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

BOX RIB – 3 PANEL
12” WIDE X 0.032” ALUMINUM

FOR

PETERSEN ALUMINUM CORP.
10551 PAC RD.
TYLER, TX 75707

Prepared by:

Paul G. Farabaugh

Approved by:

Daniel G. Farabaugh, P.E.
255 Saunders Station Rd.
 Trafford, PA 15085
(412) 373-9238
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 Dates

4/9/20  Test #1 – 5 spans @ 5’
4/22/20  Test #2 – 12 spans @ 2’

Test Specimen

Manufacturer:  Petersen Aluminum Corp.
               10551 PAC Rd.
               Tyler, TX  75707

Specimen:  Box Rib – 3 Panel, 12” wide (Coverage), 0.032” aluminum (w/ Clip Leg)

Panel Clip:  One Piece Stainless Steel Clip – 2-1/2” Long X 0.034” Thick

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.
Project No. T210-20

Installation

- The panels were installed on to 16 ga supports with #14-13 X 1-1/2” long DP1 Concealor self drill fasteners (2 fasteners per clip). The panel sidejoints were a interlocking sliding seam. The panel fixed ends used the same fasteners in the low cells of the panel into the 16 ga. supports.

- 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.

- Plastic (4 mil thick) was employed loosely between the panels and subgirts and in the side joints to create a vacuum seal.

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 Date:** 4-9-20

**Test Specimen:** Box Rib – 3 Panel, 12” wide (Coverage), 0.032” aluminum (w/ Clip Leg)

**Support Spacing:** 5’ o/c

### NEGATIVE (UPLIFT) TEST PRESSURE

<table>
<thead>
<tr>
<th>LOAD (PSF)</th>
<th>D-1</th>
<th>D-2</th>
<th>D-3</th>
<th>D-4</th>
<th>D-5</th>
<th>D-6</th>
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<tbody>
<tr>
<td>0.0</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
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<tr>
<td>10.4</td>
<td>0.207</td>
<td>0.463</td>
<td>0.213</td>
<td>0.456</td>
<td>0.167</td>
<td>0.456</td>
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<tr>
<td>20.8</td>
<td>0.532</td>
<td>1.057</td>
<td>0.528</td>
<td>1.040</td>
<td>0.410</td>
<td>1.022</td>
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<td>31.2</td>
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<td>0.821</td>
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<td>0.655</td>
<td>1.540</td>
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<tr>
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<td>1.982</td>
<td>0.838</td>
<td>1.963</td>
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<tr>
<td>52.0</td>
<td>1.266</td>
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<td>2.391</td>
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<td>2.357</td>
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<td>62.4</td>
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<td>2.703</td>
<td>1.118</td>
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### RESULTS:

Load held for 1 minute = 78.0 psf

Maximum Test Load = 80.6 psf  (Panel disengaged from clip.)
DEFLECTION POINT 3

DEFLECTION POINT 4
TEST #2

Test Date: 4-22-20

Test Specimen: Box Rib – 3 Panel, 12” wide (Coverage), 0.032” aluminum (w/ Clip Leg)

Support Spacing: 2’ o/c

NEGATIVE (UPLIFT) TEST PRESSURE

<table>
<thead>
<tr>
<th>LOAD (PSF)</th>
<th>D-1</th>
<th>D-2</th>
<th>D-3</th>
<th>D-4</th>
<th>D-5</th>
<th>D-6</th>
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<td>0.0</td>
<td>0.000</td>
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<td>0.036</td>
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<td>0.024</td>
<td>0.154</td>
<td>0.025</td>
<td>0.155</td>
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<td>0.0</td>
<td>0.008</td>
<td>0.015</td>
<td>0.003</td>
<td>0.008</td>
<td>0.002</td>
<td>0.014</td>
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<tr>
<td>15.6</td>
<td>0.133</td>
<td>0.518</td>
<td>0.102</td>
<td>0.474</td>
<td>0.098</td>
<td>0.491</td>
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<td>0.014</td>
<td>0.029</td>
<td>0.009</td>
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<td>0.026</td>
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<td>31.2</td>
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<td>0.964</td>
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<td>0.701</td>
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<td>2.861</td>
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<tr>
<td>0.0</td>
<td>0.602</td>
<td>1.133</td>
<td>0.513</td>
<td>1.103</td>
<td>0.495</td>
<td>1.172</td>
</tr>
<tr>
<td>109.3</td>
<td>1.218</td>
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<td>1.109</td>
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<tr>
<td>124.9</td>
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<td>3.147</td>
<td>1.133</td>
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<td>1.078</td>
<td>3.075</td>
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<tr>
<td>0.0</td>
<td>0.801</td>
<td>1.611</td>
<td>0.663</td>
<td>1.619</td>
<td>0.670</td>
<td>1.645</td>
</tr>
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</table>

RESULTS:

Load held for 1 minute = 150.8 psf

Maximum Test Load = 156 psf (Panel disengaged from clip)
Deflection Point 1

Deflection (in) vs Pressure (PSF)

Deflection Point 2

Deflection (in) vs Pressure (PSF)
TEST #1

PLAN VIEW

12'

DEFORMATION POINT

FIXED END
SUPPORTS (TYP.)
INTERIOR SUPPORT
INTERIOR SUPPORT
INTERIOR SUPPORT
CHAMBER FRAME
INTERIOR SUPPORT
FIXED END
TEST #2

PLAN VIEW

DEFLECTION POINT
DETAIL 1
INBOARD SIDE

CLIP DETAIL

LAP DETAIL

INBOARD DETAIL

APPROVED

APPROVED AS NOTED

DATE

TOLERANCE STANDARDS FOR THickest METAL:

*ACUMULATION - (+ or -) 1/16 in

DEPTIl - (+ or -) 1/32 in

RADII - (+ or -) 1/32 in

ANGLES - (+ or -) 2 degrees

CAMBER - 1/8 in in 10 ft

SKE - 1/8 in in 10 ft

DIVE - 1/8 in in 10 ft

ALL DIMENSIONS ARE BOTTOM OF SHEET INTERCEPTS (U.O.N.)

ALL FORMING RADII ARE 0.125 UNLESS OTHERWISE NOTED

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A. S. C. MACHINE TOOLS, INC.

SPOKANE, WASHINGTON

PETERSEN ALUMINUM CORP.

BOX RIB P3

1-7-18 PR27660 TP-2936
Project No. T210-20

PANEL CLIP
TENSILE TEST REPORT

Client: Petersen Aluminum Corp.
10551 PAC Rd.
Tyler, TX 75707

Test Date: March, 31, 2020

Test Method: ASTM B557-10 aluminum

Material Description:
Box Rib – 3 Panel, 12” wide (Coverage), 0.032” aluminum w/clip leg

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Width (in)</th>
<th>Thickness (in)</th>
<th>Yield Load (lb)</th>
<th>Max. Load (lb)</th>
<th>0.2% Offset Yield Strength (psi)</th>
<th>Tensile Strength (psi)</th>
<th>Elongation (% in 2 inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20058 Aluminum w/clip leg</td>
<td>0.501</td>
<td>0.030</td>
<td>351.70</td>
<td>393.46</td>
<td>23,400</td>
<td>26,179</td>
<td>10.2</td>
</tr>
</tbody>
</table>

Equipment Used: Tensile Machine #QT7-061196-020
Caliper #14682489
Extensometer #10311744D
Micrometer #52-222-001