

**ASTM E 108 BURNING BRAND TEST REPORT**

**Report No.:** B7439.01-121-24

**Rendered to:**

Solatube International, Inc.  
2210 Oak Ridge Way  
Vista, California 92081

**PRODUCT TYPE:** Tubular Daylight Device

**SERIES/MODEL:** 330-DS

**SERIES/MODEL:** 750-DS

**SPECIFICATION:** ASTM E 108-07a, *Standard Test Methods for Fire Tests of Roof Coverings*.

<b>ASTM E108 Burning Brand Summary of Test Results</b>				
<b>Sample #</b>	<b>Roof Covering Description</b>	<b>Type of Test</b>	<b>Target Classification</b>	<b>Results</b>
Sample #1 330-DS	Non-combustible deck with 330-DS Tubular Daylight Device (see descriptions)	Burning Brand	Class B brands continuously for 1 hour	Pass
Sample #2 750-DS	Non-combustible deck with 750-DS Tubular Daylight Device (see descriptions)	Burning Brand	Class B brands continuously for 1 hour	Pass

**Test Completion Date:** 03/06/2012

**This report contains in its entirety:**

**Cover Page:** 1 page  
**Report Body:** 7 pages  
**Test Equipment:** 1 page  
**Photographs:** 8 pages  
**Drawings:** 2 pages

Reference must be made to Report No. B7439.01-121-24, dated 03/13/2012 for complete test specimen description and detailed test results.

**1.0 Report Issued To:** Solatube International, Inc.  
2210 Oak Ridge Way  
Vista, California 92081

**2.0 Test Laboratory:** Architectural Testing, Inc.  
130 Derry Court  
York, Pennsylvania 17406  
717-764-7700

**3.0 Project Summary:**

**3.1 Introduction:** This fire test standard aims to measure relative fire characteristics of roof coverings under simulated fire scenarios which originate outside the building. Under controlled laboratory conditions, the behavioral response of materials, products or assemblies as affected by heat and flame are described. The performances of the roof covering systems are described only under specific conditions. Information is not provided by these tests that are applicable to any scenarios other than the specific conditions experienced during testing. Information is not provided by these tests that are applicable to actual fire situations because of the inherent differences between the classes as it pertains to fire source and fire application; no comparison between the classes exist. Results from tests are applicable to the specifics of the test and the aspect in which the tests were conducted, and are not applicable to similar materials or the results of those materials when used in concert with other materials.

**3.2 Product Type:** Tubular Daylight Device

**3.2.1 Series/Model:** 330-DS

**3.2.2 Series/Model:** 750-DS

**3.3 Compliance Statement:** Results obtained are tested values and were secured by using the designated test method(s). 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 specimens tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

**3.4 Test Date:** 03/06/2012

**3.5 Test Sample Source:** The parts for all specimens were selected by Keystone Certifications, Inc. personnel. The specimens were selected and permanently labeled on February 21, 2012 and initialed by "RLS." Representative samples of the test specimen(s) will be retained by Architectural Testing for a minimum of four years from the test completion date.

**3.6 Test Procedure:** The ambient room temperature was between 50°F and 90°F as required by the ASTM E 108 standard. Samples and burning brands were exposed to a 12 mph wind for the duration of each test.

**Burning Brand:** A fire brand was constructed of nominal 1" by 1" by 6" strips of Douglas Fir forming a grid of approximately 6" square and 2-1/4" thick. The brand was placed and allowed to burn until all evidence of flame, glow and smoke had disappeared from the brand. At that time a second brand was placed at the same location and also allowed to continue burning until all evidence of flame, glow and smoke had disappeared. Upon client request, additional brands were placed on the test specimen for a sustained burn time of 60 minutes. Brands were placed horizontally on the flange of the specimen.

**3.7 Test Equipment:** The equipment used to conduct this test meets the requirements of ASTM E108-07a. The air speed was calibrated before the burning brand test. The test equipment and test apparatus descriptions are listed in Appendix A.

**3.8 Drawing References:** The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Architectural Testing per the drawings located in Appendix C. Any deviations are documented herein or on the drawings.

**3.9 List of Official Observers:**

<u>Name</u>	<u>Company</u>
Josh Rillie	Solatube International, Inc.
Ethan Grove	Architectural Testing, Inc.
Ben Eveler	Architectural Testing, Inc.

**4.0 Test Specification(s):** The fire test was conducted in accordance with ASTM E 108-07a, *Standard Test Methods for Fire Tests of Roof Coverings*.

### 5.0 Test Specimen Description:

Manufacturer:	Solatube International, Inc.
Series/Model:	330 DS (Specimen #1)
Type Product:	Tubular Daylight Device
Size(s):	21" diameter tubular daylight opening with an 11" rise from the roof deck to the top of the tubular opening. Overall flange diameter of 33-5/8". Reference Drawing in Appendix C.
Color:	Gray
Test Roof Slope:	Flat (0 inches of rise for 12 inches of horizontal travel)
Description:	Product consisted of 0.042 in. thick steel flashing, 0.035 in. thick steel edge protection band, extruded plastic tube ring and a nominal 0.140 in. thick clear plastic dome.

Manufacturer:	Solatube International, Inc.
Series/Model:	750 DS (Specimen #2)
Type Product:	Tubular Daylight Device
Size(s):	21" diameter tubular daylight opening with an 11" rise from the roof deck to the top of the tubular opening. Overall flange diameter of 33-5/8". Reference Drawing in Appendix C.
Color:	Gray
Test Roof Slope:	Flat (0 inches of rise for 12 inches of horizontal travel)
Description:	Product consisted of 0.042 in. thick steel flashing, 0.035 in. thick steel edge protection band, extruded plastic tube ring and a nominal 0.15 in. thick light diffusing plastic dome.

**6.0 Roof Deck Construction:** The test decks were constructed on 2x4 pine lumber spaced 24 in. on center. A non-combustible roof deck was constructed of nominal 5/8 in. thick Type X gypsum board under a 1/4 in. thick fiber cement board. A 22-1/2 in. hole, centered horizontally and vertically on the deck, was cut to allow installation of the product.

**7.0 Installation:** The products were installed by a Solatube representative. The products were secured to the test deck with (16) #10 by 2 in. long pan head fasteners evenly spaced around the circumference of the mounting flange, each approximately 3/4 in. from the edge. The plastic tube ring and dome were set on the flashing and secured with (3) #8 by 1.5 in. long pan head fasteners evenly spaced around the dome and a steel dome edge protection band. No sealant was used in the installation between the flange and the test deck.

**8.0 Test Results:** The results are tabulated as follows:

**Calibration Information:**

Average Wind Speed: 1043 ft. /min.  
 Ambient Temperature: 63°F

**Burning Brand:**

**Placement of Brands:** Centered horizontally, 10 in. from the leading edge of the deck, on the flange of the product. The 2-1/4" side of the brand was against the vertical flange of the skylight.

**Average Brand Weight:** Brands were verified to be 2000±150g at the time of test

**Specimen #1**

Time (min:sec)	Event	Observations
00:01	Brand #1 Placed on Deck	None
02:00	Specimen Ignition	Paint on the flashing exterior began to show signs of charring.
03:00	Evidence of Charring Inside Flashing	The flashing began showing discoloration and charring on the inside wall of the product. No flames observed.
17:00	Brand #2 Placed on Deck	Slight warping of the flashing fastened to the deck.
19:35	Ember Penetrates Flashing	A single ember from the brand traveled to the inside of the product (between the flashing and roof deck) and self-extinguished approximately 1 ft. below the underside of the deck.
34:00	Brand #3 Placed on Deck	None
51:00	Brand #4 Placed on Deck	None
60:00	Test Concluded	None
<p>Conclusions: Pass</p> <ol style="list-style-type: none"> <li>1. No portion of the skylight formed a glowing brand that continued to glow after reaching the floor.</li> <li>2. The brand did not burn through the product to expose the roof deck.</li> <li>3. No sustained flaming was observed on the underside of the deck or product.</li> <li>4. No flames were spread to the plastic dome.</li> </ol>		



**8.0 Test Results:** (Continued)

**Specimen #2**

<b>Time (min:sec)</b>	<b>Event</b>	<b>Observations</b>
00:01	Brand #1 Placed on Deck	None
02:00	Specimen Ignition	Paint on the flashing exterior began to show signs of charring.
02:25	Ember Penetrates Flashing	A single ember from the brand traveled to the inside of the product (between the flashing and roof deck) and self-extinguished approximately 1 ft. below the underside of the deck.
02:30	Under Flame Present	Non-sustained flaming on the inside of the product was observed. Intermittent flickers were observed for approximately 20 seconds.
17:00	Brand #2 Placed on Deck	1-2 embers resulting from the brand every 5-10 minutes, embers did not reach the floor.
34:00	Brand #3 Placed on Deck	1-2 embers resulting from the brand every 5-10 minutes, embers did not reach the floor.
51:00	Brand #4 Placed on Deck	1-2 embers resulting from the brand every 5-10 minutes, embers did not reach the floor.
60:00	Test Concluded	None
<p>Conclusions: Pass</p> <ol style="list-style-type: none"> <li>1. No portion of the skylight formed a glowing brand that continued to glow after reaching the floor.</li> <li>2. The brand did not burn through the product to expose the roof deck.</li> <li>3. No sustained flaming was observed on the underside of the deck or product.</li> <li>4. No flames were spread to the plastic dome.</li> </ol>		

The service life of this report will expire on the stated Test Record Retention End Date, at which time such materials as drawings, data sheets, samples of test specimens, copies of this report, and any other pertinent project documentation, shall be discarded without notice.

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 Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC.

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Ethan Grove  
Technician

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Brady W. McNaughton, P.E.  
Program Manager – Fire Testing

EJG:ddr

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Test Equipment (1)
- Appendix-B: Photographs (8)
- Appendix-C: Drawings (2)

This report produced from controlled document template ATI 00538, revised 01/19/12.



### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	3/26/2012	N/A	Original report issue



**Appendix A  
 Test Equipment**

**Instrumentation:**

<b>Instrument</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Description</b>	<b>ATI Number</b>
Anemometer	ALNOR	RVA501	Wind vein anemometer	63192
ASTM E 108 Apparatus	Architectural Testing	N/A	Test Apparatus	A1101
Oven	Quality Labs Inc.	N/A	Brand conditioning oven	N/A
Thermostat	Omega	HH509	Multi-meter style with thermocouple	62101
Thermocouple	Omega	K	Welded thermocouple	63278
Temperature / Humidity Transmitter	Comet	T7510	Temperature and humidity transmitter ( sample & test deck conditioning room)	63242
Moisture Meter	Delmhorst	RDM-3	Moisture meter	63199
Scale	A and A Scales LLC	VS700	Scale to weigh brands prior to testing	63272
Stopwatch	Traceable	N/A	Stopwatch	63215



**Architectural Testing**

Test Report No.: B7439.01-121-24  
Report Date: 3/26/2012  
Test Record Retention End Date: 03/06/2016

## **Appendix B**

### **Photographs**



**Photo No. 1**  
Installation of 330 DS (Typical)



**Photo No. 3**  
Burning Brand Test of 330 DS



**Photo No. 4**  
Inside of 330 DS Flashing at Test Conclusion



**Photo No. 5**  
Warping of 330 DS Flashing



**Photo No. 6**  
Installation of 750 DS (Typical)



**Photo No. 7**  
Burning Brand Test of 750 DS





Architectural Testing

Test Report No.: B7439.01-121-24  
Report Date: 3/26/2012  
Test Record Retention End Date: 03/06/2016



**Photo No. 8**  
Inside of 750 DS Flashing at Test Conclusion



**Photo No. 9**  
Warping of 750 DS Flashing



**Architectural Testing**

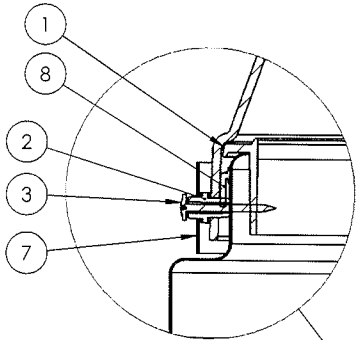
Test Report No.: B7439.01-121-24  
Report Date: 3/26/2012  
Test Record Retention End Date: 03/06/2016

## **Appendix C**

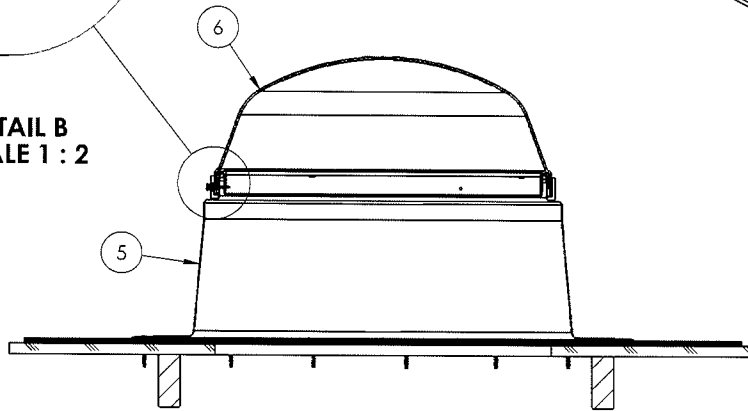
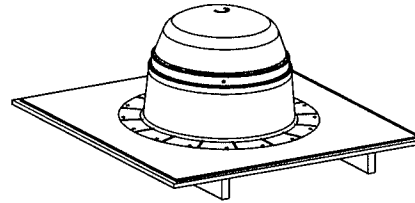
### **Drawings**

**SOLATUBE 330 DS  
(21 in/530 mm)  
11 in SELF FLASHING  
WITH DOME EDGE PROTECTION BAND**

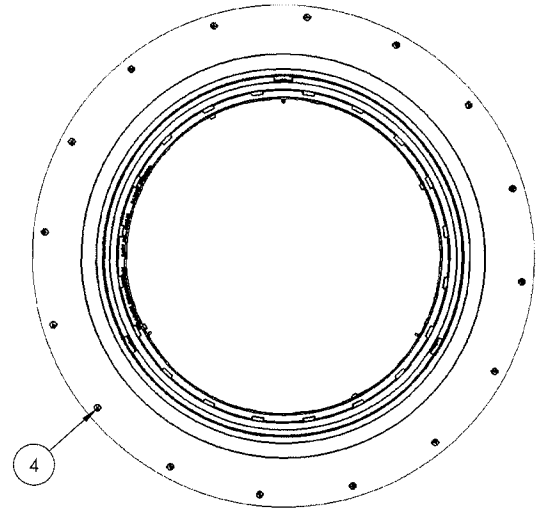
REVISIONS					
REV.	ECO	DATE	REVISED	CHECKED	APPROVED
1		3/8/2012			



**DETAIL B  
SCALE 1 : 2**



**SECTION A-A**



**TOP VIEW**

**NOTES:**

1. STRUCTURAL ELEMENTS (PLYWOOD, RAFTERS, DRYWALL ETC.) BY OTHERS & SHOWN FOR REFERENCE ONLY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	400785	TUBE RING	1
2	700870	DOME SPACER	3
3	700860	SCREW #8x1.5" SMS	3
4	700480	SCREW #10X2 FLASHING TRUS PHIL	16
5	200860	FLASHING 11" HIGH	1
6	509100	330 DS DOME	1
7	400465	DOME EDGE PRO BAND	1
8	600280	DOME SEAL	1

**UNLESS OTHERWISE SPECIFIED:**  
TOLERANCES  
ANGULAR:  $\pm 0.5^\circ$   
INCH  
.XX  $\pm .01$   
.XXX  $\pm .005$   
.XXXX  $\pm .002$

MATERIAL  
--

FINISH  
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**DO NOT SCALE DRAWING**

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STEVENS

CHECKED BY  
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DATE  
3/8/12

DATE  
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DATE  
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**SOLATUBE**

2210 OAK RIDGE WAY  
VISTA, CALIFORNIA 92081-8341  
PH (760) 587-4400

TITLE:  
**330 DS - 11 IN SELF FLASHING  
DOME EDGE PROTECTION BAND**

SIZE	PROJECTION	DWG. NO.	REV
<b>B</b>	(3rd)	<b>330 DS-SF-DEPB</b>	<b>1</b>
UNIT INCH		SCALE: 1:8	SHEET 1 OF 1

**Architectural Testing**

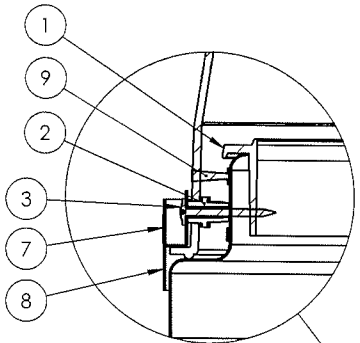
Test sample complies with these details.  
Deviations are noted.

Report # B7439.01-121-24

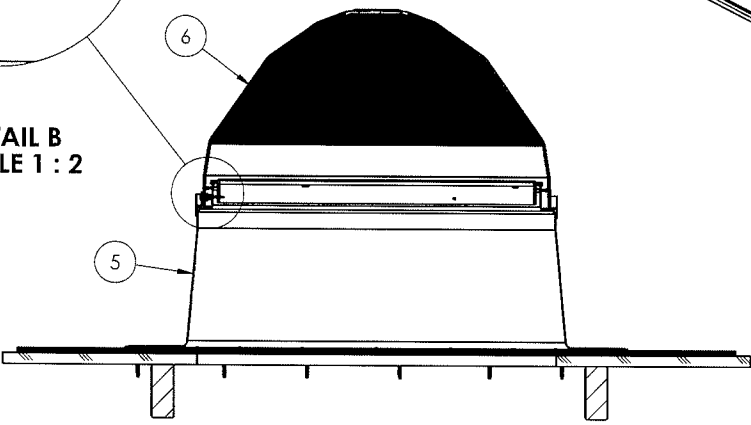
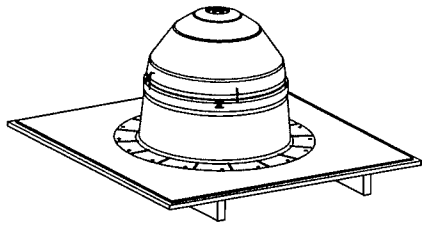
Date 3-13-12 Tech EG

**SOLATUBE 750 DS  
(21 in/530 mm)  
11 in SELF FLASHING  
WITH DOME EDGE PROTECTION BAND**

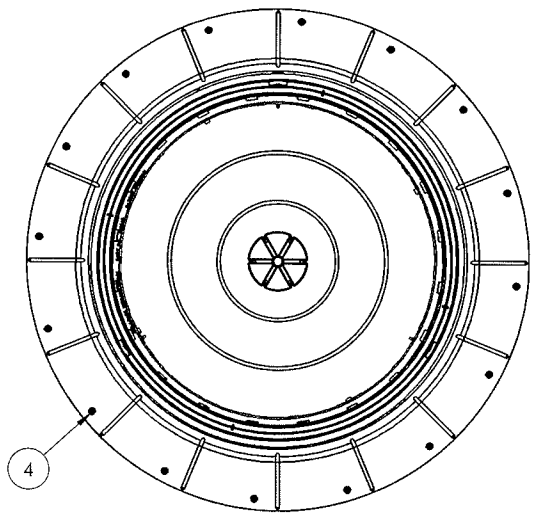
REVISIONS					
REV.	ECO	DATE	REVISED	CHECKED	APPROVED
1		3/8/2012			



**DETAIL B  
SCALE 1 : 2**



**SECTION A-A**



**TOP VIEW**

**NOTES:**

- STRUCTURAL ELEMENTS (PLYWOOD, RAFTERS, DRYWALL ETC.) BY OTHERS & SHOWN FOR REFERENCE ONLY

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	400785	TUBE RING	1
2	700870	750 DS SHOULDER SPACER	3
3	700860	SCREW #8x1.5" SMS	3
4	700480	SCREW #10X2 FLASHING TRUS PHIL	16
5	200860	FLASHING 11" HIGH	1
6	401930	750 DS DOME	1
7	400475	DOME EDGE PRO TAB	3
8	400465	DOME EDGE PRO BAND	1
9	600280	DOME SEAL	1

<b>UNLESS OTHERWISE SPECIFIED:</b>	<b>PROPRIETARY AND CONFIDENTIAL</b>	
TOLERANCES ANGULAR: ±0.5° INCH .XX ± .01 .XXX ± .005 .XXXX ± .002	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF SOLATUBE. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF SOLATUBE IS PROHIBITED.	
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FINISH --	CHECKED BY --	DATE --
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**TITLE: 750 DS - 11 IN SELF FLASHING DOME EDGE PROTECTION BAND**

SIZE <b>B</b>	PROJECTION (3rd)	DWG. NO. <b>750 DS-SF-DEPB</b>	REV <b>1</b>
UNIT INCH	SCALE: 1:8	SHEET 1 OF 1	

**Architectural Testing**  
 Test sample complies with these details.  
 Deviations are noted.  
 Report # B7439.01-121-24  
 Date 3-13-12 Tech EG