Project No. T270-15

Report Date: September 30, 2015

Total Pages (inclusive): 19

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

HWP SERIES PANEL
HWP-12B WALL PANEL

FOR

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

Report Prepared By:

Paul G. Farabaugh

Reviewed and Approved By:

Daniel G. Farabaugh
Project No. T270-15

ASTM E1592-01
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 Date

9/16/15 Test #1 - 9 spans @ 1'-4" o.c.
9/22/15 Test #2 - 3 spans @ 4'-0" o.c

Test Specimen

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

Panel: HWP-12B Wall Panel, 12" (nominal) Panel Width, 24 Ga. Steel
Panel Clip 20 ga. x 2.5" wide clip.

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.
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Installation

- The panels were installed on to 16 ga supports with the negative pressure clips using #14 - 13 x 1-1/2" long self drill, flat head, Concealer fasteners (2 fasteners per clip). Continuity fasteners were located at the top of the sidelap joints at panel ends.

- 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-1592-01 and as noted herein. In our opinion the tape and plastic had no influence on the results of the test.
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TEST #1

Specimen: HWP-12B Wall Panel, 12”(nominal) Panel Width, 24 Ga. Steel

Clip Spacing: 1'- 4" 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>
<th>D-7</th>
<th>D-8</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>11.8</td>
<td>0.017</td>
<td>0.05</td>
<td>0.012</td>
<td>0.093</td>
<td>0.018</td>
<td>0.054</td>
<td>0.02</td>
<td>0.042</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.001</td>
<td>0.007</td>
<td>0.002</td>
<td>0.008</td>
<td>0</td>
<td>0.007</td>
<td>0.002</td>
<td>0.007</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>17.0</td>
<td>0.033</td>
<td>0.127</td>
<td>0.03</td>
<td>0.178</td>
<td>0.035</td>
<td>0.137</td>
<td>0.039</td>
<td>0.112</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.002</td>
<td>0.008</td>
<td>0.002</td>
<td>0.011</td>
<td>0.001</td>
<td>0.008</td>
<td>0.004</td>
<td>-0.033</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>22.2</td>
<td>0.049</td>
<td>0.208</td>
<td>0.051</td>
<td>0.263</td>
<td>0.052</td>
<td>0.226</td>
<td>0.056</td>
<td>0.189</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.002</td>
<td>0.014</td>
<td>0.002</td>
<td>0.018</td>
<td>0.002</td>
<td>0.014</td>
<td>0.005</td>
<td>-0.034</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>27.4</td>
<td>0.059</td>
<td>0.284</td>
<td>0.069</td>
<td>0.335</td>
<td>0.069</td>
<td>0.31</td>
<td>0.067</td>
<td>0.267</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.004</td>
<td>0.019</td>
<td>0.001</td>
<td>0.024</td>
<td>0.003</td>
<td>0.02</td>
<td>0.006</td>
<td>0.02</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>32.7</td>
<td>0.071</td>
<td>0.367</td>
<td>0.089</td>
<td>0.414</td>
<td>0.085</td>
<td>0.399</td>
<td>0.081</td>
<td>0.34</td>
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</tr>
<tr>
<td>1.4</td>
<td>0.005</td>
<td>0.024</td>
<td>0.001</td>
<td>0.029</td>
<td>0.006</td>
<td>0.026</td>
<td>0.008</td>
<td>-0.055</td>
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</tr>
<tr>
<td>43.1</td>
<td>0.094</td>
<td>0.517</td>
<td>0.129</td>
<td>0.554</td>
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<td>0.547</td>
<td>0.111</td>
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<td>0.034</td>
<td>0.002</td>
<td>0.044</td>
<td>0.01</td>
<td>0.039</td>
<td>0.012</td>
<td>-0.008</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>53.5</td>
<td>0.122</td>
<td>0.668</td>
<td>0.175</td>
<td>0.694</td>
<td>0.144</td>
<td>0.705</td>
<td>0.142</td>
<td>0.616</td>
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</tr>
<tr>
<td>1.4</td>
<td>0.013</td>
<td>0.052</td>
<td>0.003</td>
<td>0.068</td>
<td>0.018</td>
<td>0.067</td>
<td>0.019</td>
<td>-0.008</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>63.9</td>
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<td>0.828</td>
<td>0.227</td>
<td>0.841</td>
<td>0.185</td>
<td>0.863</td>
<td>0.183</td>
<td>0.761</td>
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</tr>
<tr>
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<td>0.069</td>
<td>0.02</td>
<td>0.107</td>
<td>0.029</td>
<td>0.078</td>
<td>0.03</td>
<td>0.028</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>74.3</td>
<td>0.199</td>
<td>0.994</td>
<td>0.289</td>
<td>1.006</td>
<td>0.238</td>
<td>1.036</td>
<td>0.228</td>
<td>0.919</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.033</td>
<td>0.111</td>
<td>0.036</td>
<td>0.153</td>
<td>0.047</td>
<td>0.117</td>
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<td>-0.047</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>84.7</td>
<td>0.261</td>
<td>1.186</td>
<td>0.375</td>
<td>1.218</td>
<td>0.304</td>
<td>1.182</td>
<td>0.283</td>
<td>1.077</td>
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</tr>
<tr>
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<td>0.071</td>
<td>0.206</td>
<td>0.068</td>
<td>0.29</td>
<td>0.086</td>
<td>0.24</td>
<td>0.074</td>
<td>0.204</td>
<td>PANEL WT.</td>
</tr>
</tbody>
</table>

RESULTS:

Maximum Test Load (held for 1 min.) = 89.9 psf * (No Failure)

Ultimate Test Load = 93.5 psf * (Panel Seam Disengagement)

* Includes panel dead load.
DEFLECTION POINT 7

DEFLECTION (IN)

PRESSURE (PSF)

DEFLECTION POINT 8

DEFLECTION (IN)

PRESSURE (PSF)
TEST #1

OPEN END

POINT OF MAX DEFLECTION

7" x 8"
1" x 2"
3" x 4"
5" x 6"

12" WIDE PANEL

16 GA. SUPPORT (TYP.)

DETAIL 1

WOOD CHAMBER FRAME

X# - DEFLECTION POINT

PLAN VIEW
TEST #2

Specimen: HWP-12B Wall Panel, 12" (nominal) Panel Width, 24 Ga. Steel

Clip Spacing: 4 ft 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>
<th>D-7</th>
<th>D-8</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>11.8</td>
<td>0.114</td>
<td>0.215</td>
<td>0.095</td>
<td>0.238</td>
<td>0.065</td>
<td>0.242</td>
<td>0.053</td>
<td>0.211</td>
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</tr>
<tr>
<td>1.4</td>
<td>0.002</td>
<td>0.002</td>
<td>0.005</td>
<td>0.01</td>
<td>0.003</td>
<td>0.011</td>
<td>0.002</td>
<td>0.011</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>17.0</td>
<td>0.184</td>
<td>0.275</td>
<td>0.153</td>
<td>0.366</td>
<td>0.111</td>
<td>0.371</td>
<td>0.088</td>
<td>0.331</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.005</td>
<td>0.008</td>
<td>0.012</td>
<td>0.026</td>
<td>0.009</td>
<td>0.031</td>
<td>0.007</td>
<td>0.025</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>22.2</td>
<td>0.271</td>
<td>0.332</td>
<td>0.223</td>
<td>0.508</td>
<td>0.178</td>
<td>0.521</td>
<td>0.127</td>
<td>0.453</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.016</td>
<td>0.025</td>
<td>0.022</td>
<td>0.048</td>
<td>0.018</td>
<td>0.054</td>
<td>0.014</td>
<td>0.045</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>27.4</td>
<td>0.387</td>
<td>0.445</td>
<td>0.305</td>
<td>0.656</td>
<td>0.261</td>
<td>0.664</td>
<td>0.172</td>
<td>0.587</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.047</td>
<td>0.057</td>
<td>0.047</td>
<td>0.085</td>
<td>0.049</td>
<td>0.094</td>
<td>0.024</td>
<td>0.078</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>32.7</td>
<td>0.487</td>
<td>0.551</td>
<td>0.389</td>
<td>0.797</td>
<td>0.355</td>
<td>0.816</td>
<td>0.219</td>
<td>0.703</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.083</td>
<td>0.103</td>
<td>0.083</td>
<td>0.129</td>
<td>0.1</td>
<td>0.146</td>
<td>0.038</td>
<td>0.113</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>43.1</td>
<td>0.716</td>
<td>0.86</td>
<td>0.552</td>
<td>1.093</td>
<td>0.497</td>
<td>1.097</td>
<td>0.32</td>
<td>0.966</td>
<td>PANEL WT.</td>
</tr>
<tr>
<td>1.4</td>
<td>0.172</td>
<td>0.205</td>
<td>0.14</td>
<td>0.209</td>
<td>0.175</td>
<td>0.239</td>
<td>0.067</td>
<td>0.189</td>
<td>PANEL WT.</td>
</tr>
</tbody>
</table>

RESULTS:

Maximum Test Load (held for 1 min.) = 48.3 psf * (No Failure)

Ultimate Test Load (failure) = 50.1 psf * (Panel Seam disengagement)

* Includes panel dead load.
DEFLECTION POINT 3

DEFLECTION (IN)

PRESSURE (PSF)

DEFLECTION POINT 4

DEFLECTION (IN)

PRESSURE (PSF)
TEST #2

PLAN VIEW
DETAIL 1
CUSTOMER APPROVAL:
My signature on this print indicates approval of all the information shown (or as amended hereon) and that items made to these specifications will be accepted.

NAME: [Signature]

DATE: [Date]

Isometric view
Scale: 1:1

Detail A
Scale: 3:1

Material:

[90] Galy
Commercial Quality

SFS-MAC-1

Reference:

Section cut B-B
Scale: 3:1
TENSILE TEST REPORT

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

Test Date: 9-30-15

Test Method: ASTM A370-10

Material Description: HWP-12B Wall Panel, 12"(nominal) Panel Width, 24 Ga. Steel

<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>0094-15</td>
<td>0.502</td>
<td>0.023</td>
<td>646.3</td>
<td>750.5</td>
<td>55,978</td>
<td>65,001</td>
<td>25.0</td>
</tr>
</tbody>
</table>

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