

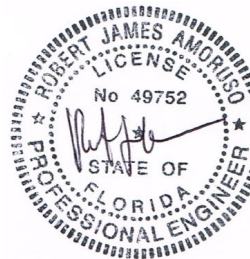


Equivalency Evaluation Report

Date:	August 2, 2023
PTC Report No.:	2399-EER
Report Revision No.:	4
PTC Project No.:	422-0615
Product Mfg.:	Solatube International, Inc. 2210 Oak Ridge Way Vista, CA 92081
Product Name:	Solatube Brighten Up® Series Model 160 DS TDD Solatube Brighten Up® Series Model 290 DS TDD
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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Digitally signed by
Robert J Amoruso
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Evaluated by:
Robert J. Amoruso, P.E.
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Project Scope

Evaluate equivalency of testing standards used for the performance testing of Solatube Impact Solatube Brighten Up® Series Model 160 DS and Model 290 DS Tubular Daylight Device for conformance to the 8th Edition (2023) Florida Building Code – Building and Residential Volumes excluding the High Velocity Hurricane Zone (HVHZ).

Products included:

- Solatube Brighten Up® Series Model 160 DS (10 inch Tube Dia.)
- Solatube Brighten Up® Series Model 290 DS (14 inch Tube Dia.)

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

- 1) ASTM E283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- 2) ASTM E330-02, Standard Test Method for Structural Performance of Exterior windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- 3) ASTM E331-00, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- 4) ASTM E547-00, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference

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 G155-00ae1, *Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non Metallic Materials*
- 3) ASTM D638-03, *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 2843-99, *Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.*
- 12) ASTM D 2843-93, *Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics.*
- 13) ASTM D635-14, *Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position*
- 14) ASTM D1929-16, *Standard Test Method for Determining Ignition Temperature of Plastics*
- 15) ASTM D2843-16, *Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics*

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

- 1) ICC-ES Report No. ESR-1653

References and Supporting Documents

- 1) Drawings. See the following manufacturer's product drawings included with this product approval document.
 - a. Model 160 DS TDD - Product Drawing Package
 - i. 160-PF-HC-STD, Product Drawing
 - ii. 160-290-ESR, Product Details
 - iii. 160 DS Alternate Round to Square Assembly
 - b. Model 290 DS TDD - Product Drawing Package
 - i. 290-PF-HC-STD, Product Drawing
 - ii. 160-290-ESR, Product Details
 - iii. 290-6F-BDECK, Commercial Roof Assembly Detail
 - iv. 290-6F-TYPE II_III, TYPE II & III Roof Assembly Detail
 - v. 290-CURB-BDECK, Commercial Roof Assembly Detail
 - vi. 290-CURB-TYPE II-III, TYPE II & III Roof Assembly Detail
 - vii. 290-PF-TYPE IV, Type IV (T & G) Roof Assembly Detail
 - viii. 290 DS Alternate Round to Square Assembly

2) Testing

- a. Performance Testing, Architectural Testing, Inc. (Fresno, CA)
 - i. 97759.01-30-44-R2 for 330 DS-O & C, 750 DS-O & C and 290 DS
 - ii. 97744.01-301-26-R0 for 160 DS and 290 DS
 - iii. 81605 01-301-26-R1 for 160 DS, 290 DS, 330DS-O, 330DS-C, 750DS-O and 750DS-C
 - iv. 81604.01-301-26-R2 for 160 DS, 290 DS, 330DS-O and 330DS-C
- b. OUTER DOME, DOME RING, TOP TUBE CLIP AND INNER DOME testing for High Impact Acrylic PMMA (Poly(methyl methacrylate))
 - i. Intertek Test Report No. 3143957-004, dated 9/24/08, testing to ASTM G155-05a and D638-08 in accordance with ASTM D2565-99.
 - ii. SGS Test Report No. 177:013002-01-R1, dated 6/10/08, testing to ASTM D635-06.
 - iii. SGS Test Report No. 177:013002-02-R1, dated 6/10/08, testing to ASTM D1929-96.
 - iv. SWRI Test Report No. 01.12693.01.139, dated 4/5/07, testing to ASTM E84-06.
- c. OUTER DOME, DOME RING, TOP TUBE CLIP AND INNER DOME testing for High Impact Acrylic PMMA (Poly(methyl methacrylate))
 - i. Architectural Testing Inc. Test Report No. 58735.01-106-18, dated 1/4/07, testing to ASTM G155-00ae1 and D638-03.
 - ii. SGS Test Report No. 177:002666-03, dated 1/2/07, testing to ASTM D635-06.
 - iii. SGS Test Report No. 177:002666-01, dated 1/13/07, testing to ASTM D1929-96(2001)e1.
 - iv. SGS Test Report No. 177:002666-02, dated 1/2/07, testing to ASTM D2843-99.
- d. EFFECT LENS, 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.
- e. CEILING RING AND DRESS RING 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.
- f. CEILING RING AND DRESS RING testing for Medium Impact Acrylic PMMA (Poly(methyl methacrylate))
 - i. ICC-ES Report No. ESR-1653 demonstrates compliance to I-Codes for use in skylight applications. Report No. ESR-1653 and 8th Edition (2023) FBC requirements same based on review of documented results.
- g. DIFFUSER PANEL 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.

h. DIFFUSER PANEL 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. .

i. Acrylic Lens and Trim Ring – Plastics 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

3) Reports

- a. PTC Report No. 2399-PER, Rev. 4, *Solatube Brighten Up® Series Model 160 DS and Model 290 DS Tubular Daylight Device – Product Evaluation Report*, signed and sealed by Robert J. Amoruso, P.E.

Equivalency Evaluation – Performance Testing

Test Standard used	8th Edition (2023) FBC/FRC Standard Revision Level	Comments
ASTM E283-04	ASTM E283- 04 (2012)	Same revision level used in test as required in code.
ASTM E330-02	ASTM E330-14	Same revision level used in test as required in code.
ASTM E331-00	ASTM E331-00 (2009)	Review of the revision year required by the code and that used in testing indicate no significant changes that would affect test results.
ASTM E547-00	ASTM E547-00 (Not Referenced)	Not referenced in the code.

Equivalency Evaluation – Plastics Testing

Test Standard used	8th Edition (2023) 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 D638-03	Same revision level used in test as required in code.
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 D2843-99 ASTM D2843-93 ASTM D2843-16	ASTM D 2843-16	Review of the revision year required by the code and that used in testing indicate no significant changes that would affect test results.
ASTM E84-06 ASTM E84-09a	ASTM E84-18b	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 G155-00ae1	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.