CSI SECTION 08 62 23
TUBULAR DAYLIGHTING DEVICE
21” FINISHED CEILING

PART 1 GENERAL

NOTES TO SPECIFIER: Delete paragraph B if no accessories are required.

1.1 SECTION INCLUDES

A. Tubular daylighting devices (TDD’S) consisting of roof dome, a flat/curb mounted flashing, reflective light pipe, a ceiling/trim ring assembly, and diffuser assembly.

B. Accessories: Adjustable light dimmer, Transition Box LED light kit, security bar, and pre-manufactured curb.

1.2 RELATED SECTIONS

NOTES TO SPECIFIER: Add or delete sections applicable to project.

A. Section 01352 – LEED Requirements

B. Section 07311 – Asphalt Shingles: Flashing of skylight base

C. Section 07320 – Roof Tiles: Flashing of skylight base

D. Section 07510 – Built-up Bituminous Membrane Roofing: Flashing of skylight base

E. Section 07530 – Electronic Membrane Roofing: Flashing of skylight base

F. Section 07550 – Modified Bituminous Membrane Roofing: Flashing of skylight base

G. Section 07600 – Flashing: Metal flashings

H. Section 07720 – Roof Accessories: Skylight Curb

I. Section 08620 – Unit Skylights: Skylights without reflective tube

J. Section 08630 – Metal Framed Skylights

K. Section 16150 – Equipment Wiring: Electrical connections

L. Section 16500 – Lighting Equipment and Controls: Light bulbs and Lamps

1.3 REFERENCE STANDARDS

Structural

A. AMA/WDMA/CSA 101/I.S.2/A440-08 – North American Fenestration Standard/Specification for windows, doors, and skylights (includes all applicable reference standards.)

B. ANSI 101/I.S.2/NAFS-02 – Voluntary Performance Specification for Windows, Skylights, and Glass Doors (includes all applicable reference standards.)

C. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 2001

D. ASTM E 108 – Standard Test Methods for Fire Tests of Roof Coverings

E. ASTM E 283 – Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

F. ASTM E 330 – Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference

G. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Static Air Pressure Difference

H. ASTM E 1886 – 02 – Standard Test Method for Performance of Exterior Window, Curtain Walls, Doors, and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials

I. ASTM E 1996 – Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes

J. ASTM D 635 – Test Method for Rate of Burning and/or Extent of time of Burning of Self-Supporting Plastics in a Horizontal Position

K. ASTM D-1929-96 (2001) – Standard Test Method for Ignition Properties of Plastics.

L. International Building Code (IBC) – Model building code developed by International Code Council

M. International Energy Conservation Code (IECC) – Model Energy Building Code

N. International Residential Code (IRC) – Comprehensive Residential Code That Creates Minimum Regulation for One and Two Family Dwellings of Three Stories or Less

O. UL 790 – Standard for Tests for Fire Resistance of Roof Covering Materials

P. ICC-ES AC 16 – Acceptance Criteria for Plastic Skylights

Q. ICC-ES Evaluation Report – ER-5874

R. Florida Building Code TAS 201 – Impact Test Procedures

S. Florida Building Code TAS 202 – Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure

T. Florida Building Code TAS 203 – Criteria for Testing Products Subject to Cyclic Wind Pressure Loading

Thermal

A. NFRC 100, Procedure for Determining Fenestration Product U-factors
B. NFRC 102, Test Procedure for Measuring Steady-State Thermal Transmittance of Fenestration Systems
C. NFRC 200, Procedure for Determining Fenestration Product Solar Heat Gain Coefficient at Normal Incidence
D. NFRC 201, Interim Standard Test Method for Measuring the Solar Heat Gain Coefficient of Fenestration Systems Using Calorimeter Hot Box Methods

Electrical

A. UL 2108 - Low Voltage Lighting Systems
B. CSA C22.2 No. 250.0 – Luminaires
C. ASTM E 308 - Standard Practice for Computing the Colors of Objects by Using the CIE System; 2006

1.4 DESIGN/ PERFORMANCE REQUIREMENTS

NOTES TO SPECIFIER: Tubular Daylighting Devices shall be capable of meeting the following performance requirements. Delete paragraphs not applicable to project.

A. Hurricane Tested and Approved: Meets Florida Building Code TAS 202, TAS 201 and TAS 203 to achieve the rating of "hurricane approved".

B. Uniform Load Test: Withstand rated dead and live loads caused by pressure and uplift of wind acting normal to plane of roof to a download pressure of +100 psf and an uplift pressure of - 100 psf measured in accordance with ANSI/ASTM E 330, AAMA/WDMA 1600/17 and TAS 202.

C. Air leakage through assembly limited to 0.30 cfm/ft2 , measured at a reference differential pressure across assembly of 1.57 psf as measured in accordance with AAMA/WDMA 1600/IS7, ANSI/ASTM E 283 AND TAS 202.

D. Water infiltration: No water penetration noted when measured in accordance with AAMA/WDMA1600/IS7, TAS 202, and ANSI/ASTM E547 with a test pressure differential of 15 psf.

E. Fire Testing by Manufacturer of Flammable Materials Used meets requirements of the 2006 International Building Code:

1. Class B Burning Brand – The Burning Brand shall self-extinguish without transferring the fire to the dome. See ASTM E 108 and UL 790.
2. Self-ignition temperature – Greater than 650 degrees F per: U.B.C. Standard 26-6. See ASTM D 1929.
3. Standard Test Method for Density of Smoke from the Burning or Decomposition of Plastics – U.B.C. Standard 26-5. See ASTM D 2843.
4. Smoke Density – Rating no greater than 450 Per U.B.C. 8-1. See ASTM Standard E 84 in a way intended for use.
5. Rate of Burn – Minimum Burning Rate: 2.5"/min (64mm/min) Classification CC-2: U.B.C. Standard 26-7. See ASTM D 635.

1.5 SUBMITTALS

A. Submit under provisions of section 01300.

B. Product data: Manufacturer's data sheet on every 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 drawings showing layout, profiles and product components, including anchorage, flashings and accessories.

D. Verification samples: For each finish product specified, two samples, minimum size 6 inches (150mm) square, representing actual product and finish.

E. Manufacturer's certificates: Independent Test Lab Reports and Certifications are on file to verify products meet or exceed specified requirements.

F. Photometric IES files: Independent Test Lab Reports containing IES and Photometric data are available from Natural Light Energy Systems.

G. Electrical Wiring Drawings for Dimmer and Transition Box LED Light Kit.

NOTES TO SPECIFIER: Delete paragraph H if the project is not a LEED project.

H. LEED Credit's requirements for the products specified:

1. Energy and Atmosphere: Data on improvement of energy performance credits.
2. Indoor Environmental Quality: Project list and data for perimeter and non-perimeter controllability for the lighting controls and systems in daylight zones.
3. Indoor Environmental Quality: Project list and data for daylight zones for the products specified.
4. Innovation and Design: Data on potential innovation in design credits.
5. Regional Priority: Specific information on regional credits which may be available for the project location.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer engaged in manufacture of tubular skylights for minimum 15 years.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in Manufacturers unopened packaging until ready for installation

B. Store materials in a dry warm ventilated weather-tight location.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.

1.9 MANUFACTURER'S WARRANTY

A. Tubular Daylighting Device: Manufacturers standard warranty for 25 years.

1.10 COORDINATION

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

PART 2 PRODUCTS

NOTES TO SPECIFIER: Retain substitutions provisions C and delete B based upon project requirements.

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Natural Light Energy Systems; 10821 N. 23rd Avenue, Phoenix, Arizona, 85304, telephone: (800) 363 9865, email: commercialsales@nltubular.com, fax:(602)485-4895, www.nltubular.com.

B. Substitutions not accepted.

C. Requests for substitutions shall be submitted and approved in accordance with Section 012500.

2.2 TUBULAR DAYLIGHTING DEVICES

A. Model 21K, 21 inch (533mm):

NOTES TO SPECIFIER: Select a. or b. below based upon project requirements.

1. Dome Assembly and Glazing: High-impact exterior dome having ~90% transparency, unique condensation release system and bug and dust proof sealing system.
    a. High impact, UV resistant acrylic, 0.177 inches (4.5mm) thick.
    b. Polycarbonate, UV stabilized, 0.150 inches (3.8mm) thick.

2. Roof Flashing Base:

NOTES TO SPECIFIER: Select paragraph a. thru d. as required by project.

a. Self-flashing one piece made of seamless 1100 series grade aluminum .080 (2mm) inch thick. Dome opening 21.375 inch (543 mm) diameter. Overall diameter is 33.75 inches (857mm), 8 inch (203 mm) rise with a 4 inch (102 mm) flashing flange.

b. Curb mount one piece made of seamless 1100 series grade aluminum .080 (2mm) inch thick. 28 inches (711mm) square curb with a 5.25 inches (133mm) rise and dome opening is 21.375 inches (543mm).

c. Flashing insulator for flat flashing made of EPDM and installed as thermal isolation for use between flashing and roof deck.

d. Flashing insulator for curb made of EPDM and installed as thermal isolation for use between curb and flashing.

3. Roof Turret extensions:

NOTES TO SPECIFIER: Turret extensions are optional and available in multiple heights. Delete if not required.

a. One Seam 1100 series grade aluminum .08 (2mm) inch thick, 12 inch height.

b. One Seam 1100 series grade aluminum .08 (2mm) inch thick, 24 inch height.

c. One Seam 1100 series grade aluminum .08 (2mm) inch thick, 36 inch height.

d. One Seam 1100 series grade aluminum .08 (2mm) inch thick, 48 inch height.

4. Reflective Light pipe: 21 inch (533 mm) diameter, 98% reflective, sputtered silver on aluminum sheet. .02 inches (.5mm).

NOTES TO SPECIFIER: Light pipe extensions are optional and available in multiple heights. Delete if not required.

a. Light Pipe extensions; prepared for easy assembly of multiple units. Length as required for application.

1. 12 inch length.

2. 24 inch length.

NOTES TO SPECIFIER: Angle Elbows are optional. Delete if not required.

b. Universal Angle Elbows; adjustable between 0 to 30 degrees. Can be mounted on top, middle, or bottom of reflective light assemblies as required for application.

NOTES TO SPECIFIER: Select a or b below as required for project.

5. Diffuser Assembly:
   a. Round to square transition box made of aluminum frame, trim ring for open ceiling with 21.25 inch (540mm) diameter. Universal fasteners can accommodate suspended ceiling or hard ceiling applications.

NOTES TO SPECIFIER: Select 1, 2, 3 or 4 below as required for project.

      1. 100% impact modified, UV stabilized acrylic, Prismatic
      2. 100% impact modified polycarbonate, UV stabilized, Prismatic.
      3. 100% impact modified Soft white acrylic.
      4. Skybrite acrylic hexagonal microstructure fresnel lens designed to provide maximum output with wide angle distribution.

   b. Round ceiling/trim ring made of aluminum powder coated white for hard ceiling applications.

NOTES TO SPECIFIER: Select 1, 2 or 3 below as required for project.

      1. 100% impact modified, UV stabilized acrylic, Prismatic
      2. 100% impact modified polycarbonate, UV stabilized, Prismatic.
      3. 100% impact modified Soft white acrylic.

6. Fasteners: same material as metals being fastened, non-magnetic steel, non corrosive metal of type recommended by manufacturer, or injection molded nylon.

7. Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

2.3 ACCESSORIES

NOTES TO SPECIFIER: Accessories are optional. Retain the accessories as applicable for the project.

A. Daylight Dimmer Assembly:

NOTES TO SPECIFIER: Select source voltage a. or b. as applicable for the project.

1. Dimmer motor: Electro-mechanically actuated daylight damper valve with maximum current draw of 50 ma per unit; Daylight output ranges between 1 and 100 percent. The two directional motor shall allow the damper to rotate from its fully open position at 0 degrees, to its fully closed position at 90 degrees and back to 0 degrees. Up to 15 daylight dimmers can be connected and controlled by one switch. The dimmer motor source voltage has two options;
    a. Low Voltage, 24volts, AC or DC. Can be connected with low voltage plenum cable in accordance with local building codes.
    b. Line Voltage, 90 – 265 volts, 50/60 Hz.
2. Dimmer Housing: shall be manufactured of one piece of highly reflective aluminum light pipe material. The light pipe will be rolled into a hollow cylinder, 21” (533mm) in diameter and 12” (305mm) tall. There shall be 2 holes of 3/4” (19mm) in the cylinder, at the mid-point vertically and at 180 degrees from one another.
3. Dimmer Damper: The dimmer damper shall be made of two circular pieces of highly reflective light pipe material of 21-7/8” (556mm) diameter placed back to back and riveted together. The dimmer damper shall be riveted to and rotate about an aluminum spandrel of 3/8” (16mm) diameter, which will be sit through both holes in the dimmer housing and be operated by the dimmer motor.
4. Switch (Supplied by others): Manufacturer-specific AC/DC, SP/DT switch required to operate Daylight Dimmer, one switch per set of up to 15 synchronously controlled dimmers. Locate switch as directed by Architect.

B. Transition Box LED Light Kit (TBLED):

1. LED Quadrants: Four individual triangular LED boards are mechanically fixed to each quadrant of the inside of the transition box. Approximate light output is 7200 lumens.
2. LED Driver: UL Listed IP65 rated driver has input values from 100V – 240V at 50-60Hz, and an output rating of up to 75W. It is mechanically mounted on a nearby structural member or on the back of the Transition Box. One LED Driver powers one TBLED unit. The LED Driver can be mounted up to 9ft (2.75m) from the TBLED with no decline in performance. Wiring from the LED Driver to the mains power must be done in accordance with local building codes.

C. Security Bar: Single piece of galvanized steel pipe with a ¾" outside diameter and ½" inside diameter. The security bar is mechanically secured across the diameter of the dome collar with self-tapping screws.

D. Pre-Manufactured Curbs: One piece made of ASTM B209, 1100 series grade aluminum .080 (2mm) inch thick, 27.25 inches (692 mm) square curb) with 4 inch flanges to secure curb to roof deck. The curb shall have mill finish, fully welded seams, integral 2 inch fiberglass semi-rigid insulation liner with 2" x 2" nominal wood nailer at top of curb for mounting.

NOTES TO SPECIFIER: Select custom curb height as applicable for the project.

1. Curb 4 inch height
2. Curb 8 inch height
3. Curb 12 inch height

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, and anchoring for compliance with requirements for installation.

B. If substrate preparation is the responsibility of another installer, notify architect of unsatisfactory preparation before proceeding.

C. Proceed with installation only after all unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install in accordance with manufacturers current written instructions and approved shop drawings. Coordinate installation with installers of substrates, air and water vapor retarders, and roofing materials to ensure installation is weather tight.

B. Where metal surfaces of tubular daylighting devices contact incompatible materials, apply bituminous coating on concealed metal surfaces or materials providing a permanent separation.

3.3 FIELD QUALITY CONTROL

A. After installation of first unit, field test to determine adequacy of installation. Conduct water test in presence of owner, architect, or contractor, or their designated representative. Correct if needed before proceeding with installation of subsequent units.

B. Test for water leaks according after installation is complete and curing of sealants. Perform test for total area of each tubular daylighting device.

C. Daylight Dimmers: Test and adjust dimmer assemblies for proper operation.

3.4 CLEANING AND PROTECTION

A. Protect installed products until completion of project.

B. Clean exposed tubular unit skylight surfaces according to manufacturer's written instructions. Touch-up, repair or replace damaged products before substantial completion.

C. Replace glazing that has been damaged during construction period.

END OF SECTION