

## SECTION 08625

### TUBULAR DAYLIGHTING DEVICE

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- .1 Tubular daylighting device, consisting of roof dome, reflective tube, and diffuser assembly; configuration as indicated on the drawings.
- .2 **Accessories.**
  - .1 **Daylight Dimmers ( Optional)**
  - .2 **Security Bars (Optional)**
  - .3 **Light Fixtures (Optional - 160 DS and 290 DS only)**
  - .4 **Ventilation (Optional - 160 DS and 290 DS only)**

##### 1.2 RELATED SECTIONS

- .1 Section 07311 - Asphalt Shingles: Flashing of skylight base.
- .2 Section 07320 - Roof Tiles: Flashing of skylight base.
- .3 Section 07510 - Built-Up Bituminous Roofing: Flashing of skylight base.
- .4 Section 07530 - Elastomeric Membrane Roofing: Flashing of skylight base.
- .5 Section 07550 - Modified Bituminous Membrane Roofing: Flashing of skylight base.
- .6 Section 07600 - Flashing: Metal flashings.
- .7 Section 08620 - Unit Skylights: Skylights without reflective tube.
- .8 Section 08630 - Metal Framed Skylights.
- .9 **Section 15810 - Ducts: Fan vent duct and connections.(Optional - 160 DS and 290 DS only)**
- .10 **Section 16150 - Equipment Wiring: Electrical connections (Optional)**
- .11 **Section 16500 - Lighting Equipment and Controls: Light bulbs and lamps.( Optional - 160 DS and 290 DS only)**

### 1.3 REFERENCES

- .1 ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008a.
- .2 ASTM A 463/A 463M - Standard Specification for Steel Sheet, Aluminum Coated, by the Hot Dip Process; 2006.
- .3 ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized), by the Hot Dip Process; 2007.
- .4 ASTM E 283 - Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004.
- .5 ASTM E 308 - Standard Practice for Computing the Colors of Objects by Using the CIE System; 2006.
- .6 ASTM E 330 - Structural Performance of Exterior Windows, Curtain Walls and Doors; 2002.
- .7 ASTM E 547 - Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain walls by Cyclic Air Pressure Difference; 2000.
- .8 ASTM D 635 - Test Method for Rate of Burning and/or Extent of Time of Burning of Self-Supporting Plastics in a Horizontal Position; 2006.
- .9 ASTM D-1929 - Test Method for Ignition Properties of Plastics; 1996 (2001).
- .10 UL 181 - Factory Made Air Ducts and Air Connectors
- .11 UL 790 - Standard for Tests for Fire Resistance of Roof Covering Materials; 2004.
- .12 ICBO/ICC AC-16 - Acceptance Criteria for Plastic Skylights; 2008.

### 1.4 PERFORMANCE REQUIREMENTS

- .1 Completed tubular daylighting device assemblies shall be capable of meeting the following performance requirements:
  1. Air Infiltration Test: Air infiltration will not exceed 0.30 cfm/sf aperture with a pressure delta of 1.57 psf across the tube when tested in accordance with ASTM E 283.
  2. Water Resistance Test: No uncontrolled water leakage at 10.5 psf pressure differential with water rate of 5 gallons/hour/sf when tested in accordance with ASTM E 547.

3. Uniform Load Test:
  - .1 No breakage, permanent damage to fasteners, hardware parts, or damage to make daylighting system inoperable or cause excessive permanent deflection of any section when tested at a Positive Load of 150 psf (7.18 kPa) or Negative Load of 70 psf (3.35 kPa).
  - .2 All units shall be tested with a safety factor of (3) for positive pressure and (2) for negative pressure, acting normal to plane of roof in accordance with ASTM E 330.
4. Fire Testing:
  - .1 When used with the Dome Edge Protection Band, all domes meet fire rating requirements as described in the 2006 International Building Code.
  - .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 Per U.B.C. 8-1 (See ASTM Standard E 84) in way intended for use. Classification C.
  - .4 Rate of Burn and/or Extent - Maximum Burning Rate: 2.5 inches/min (62 mm/min) Classification CC-2: U.B.C. Standard 26-7. See ASTM D 635.
  - .5 Rate of Burn and/or Extent - Maximum Burn Extent: 1 inch (25 mm) Classification CC-1: U.B.C. Standard 26-7. See ASTM D 635.

#### 1.5 SUBMITTALS

- .1 Submit under provisions of Section 01300.
- .2 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.
- .3 Shop Drawings. Submit shop drawings showing layout, profiles and product components, including anchorage, flashings and accessories.

- .4 Verification Samples: As requested by Architect.
- .5 Test Reports: Independent testing agency or evaluation service reports verifying compliance with specified performance requirements.
- .6 **LEED Submittals: Provide documentation of how the requirements of Credit will be met:**

- .1 **List of Daylight Credits available for the products specified.**

- .2 **Data on Energy Optimization Performance Credits for the products specified.**

- .3 **Data on Regional Credits which may be available for the project location. (LEED 2.1)**

- .4 **Data on Perimeter and Non-Perimeter Controllability of Systems for use of Daylight Dimmer option with the products specified.**

- .5 **Data on potential Innovation in Design Credits which may be available for the innovative use of the products specified.**

## 1.6 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Engaged in the manufacturing of tubular daylighting devices for minimum 15 years. Installer shall be acceptable to the manufacturer, SOLATUBE International Inc.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- .1 Store products in manufacturer's unopened packaging, keep from weather until ready for installation.
- .2 Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## 1.8 PROJECT CONDITIONS

- .1 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

- .1 Daylighting Device: Manufacturer's standard warranty for ten (10) years

- .2 Electrical Parts: Manufacturer's standard warranty for five (5) years, unless otherwise indicated.
- .3 Submit manufacturer's and installer's written warranty agreeing to repair or replace panel system work which fails in materials or workmanship within one (1) year of the date of delivery. Failure of materials or workmanship shall include leakage, excessive condensation, deterioration of finish on metal in excess of normal weathering and defects in accessories, and other components of the work. (Contact local representative for extended warranty periods.)

## **PART 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- .1 Acceptable Manufacturer: Solatube International, Supplied and Installed by Thermal Systems KWC Ltd, Calgary, AB. Ph 403-250-5507 Fax 403-250-6891; Web: [www.thermalsystems.ca](http://www.thermalsystems.ca) .
- .2 Substitutions: Systems not having the Raybender® 3000 Technology capturing dome and the Spectralight® Infinity Tubing will not be accepted.

### **2.2 TUBULAR DAYLIGHTING DEVICES**

- .1 Tubular Daylighting Devices General : Transparent roof-mounted skylight dome and self-flashing curb, reflective tube, and ceiling level diffuser assembly, transferring sunlight to interior spaces; complying with ICBO/ICC AC-16.
- .2 SolaMaster Series: Solatube Model 750 DS-C Penetrating Ceiling, 21 inch (530 mm) Daylighting System:
  - .1 Roof Dome Assembly: Transparent, UV and impact resistant dome with flashing base supporting dome and top of tube.
    - .1 Outer Dome Glazing: Type DA, 0.125 inch (3.2 mm) minimum thickness injection molded acrylic classified as CC2 material; UV inhibited, impact modified acrylic blend.
    - .2 Inner Dome Glazing: Type DAI, 0.115 inch (3 mm) minimum thickness acrylic classified as CC2 material.(Energy Star Approved with .1 & .2 used together) (750 DS only)
    - .3 **Inner Dome Glazing: Type DPI, 0.115 inch (3 mm) minimum thickness polycarbonate classified as CC1 material.(Optional) (750 DS only)**

- .3 Raybender 3000: Variable prism optic molded into outer dome to capture low angle sunlight and limit high angle sunlight.
- .4 Roof Flashing Base: One piece, seamless, leak-proof flashing functioning as base support for dome and top of tube.
  - .1 Base Material: Sheet steel, corrosion resistant conforming to ASTM A 653/A 653M or ASTM A 463/A 463M, 0.028 inch (0.7 mm) thick.
  - .2 *Base Style: Type F08, Self mounted, 8 inches (203 mm) high.(Optional)*
  - .3 Base Style: Type F11, Self mounted, 11 inches (279 mm) high (750 DS).
  - .4 Base Style: Type FCM, Curb cap, with inside dimensions of 27 inches by 27 inches (685 mm x 685 mm) to cover curb as specified in Section 07600 (750 DS) (Optional).
  - .5 *Base Style: Type FF6 (no pitch) (160 DS and 290 DS)*
  - .6 *Flashing Insulator: Type FI, Thermal isolation material for use under flashing.*
  - .7 *PVC Boot: Type P, White PVC for flashing to flat PVC roof surfaces.(Optional)*
  - .8 *Dome Edge Protection Band: Type PB, For fire rated roofs. Galvanized steel, nominal thickness of 0.039 inches (1 mm).(Optional)*
- .5 Tube Ring: Attached to top of base section; 0.090 inch (2.3 mm) nominal thickness injection molded high impact PVC; to prevent thermal bridging between base flashing and tubing and channel condensed moisture out of tubing.
  - 1. Dome Seal: Adhesive backed weather-strip 0.63 inch (16 mm) tall by 0.28 inch (7 mm).
  - 2. Reflective Tubes: Aluminum sheet, thickness 0.018 inch (0.5 mm).

- .1 General:
  - .1 Interior Finish: Spectralight Infinity high reflectance specular finish on exposed reflective surface. Specular reflectance for visible spectrum (400 nm to 760 nm) greater than 99 percent. Total solar spectrum reflectance (400 nm to 2500 nm) less than 93 percent.
  - .2 Color: a\* and b\* (defined by CIE L\*a\*b\* color model) shall not exceed plus 2 or be less than minus 2 as determined in accordance to ASTM E 308.
- .2 Top Tube Angle Adapter, Type TA:
  - .1 *Reflective 30 degree adjustable Top Tube Angle Adapter, 16 inches (406 mm) long. (Optional)*
- .3 Bottom Tube Angle Adapter, Type BA:
  - .1 *Reflective 30 degree adjustable Bottom Tube Angle Adapter, 16 inches (406 mm) long, required for transition box.(Optional)*
- .4 Top Tube Angle Adapter and Bottom Top Tube Angle Adapter Kit, Type AK:
  - .1 *Reflective 30 degree adjustable top and bottom angle adapters (one each), 16 inches (406 mm) long. (Optional)*
- .5 Extension Tube:
  - .1 *Reflective extension tube, Type EXX, Notched for Open Ceiling diffuser attachment, 24 inches (610 mm) long (Optional)*
- .6 Reflective 90 degree Adjustable tube:
  - .1 *Extension Tube Angle Adapter: Provide manufacturer's standard adapters for applications requiring; (Optional)*

- .1 *Type A1 one 0 to 90 degree extension tube angle adapter. (Optional)*
  - .2 *Type A2 two 0 to 90 degree extension tube angle adapters. (Optional)*
- .3 Diffuser Assemblies for Tubes Penetrating Ceilings: Solatube Model 750 DS-C. Ceiling mounted box transitioning from round tube to square ceiling assembly, supporting light transmitting surface at bottom termination of tube; 23.8 inches by 23.8 inches (605 mm by 605 mm) square frame to fit standard suspended ceiling grids or hard ceilings.
- .1 Round to square transition box made of opaque polymeric material, classified as CC2, Class C, 0.110 inch (2.8 mm) thick.
  - .2 Natural Effect Lens made of acrylic, classified as CC2, Class C, 0.060 inch (1.5 mm) thick, with open cell foam seal to minimize condensation and bug, dirt, and air-infiltration per ASTM E283.
  - .3 Lens: Type L1 OptiView Fresnel lens design to maximize light output and diffusion with extruded aluminum frame. Visible Light Transmission shall be greater than 90 percent at 0.022 inch (0.6 mm) thick. Classified as CC2.
  - .4 *Lens: Type L2 Prismatic lens design to maximize light output and diffusion with extruded aluminum frame. Visible Light Transmission shall be greater than 90 percent at 0.100 inches (2.5 mm) thick. Classified as CC2.(Optional)*
3. Accessories: *(All Optional components Below)*
- .1 *Security Bar: Type B Security Bar 0.375 inch (95 mm) stainless steel bar across flashing diameter opening. (Optional)*
  - .2 *Wire Suspension Kit: Type E, Use the wire suspension kit when additional bracing to the structure is required.*
  - .3 *Security Kit: Type SK Dome Security Kit, rivets with nylon spacers to replace dome screws.*
  - .4 *Local Dimmer Control: Provided with dimmer switch and cable.*

- .1 Daylight Dimmer: Type D Electro-mechanically actuated daylight valve; for universal input voltages ranging between 90 and 277 V at 50 or 60 Hz; maximum current draw of 50 ma per unit; controlled by low voltage, series Type T02: circuited, 4 conductor, size 22 cable; providing daylight output between 2 and 100 percent. Provided with dimmer switch and cable.*
- .2 Switch: Type SW, Manufacturer-specific low voltage DC DP/DT switch (white) required to operate Daylight Dimmer. Note: only one switch is required per set of synchronously controlled dimmers.*
- .3 Cable: Type CA, Two conductor low voltage cable (500 ft.) for multiple unit DC connection.*

## 2.3 ACCESSORIES

- .1 Fasteners: Same material as metals being fastened, non-magnetic steel, non-corrosive metal of type recommended by manufacturer, or injection molded nylon.
- .2 Suspension Wire: Steel, annealed, galvanized finish, size and type for application and ceiling system requirement.
- .3 Sealant: Polyurethane or copolymer based elastomeric sealant as provided or recommended by manufacturer.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- .1 Do not begin installation until substrates have been properly prepared.
- .2 If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.2 PREPARATION

- .1 Clean surfaces thoroughly prior to installation.
- .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.3 INSTALLATION

- .1 Install in accordance with manufacturer's printed instructions.
  - .2 Supplied Roof flashings are to be installed during the construction of the roof system. Tie-in to roofing system: follow design and drawings by Architect, and suppliers details.
  - .3 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.
  - .4 Remove all interior protective film from Spectra Light tubing.
  - .5 All connections points are to be fastened as per manufactures specifications. Minimum of three (3) fasteners per connection joint.
  
  - .6 All connections are to be sealed with supplied tape as per Manufacturer's specifications. Elbows connections and segments are to be sealed with supplied tape.
  - .7 Ensure all weep holes and drainage channels are unobstructed.
- 3.4 PROTECTION
- .1 Protect installed products until completion of project.
  - .2 Touch-up, repair or replace damaged products before Substantial Completion.
  - .4 Final cleaning is not part of this section.

END OF SECTION