



Equivalency Evaluation Report

Date:	November 9, 2020
PTC Report No.:	2664-EER
Report Revision No.:	1
PTC Project No.:	420-0812
Product Mfg.:	Solatube International, Inc. 2210 Oak Ridge Way Vista, CA 92081
Product Name:	Impact 290 DS Low Profile Tubular Daylight Device - HVHZ
Product Category:	Sky Lights
Product Sub-Category:	Skylight
Compliance Method:	Product Approval Rule 61G20-3.015(4)(d) – Equivalency of Standards
Prepared By:	Robert J. Amoruso, P.E. Florida P.E. License Number 49752 PTC Product Design Group, LLC FBPE Certification of Authorization No. 25935

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Evaluated by:
Robert J. Amoruso, P.E.
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Project Scope

Evaluate Solatube Impact 290 DS Low Profile Tubular Daylight Device for conformance to the Current Edition of the Florida Building Code – Building and Residential Volumes including the High Velocity Hurricane Zone (HVHZ). This includes the 7th Edition (2020) Florida Building Code.

Description of Product – Installation Requirements

See Reference 1 for a description of the product, its installation and other pertinent data related to its approved use.

Performance and Testing Standards

Reference 2.a.i conducted air, water and structural testing including impact and cyclic loading to the following standard(s).

- 1) TAS 201-94 - *Impact Test Procedures*
- 2) TAS 202-94 - *Criteria for Testing Impact & Nonimpact Resistant Building Envelope Components Using Uniform Static Air Pressure*
- 3) TAS 203-94 - *Criteria for Testing Products Subject to Cyclic Wind Pressure Loading*
- 4) ASTM E1886-13a, Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
ASTM E1996-14a, Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes

Reference 2.a.ii conducted air, water, and structural testing to the following standard(s).

- 1) AAMA/WDMA/CSA 101/1.S.2/A440-08

Reference 2.b, 2.c, 2.d, 2.e, 2.g, 2.h and 2.i conducted plastics testing to the following standard(s).

- 1) ASTM G155-05a, Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials
- 2) ASTM D638-03, Standard Test Method for Tensile Properties of Plastics
- 3) ASTM D638-08, Standard Test Method for Tensile Properties of Plastics
- 4) ASTM D635-06, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
- 5) ASTM D635-74, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
- 6) ASTM D1929-96 (2001)e1, Standard Test Method for Determining Ignition Temperature of Plastics.

- 7) ASTM D1929-96, Standard Test Method for Determining Ignition Temperature of Plastics.
- 8) ASTM D1929-68(1975), Standard Test Method for Determining Ignition Temperature of Plastics.
- 9) ASTM E84-06, Standard Test Method for Surface Burning Characteristics of Building Materials
- 10) ASTM E84-09a, Standard Test Method for Surface Burning Characteristics of Building Materials
- 11) ASTM D 2843-93, Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.
- 12) ASTM D635-14, Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
- 13) ASTM D1929-16, Standard Test Method for Determining Ignition Temperature of Plastics
- 14) ASTM D2843-16, Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics
- 15) ASTM D2565-99, Standard Practice for Xenon Arc Exposure of Plastics Intended for Outdoor Applications

Reference 2.d recorded ICC/FBC conforming plastics testing in the following evaluation reports.

- 1) ICC-ES Report No. ER-1084
- 2) ICC-ES Report No. ESR-1635

References and Supporting Documents

1) Drawings

- a. SOLA0016, dated 4/16/20, signed and sealed by Robert J. Amoruso, PE, *Solatube Impact 290 DS Low Profile Tubular Daylight Device – Installation Anchorage Details*.

2) Testing (note that References 2.b thru 2.h have the BOM Item description and (Item No.) shown.

- a. Performance Testing:
 - i. Intertek Test Report No. J2410.02-303-44, dated 1/30/20 (Revision), TAS 201, TAS 202, TAS 203, ASTM E1886 and ASTM E1996 testing on low profile glass skylight, tubular daylight device, signed and sealed by Tyler Westerling, FL P.E. No. 72012.
 - ii. Intertek Test Report No. J2410.01-303-44, dated 4/9/20 (Revision), AAMA/WDMA/CSA 101/1.S.2/A440-08 testing on low profile glass skylight, tubular daylight device.
- b. EFFECT LENS (21), PET-GAG (PET – Polyethylene Terephthalate, High Frequency Welding Grade - GAG) testing
 - i. SGS Test Report No. 2138368-1, dated 8/27/10, testing to ASTM D635-06.
 - ii. SGS Test Report No. 2138368-3, dated 2/2/10, testing to ASTM D1929-96(2001)e1.
 - iii. SGS Test Report No. 2138368-2, dated 8/31/10, testing to ASTM E84-09a.
- c. CEILING RING (24) testing for Medium Impact Acrylic PMMA (Poly(methyl methacrylate))
 - i. SGS Test Report No. 177:013002-01-R1, dated 6/10/08, testing to ASTM D635-06.
 - ii. SGS Test Report No. 177:013002-02-R1, dated 6/10/08, testing to ASTM D1929-96.

- iii. SWRI Test Report No. 01.12693.01.139, dated 4/5/07, testing to ASTM E84-06.
 - iv. Intertek Test Report No. 3143957-004, dated 9/24/08, testing to ASTM G155-05a and D638-08 in accordance with ASTM D2565-99.
- d. CEILING RING (20) testing for Medium Impact Acrylic PMMA (Poly(methyl methacrylate))
 - i. ICC-ES Report No. ER-1084 demonstrates compliance to I-Codes for use in skylight applications. Report No. ER-1084 and Current Edition FBC requirements same based on review of documented results.
 - ii. ICC-ES Report No. ESR-1635 demonstrates compliance to I-Codes for use in skylight applications. Report No. ESR-1635 and Current Edition FBC requirements same based on review of documented results.
 - e. DIFFUSER PANEL (22) testing for Medium Impact Acrylic PMMA (Poly(methyl methacrylate))
 - i. SGS Test Report No. 177:013002-03-R1, dated 6/10/08, testing to ASTM D635-06.
 - ii. SGS Test Report No. 177:013002-04-R1, dated 6/10/08, testing to ASTM D1929-96.
 - iii. SWRI Test Report No. 01.13536.01.060, dated 1/30/08, testing to ASTM E84-06.
 - f. DIFFUSER PANEL (2) testing for Polycarbonate
 - i. SGS Test Report No. 153367-2, dated 4/2/01, testing to ASTM D635-74.
 - ii. SGS Test Report No. 153367-1, dated 4/2/01, testing to ASTM D1929-68(1975).
 - iii. SGS Test Report No. 153367-3, dated 4/2/01, testing to ASTM D2843-93.
 - g. Acrylic Lens and Trim Ring (Various in BOM of Optional Diffusers) testing for Acrylic Material
 - i. Intertek/ATI Test Report No. G3786.01-106-24, dated 4/28/17 for Huashuaite Clear Acrylic Sheet Material, testing to ASTM D635-14, ASTM D1929-16 and ASTM D2843-16
 - h. Misc. testing of Plastic or Foam Plastic have had flammability characteristics tested using alternate UL procedures below (see table in Reference 3.a).
 - i. UL 94 Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances (like ASTM E84)
 - ii. UL 900, Standard for Air Filter Units
- 3) Reports
- a. PTC Report No. 2664, *Solatube Impact 290 DS Low Profile Tubular Daylight Device – Product Evaluation Report*, dated 4/16/20, signed and sealed by Robert J. Amoruso, P.E.

Equivalency Evaluation – Plastics Testing

Test Standard used	Current Edition of the FBC/FRC Standard Revision Level	Comments
ASTM D635-06 ASTM D635-74 ASTM D635-14	ASTM D635-14	Review of the revision year required by the code and that used in testing indicate no significant changes that would affect test results.
ASTM D638-03 ASTM D638-08	ASTM D638-03	Same revision level used in test as required in code. -- OR -- Review of the revision year required by the code and that used in testing indicate no significant changes that would affect test results.
ASTM D1929-96 (2001)e1 ASTM D1929-96 ASTM D1929-68(1975) ASTM D1929-16	ASTM D1929-16	Review of the revision year required by the code and that used in testing indicate no significant changes that would affect test results.
ASTM D2843-93 ASTM D2843-16	ASTM D 2843-06	Review of the revision year required by the code and that used in testing indicate no significant changes that would affect test results.
ASTM E84-06 ASTM E84-09a	ASTM E84-06	Review of the revision year required by the code and that used in testing indicate no significant changes that would affect test results.
ASTM G155-05a	ASTM G155-13	Same revision level used in test as required in code. -- OR -- Review of the revision year required by the code and that used in testing indicate no significant changes that would affect test results.
ASTM D2565-99	ASTM D2565-99(2008)	Review of the revision year required by the code and that used in testing indicate no significant changes that would affect test results.

Plastic and or foam plastic component testing using UL testing protocols for flammability (Reference 2.h) includes UL 94 (like ASTM E84) and UL 90 (for foam filters) for components listed in Reference 3.a have been verified on the UL database as current.

Equivalency Evaluation – Performance Testing

The table below lists the HVHZ performance testing standard revision levels used in testing (Reference 2.a) and compares them to the revision level in the current edition of the FBC – Test Protocols.

HVHZ Testing	
Standard Used in Testing	Standard as Listed in Current FBC Edition
TAS 201-1994	TAS 201-1994
TAS 202-1994	TAS 202-1994
TAS 203-1994	TAS 203-1994

- The testing requirements in the 7th Edition (2020) Florida Building Code – Testing Protocols TAS 201, TAS 202 and TAS 203 have been met.

The table below lists the non-HVHZ performance testing standard revision levels used in testing (Reference 2.a) and compares them to the revision level in the current edition of the FBC – Test Protocols.

Non-HVHZ Testing	
Standard Used in Testing	Standard as Listed in Current FBC Edition
AAMA/WDMA/CSA 101/1.S.2/A440-08	AAMA/WDMA/CSA 101/1.S.2/A440-08
ASTM E1886-13a	ASTM E1886-13a
ASTM E1996-14a	ASTM E1996-14a

- The testing requirements in the 7th Edition (2020) Florida Building Code have been met.