



SECTION 086223

TUBULAR DAYLIGHTING DEVICES

PART 1

1.1 SECTION INCLUDES:

- A Tubular Daylighting Device (TDD) consisting of polycarbonate Lexan collector dome, aluminum roof flashing, reflective transfer tubes, and diffuser assembly per specifications and drawings.
- B Accessories

1.2 RELATED SECTIONS:

- A Section 076200 – Sheet Metal Flashing.
- B Section 075400 – Thermoplastic Membrane Roofing
- C Or per specification and drawings.

1.3 REFERENCES:

- A ASTM B 209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- B ASTM E 283 – Test Method for Rate of Air Leakage through Exterior Window, Curtain Walls, and Doors under Specified Pressure Differences across the Specimen.
- C ASTM E 330 – Structural Performance of Exterior Window, Curtain Walls, and Doors.
- D ASTM E 331 – Test Method of Water Penetration of Exterior Window, Curtain Walls, and Doors by Static Air Pressure Difference.
- E ASTM E 1996 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by wind blown debris in Hurricanes.

- F ASTM E 308 – Standard Practice for Computing the Colors of Objects by using the CIE System; 2006.
- G ASTM E 108 – Standard Test Methods for Fire Tests of Roof Coverings.
- H ASTM E 547 – Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Air Pressure Difference; 2000.
- I ASTM E 1886 – 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.
- J ASTM E 84 – Standard Test Method for Surface Burning characteristics of Building Materials; 2001.
- K ASTM D 1929 – Test Method for Ignition properties of Plastics.
- L ASTM D 635 0 – Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position.
- M UL 790 – Complies with Standard for Tests for Fire Resistance of Roof covering Materials.
- N FLORIDA BUILDING CODE TAS 201 – Impact Test Procedures.
- O FLORIDA BUILDING CODE TAS 202 – Criteria for Testing Impact and Non Impact Resistant building Envelope Components Using Uniform Static Air Pressure loading.
- P FLORIDA BUILDING CODE TAS 203 – Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

1.4 PERFORMANCE REQUIREMENTS

- A Hurricane tested and approved for large missile impacts and severe wind loads, tested by Architectural Testing, Inc., Riviera Beach, FL in accordance with Miami-Dade County Protocol, TAS 201, TAS 202, and TAS 203 to achieve FBC approval number FL15859 to meet code for use in HVHZ (High Velocity Hurricane Zone) with design pressure of +150/-100 psf. (Safety factor: 3).
 1. Uniform Load Test: Withstand dead and live loads caused by pressure, and uplift of wind acting normal to plane of roof to a download pressure of +150 psf. and an uplift of -100 psf. measured in accordance with ANSI/ASTM E 330, AAMA/WDMA 1600/IS7 and TAS 202 (Safety factor of 3).
 2. Air leakage through assembly limited to 0.30 cfm/ft², (our tests show a result of 0.12 cfm/ft²), measured at a reference differential pressure across assembly of 1.57 psf.(75 Pa) as measured in accordance with AAMA/WDMA 1600/IS7, ANSI/ASTM E 283 and TAS 202.

3. Water Infiltration: No water penetration noted when measured in accordance with AAMA/WDMA 1600/IS7, TAS 202, and ANSI/ASTM E 331 with a test pressure differential of 22.5 psf.
4. Large Missile Impact: Passes Large Missile Impact Test when measured in accordance with TAS 201, ANSI/ASTM E 1886 and ANSI/ASTM E 1996.

B Fire Testing:

1. Class A Burning Brand: The burning brand shall self-extinguish without transferring the fire to the dome. (See ASTM E 108 and UL 790). Flame Spread-0.
2. Self-Ignition Temperature: Greater than 650 degrees F., Per: U.B.C. Standard 26-6. (See ASTM D 1929).
3. Smoke Density: Rating no greater than 450 degrees F., Per U.B.C. 8-1 (See ASTM Standard E 84). Smoke Density-0 and Flame Spread-0.
4. Rate of Burn: Minimum Burning Rate- 2.5 Inches/min (64mm/min) Classification CC-1: U.B.C. Standard 26-7. (See ASTM D 635 and ASTM D 1929).

1.5 SUBMITTALS

- A Submit under provisions of Section 01600.
- B Product Data: Manufacturer's data sheets on each product to be used, including:
1. Preparation instructions and recommendations
 2. Storage and Handling requirements and recommendations
 3. Installation Methods
- C Shop Drawings: Submit shop drawing showing layout, profiles and product components including; anchorage, flashings, and options.
- D Verification Samples: For each Finished Product Specified, Two samples, minimum size of 6 inches (150mm) square, representing actual product and finish. Per Architects request.
- E Manufacturer's Certificates: Certify products meet or exceed specified requirements.
- F Manufacturer's Warranties: 10 Years

1.6 QUALITY ASSURANCE

- A Manufacturer Qualifications: Manufacturer engaged in the manufacturing of Tubular Daylighting Devices for a minimum of 15 Years.

1.7 DELIVERY, STORAGE, AND HANDLING

- A Store products in Manufacturer's original packaging until ready for installation.
- B Project materials from exposure to moisture, high levels of heat, and direct sunlight. Do not deliver until after "wet work" is complete and dry.
- C Store materials in a dry, room temperature, ventilated, and weather tight location.

1.8 PROJECT CONDITION

- A Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by Manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 WARRANTY

- A Tubular Daylighting Devices: Manufacturer's standard warranty for 10 years on all component parts.

1.10 COORDINATION

- A Coordinate work with other operations and installation of roofing materials to avoid damage to installed materials.

PART 2

2.1 MANUFACTURERS

- A Acceptable Manufacturer: Sun-Dome® by Daylighting Technologies, Inc. located at 3612 Reese Avenue, Riviera Beach, FL 33404. Toll-Free: 800-596-8414, Local: 561-840-0095, Fax: 561-840-7606, Web-Site: www.sun-dome.com, E-mail: info@sun-dome.com.

2.2 MATERIALS

- A Tubular Daylighting Devices General
 - 1 Roof dome assembly consisting of a High-Impact Polycarbonate Lexan® dome, a closed-cell Volara gasket to control condensation problems, and a 12" section of reflective tubing mounted to an aluminum angle ring with an ABS Thermal Break.
 - 2 Aluminum flashings provided to fit roof slopes correctly to allow collector dome to capture all available light by being installed upright and perpendicular to the ground.

- 3 Alanod Miro Silver®, the top rated UV stable 98% reflective tubing material available.
 - 4 Ceiling diffuser assembly consisting of an acrylic diffuser and a closed-cell Volara Gasket.
- B Sun-Dome: Commercial Series; CS-2100 SD-CL (closed ceiling), 21 inch (530 mm) T.D.D.:
- 1 Roof Dome Assembly:
 - a Glazing: 100 percent impact tested, UV Stabilized polycarbonate GE Lexan® with a nominal thickness of 0.125 inches.
 - b Dome Seal: A Closed-Cell Volara Gasket 1/8-inch (19.05 mm) thick to eliminate condensation, bugs, dirt, and air infiltration per ASTM E 283.
 - c Top Reflective Tube Section: The first reflective tube in the system, Alanod Miro Silver® (see reflective tubing below).
 - d Mounting Ring: A 1-1/2 inch by 1-1/2 inch aluminum angle ring at 1/8 inch thick.
 - e Thermal Break: A 1/8inch thick custom ABS angle ring, creates break between metal materials to eliminate heat/cold transfer.
 - 2 Roof Flashing: Leak-Proof flashing functioning as base support for dome and top of reflective tube. Aluminum Sheet conforming to ASTM B 209/E 283/E 330/E 331/E 1996/E 108/E 547/E 1886/E 84/UL 790/(TAS 201, 202, 203), is 0.040 inch (1.016 mm) thick.
 - a Flat Flashing – for use on 0 / 12 – 1 / 12 Pitch Roof (positive drainage)
 - b Low Pitch Flashing – for use on 2 / 12 – 3 / 12 Pitch Roof
 - c Medium Pitch Flashing – for use on 4 / 12 – 6 / 12 Pitch Roof
 - d High Pitch Flashing – for use on 7 / 12 – 8 / 12 Pitch Roof
 - e Curb Cap Flashing – for use on top of a Roof Curb; 27 inches by 27 inches I.D., fabricated from 0.040 inches thick aluminum with boxed and riveted corners to provided added strength.
 - f Specific Roof Pitch Flashings are available by special order.
 - 3 Reflective Tubing Thermal Break: EternaBond®'s Roof Seal with MicroSealant® technology; a 100% solids formulation of synthetic resins, thermoplastics and non-curing rubber with a built-in primer. It is bonded to a UV stable backing; to eliminate condensation, bugs, dirt, and air infiltration per ASTM E 283.

- 4 Reflective Tubing Seal: IPG Aluminum Foil Tape with Adhesive backing to eliminate condensation, bugs, dirt, and air infiltration per ASTM E 283.
- 5 Reflective Tubing: Alanod Miro Silver®, the top rated UV stable 98% reflective aluminum/silver tubing material. Aluminum-Alloy sheet conforming to ASTM B 209 is 0.020 inch (0.508 mm) thick.
- 6 Diffuser Assembly for Tubes Penetrating Ceilings (Closed Ceiling): Sun-Dome: Commercial Series; CS-2100 SD-CL (closed ceiling), 21 inch (530 mm) diameter diffuser attaches with screws to the ceiling with the Volara gasket between the ceiling and the diffuser.
 - a Lens: High Dispersant Diffuser (HDD); Prismatic lens designed to maximize light output of diffusion. Visible Light Transmission shall be no less than 90 percent at 0.125 inch (3.175 mm) thick. Classified as CC-2.
 - b Lens: High Translucency Diffuser (HTD; White translucent lens designed to evenly diffuse (spread) a soft and calming illumination (light) with no glare. Classified as CC-2.
 - c Diffuser Seal: A Closed-Cell Volara Gasket $\frac{3}{4}$ -inch (19.05 mm) thick to eliminate condensation, bugs, dirt, and air infiltration per ASTM E 283.
- 7 Options:
 - a Reflective Tubing Elbow Kit: A Pair of Tubing Angle Adapters 0-30 Degrees allows the tubing to be maneuvered around HVAC ducts, trusses, or to line up the hole in roof to the hole in ceiling.
 - b Reflective Tubing Extension Kit: Extension Tube at 24 inch (609.6 mm) in length each to achieve desired drop for placement of diffuser assembly.
 - c Sun-Dome® round to square transition troffer box that measures 23.750 x 23.750 (inches) fabricated of 0.040 inch aluminum with a dual glazing system; consisting of a flat polycarbonate sheet inside the troffer box with a sealed swing down frame and lens assembly for easy access and cleaning.
 - c-1 Pyramidal Lens Option
 - c-1.1: Standard Prismatic Pattern Lens
 - c-2 Flat Lens Option
 - c-2.1: Standard Prismatic Pattern Lens
 - c-2.2: Conical Prism Lens
 - c-2.3: Translucent White Lens

- d Sun-Dome® Eclipse Dimmer: A fully assembled ready for installation light dimmer unit that goes in the bottom tube of the system. Comes finished with a AC 120v motor. 50-60Hz 2-2.5W fully adjustable to stop at any desired position. All Electrical parts are UL approved.
 - d-1 Hardwired: operated by a 3 position momentary contact, center off switch; 15A 120/277 V. (switch sold separately)
- e Sun-Dome® Interior Light-Kit: A fully assembled ready for installation interior light kit that goes in the bottom tube of the system. Comes finished with a 120v, 10W, 1000 lumen L.E.D. Bulb.
 - e-1 Hardwired: operated by a standard ON-OFF switch; 120V
- f Dome Security Kit: Replaces all standard Phillips head screws for the dome assembly with T-15 Tamper Proof #8 1-inch long stainless steel screws. Comes completely assembled with stainless steel washer with neoprene backing and O-rings on the screws. Bit to go with T-15 Tamper Proof Screws is included.
- g Burglar Bar: A 3/8-inch Stainless Steel rod that penetrates across the center of the top reflective tube at the underside of the roof. A 1.5 inch (38.1 mm) by 1.5 inch (38.1 mm) aluminum angle ring is sleeved around the outside of the top reflective tube up to the interior roof line and attached to the underside of the roof with #10 x 1 inch Stainless Steel Screws or equivalent fastener. The Stainless Steel bar is inserted through the aluminum angle ring and the center of the reflective tube. The stainless steel rod is held in place by 3/8-inch shaft collar on both sides.

PART 3

3.1 EXAMINATION

- A Do not begin installation until substrates have been properly prepared.
- B If substrate preparation is the responsibility of another installer please be sure to notify the General Contractor/Project Manager of any unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A Clean Surfaces thoroughly prior to installation.
- B Prepare surfaces using the methods recommended by the Manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A Install in accordance with Manufacturer's printed instructions and CAD illustrations in accordance with the Architect's specifications for the project.
- B After the initial installation, please perform a field test to verify compliance with the Manufacturer's installation instructions. This should be conducted in the presence of the owner, Architect, Contractor, or a designated supervisor for a final approval. Correct if needed before proceeding with installation of subsequent units.

3.4 PROTECTION

- A Protect installed products until completion of project.
- B Inspect installed units for damage at completion of roof surface.