TAS 100(A)-95 TEST REPORT

Rendered to:

SUNMODO CORPORATION

SERIES/MODEL: TopTile Mount
TYPE: Solar Panel Roof Attachment

This report contains in its entirety:

- Cover Page: 1 Page
- Report Body: 5 Pages
- Photographs: 2 Pages
- Drawings: 6 Pages

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Test Date: 7/25/18
And: 7/26/18
Report Date: 8/17/18
Revision 1: 8/22/18
Expiration Date: 7/26/28
Miami-Dade County Notification No.: ATI 18031
Series/Model: TopTile Mount

Project Summary: Intertek B&C was contracted by SunModo Corporation to conduct wind driven rain testing per Florida Building Code Test Protocols for the High Velocity Hurricane Zone (HVHZ) – Testing Application Standard TAS 100(A)-95 on TopTile Mount solar panel roof attachment. All test data, photos, and results are included herein. The sample was provided by the client.

Test Specification: All tests were performed in accordance with the referenced specification, unless stated otherwise.

TAS 100(A)-95, Test Procedure for Wind and Wind Driven Rain Resistance and/or Increased Windspeed Resistance of Soffit Ventilation Strip and Continuous or Intermittent Ventilation System Installed at the Ridge Area.

Test Specimen Description:

**Roof Deck Description:** An 8' 0" wide by 6' 0" long roof deck with 2:12 slope was utilized. The roof deck consisted of #2 Spruce-Pine-Fir nominal 2x6 rafters sheathed with 15/32" plywood. The rafters were spaced 24" on center. The plywood was secured to the rafters with 1-5/8" drywall screws spaced 6" on center around the perimeter and 12" on center at the intermediate supports. The plywood sheathing was covered with self-stick ice and water shield underlayment only.

**TopTile Mount Installation:** The test specimens consisted of an aluminum flashing and an aluminum stanchion. The aluminum flashing consisted of 0.030" thick aluminum flashing with an EPDM boot. The boot utilized a 1-3/8" diameter hole with washer for the stanchion. The stanchion was constructed from 1-3/8" diameter by 7" long aluminum. The stanchion was secured to the roof deck, centered over a stud, with an integral 1/4" x 2-1/8" lag screw with washer. The washer consisted of a 1-5/16" diameter by 0.13" thick sealing washer on the underside and a 1-5/16" diameter by 1/16" thick steel washer on the topside. The stanchion was additionally secured to the roof deck with three #14 x 7" wood screws placed in the pre-drilled holes in the stanchion. The assembly was installed per the manufacturer's installation instructions. Two replicates were installed to the roof deck.

A 2x4 spacer box was utilized to simulate the change in height when installed over battens and tiles.
**Test Results**: The following results have been recorded:

**Protocol TAS 100(A)-95 Wind Driven Rain**

**Test Procedure**: The wind speed intervals were conducted as follows:

<table>
<thead>
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<th>Interval No.</th>
<th>Wind Speed (mph)</th>
<th>Time (min)</th>
<th>Water Spray</th>
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<tr>
<td>1</td>
<td>35</td>
<td>15</td>
<td>On</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>5</td>
<td>Off</td>
</tr>
<tr>
<td>3</td>
<td>70</td>
<td>15</td>
<td>On</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>5</td>
<td>Off</td>
</tr>
<tr>
<td>5</td>
<td>90</td>
<td>15</td>
<td>On</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>5</td>
<td>Off</td>
</tr>
<tr>
<td>7</td>
<td>110</td>
<td>5</td>
<td>On</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>5</td>
<td>Off</td>
</tr>
</tbody>
</table>

**Wind Speed** | **Results** | **Allowed** |
---|---|---|
35 mph | No leakage | . |
70 mph | No leakage | . |
90 mph | No leakage | . |
110 mph | No leakage | . |
| | No leakage | 14.30 fl-oz |

**Results**: Pass

**Official Observers**: The following representatives witnessed all or part of the testing.

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
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</thead>
<tbody>
<tr>
<td>Eric M. Brennan</td>
<td>Intertek B&amp;C</td>
</tr>
<tr>
<td>Tyler J. Holland</td>
<td>Intertek B&amp;C</td>
</tr>
<tr>
<td>Joseph A. Reed, P.E.</td>
<td>Intertek B&amp;C</td>
</tr>
<tr>
<td>Kyle W. Ruth</td>
<td>Intertek B&amp;C</td>
</tr>
</tbody>
</table>
Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Intertek B&C for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire.

Results obtained are tested values and were secured by using the designated test methods. No conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen can be made. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Intertek B&C.

Digitally Signed by: Kyle Ruth
Kyle W. Ruth
Technician – Product Testing

Digitally Signed by: Joseph A. Reed
Joseph A. Reed, P.E.
Senior Director

Attachments (pages): This report is complete only when all attachments listed are included.
- Appendix A: Photographs (2)
- Appendix B: Drawings (6)
## Revision Log

<table>
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<td>1</td>
<td>8/22/18</td>
<td>Drawings</td>
<td>Added drawing K10207-1XX and installation manual</td>
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This report produced from controlled document ATI 00173, revised 03/06/07.
Appendix A

Photographs

Photo No. 1
Test Specimens

Photo No. 2
Underneath of Test Deck Before Testing
Photo No. 3
TopTile Mount Installation

Photo No. 4
Underneath of Test Deck After Testing
Appendix B

Drawing
General Specifications

Material

Dimensions in inches [millimeters]

Tolerances

X.XXX ± 0.01 [0.25mm]
X.XX ± 0.02 [0.50mm]
X.X ± 0.039 [1.0mm]

Unless otherwise spec'd

CHECKED BY

APPROVALS

REV

DESCRIPTION

DATE

APPROVED

A

INITIAL RELEASE

04/19/17

LWF

Kit with Wood Screws

K10207-105

K10207-005

K10210-005

B15058-005 (5")

K10207-107

K10207-007

K10210-007

B15058-007 (7")

QTY

Part Number

Item

Kit Number

Description

Revision History

Zone

Rev

Description

Date

Approved

- A

Initial Release

04/19/17

LWF

Report #: I6899.03

Date: 8/22/18

Verified by: [Signature]

SEE BOM

Sunmodo Corp.

14800 NE 65TH STREET, VANCOUVER WA 98682

LWF

04/19/17

K10207-1XX

Scale: None

Sheet 1 of 1

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SunModo PV Rack Mounting System

UL2703 Compliant
Deck Stanchion Selection Diagram:

1. CORRECT tripod hole position:
   Tripod holes are above the tile and below the collar of the EPDM Cover.

   Note: Repositioning the Tripod Stanchion higher or lower along the tile will increase or decrease the position of the tripod holes.

2. Acceptable tripod hole position:
   Tripod holes are above the tile, yet above the collar of the EPDM Cover. Addition Great Stuff FireBlock spray foam can be used to prevent water infiltration.

3. INCORRECT tripod hole position:
   Tripod holes are below the curve tile profile and the collar of the EPDM Cover will not seal against the flats of the stanchion. The TopTile Mount side screws cannot be installed without disassembling the curved tile roof.
Spacer Assembly:

To remove Washer and EPDM Gasket, unscrew along the length of the screw.

Install Spacer

Screw on Washer and EPDM Gasket to hold Spacer in place.
Installation Instructions:

Step 1: Drill
1. Locate and mark the desired location of the TopTile Mount.
2. Using a hand drill guide and a 1-1/2” tile hole saw, drill a hole into the tile.
3. If installing the Rafter Mounting System: Drill 5/32” pilot hole into the rafter in accordance with the NDS guidelines. It is important that the pilot hole is centered about the hole in the tile.

Step 2: Clean
4. Remove tile dust from around the hole in the tile and underlayment.

Step 3: Install
5. If installing the Rafter Mounting System: Screw the Stanchion into the 5/32” pilot hole. Torque to 20 ft-lbs.
6. If installing the Tripod Mounting System: Screw the Stanchion into the deck of the roof. Torque to 7.5 ft-lbs.

Step 4: Waterproof (Materials not provided)
7. If installing the Rafter Mounting System: Use the straw nozzle and place a bead of Great Stuff FireBlock around the Stanchion and hole in the tile.
8. If installing the Tripod Mounting System: Insert the straw nozzle into the three holes on the side of the Stanchion and slowly spray Great Stuff FireBlock onto the roof deck for 2-4 seconds. Also spray around the Stanchion and the hole in the tile.
   Wait 5-10 minutes before proceeding to allow Great Stuff FireBlock spray foam to setup.
Step 5: Wood Screws
9. Install the three Wood Screws into the Stanchion.
10. Note: Due to the side driving force of installing the screw into the side of the Stanchion, care should be taken to keep the Stanchion plum.

Step 6: Flashing (Materials not provided)
11. Apply a bead of structural sealant, ChemLink M1 or equivalent, in the shape of an upside down U on the backside of the flashing and install flashing over Stanchion and under the edge of the tile located above.
12. For curved tiled roofs hand form flashing to tile contour.

Step 7: L-Foot Assembly
13. Attach an L-Foot to the Stanchion using the 3/8" Bolt provided. Torque to 15ft-lbs.

Step 8: Rail Assembly

Note:
For concrete deck mounting guidelines refer to SunModo document D10091 and the anchor manufacturer’s installation procedure.