

VELUX America Inc.  
SPECIFICATION FOR MODEL VCE/VCM/VCS  
ELECTRIC/SOLAR or MANUAL VENTING CURB MOUNTED  
SKYLIGHT

**VELUX America Inc.**  
SPECIFICATION FOR  
MODEL VCE/VCM/VCS VENTING CURB MOUNT SKYLIGHT

SECTION 08620 - UNIT SKYLIGHTS

**PART 1 GENERAL**

1.1 SECTION INCLUDES

- A. Performance and product component information for VELUX [VCM Manual curb mount venting skylight] [VCE electric curb mount venting skylight] or [VCS solar curb mount venting skylight].
- B. Unit skylight mounted on site-built curbs.

1.01 REFERENCE STANDARDS

- A. ASTM E 283 – *Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors Under Specific Pressure Differences Across the Specimen.*
- B. ASTM E 330 – *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.*
- C. ASTM E 331 – *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.*
- D. ASTM E 1886 – *Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missiles(s) and Exposed to Cyclic Pressure Differentials.*
- E. ASTM E 1996 – *Standard Specifications for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.*
- F. National Fenestration Rating Council, NFRC 100, *Procedure for Determining Fenestration Product U-factors.*
- G. National Fenestration Rating Council, NFRC 200, *Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.*
- H. National Fenestration Rating Council, NFRC 300, *Test Method for Determining Solar Optical Properties of Glazing Materials and Systems.*
- I. Occupational Safety & Health Administration, OSHA Standards – 29 CFR 1910.23, *Guarding Floor Openings and Holes.*
- J. Underwriters Laboratories Inc., UL 325, *Standard for Door, Drapery, Gate, Louver and Window Operators and Systems*, Fifth Edition.

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1.02 SYSTEM DESCRIPTION

- A. Skylight: Top hung venting curb mount skylight that consists of six integrated components - an interior condensation drainage gasket, an insulating glass unit, an interior rigid polyvinyl chloride (PVC) white maintenance-free frame and sash, exterior structurally glazed, roll-formed aluminum sash and frame counter flashing with ASA corner keys.
- B. Configuration: Outward opening, continuous top hinged, production-installed {solar} [electric] or [manual] chain operator, engineered deck seal mounting system with durable foam seal to seal the skylight to the curb. Pre-installed accessory mounting brackets and pre-wired for VCE electric blinds.
- C. Operation: Either an [electric/solar chain operator and a remote control] [manual chain operator with in reach crank handle] [manual control rod] [motorized control rod].
  - a. Electric operator (VCE): 2.4 GHz radio frequency remote control and a chain driven operator. Power requirements 40 watts, 60 Hz, and UL listed.
  - b. Solar operator (VCS) 2.4 GHz radio frequency remote control and a chain driven operator is powered by a solar charged battery operator. Battery pack is a 9 cell Panasonic NiMH 10.8V, 2100 mA.H.
  - c. Manual venting skylight (VCM) is operated by a manual, gear driven Truth operator.
    - i. Closed loop and manual control rod. Control rod is available as an accessory.
    - ii. Manual crank handle for in reach applications (available as an accessory).
    - iii. Motorized control rod for out of reach applications (available as an accessory).
- D. Condensation Control: Integral internal condensation collection system and drainage slots.
- E. Accessory tray for the mounting of accessories is available but sold separately.
- F. Sun screen accessories available but sold separately
  - a. Blackout blind available in 24 v dc electric or solar powered variants.
  - b. Roller blind available in 24 v dc electric or solar powered variants

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- G. Power supplies and electric controls are available but sold separately.
  - a. KLR 100 remote control
  - b. KLC 500 accessory power supply (controls up to five accessories)
  - c. KLF 100 sensor interface and/or signal repeaters
  - d. KLI 110 wall mounted control switch

**1.03 PERFORMANCE REQUIREMENTS**

- A. The VCM, VCE and VCS curb mount skylights are independently tested in accordance with listed standards for compliance with the unit skylight provisions of the latest IBC and IRC model building codes. Rated performance grade may vary with skylight size and glazing type. The lowest design pressure values have been listed in (a) below, but other specific values can be substituted from the accompanying chart.
  - a. AAMA/WDMA/CSA 101/I.S.2/A440-11 (NAFS-11) performance grades must be greater than or equal to the values listed in (i) and (ii). Other specific data is listed in the chart just below.
    - i. Downward design pressure = 165 psf
    - ii. Uplift Design Pressure = 30 psf

<b>Structural Performance</b> [Performance Grade or DP] *					
Tested Size	<b>Uplift</b> (lbs/ft <sup>2</sup> )				
<b>4646</b>	45	30	60	45	40
<b>2246</b>	n.r.	n.r.	n.r.	n.r.	65
Tested Size	<b>Download</b> (lbs/ft <sup>2</sup> )				
<b>4646</b>	165	165	165	165	400
<b>2246</b>	n.r.	n.r.	n.r.	n.r.	625
*Tested in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-11 Performance ratings also apply to sizes smaller than the Tested Size VCE skylights are WDMA Hallmark certified See <a href="http://www.wdma.com">www.wdma.com</a> , Hallmark No. 426-H					
** 06 variant is tested and WDMA Hallmark certified for Wind-Borne debris impact in accordance with ASTM E 1886 and ASTM E 1996. Rated for Wind Zone 3, Missile Level C, Cycle Pressure +50/-50					

- B. Highest Measured Air Leakage: 0.1 l/s/m<sup>2</sup> (0.02 CFM/ft<sup>2</sup>) of total unit area, measured at a differential pressure of 75 Pa (1.57 psf) in accordance with ASTM E 283. Meets A3 level under Canadian requirements of NAFS standards in (A).
- C. Water Penetration: No water penetration occurred when measured in accordance with ASTM E 331 with a test pressure differential of 720 Pa (15 psf). Meets unlimited design pressure level under tougher Canadian requirements of NAFS.

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- D. Thermal Performance: Tested and certified in accordance with NFRC 100 and 200 procedures.  $U = 0.52 \text{ Btu/hr}\cdot\text{ft}^2 \cdot \text{F}^\circ$  or less, SHGC = 0.24 or less, and VT = 0.55 or more (clear) or VT = 0.40 or more (white). Meets U.S. ENERGY STAR<sup>®</sup> criteria for all zones.
- E. Model VCE skylight electrics have UL approval.
- F. VCM and VCE skylights with impact glazing (06): Tested and certified in accordance with ASTM E 1886 and ASTM E 1996, cycle pressure +/-50, Missile level C, Wind Zone 3.
- G. Member deflection less than flexure limit of glass with full recovery of glazing materials.
- H. System accommodated movement between sash and frame and perimeter framing, without damage to components or deterioration of seals.
- I. Weep drainage system designed to channel water entering joints, condensation occurring in glazing channel, or migrating moisture occurring within system or exterior by means of gaskets with integrated condensation gutter.

#### 1.04 SUBMITTALS

- A. Product Data: Manufacturer's installation details and product data sheets included:
  - a. Preparation details and installation instructions
  - b. Product Data sheets with storage and handling information
  - c. Architectural roof sectional drawings can be found at [www.VELUXusa.com](http://www.VELUXusa.com).
  - d. Code compliance information can be found within these specifications, or by contacting VELUX at 800-888-3589, or by visiting [www.VELUXusa.com](http://www.VELUXusa.com).
- B. Architectural/Cross Sectional Drawings
  - a. Mounting details
  - b. Frame sizes
  - c. Flashing details
- C. Shop Drawings
  - a. Indicate material types, gauge, finishes, and installation details.

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## 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - a. Skylight manufacturer shall have a minimum of ten years experience in design and fabrication of deck mount glass skylights.
  - b. Skylights shall be manufactured to the highest standards of quality and craftsmanship in ISO 9001 and ISO 14001-certified facilities.
  - c. Flashings shall be engineered and manufactured for the roofing material and skylight.
- B. Source Limitations: Obtain unit skylights, flashings, and accessories from a single source and from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and Labeled as defined in NFPA 70, by a qualified testing agency and marked for intended location and application.
- D. Unit Skylight Standard: Comply with AAMA/WDMA 101/I.S.2./NAFS, *North American Fenestration Standard Voluntary Performance specifications for Windows, Skylights and Glass Doors* and all later editions for minimum standards of performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
- E. Provide WDM Hallmark certified unit skylights with an attached label.
- F. Thermal Performance – rated per applicable NFRC procedures.
  - a. Provide NFRC certified unit skylight ratings on an attached label.
  - b. Qualify under Energy Star criteria in all 50 states and attach verifying label.
- G. Provided NFRC certified unit skylights with an attached label. Warranted by the manufacturer for 20 years on the insulated glass unit performance at described in the manufactures published literature, 10 years warranty on all factory components as described in manufactures published literature.
- H. Manufactured to the highest standards of quality and craftsmanship in accordance with VELUX Manufacturing Standards.

## 1.06 COORDINATION

- A. Coordinate unit skylight flashing requirements with roofing system.
- B. Coordinate size and locations of site built curbs with actual unit skylight if the slope of the roof is less than 14 degrees.

## 1.07 WARRANTY

- A. Standard VELUX warranty, as specified in VELUX Warranty, publication XUS 20194.
- B. 10-Year “No Leak” installation warranty, as specified in VELUX Warranty, publication XUS 20194.

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1.08 DELIVERY, HANDLING, STORAGE

- A. Deliver products in manufacturer's original containers dry, undamaged, seals and labels intact.
- B. Store and protect products in accordance with manufacturer's recommendations.

**PART 2 PRODUCTS**

2.01 MANUFACTURER

- A. Acceptable Manufacturer: VELUX America Inc., P.O. Box 5001, Greenwood, SC 29648; Toll Free Tel: 800-888-3589; Fax: 864-943-2631; Web: [www.VELUXusa.com](http://www.VELUXusa.com)
- B. Substitutions: Not permitted

2.02 MATERIALS

- A. Maintenance free exterior aluminum frame and sash covers: Roll formed 15 gauge, 1.5 mm (0.06") thick, prefinished neutral gray, production engineered, and fabricated to fit.
- B. Rigid polyvinyl chloride (PVC) for the frame and sash components with co-extruded gaskets and white finish. EPS filler where possible.
- C. Fasteners: (Skylight to curb) #8 x 1½" stainless steel wood screw
- D. Dual-pane sealed Glazing
  - a. Dual-pane with warm edge technology, 95% argon gas, and LoE<sup>3</sup> silver coating that increases visible light over standard LoE coatings while lowering the solar heat gain. The following glazing options are available:
    - i. Type 04 – Tempered LoE<sup>3</sup> pane over a laminated heat strengthened interior pane with a (0.030") polyvinyl butyral interlayer.
    - ii. Type 05 – Tempered LoE<sup>3</sup> pane over tempered pane
    - iii. Type 06 – Tempered LoE<sup>3</sup> pane over laminated heat strengthened interior pane with a (0.090") polyvinyl butyral interlayer.
    - iv. Type 08 – Same as 04 but with a white coated interlayer.
- E. Operators and Manual Operator Accessories
  - a. Electric Motors: Standard on all electric venting skylights (VCE) 120V, 40 watts, 60 Hz rated assembly that uses a robust chain driven system to open the skylight 11 inches. A 2.4 GHz remote control is a standard component with each VCE/VCS. Optional interface controls include the

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KLF/repeater sensor interface and the KLI 110 wall mounted keypad.

- b. Solar operator (VCS) is powered by a solar charged battery operator. Battery pack is a 9 cell Panasonic NiMH 10.8V, 2100 mA, 60 Hz rating assembly that uses a robust chain driven system to open the skylight 11 inches. A 2.4 GHz radio frequency remote control is a standard component with each VCS. Optional interface controls include the KLF/repeater sensor interface and the KLI 110 wall mounted keypad.
  - b. Manual control rods and extension poles available on manually operated venting skylights (VCM).
  - c. Battery operated control rod.
  - d. In reach crank handles
- F. Weather stripping: Co-extruded or factory applied thermoplastic elastomer gasketing throughout entire frame and sash, profiled to effect weather seal.
- G. Screen: Aluminum screen profile, spring metal clip attachment, 0.28 mm glass fiber thread with PVC coating, charcoal in color.

### 2.03 FABRICATION

- A. Fabricated PVC frame with welded corners and EPS-filled air pockets for improved energy efficiency. The operator is also enclosed within the frame for a seamless low profile design.
- B. Fabricated one piece aluminum counter flashing system with welded corners.
- C. Provide permanent external drainage channels to manage water flow and drain to the exterior. Provide internal drainage of glazing spaces to exterior through gasketing to remove condensation.
- D. Assembled insect screen of rolled aluminum rectangular sections. Sections are square cut and assembled using square corner keys. Fit mesh taut and secure with vinyl spline.
- E. All units are factory glazed with hot melt silicone-based exterior seal.
- F. Site built curb or other type will be needed.
- G. ECL aluminum flashing is available, but site built fabricated flashings can be installed.
- H. ECW aluminum flashing with malleable sill apron is available for thick roofing material.

### 2.04 FINISHES

- A. Exterior surfaces: Maintenance free roll-formed aluminum exterior sash frame with natural gray Kynar 500 polyvinylidene fluoride resin finish.

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Maintenance free roll-formed exterior frame, painted with umber gray powder coat.

- B. Maintenance free flashing: Roll formed aluminum, natural gray, baked on polyester polyamide primer and finish coats.
- C. Interior Surface: White maintenance free PVC.
- D. Screens: Frames – white; mesh – charcoal.
- E. Operator – concealed within the skylight frame.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify rough opening dimensions and proper orientation of skylight.

#### **3.02 INSTALLATION**

- A. Install skylight in accordance with manufacturer's installation instructions and local building code requirements.
- B. Align skylight level, free of warp or twist; maintain dimensional tolerances.
- C. Attach skylight to field-constructed curb with screws furnished by manufacturer to accommodate construction tolerances and other irregularities.
- D. Provide thermal isolation when components penetrate or disrupt building insulation. Pack fibrous insulation in rough opening to maintain continuity of thermal barriers.
- E. Coordinate attachment and seal of perimeter air and vapor barrier material.
- F. Install manufacturer's engineered perimeter flashing in accordance with manufacturer's installation instructions to achieve weather tight installation

#### **3.03 CLEANING**

- A. Clean exposed skylight according to manufacturer's written instructions. Touch up damaged metal coatings and finishes.
- B. Remove excess sealants, dirt, and other substances.
- C. Remove and replace glazing that has been broken, chipped, cracked, abraded or damaged during the construction process.
- D. During the construction process, protect the skylight surfaces from contact with contaminate.