Farabaugh Engineering and Testing Inc.

Project No. T108-21

Report Date: January 27, 2021

No. Pages: 8 (inclusive)

UL 580 UPLIFT RESISTANCE TESTING

CMP SERIES NAIL STRIP ROOF PANEL
16" WIDE X 0.032" ALUMINUM

FOR

CONSTRUCTION METAL PRODUCTS INC..
2204 WEST FRONT STREET
STATESVILLE, NC. 28677

3/5/25

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Purpose

This test method covers the evaluation of uplift resistance of roof assemblies per UL 580-06, rev. 2009 and as provided herein.

Test Specimen

Manufacturer: Construction Metal Products Inc.
2204 West Front Street.
Statesville, NC. 28677

Specimen: Series Nail Strip Metal Roof Panel, 16" wide X 0.032" aluminum

Substrate: 15/32" plywood

Test Completion Date

January 11, 2021

Testing Apparatus

Test Chamber: The test chamber consisted 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 degree 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 degree 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.

Installation

- The 15/32” APA Plywood sheathing was attached to 2 x 10 wood structural framing supports using 8d x 2-1/2” long ring shank nails. Wood supports were located at 2’-0” o.c. The nail pattern was 6" o.c. in the field and 6" o.c. around the perimeter.

- The metal roof panels were attached to the wood deck substrate using #10 -13 x 1” long pancake head screws spaced at 18-1/2” o.c. for Test #1 and 4-1/2” o.c. for Test #2 along the length of the panel as shown on attached drawings. The outer perimeter of the assembly was secured with perimeter fastening as required to maintain a periphery seal.

- 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 per UL 580 as shown in the attached table.

- Upon completion of each 60 minute oscillation phase and at the conclusion of each class level, the assembly was examined and observations recorded.

- Vertical movement of the assembly during the tests was recorded.

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TEST #1
UL 580 UPLIFT TEST

Test Specimen: Series Nail Strip Metal Roof Panel, 16” wide x 0.032”aluminum

Fastener Spacing: 18-1/2”o.c. along length of panel

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	5	8	5	5-5/16
1	5	16.2	0	4-7/8	7-1/2	4-15/16	4-5/8
2	5	16.2	13.8	4-3/4	6-15/16	4-13/16	4-5/16
3	60	8.1 – 27.7*	13.8	4-5/8	6-13/16	4-3/4	4-1/8
4	5	24.2	0	4-3/4	6-15/16	4-3/4	4-1/4
5	5	24.2	20.8	4-9/16	6-11/16	4-5/8	4

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	4-5/8	6-3/4	4-11/16	4-1/8

* Oscillation frequency as specified in UL 580.

Results:

Maximum Total Uplift Pressure (Held for 1 min.) = 53.5 psf

While heading to the Phase 2 of the Class 60, the panel seam disengaged at 59.8 psf.

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TEST #2
UL 580 UPLIFT TEST

Test Specimen: Series Nail Strip Metal Roof Panel, 16” wide x 0.032”aluminum

Fastener Spacing: 4-1/2”o.c. along length of panel

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	8	6-5/16	5-9/16	6-5/8
1	5	16.2	0	8	5-11/16	5-9/16	5-15/16
2	5	16.2	13.8	7-7/8	5-3/8	5-7/16	5-5/8
3	60	8.1 – 27.7*	13.8	7-3/4	5-1/8	5-3/8	5-7/16
4	5	24.2	0	7-7/8	5-5/16	5-5/16	5-5/8
5	5	24.2	20.8	7-3/4	5-1/16	5-5/16	5-3/8

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	7-3/4	5-1/8	5-3/8	5-9/16
2	5	32.3	27.7	7-5/8	4-7/8	5-1/4	5-1/8
3	60	16.2 – 55.4*	27.7	7-1/2	4-7/16	5-1/16	4-11/16

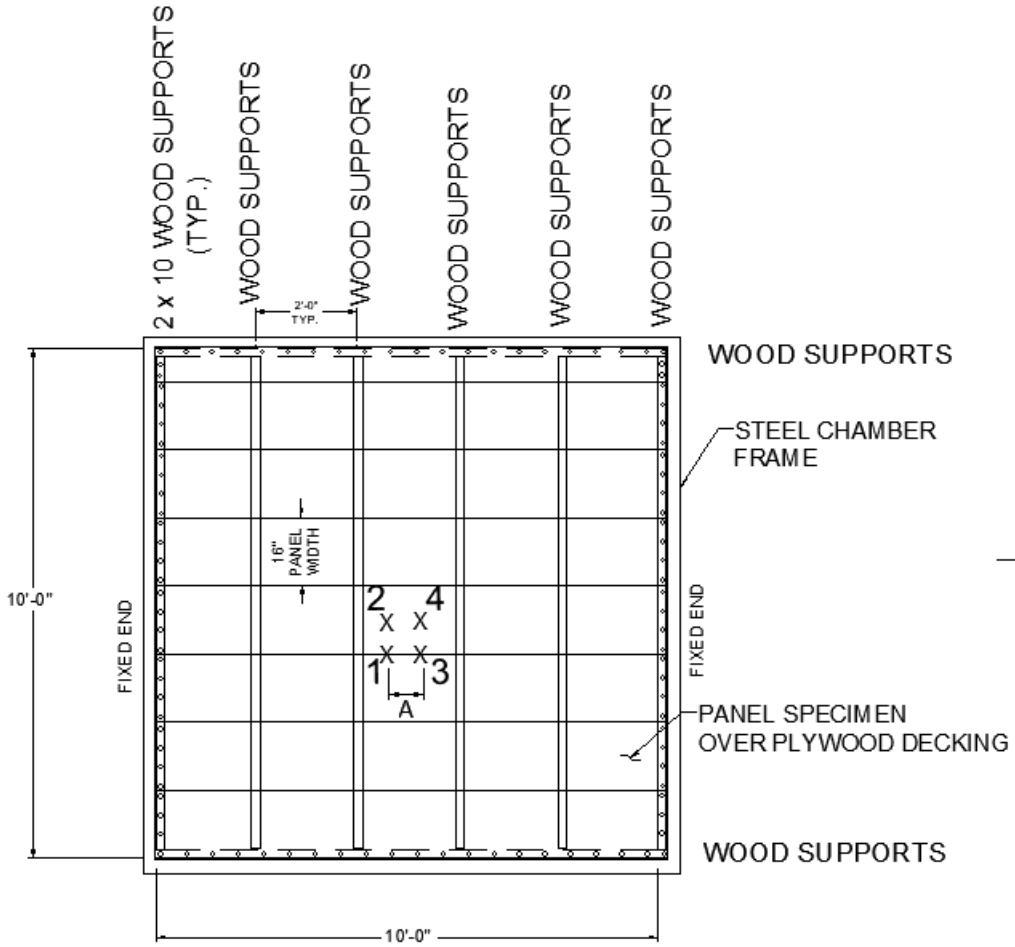
* Oscillation frequency as specified in UL 580.

<u>Results:</u>

Maximum Total Uplift Pressure (Held for 1 min.) = 83.2 psf

While performing the cycling testing at the Phase 3 of the Class 60, the panel seam disengaged at 83.2 psf.

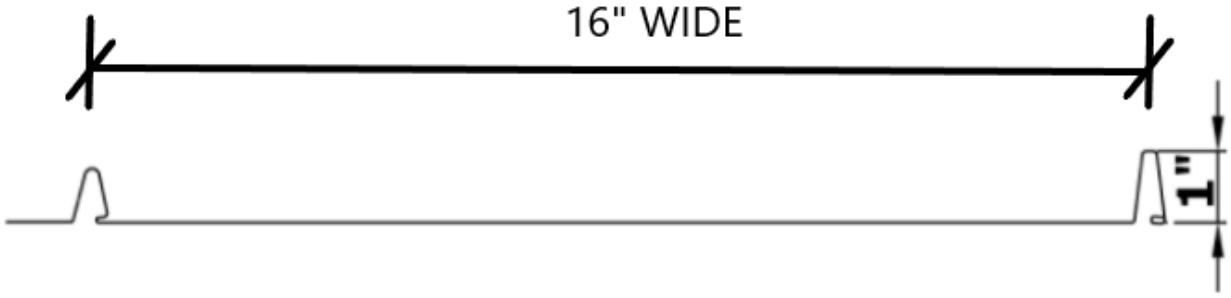
TEST SET UP



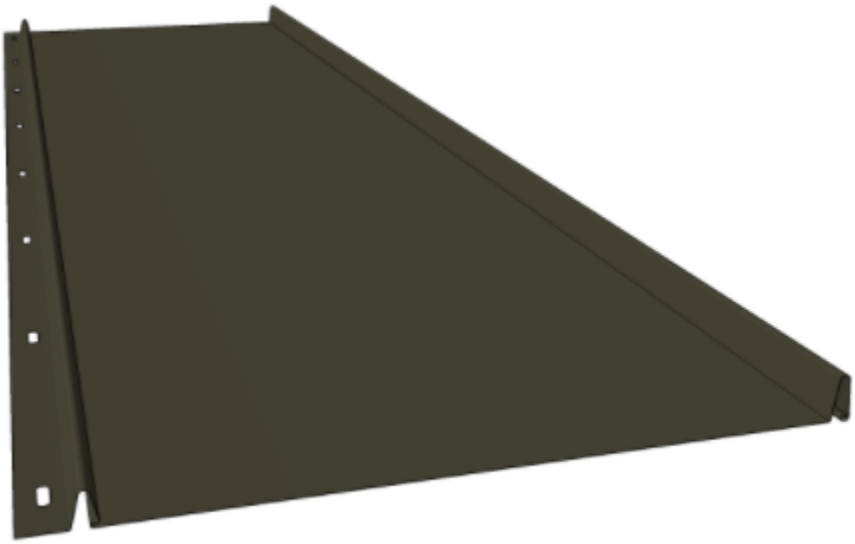
NOTE:- DEFECTION POINT #1 AT FASTENER LOCATION
A = FASTENER LOCATION / 2

X# - DEFLECTION LOCATION

PLAN VIEW OF PANELS



CMP NAIL STRIP PANEL



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TENSILE TEST REPORT

Client: Construction Metal Products Inc.
2204 West Front Street.
Statesville, NC. 28677

Test Date: January 27, 2021

Test Method: ASTM B557-10

Material Description:
Series Nail Strip Metal Roof Panel, 16” wide x 0.032” aluminum

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)
21008	0.499	0.030	325.9	380.5	21,771	25,417	10.6

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