

VELUX America Inc.
SPECIFICATION FOR MODEL VS and VSE
"NO LEAK" VENTILATING SKYLIGHT

SECTION 08620
UNIT SKYLIGHTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Performance and product component information for VELUX top hinged [VSE electric deck mount venting skylight] or [VS manual deck mount venting skylight]
- B. VELUX Skylight Adhesive Underlayment provided with flashing kits.
- C. Engineered flashings [EDL for shingle and thin roofing materials][EDM for metal roofing materials like standing seam] [EDW for tile or thick roofing material] [EKL for stacking skylight side by side and over and under with thin roofing materials] [EKW for stacking skylights side by side and over and under with thick roofing materials]

1.02 REFERENCE STANDARDS

- A. *ASTM E 283 – Standard Test Method for Determining Rate of Air Leakage through Exterior Windows, Curtain Walls, and Doors While 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 the 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*.

1.03 SYSTEM DESCRIPTION

- A. Skylight: Top hinged ventilated deck mounted skylight that consists of the following integrated components – an interior condensation drainage gasket, [pre-finished white wooden frame and sash for all sizes] or [Stain grade wooden frame and sash for C06 and M06 sizes], a [manual] or [electric] operator, exterior maintenance free [aluminum] or [Copper] cladding/counter flashing, ASA corner keys, and an insulating thermal pane glass unit with two seals, warm edge spacer system, three coats of low e silver to increase visible light transmittance while reducing solar heat and a continuous deck seal mounting system with durable foam seal.
- B. Configuration: Outward opening, continuous top hinged, production-installed electric or manual chain operator, engineered deck seal mounting system with durable foam seal to seal the skylight to the roof deck. Pre-installed accessory mounting brackets and pre-wired for VSE electric venting models.
- C. Operation: Sash is operated by either an [electric skylight operator for (VSE)] or [manual skylight operator for (VS)]
 - a. Electric operator: 2.4 GHz radio frequency remote control and a chain driven operator. Power requirements 40 watts, 60 Hz, and UL listed.
 - b. Manual venting skylight (VS) is operated by a manual, gear driven Truth operator.
- D. Condensation Control: Integral internal condensation collection system and drainage slots.
- E. Accessories available but sold separately
 - a. Blackout blinds available in 24 v dc electric or solar powered variants.

- b. Roller blinds available in 24 v dc electric or solar powered variants.
 - c. Venetian blinds available in 24 v dc electric.
- F. 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 repeater
 - d. WLB 100 battery back up
 - e. KLI 110 wall mounted control switch

1.04 PERFORMANCE REQUIREMENTS

- A. The VS and VSE deck mount skylights independently tested in accordance with listed standards for compliance with the unit skylight provisions of the 2003, 2006 and 2009 IBC, IECC, and IRC. Performance is dependent on skylight size and glazing type. The maximum values have been listed in (a) below but size specific values can be substituted from the chart.
- a. AAMA/WDMA/CSA 101/I.S.2/A440-05 (NAFS – 05) and/or AAMA/WDMA/CSA 101/1.S.2/A440-08 (NAFS – 08) performance grades must be greater than or equal to the following listed in i and ii. Size specific data is listed in the chart just below.
 - i. Downward design pressure = 175 psf
 - ii. Uplift Design Pressure = 50 psf

| VS and VSE Technical Information | | | | | |
|---|--------------------------------------|-----------|-------------|-----------|-----------|
| Glass | 04 | 05 | 06** | 08 | 10 |
| Structural Performance [Performance Grade or DP] * | | | | | |
| Tested Size | Uplift (lbs/ft²) | | | | |
| S06 | 50 | 50 | 55 | 50 | 60 |
| M08 | 85 | 75 | 75 | 85 | 65 |
| C06 | n.r. | n.r. | n.r. | n.r. | 70 |
| Tested Size | Download (lbs/ft²) | | | | |
| S06 | 235 | 370 | 175 | 235 | 365 |
| M08 | 280 | 550 | 230 | 280 | 270 |
| C06 | n.r. | n.r. | n.r. | n.r. | 605 |

- B. Air leakage: Less than or equal to 0.7 l/s/m² (0.13 CFM/ft²) of total unit area, measured at a pressure of 75 Pa (1.57 psf) as measured in accordance with ASTM E 283, on test sizes listed per the NAFS in (A).
- C. Water infiltration: No water penetration noted as measured in accordance with ASTM E 331 with a test pressure differential of 720 Pa (15.0 psf). Exceeds requirements of NAFS standards in (A).
- D. Model VSE skylight is pending UL approval.
- E. Thermal Performance: $U = 0.43 \text{ Btu/hr} \cdot \text{ft}^2 \cdot \text{F}^\circ$ or less, SHGC = 0.23 or less and $V_t = 0.52$ or greater (clear) or $V_t = 0.39$ or greater (white). Tested and certified in accordance with NFRC 100 and 200 procedures. Meets ENERGY STAR® criteria for all zones.
- F. VS and VSE 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. Limit member deflection to flexure limit of glass with full recovery of glazing materials.
- H. System accommodates without damage to components or deterioration of seals, movement between sash and frame and perimeter framing.
- I. Weep drainage system designed to channel water entering joints, condensation, or migrating moisture occurring within system to exterior by means of Santoprene® gasket with integrated condensation gasket.
- J. Florida Product Approval: FL-13309

1.05 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 .
 - d. Code compliance information can be found within these specifications, or by contacting VELUX at 800-888-3589, or by visiting 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.
- D. Maintenance data: For unit skylights (unit skylight flashing system) (sunscreening accessories) to include in maintenance manuals.
- E. Warranty: Sample of warranty or special warranty.

1.06 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.
 - d. Skylight installed with three layers of protection: Deck seal mounting system, adhesive underlayment wrapped round the skylight frame and onto the roof deck, and engineered flashings, carries a “No Leak” installation warranty.
- B. Source Limitations: Obtain unit skylights, flashings, and accessories from 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.

- a. Provide WDMA Hallmark certified unit skylight with an attached label.
- E. 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.

1.07 COORDINATION

- A. Coordinate unit skylight flashing requirements with roofing system.
- B. Coordinate size and locations of site built curbs with ECB flashing for actual unit skylight if the slope of the roof is less than 14 degrees.
- C. Pre-installation conference: conduct conference at (project site).

1.08 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.

1.09 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 29648-5001; Toll Free Tel: 800-888-3589; Fax: 864-943-2631; Web: www.VELUXusa.com
- B. Substitutions: Not permitted

2.02 MATERIALS

- A. Wood: Kiln-dried, laminated Ponderosa Pine pre-painted with two coats of white finish. Special order stain grade variant available upon request.
- B. Maintenance free exterior cladding: Roll formed 0.65 mm aluminum frame coverings, 0.57 mm aluminum sash coverings, 0.55 mm copper frame coverings, 0.50 copper sash coverings prefinished, production engineered, and fabricated to fit exterior exposed surfaces.
- C. Dual sealed Glazing
 - a. Dual sealed thermal pane with warm edge technology, 95% argon gas, and with three layers of LoE³ silver that increases visible light over standard low e coatings while lowering the solar heat gain. The following glazing options are available:
 - i. 04 – Tempered LoE³ pane over a laminated heat strengthened interior pane with a (0.030”) vinyl interlayer.
 - ii. 05 – Tempered LoE³ pane over tempered pane
 - iii. 06 – Tempered LoE³ pane over laminated heat strengthened interior pane with a (0.090”) vinyl interlayer.
 - iv. 08 – Same as 04 but with a white vinyl interlayer.
 - v. 10 – Tempered LoE³ pane over a laminated tempered interior pane with a (0.030”) vinyl interlayer to achieve higher snow load ratings.
- D. Operators and Manual Operator Accessories
 - a. Electric Motors: Standard on all electric venting skylights (VSE) 120 V, 40 watts, 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 standard component with each VSE. Optional interface controls include the KLF/repeater sensor interface and the KLI 500 wall mounted keypad.
 - b. Manual control rods and extension poles available for manually operated venting skylights (VS).
 - c. Battery operated control rod.
 - d. In reach crank handles
- E. Fasteners: 1-1/4 inch ring shank nails provided for attaching deck seal mounting flange to roof decking. Ring shank nails are double hot dipped zinc coated.

- F. Weather stripping: Factory applied neoprene and thermoplastic elastomer weather stripping 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.
- H. Mounting System: Continuous corrosion resistant steel mounting system with a durable foam seal and rough opening alignment notches.

2.03 FLASHING OPTIONS

- A. Type EDL Flashing is a prefabricated step flashing system designed for use with roofing materials less than 3/4" thick and for slopes of 15 degrees to 85 degrees.
- B. Type EDW Flashing is a prefabricated gutter flashing system designed for use with roofing material greater than 3/4" thick, or high profile material, and for roof slopes of 15 degrees to 85 degrees. Sill flashing section consists of corrugated apron to allow form fit of high profile material.
- C. Type EDM Flashing is a prefabricated flashing system designed for use with metal roofing materials and for roof slopes of 15 degrees to 85 degrees. Sill flashing section consists of corrugated apron to allow form fit of roofing material profile.
- D. Type EKL for stacking skylights side by side and over and under with thin roofing materials
- E. EKW for stacking skylights side by side and over and under with thick roofing materials
- F. Type ECB site-built curb counter flashing kit for sloped applications less than 14 degrees.

2.04 FABRICATION

- A. Fabricate frame with slip mortise and tendon corners that are glued and nailed for strength and stability.
- B. Fabricate frame components with precision tolerances enabling installation and movement of sash and dynamic movement of perimeter weather stripping.

- 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.
- D. Assemble 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 factory glazed with hot melt silicone-based exterior seal.
- F. No site fabrication needed.
- G. Rough opening to be framed per manufacturer's listed dimensions.

2.05 FINISHES

- A. Exterior surfaces: Exposed exterior wood surfaces to be covered with roll formed maintenance free [aluminum] [copper as a special order] cladding pieces. Aluminum has a neutral gray, Kynar® 500 polyvinylidene fluoride resin finish. Copper is roll-formed, mill finish.
- B. Maintenance-free flashing: Roll formed aluminum, neutral gray, baked on polyester polyamid primer and finish coats. Copper is roll formed, mill finish.
- C. Interior surface: All exposed interior wood surfaces to be finished white with a 10-year maintenance free finish.
- D. Screens: Frames – white aluminum, mesh – charcoal.
- E. Operator - concealed beneath white removable cover.

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.
- B. Use the alignment notches on the deck seal mounting system to align skylight flush with the rough opening, free of warp or twist; maintain dimensional tolerances.

- C. Attach and seal the skylight to roof sheathing by nailing through the predrilled holes in the deck seal mounting system.
- D. Apply one layer of adhesive underlayment around the perimeter of the skylight frame.
- E. Install the manufacturer's engineered perimeter flashing in accordance with manufacturer's installation instructions to achieve weather tight installation.
- F. Install sun screen products and electrical controls.
- G. Provide thermal isolation when components penetrate or disrupt building insulation. Pack fibrous insulation in rough opening to maintain continuity of thermal barriers.

3.03 Cleaning

- A. Clean exposed skylight according to manufacturer's written instructions. Touch up damage 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 contaminants.

3.04 Field Quality Control

- A. Install skylight in accordance with manufacturer's installation instructions.