VELUX America Inc.
SPECIFICATION FOR MODEL FS
“NO LEAK” FIXED SKYLIGHT

SECTION 08620
UNIT SKYLIGHTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance and product component information for VELUX® FS fixed deck mount 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 or high profile 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 Under Specific Pressure Differences Across the specimen.

B. ASTM E 330 – *Standard Test Method for Structural Performance of Exterior Windows, and 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 Missile(s) and Exposed to Cyclic Pressure Differentials*.

E. ASTM E 1996 – *Standard Specification 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*.

1.03 SYSTEM DESCRIPTION

A. Skylight: Fixed deck mounted skylight consisting of the following main integrated components – an interior condensation drainage gasket, pre-finished white wooden frame [Special order stain grade wooden frame available on request], exterior maintenance-free [aluminum] [copper] cladding/counter flashing, ASA corner keys, and an insulating thermal pane glass unit with two seals, warm edge spacer system, three coats of LoE^3 silver to increase visible light transmittance while reducing solar heat, and a continuous deck seal mounting system with durable foam seal.

B. Configuration: Fixed unit, engineered deck seal mounting system with durable foam seal to seal the skylight to the roof deck. Pre-installed accessory mounting brackets.

C. Condensation Control: Integral internal condensation collection system and drainage slots.

D. Accessories available but sold separately.

a. Blackout blinds available in 24 v dc electric powered, solar powered and manual operation variants.

b. Roller blinds available in 24 v dc electric powered, solar powered, and manual operation variants.

c. Venetian blinds available in 24 v dc electric powered and manual operation variants.

E. Power supplies and electric controls are available but sold separately.

a. KLR 100 radio frequency remote control

b. KLC 500 accessory power supply (controls up to five accessories).

c. KLI 110 wall mounted keypad

1.04 PERFORMANCE REQUIREMENTS

A. The FS deck mount skylight is independently tested in accordance with listed standards for compliance with the unit skylight provisions of the 2003, 2006 and 2009 IBC, IECC, and IRC as follows:

a. AAMA/WDMA/CSA 101/I.S.2/A440-05 (NAFS – 05) and/or AAMA/WDMA/CSA 101/I.S.2/A440-08 (NAFS – 08)

Performance Grades must be greater than or equal to:
i. Downward design pressure = 100 psf
ii. Uplift Design Pressure = 40 psf

b. AAMA/WDMA/CSA 101/I.S.2/A440-02 (NAFS – 02)

Rated pressures must be greater than or equal to:
i. Downward design pressure = 100 psf
ii. Uplift Design Pressure = 50 psf

B. Air leakage: Maximum of 0.4 l/s/m² (0.08 CFM/ft²) of total unit area, measured at a pressure of 75 Pa (1.57 psf) in accordance with ASTM E 283, per the NAFS standards 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. Thermal Performance: U-factor = 0.45 Btu/hr*ft^2*F° or less, SHGC = 0.26 or less and [Vt = 0.52 or greater (clear)] or [Vt = 0.39 or greater (white)]. Tested and certified in accordance with NFRC 100 and 200 procedures. Applicable to aluminum and copper clad models. 2010 ENERGY STAR qualified in all U.S. zones. Applicable to aluminum and copper-clad models.

E. FS skylights with impact glazing (06): Tested and certified in accordance with ASTM E 1886 and ASTM E 1996, Rated for Wind Zone 3, Missile Level C, Cycle Pressure +50 / -50.

F. Limit member deflection to flexure limit of glass with full recovery of glazing materials.

G. System accommodates, without damage to components or deterioration of seals, movement between frame and perimeter components.

1.05 SUBMITTALS

A. Product Data: Manufacturer’s installation details and product data sheets include:

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 the specification, 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 be included 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 to match up with 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 flashing, carries a “No Leak” installation warranty.

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.

a. Provide third-party certified unit skylight with 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 installation 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 product warranty, as specified in VELUX Warranty, publication XUS 20194.

B. 10-year “NO LEAK” installation warranty. (Ref. 1.06(d))

1.09 DELIVERY, HANDLING, STORAGE

A. Deliver products in manufacturer's original containers, dry and undamaged, with 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: 865-388-1329; Web: www.VELUXusa.com

B. Substitutions: Not permitted

2.02 MATERIALS

A. Wood: Kiln-dried, laminated Ponderosa Pine pre-finished white.

B. Maintenance free exterior cladding: [Roll formed 0.65 mm aluminum frame coverings,] [0.55 mm copper frame coverings,] prefinished, production engineered, and fabricated to fit exterior exposed surfaces (Alloy AA 3003 H12 and AA 3003 H16).

C. Dual sealed Glazing

a. Dual sealed thermal pane with warm edge technology, 95% argon gas fill, 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 0.030” interlayer.
   ii. 05 – Tempered LoE³ pane over tempered interior pane.
   iii. 06 – Tempered LoE³ pane over laminated heat strengthened interior pane with 0.090” interlayer.
   iv. 08 – Tempered LoE³ pane over a white laminated heat strengthened interior pane with 0.030” interlayer.
   v. 10 – Tempered LoE³ pane over a laminated tempered interior pane with 0.030” interlayer to achieve higher snow load ratings.

D. Operators and Manual Operator Accessories

a. Manual control rods and extension poles available or manual operated sunscreening accessories.

b. Battery operated control rod for sunscreening accessories.

E. Field 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 elastomeric weather stripping throughout entire frame, profiled to effect weather seal.

G. Mounting System: Continuous corrosion resistant 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 5/16" thick and for slopes of 14 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 14 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 14 degrees to 85 degrees. Sill flashing section consists of corrugated apron to allow form fit of roofing material profile.

D. Type ECB Counter Flashing is a flashing systems designed for use on site-fabricated curbs with deck mounted skylights on low-pitched roof slopes of 0 degrees to 14 degrees. ECB counter flashing should be used with membrane roofing.

E. Type EKL gang flashing system for use with roofing materials less than 5/16" thick and for slopes of 14 degrees to 85 degrees.

F. Type EKW gang flashing system for use with roofing material greater than 3/4" thick, or high profile material, and for roof slopes of 14 degrees to 85 degrees. Sill flashing section consists of corrugated apron to allow form fit of high profile material.

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. All units factory glazed with hot melt silicone-based exterior seal.

E. No site fabrication needed.

F. 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 made to 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 painted white with a 10-year maintenance free finish.]

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify rough opening dimension and squareness, proper orientation of skylight, proper roof pitch, and flashing.

3.02 INSTALLATION

A. Install skylight in accordance with manufacturer's installation instructions and local code requirements.

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. One fastener required in each predrilled hole.

D. Apply one layer of VELUX skylight adhesive underlayment around the perimeter of the skylight frame.

E. Install the manufacturer’s engineered perimeter flashing in accordance with manufacturer’s installation instruction to achieve a weather tight installation.

F. Install sun screening 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 to 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 contaminates.

3.04 FIELD QUALITY CONTROL

A. Install skylight, adhesive skylight underlayment, and flashing in accordance with manufacturer's installation instructions.