Project No. T161-19

Report Date: April 11, 2019

No. Pages: 8 (inclusive)

ASTM E-1680 AIR LEAKAGE TEST
ASTM E-1646 WATER PENETRATION TEST

ON

T-PANEL - METAL ROOF PANEL
16" WIDE X 24 GA. STEEL
WITH INTERMITTENT CLIPS

FOR

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

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Project No. T161-19

AIR LEAKAGE AND WATER PENETRATION TESTING

Purpose

The purpose of this test is to establish air and water infiltration rates on the Petersen Aluminum Roof Panel System.

Test Date

4/10/19

Test Specimen

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

Panel: T-PANEL - Metal Roof Panel, 16” wide x 24 ga. steel with 24 ga. steel cap

Intermittent Clip: 6" wide x 16 ga. galvanized steel clip

Testing Apparatus

A vacuum test chamber was used with static pressure taps. A controlled blower provided uniform pressure to the specimen mock-up. Calibrated manometers were used to measure the pressure at each pressure tap.

Installation

- The panels were installed on to 16 ga supports with using (2) #14-13 X 1-1/2” long, DP1, Concealer, self-drill fasteners per intermittent clips at supports. The panel sidejoints used a 24 ga. seam cap and were seamed with a mechanical seamer. The seam cap used 2 beads of factory sealant, one bead on each side of cap corners. The panel ends were fastened with (3) 1/4-14 x 1-1/2 long, self-drill, hex head fasteners with washer. The panels were attached and sealed to the perimeter frame. Test was done with panels in horizontal position (no slope).
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Theory of Procedure

The tests were conducted in accordance with ASTM E-1680-11 “Rate of Air Leakage Through Exterior Metal Roof Panel System”, and ASTM E-1646-95, “Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference” and as provided here-in.

Air Leakage Test Procedure

The test procedure is as per ASTM 1680-11 and as provided herein.

The intermediate support was traversed 3/4” in both directions (from initial location) and returned to initial location. This was done twice for a total of 2 cycles.

A positive preload pressure of 15 psf was applied for 10 seconds. Panels were allowed to recover for a period of 2 minutes. A negative preload pressure of 15 psf was applied for 10 seconds. Panels were allowed to recover for a period of 2 minutes. The positive and negative preload cycle was repeated two additional times for a total of 3 cycles.

Air infiltration rates only were determined at the specified test pressures.

Water Penetration Test Procedure

The test procedure is as per ASTM 1646-95 and as provided herein.

The intermediate support was traversed 3/4” in both directions (from initial location) and returned to initial location. This was done twice for a total of 2 cycles.

Due to the panels being preloaded during the Air Leakage Test, no additional preload was performed for the Water Penetration Test.

Overflow devices were attached to provide a minimum of ½” of water ponding during the test.

A calibrated water spray and uniform pressure loads were applied at the specified rates.
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Ambient Temp. = 60 deg.F  
Barometric Pressure = 29.91” Hg

ASTM E1680  
AIR LEAKAGE TEST

POSITIVE PRESSURE  
(INFILTRATION)

<table>
<thead>
<tr>
<th>STATIC PRESSURE DIFFERENTIAL (PSF)</th>
<th>AIR LEAKAGE RATE (CFM/SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>+6.24</td>
<td>0.017</td>
</tr>
<tr>
<td>+15.0</td>
<td>0.022</td>
</tr>
</tbody>
</table>

NEGATIVE PRESSURE  
(EXFILTRATION)

<table>
<thead>
<tr>
<th>STATIC PRESSURE DIFFERENTIAL (PSF)</th>
<th>AIR LEAKAGE RATE (CFM/SF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>+6.24</td>
<td>0.020</td>
</tr>
<tr>
<td>+15.0</td>
<td>0.030</td>
</tr>
</tbody>
</table>

Results:

As a result of the test pressures, the test specimen exhibited air leakage rates as shown on the above table.
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ASTM E-1646
WATER PENETRATION TEST

Panel Surface Temperature Prior To Test: 57 deg. F
Panel Surface Temperature During Test: 53 deg. F

POSITIVE PRESSURE
(INFILTRATION)

<table>
<thead>
<tr>
<th>STATIC PRESSURE DIFFERENTIAL (PSF)</th>
<th>WATER SPRAY RATE (GAL/HR/SF)</th>
<th>TEST DURATION (MIN)</th>
<th>WATER INFILTRATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>+15.0</td>
<td>5</td>
<td>15</td>
<td>None</td>
</tr>
<tr>
<td>+20.0</td>
<td>5</td>
<td>15</td>
<td>None</td>
</tr>
<tr>
<td>+30.0</td>
<td>5</td>
<td>15</td>
<td>None</td>
</tr>
</tbody>
</table>

Results:

As a result of the test pressures, the test specimen exhibited no water penetration as shown on the above table.
TEST SET-UP

INTERMEDIATE SUPPORT

3'-9"

5'-0"

9'-0"

PLAN VIEW

PANEL SPECIMEN

PANEL SIDEJOINT (TYP.)

CHAMBER FRAME