 degrees angle, with the fifth tube located 18” from the center of the air inlet opening. The end of each tube was 7” above the chamber floor. The tubes were connected to a manifold that, in turn was connected to a manometer.

Vacuum Chamber Measurement: The air pressure in the vacuum chamber was measured at five points. Each of four points was located 18” from chamber corners at a 45 degrees angle and 8” above the chamber floor. The fifth tube located 12” from the center of the exhaust opening and 6” below the opening. The tubes were connected to a manifold that, in turn was connected to a manometer. The pressure in the vacuum chamber was controlled by an automatic damper. The damper door was moved by means of an air motor hooked to an air line and controlled by pressure switches located in the control console. An additional pressure line from the manifold to pressure switches controlled the automatic damper.

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Installation

- The 15/32" plywood was attached to the wood joist (2x10) supports (spaced at 2'-0" o.c.) using 8d ring shank nails at 6" on center around the perimeter and at interior supports.
- The metal roof panels were attached to the wood deck substrate using #10-12 X 1-1/2" long, hex head wood screw, type 17 point, w/1/2" steel sealing washer. The screws were attached with a specified spacing pattern across the width of the panel with a fastening spacing of 24" o.c. along the length of the panel. The panel sidejoint was lap joint. The outer perimeter of the assembly was secured with perimeter fastening as required to maintain a periphery seal. See fastening pattern for location of fasteners across width of panel.
- A plastic barrier was located between the panels and the underlying substrate.

Test Procedure

- The test assembly was subjected to positive and negative pressures to form an uplift pressure at the values and time duration as shown in the attached table.
- Each pressure increment was held for at least 1 minute.
- Vertical movement of the assembly during the tests was recorded.
- Subsequent to the completion of Phase 5 of the Class 90 test sequence, the test specimen was subjected to higher static uplift pressures per UL 1897 as shown on the attached table. The positive uplift pressure supplied from below was maintained at 48.5 psf while the negative uplift pressure supplied from above was increased in increments until failure or the desired uplift pressure was obtained.

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TEST #1
UL 580 UPLIFT TEST

Test Date: 7/8/21

Test Specimen: Elite Rib Metal Panel 36" wide coverage x 29 ga

Fastener Spacing: 24" o.c.

Class 30 Deflection Measurements

Phase	Time Duration (min.)	Negative Pressure (psf)	Positive Pressure (psf)	#1 (in)	#2 (in)	#3 (in)	#4 (in)
Initial	0	0	0	4-5/8	5	4-1/4	8
1	5	16.2	0	4-9/16	4-13/16	4-3/16	7-13/16
2	5	16.2	13.8	4-9/16	4-9/16	4-3/16	7-5/8
3	60	8.1 – 27.7*	13.8	4-9/16	4-1/2	4-1/8	7-9/16
4	5	24.2	0	4-9/16	4-9/16	4-3/16	7-5/8
5	5	24.2	20.8	4-1/2	4-3/8	4-1/8	7-1/2

Class 60 Deflection Measurements

Phase	Time Duration (min.)	Negative Pressure (psf)	Positive Pressure (psf)	#1 (in)	#2 (in)	#3 (in)	#4 (in)
1	5	32.3	0	4-1/2	4-1/2	4-1/8	7-9/16
2	5	32.3	27.7	4-7/16	4-1/4	4-1/16	7-5/8
3	60	16.2 – 55.4*	27.7	4-3/8	4-1/16	4	7-1/4
4	5	40.4	0	4-1/2	4-5/16	4-1/8	7-3/8
5	5	40.4	34.6	4-3/8	4-1/16	4	7-1/4

Class 90 Deflection Measurements

Phase	Time Duration (min.)	Negative Pressure (psf)	Positive Pressure (psf)	#1 (in)	#2 (in)	#3 (in)	#4 (in)
1	5	48.5	0	4-5/16	4-1/8	4-1/16	7-3/16
2	5	48.5	41.5	4-3/8	4	4	7-1/8
3	60	24.2 – 48.5*	41.5	4-3/8	4	4	7-1/8
4	5	56.5	0	4-7/16	4-1/8	4-1/16	7-1/4
5	5	56.5	48.5	4-1/4	3/7/8	3-15/16	7

* Oscillation frequency as specified in UL 580.

Results: Upon completion of the above loading, there were no specimen failures.

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TEST #1 (cont.)

UL 1897 UPLIFT TEST

Test Date: 7/8/21

Test Specimen: Elite Rib Metal Panel 36" wide coverage x 29 ga

Fastener Spacing: 24" o.c.

Results:

Deflection Measurements

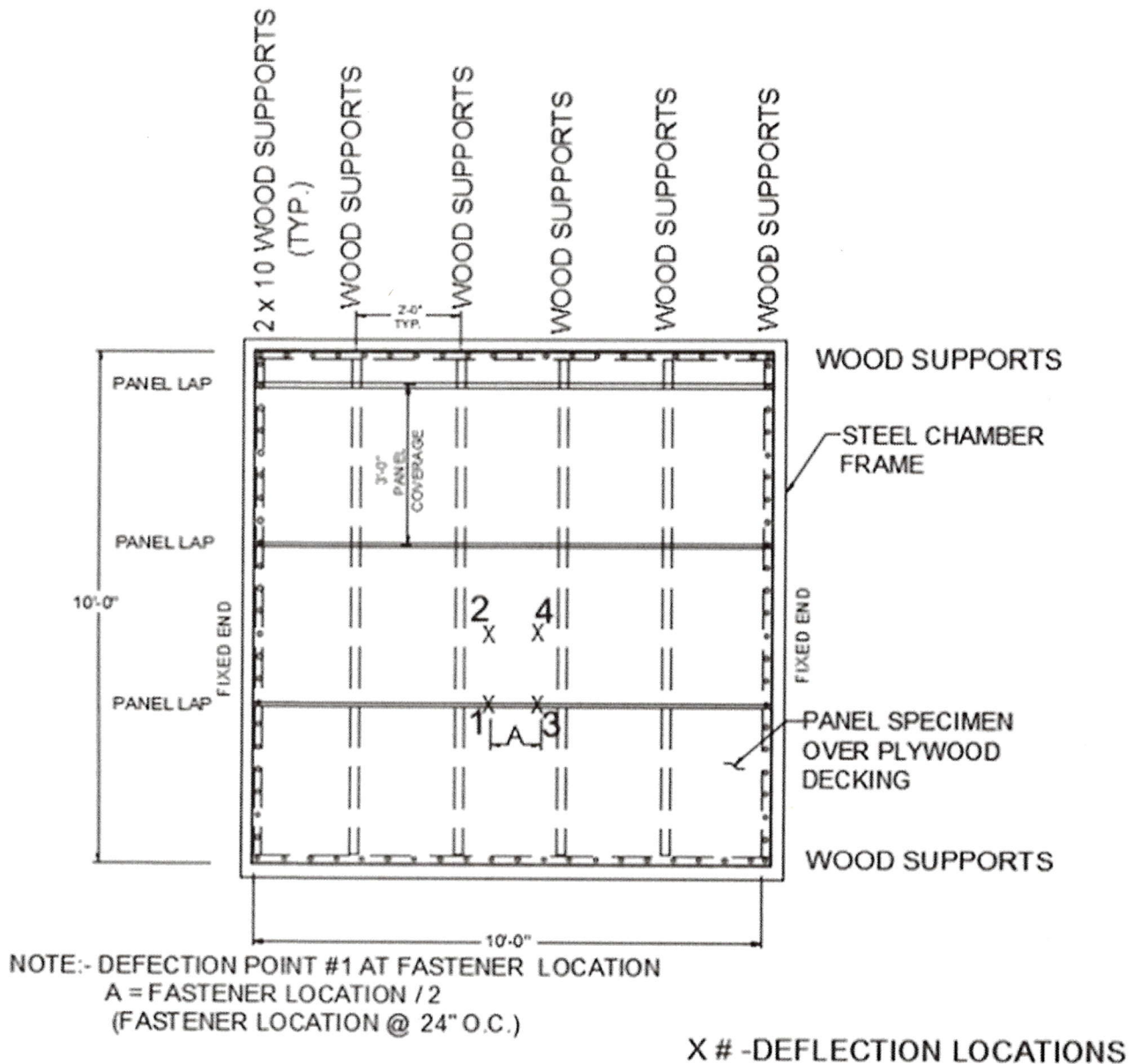
Total Uplift Pressure (psf)	Time Duration (min.)	#1 (in)	#2 (in)	#3 (in)	#4 (in)
112	1	4-1/4	3-13/16	3-7/8	7
127	1	4-3/16	3-3/4	3-7/8	6-15/16
142	1	4-3/16	3-11/16	3-7/8	6-3/4
157	1	4-1/8	3-5/8	3-11/16	6-1/4

Results:

Maximum Total Uplift Pressure (Held for 1 min.) = 167.9 psf

Max.Total Uplift Test Pressure at Failure=173.2 psf (Panel fasteners pulled out of plywood.)

TEST SET UP

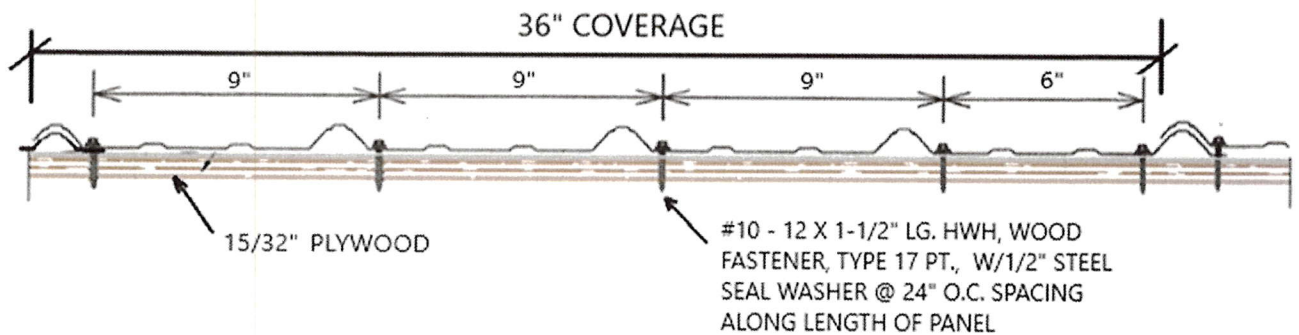
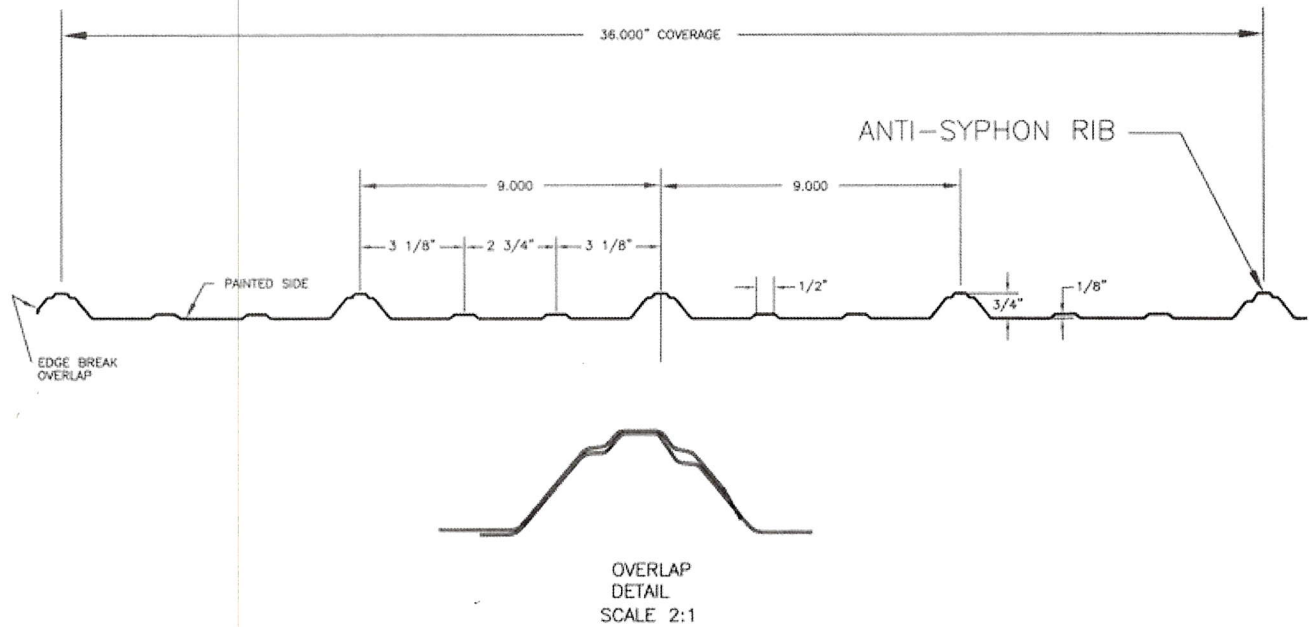


PLAN VIEW OF PANELS

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ELITE RIB PANEL

STRIP WIDTH = 40.875



FASTENER PATTERN 9/9/9/6 @ 24" O.C. ALONG LENGTH OF PANEL

Spectrochemical Laboratories-Material Evaluation, Inc.

155 Prominence Drive, New Kensington, PA. 15068

Phone: (724) 334-4140 Fax: (724) 334-4143

Date: 29-Jun-21

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Report of Tensile Testing

Client: Farabaugh Engineering & Testing (Ref PO #: Verbal - P. Farabaugh)

PIN #	Dimensions (in.) Width x Thickness	Area (sq. in.)	Yield Point (lb.)	Tensile Strength (lb.)	Yield Strength (psi.)	Tensile Strength (psi.)	Elongation (% in 2 in.)	Fracture Location
ELITE RIB PANEL	0.5009 x 0.0124	0.0062	672	707	108100	113800	0.5	U/4 (Out of GL.)

Test Method: Q2300.04 rev.14 (ASTM A370-20, E8-21, or E646-16: Yld. by 0.2% offset, Elong. after fracture)

Equipment Used: Instron 5900R60HVL (s/n: 1602) w/ Extensometer (s/n: E93054)

Performed By: T. Ault

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Please send your comments and concerns to us at feedback@spectrochemicalinc.com

For more information call: 724-334-4140

Respectfully submitted,



Todd A. Ault

Laboratory Manager