



Commercial Dynamic Dome Unit Skylight - Guide Specification

For over 70 years, VELUX has been delivering energy efficient daylight to living spaces where people, live, work, and play. VELUX is the world leader in harnessing the benefits of the sun, providing energy efficient top lighting solutions, and recognized as one of the strongest brands in the global materials and home improvement industry.

VELUX dynamic dome skylights are designed for commercial roof applications. Daylighting provided through VELUX skylights improves the low sun angle lighting levels and visual comfort of these commercial and industrial spaces. The VELUX dynamic dome skylight is a category leader with a maintenance free frame, structural seal, and durable dome options with performance levels meeting project specifications. The dynamic dome glazing's unique design maximizes the amount of early morning and late afternoon daylight brought into commercial and industrial spaces.

VELUX test facilities ensure that new products comply with regulations and market demands for technical performance. VELUX testing ensures that our products withstand the most difficult climatic conditions in the markets where they are sold. Our test procedures include load capacity, air and water tightness in a test chamber and a weather simulator, mechanical tests, impact test results, durability tests, U-factor and solar heat gain tests, burn brand resistance and visual inspection of the surface quality.

SECTION 08 62 00 –UNIT SKYLIGHTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Dynamic dome unit skylight with formed curb counterflashing for mounting on site-built or prefabricated roof curbs, for flat, low-slope and steep-slope roofing applications.

1.2 RELATED REQUIREMENTS

Specifier: If retaining optional "Related Sections" article, edit to include sections applicable to Project.

- A. Section 061053 "Miscellaneous Rough Carpentry" for site-built wood roof curbs and nailers for unit skylights.
- B. Division 07 roofing section for flashing and roofing terminations at unit skylight curbs.
- C. Section 077200 "Roof Accessories" for manufactured metal roof curbs for unit skylights.

1.3 REFERENCE STANDARDS

Specifier: If retaining optional "References" article, edit to include standards cited in edited Section.

- A. General: Applicable edition of references cited in this Section is current edition published on date of issue of Project specifications, unless otherwise required by building code in force.
- B. American Architectural Manufacturers Association (www.aama.net), Window & Door Manufacturers Association (www.wdma.com), Canadian Standards Association (www.csagroup.org/us/en/services)
 - 1. AAMA/WDMA/CSA 101/I.S.2/A440 - North American Fenestration Standard/ Specification for Windows, Doors, and Skylights (NAFS)
 - 2. CSA A440S1 – Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440
 - 3. AAMA 502 – Voluntary Specification for Field Testing of Newly Installed Fenestration Products
 - 4. AAMA 2603 – Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum and Panels
- C. ASTM International: www.astm.org:
 - 1. ASTM D1003 – Standard Test Method for Haze and Luminous Transmittance of Transparent Plastics
 - 2. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings

3. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
 4. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 5. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques
 6. ASTM E1886 - 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
 7. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes
- D. Code of Federal Regulations:
1. 29 CFR 1910.29 - Occupational Safety and Health Standards: Fall protection systems and falling object protection – criteria and practices.
- E. Factory Mutual (FM): www.fmglobal.com
1. FM 4431 - Approval Standard for Skylights
- F. Illuminating Engineering Society of North America (IESNA): www.ies.org:
1. IESNA – The Lighting Handbook.
- G. Leadership in Energy and Environmental Design (LEED): www.usgbc.org/leed
- H. National Fenestration Rating Council: www.nfrccommunity.org:
1. NFRC 100 - Procedure for Determining Fenestration Product U-factors
 2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
- I. National Fire Protection Association: www.nfpa.org:
1. NFPA 70 - National Electrical Code

1.4 COORDINATION

Specifier: Retain option in paragraph below that corresponds to the type of curb used on Project.

- A. Coordinate dimensions, locations, and details of skylight curbs [specified in Section 061053 "Miscellaneous Carpentry"] [specified in Section 077200 "Roof Accessories"] with unit skylight curb flashings. Verify requirements for roofing system terminations.

- B. Coordinate unit skylight interior termination locations with structural layout, ceiling layouts, and other ceiling-mounted items.

1.5 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site prior to delivery of unit skylight and installation of roof deck.

1.6 ACTION SUBMITTALS

- A. Product Data: For unit skylights. Include standard construction details, product performance characteristics, and material descriptions, dimensions of individual components and profiles, and finishes.
 - 1. Include test reports of qualified independent testing agency or third party certificates verifying compliance with performance requirements.

Specifier: Retain "LEED Submittals" Paragraph when required for Project; this Paragraph stipulates documentation required from Contractor to support cited construction-phase credits.

Review design-phase credits available related to unit skylights, including contribution to IEQ Cr 6.1 Controllability of Systems, IEQ Cr 8.1. Daylighting, EA Cr 1 Energy Optimization, and ID Cr 1 Innovation in Design credits. Consult VELUX representative for detailed support data.

B. LEED Submittals:

- 1. Credit MR 4 Recycled Content: Documentation indicating the following:
 - a. Percentages by weight of post-consumer and pre-consumer recycled content.
 - b. Total weight of products provided.
 - c. Include statement indicating costs for each product having recycled content.
- C. Shop Drawings: For unit skylight work. Include plans, elevations, sections, details, and connections to supporting structure and other adjoining work.
 - 1. Lighting photometric study indicating compliance with performance requirements in accordance with IESNA. Include layout, spacing criteria and foot-candle report.

1.7 INFORMATIONAL SUBMITTALS

Specifier: Retain paragraphs below when Project requirements include compliance with Federal Buy American provisions. VELUX Fixed Curb Mount skylights complies with requirement.

- A. Buy American Act Certification: Submit documentation certifying that products comply with provisions of the Buy American Act 41 U.S.C 10a – 10d.

- B. Florida State Product Approval Listing Number: Indicating that products comply with requirements of Florida State Building Code.
www.floridabuilding.org/pr/pr_app_srch.aspx

- C. Warranty: Sample of special warranty.

1.8 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data.

1.9 QUALITY ASSURANCE

Specifier: VELUX America LLC has been producing skylights in the US for over 30 years and in Europe for an additional 30 years prior to that. VELUX has a reputation among architects and contractors as the most reliably performing skylight in the world.

- A. Manufacturer Qualifications: A qualified manufacturer listed in this Section with minimum 30 years' experience in the US manufacturing similar products in successful use on similar projects and able to provide unit skylights meeting requirements.

Specifier: Retain "Approval of Manufacturers and Comparable Products" Subparagraph if Owner will consider product substitutions.

1. Approval of Manufacturers and Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Completed and signed Substitution Request form.
 - b. Product data, including photometric data and independent test data indicating compliance with requirements.
 - c. Sample product warranty.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of skylights that fail in materials or workmanship under normal use within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Deterioration of metals, metal finishes, dome, and other materials beyond normal weathering.
 - b. Breakage of polycarbonate glazing.
 - c. Product leaks.
2. Warranty Period:
 - a. 15 Years: Polycarbonate dome skylights including water penetration and hail breakage for hailstones 2 inches and less in diameter. Mill finished aluminum skylight frames.

- b. 10 Years: Yellowing of acrylic and polycarbonate skylight domes.
- c. 5 Years: Acrylic dome skylights, skylight model CDS with polycarbonate dome, aluminum curbs, external safety cage, internal safety screen accessory, internal security bars accessory, ventilation curb extension.
- d. 1 Year: Steel curbs

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide products of **VELUX America LLC**, Greenwood, SC 29648, available exclusively through Logistics Lighting with an extended warranty and National Account pricing. Contact for quotes or product questions: Sales@LogisticsLighting.com or 307-633-9696 or Toll-Free at 844-455-7283 website: www.LogisticsLighting.com

Specifier: Retain "Substitutions" Paragraph and select one of two options based upon Project requirements.

- B. Substitutions: [None allowed by Owner] [As permitted under Instructions to Bidders and Section 012500 "Substitution Procedures"].
- C. Source Limitations: Obtain unit skylights through single source from single manufacturer.

Specifier: Retain integral double sided insulated aluminum curb text for deck mount skylight DMD-

2.2 DYNAMIC DOME UNIT SKYLIGHT ([Curb Mount Model CMD-][Deck Mount Model DMD-])

- A. System Description: Dynamic dome, [curb] [deck] mounted fixed skylight utilizing extruded aluminum frame counter-flashing with welded corners, a PVC inner frame allowing condensation drainage, structural sealant, [integral double sided insulated aluminum curb] and accessories, as required to meet installation and performance requirements indicated. Dynamic dome skylights shall be suitable for installation on roof pitches ranging from 0 degrees up to 60 degrees from horizontal.

- 1. Basis of Design: **VELUX America LLC, Model [CMD-] [DMD-] Dynamic Dome Skylight.**

Specifier: Dynamic dome designed specifically to harvest the maximum amount of daylight delivered into commercial and industrial spaces at solar elevation angles 10 to 40 degrees. The initial rise of the dome is designed at a minimum 60 degree slope to eliminate reflection, and refract early morning and late afternoon light into the building space. The dome height is at least 30% of the skylight width in order to harvest maximum levels of daylight at low solar elevation angles. Prismatic sheets are not offered for the outer dome as prisms pointed away from sun refract as much as 10% the light to the exterior resulting in less daylight passing through the prismatic material. Prismatic sheets used for the inner dome where the prisms point to the light source allows all the daylight to pass through and fully diffuses the light as intended. VELUX refers to polycarbonate dynamic domes as LuxGuard and LuxGuard Plus.

LuxGuard Plus skylight certified for use in windborne debris areas. LuxGuard skylight certified, listed and labeled for air, water, structural loads, and is Factory Mutual (FM) Listed. The LuxGuard and LuxGuard Plus polycarbonate sheets have an integrated enhanced spectral protection (UV blocking) that insures long-term color and performance stability.

Model CMD2 is a curb mounted dynamic double dome skylight with aluminum frame. Model DMD2 is a deck mounted dynamic double dome skylight with aluminum frame and integral curb. Model CMD3 is a curb mounted dynamic triple dome skylight with aluminum frame. Model DMD3 is a deck mounted dynamic triple dome skylight with aluminum frame and integral curb. Model CMD4 is a curb mounted aluminum frame skylight utilizing an exterior dynamic dome over a flat multiwall polycarbonate sheet filled with Lumira aerogel. Model DMD4 is a deck mounted aluminum frame skylight with integral curb utilizing an exterior dynamic dome over a flat multiwall polycarbonate sheet filled with Lumira aerogel. Model CMD5 is a curb mounted aluminum frame skylight utilizing an exterior dynamic dome over security bars containing a flat multiwall polycarbonate sheet filled with Lumira aerogel. Model DMD5 is a deck mounted aluminum frame skylight with integral curb utilizing an exterior dynamic dome over security bars containing a flat multiwall polycarbonate sheet filled with Lumira aerogel. Model CMD6 is a curb mounted aluminum frame skylight utilizing two dynamic domes over a flat multiwall polycarbonate sheet filled with Lumira aerogel. Model DMD6 is a deck mounted aluminum frame skylight with integral curb utilizing two dynamic domes over a flat multiwall polycarbonate sheet filled with Lumira aerogel. Model CMD7 is a curb mounted aluminum frame skylight utilizing two dynamic domes over security bars containing a flat multiwall polycarbonate sheet filled with Lumira aerogel. Model DMD7 is a deck mounted aluminum frame skylight with integral curb utilizing two dynamic domes over security bars containing a flat multiwall polycarbonate sheet filled with Lumira aerogel.

Use white color interior dome when specifying 100% light diffusion.

- B. Dynamic Dome: Height 30% of skylight width, vacuum formed with precise repeating geometric patterns, and overall shape to maximize strength and daylight at low solar elevation angles 10 to 40 degrees. Outer dome shall be formed from smooth sheet and not prismatic in order to transmit all incident daylight through outer dome. Initial rise of the dome shall be at an angle of at least 60 degrees to horizontal in order to harvest daylight at low solar elevation angles 10 through 40 degrees. [Provide polycarbonate domes with integral UV blocking cap layer that prevents long-term yellowing, and insures material strength and performance stability.] [Light diffusion 100%.]

Specifier: Select double dome glazing(s) required for project a) polycarbonate (LuxGuard), b) Polycarbonate (LuxGuard Plus) or c) Infrared blocking acrylic. LuxGuard has air, water and structural certification and LuxGuard Plus certified for air, water, structural, wind borne debris regions, high velocity hurricane zones and Factory Mutual. Prismatic inner dome is available in all dynamic domes sizes except 7272.

1. [Double dome:
 - a. [Polycarbonate (LuxGuard) – Outer dome clear polycarbonate, 0.118 inches in thickness with UV blocking cap layer. Inner dome [white prismatic poly-

- carbonate, 0.118 inches in thickness.] [polycarbonate, 0.118 inches in thickness, color [clear] [white].] [acrylic satin ice, 0.118 inches in thickness.]]
- b. [Polycarbonate (LuxGuard Plus) - Outer dome clear polycarbonate, 0.150 inches in thickness, with UV blocking cap layer. Inner dome white polycarbonate, 0.118 inches in thickness.]
- c. [Infrared Blocking Acrylic – Outer dome Satin Sky 2, 0.118 inches in thickness. Inner dome [clear] [white] acrylic, 0.118 inches in thickness.]]

Specifier: Infrared blocking material is only available as an outer dome for triple dome skylights.

- 3. [Triple Dome:
 - a. [Polycarbonate (LuxGuard) - Outer dome clear polycarbonate, 0.118 inches in thickness with UV blocking cap layer. Middle dome clear polycarbonate 0.118 inches in thickness. Inner dome [white prismatic polycarbonate, 0.118 inches in thickness.] [polycarbonate, 0.118 inches in thickness, color [clear] [white].] [acrylic satin ice, 0.118 inches in thickness.]]
 - b. [Infrared Blocking Acrylic – Outer dome Satin Sky 2, 0.118 inches in thickness. Middle dome clear acrylic 0.118 inches in thickness. Inner dome [clear acrylic, 0.118 inches in thickness.] [acrylic satin ice, 0.118 inches in thickness.]]]

Specifier: Middle dome only available with Satin Sky 2 outer dome when specifying energy domes.

- 4. [Energy Dome: Outer dome [clear polycarbonate (LuxGuard)] 0.118 inches in thickness with UV blocking cap layer] [infrared blocking acrylic (Satin Sky 2) 0.118 inches in thickness]. [Middle dome clear acrylic 0.118 inches in thickness.] Inner glazing flat 3/8 inches thick, clear multi-walled polycarbonate filled with Lumira aerogel] [incased in tray with 0.5 inch diameter security bars].]

Specifier: Dynamic dome skylights are not available as a stocked product for all sizes and glazing options.

- C. Aluminum Frame Counter-flashing: Maintenance-free, extruded aluminum, grade 6063-T6, 0.08 inch (2.0 mm) thick with [mill] [neutral grey powder coat] finish. Counter-flashing frames completely welded in corners and counter flashes curb a minimum of 1.625 inches (41 mm). Provide aluminum frame with at least 0.5 inch (12 mm) continuous ledge on each side of the skylight that is a pinch free access for stacking, manual transportation and mounting of skylights.
 - 1. Unit Sizes: [2448] [2496] [24120] [30120] [3636] [3660] [3672] [3696] [36120] [4783] [4848] [4860] [4872] [4896] [48120] [5060] [6060] [6072] [6096] [60120] [7272].

- D. 100% Thermally Broken PVC inner-frame for Condensation Drainage: Factory applied white PVC inner-frame assembly providing a thermal break weather seal and drainage for condensation. The inner-frame design allows positive condensation to the exterior of the curb without exposed drainage openings in the aluminum frame that can introduce air infiltration into the skylight. The PVC inner-frame construction consists of coextruded fins allowing for a dry installation of skylight to the curb, eliminating weather seal strips or caulking at the top of the curb.
- E. Structural Sealant: Factory applied InstantGlaze sealant, bonding the dome to the aluminum frame and suitable for external exposure.

Specifier: Model DMD- is a Deck Mounted Dynamic Dome skylight. Deck mounted skylights are provided with factory installed integral double walled aluminum insulated curbs. Only include deck mount aluminum curb when deck mount skylights are specified.

- F. Deck Mount Aluminum Curb: Factory installed and insulated aluminum curb, 1.5 inches in thickness with 22 gauge (0.025") white finished aluminum interior and 20 gauge (0.032") mill finished aluminum exterior. Curb factory insulated with 1.5 inches of expanded polystyrene board having a 5.8 R-Value. Width and length of curb shall be [2448] [2496] [24120] [30120] [3636] [3660] [3672] [3696] [36120] [4783] [4848] [4860] [4872] [4896] [48120] [5060] [6060] [6072] [6096] [60120] [7272] with [9] [12] [16] inch curb height. Curb roof mounting flange shall be a minimum 2.75 inches in width.

2.3 DYNAMIC DOME SoCal UNIT SKYLIGHT: (Model CDS)

- A. System Description: Dynamic dome, curb mounted fixed skylight utilizing extruded aluminum frame counter-flashing with welded corners and condensation gutter, structural sealant, and accessories, as required to meet installation and performance requirements indicated. Dynamic dome skylights shall be suitable for installation on roof curbs ranging from 0 degrees up to 60 degrees from horizontal.

- 1. Basis of Design: **VELUX America LLC, Model CDS SoCal Dynamic Dome Skylight.**

Specifier: Dynamic dome designed specifically to harvest the maximum amount of daylight delivered into commercial and industrial spaces at solar elevation angles 10 to 40 degrees. The base of the dome is designed at a 30 degree slope to eliminate reflection, and refract early morning and late afternoon light into the building space. The dome height is 30% of the skylight width in order to harvest maximum levels of daylight at low solar elevation angles. SoCal model skylight uses a single white sheet of LuxGuard glazing material and is certified for air, water, and structural loads. The LuxGuard polycarbonate sheet has an integrated enhanced spectral protection (UV blocking) that insures long-term color and performance stability.

- B. Dynamic Dome: Height 30% of skylight width, vacuum formed with precise repeating geometric patterns, and overall shape to maximize strength and daylight at solar

elevation angles 10 to 40 degrees. Dome shall be formed from smooth sheet and not prismatic in order to transmit all incident daylight through outer dome. Initial rise of the dome shall be at an angle of at least 60 degrees to horizontal in order to harvest daylight at low solar elevation angles 10 through 40 degrees. Provide polycarbonate domes with integral UV blocking cap layer that prevents long-term yellowing, and insures material strength and performance stability. Light diffusion 100%.

1. Single dome: Formed from white polycarbonate sheet with UV blocking cap layer.
- C. Aluminum Frame Counter-flashing: Maintenance-free, extruded aluminum, grade 6063-T5, 0.06 inch (1.5 mm) thick with mill finish. Counter-flashing frames with exterior completely welded in corners and counter flashes curb a minimum of 2.25 inches (57.2 mm).

1. Unit Sizes: [4848] [4896]

- D. Structural Sealant: Factory applied InstantGlaze sealant, bonding the dome to the aluminum frame.

2.4 ACCESSORIES-CURBS:

- A. Steel Curb: Curb width and length designation shall be [2448] [2496] [24120] [30120] [3636] [3660], [3672] [3696] [36120] [4848] [4860] [4872] [4896] [48120] [6060] [6072] [6096], [60120] [7272]. Curb height shall be [9] [12] [16] [18] inches and nominal curb thickness shall be 1.5 inches.

Specifier: VELUX recommends fall protection. All steel curbs provided with integral safety screen, unless indicated otherwise. Curbs are available without safety screens or security bars, but must be specified with no safety screen or security bars.

1. Factory Insulated Curb: Factory engineered steel curb fabricated from [18] [14] gauge galvanized steel with fully welded corners, all welds factory primed with galvanized paint, and continuous 2 inch by 2 inch nominal pressure treated wood nailer mounted to the top flange of the curb. Curb is factory insulated with 1.5 inch thick, 3 pound density fiberglass insulation. Interior liner of curb fabricated from 20 gauge steel and primed white. Curb roof mounting flange shall be a minimum of 3 inches in width. [Provide steel curb without safety screen or security bars.] [Steel insulated curb provided with integral [fall protection safety screen constructed from 0.1875 inch steel mesh with a 6 inch on center grid spacing] [security bars constructed from 0.5 inch cold rolled steel with a 6 inch on center grid spacing]]. Basis of Design: VELUX America LLC Model, CCA3.
2. Non-insulated curb: Factory engineered steel curb fabricated from [18] [14] gauge galvanized steel with fully welded corners, all exterior welds factory primed with galvanized paint, and continuous 2 inch by 4 inch nominal pressure treated wood nailer mounted under the top flange of the curb. Curb roof

mounting flange shall be a minimum of 3 inches in width. [Provide steel curb without safety screen or security bars.] [Steel insulated curb provided with integral [fall protection safety screen constructed from 0.1875 inch steel mesh with a 6 inch on center grid spacing] [security bars constructed from 0.5 inch cold rolled steel with a 8 inch on center grid spacing]]. Basis of Design: VELUX America LLC, Model CCA6.

- B. Aluminum Curb: Factory insulated aluminum curb, 1.5 inches in thickness with 22 gauge (0.025") white finished aluminum interior and 20 gauge (0.032") mill finished aluminum exterior. Curb factory insulated with 1.5 inches of expanded polystyrene board having a 5.8 R-value. Width and length of curb shall be [2448] [2496] [24120] [30120] [3636] [3660] [3672] [3696] [36120] [4848] [4860] [4872] [4896] [48120] [6060] [6072] [6096] [60120] [7272] with [9] [12] [16] inch curb height. Curb roof mounting flange shall be a minimum 2.75 inches in width. Basis of Design: VELUX America LLC, Model CCAW.

2.5 ACCESSORIES-FALL PROTECTION AND SECURITY

- A. Interior safety screen accessory: Fall protection safety screen constructed from 0.1875 inch steel mesh with a 6 inch on center grid spacing welded to 18 gauge steel z-bar support frame continuous on each side with welded corners. Interior safety screen frame mounts to top of 1.5 inches curb with safety screen mesh located not more than 1.5 inches below top of curb. Safety screen factory are galvanized finish. Safety screen shall meet fall protection requirements by supporting a minimum static load of 400 pounds per square foot. Interior safety screen accessory width and length designation shall be [2448] [2496] [24120] [30120] [3636] [3660] [3672] [3696] [36120] [4848] [4860] [4872] [4896] [48120] [6060] [6072] [6096] [60120] [7272]. Basis of Design: VELUX America LLC, Model CRGA xxxx ICD.
- B. Exterior safety screen accessory: Fall protection screen attaches directly to the skylight frame and provides fall protection coverage over the exterior of the skylight dome. Safety screen constructed from a minimum 0.1875 inches steel mesh with a 4 inch on center grid spacing. Exterior safety screen shall meet fall protection requirements by supporting a minimum static load of 400 pounds per square foot. Safety screen accessory width and length designation shall be [2448] [2496] [24120] [30120] [3636] [3660] [3672] [3696] [36120] [4848] [4860] [4872] [4896] [48120] [6060] [6072] [6096] [60120] [7272]. Basis of Design: VELUX America LLC, Model CAE.
- C. Interior security bars accessory: Security bars accessory constructed from 0.5 inch cold rolled steel [with a 8 inch on-center grid spacing welded to 18 gauge steel z-bar support frame continuous on each side with welded corners.] [with 5 inch on-center spacing parallel to short side welded to 0.125 inch steel z-bar support frame continuous along sides.] Accessory frame mounts to top of 1.5 inches curb with security bars located less than 1 inch below top of curb. Security bars accessory has a galvanized finish. Internal security bars accessory shall meet fall protection requirements by supporting a minimum static load of 400 pounds per square foot. Size shall be [2448] [2496] [24120] [30120] [3636] [3660] [3672] [3696] [36120] [4848] [4860] [4872] [4896] [48120] [6060]

[6072] [6096] [60120] [7272]. Basis of Design: VELUX America LLC, Model CRGA xxxx BB or CRGA xxxx SB.

2.6 PERFORMANCE REQUIREMENTS

A. Unit Skylight Standard, Dynamic Dome model[s] [CMD2] [and] [DMD2] certified to AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS-17 or previous) as follows:

1. Design Pressure (DP): Minimum DP = +/- 30 psf (+/- 1.44 KPa). Dome shall not invert at positive design pressure.
2. Water Test Pressure: Minimum 15 psf (720 Pa) with no leakage at 5 gallons per minute spray rate.
3. Air Leakage Rate: Maximum 0.061 cfm/ft² (0.3 L/s/m²)

Specifier: Canadian air infiltration/exfiltration rating based on using a dynamic double dome skylight.

4. [Canadian Air Infiltration/Exfiltration Rating: Fixed (0.2 L/s/m² maximum).]

B. Daylighting: Provide daylighting photometric performance comparable to basis of design product at layout indicated, based upon daylighting profile of March 21, 9:00 am local time, at Project location by simulation in accordance with IESNA guidelines.

Specifier: Retain one of the "Windborne Debris Resistance" Paragraphs if required by authorities having jurisdiction. Select LuxGuard Plus when retaining this Paragraph. LuxGuard Plus in maximum 4'x8' and 5'x6' sizes specified in windborne debris areas defined as High Velocity Hurricane Zone (Florida Building Code), Miami-Dade, or less.

C. Windborne-Debris Resistance:

1. [Provide unit skylights capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed units representative of those specified, according to ASTM E 1886 and ASTM E 1996. Missile Level D, and +80/-80 psf cycle pressure.]
2. [High Velocity Hurricane Zone: Provide unit skylights capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed units representative of those specified, according to TAS 201, TAS 202, and TAS 203: Florida Building Code HVHZ requirements, and +80/-80 psf cycle pressure.]
3. [Miami-Dade notice of acceptance: Provide unit skylights capable of resisting impact from windborne debris, based on the pass/fail criteria as determined from testing glazed units representative of those specified, according to TAS 201, TAS 202, and TAS 203: Miami-Dade requirements, and +80/-80 psf cycle pressure.]

- D. Fire Testing for Roof Assemblies with Fire Classifications: Polycarbonate unit skylight tested in accordance with and listed as passing Class A Burning Brand test as described in ASTM E 108.
- E. Dome Burn Rate: Tested in accordance with ASTM D 635 with a documented rating of [[CC1 for [LuxGuard] [LuxGuard Plus] (polycarbonate)]]
- F. Dome Smoke Density Rating: Testing in accordance with ASTM D 2843 with a documented performance value less than or equal to 75.
- G. Dome Self-Ignition Temperature: Tested in accordance with ASTM D 1929 with a documented performance value greater than or equal to 650 degrees Fahrenheit.

Specifier: Retain the Factory Mutual Paragraph if required for project. Select LuxGuard CMD2 or DMD2 with P1C2 glazing when retaining this Paragraph for skylights. Size 60120 not part of FM approval.

- H. Factory Mutual: Skylights Factory Mutual 4431 approved.

Specifier: Retain the Hail Resistance Paragraph when selecting LuxGuard, LuxGuard Plus, or SoCal skylights.

- I. Dome Hail Resistance: Exterior dome tested in accordance with Factory Mutual 4430 to meet severe hail with 2.0 inch ice balls.
- J. Energy Performance ratings for any size commercial [CMD- curb] [DMD- deck] mounted unit skylight with dynamic dome as follows:
 - 1. Thermal Transmittance: NFRC 100 maximum U-factor:
 - a. [Double Dome:
 - 1) [LuxGuard ([CMD2] [DMD2] P1C2): 0.65]
 - b. [EcoSky:
 - 1) [Infrared blocking acrylic over acrylic ([CMD2] [DMD2] E2A1): 0.65]
 - 2) [Infrared blocking acrylic over multiwall polycarbonate filled with Lumira aerogel ([CMD4] [DMD4] E2L2): 0.36]]
 - 2. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC:
 - a. [Double Dome:
 - 1) [LuxGuard ([CMD2] [DMD2] P1C2): 0.46]
 - b. [EcoSky:
 - 1) [Infrared blocking acrylic over acrylic ([CMD2] [DMD2] E2A1): 0.37]
 - 2) [Infrared blocking acrylic over multiwall polycarbonate filled with Lumira aerogel ([CMD4] [DMD4] E2L2): 0.28]]
 - 3. Visible Light Transmittance (VLT) and Percent Haze: ASTM D 1003:

- a. [Double Dome:
 - 1) [LuxGuard ([CMD2] [DMD2] P1C2): VLT = 61.9%, Haze = 100%]
 - b. [Energy Dome:
 - 1) [Infrared blocking acrylic over acrylic ([CMD2] [DMD2] E2A1): VLT = 56.8%, Haze = 99.8%]
 - 2) [Infrared blocking acrylic over multiwall polycarbonate filled with Lumira aerogel ([CMD4] [DMD4] E2L2): VLT = 33.6%, Haze = 100%]]
 - K. Fall Protection Standard Compliance: 29 CFR 1910.29: Skylight [dome], [safety screen] [security bars] tested to support a minimum of 400 pounds over 1 square foot of the surface.
- 2.7 MATERIALS
- A. Joint Sealants: As specified in Section 079200 "Joint Sealants."
 - B. Mastic Sealants: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- 2.8 FINISHES
- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- PART 3 - EXECUTION
- 3.1 EXAMINATION
- A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 - B. Proceed with unit skylight installation only after unsatisfactory conditions have been corrected.
- 3.2 INSTALLATION
- A. Install unit skylights in accordance with manufacturer's written instructions and approved shop drawings. Coordinate installation of units with installation of substrates, air and vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that finished installation is weather tight.
 - 1. Anchor unit skylights securely to supporting substrates.

2. Install unit skylights on curbs specified in another section with tops of curbs parallel to finished roof slope.
- B. Where metal surfaces of unit skylights will contact incompatible metal or corrosive substrates, including preservative-treated wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation recommended in writing by unit skylight manufacturer.
- C. For custom flashings, install unit skylight curb counter-flashing to produce weatherproof seal with curb and overlap with roofing system termination at top of curb.

3.3 FIELD QUALITY CONTROL

- A. Work will be considered defective if it does not pass inspections.
- B. Additional testing and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- C. Prepare inspection reports.

3.4 CLEANING AND PROTECTION

- A. Clean exposed unit skylight surfaces according to manufacturer's written instructions. Touch up damaged metal coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- B. Replace glazing that has been damaged during construction period.
- C. Protect unit skylight surfaces from contact with contaminating substances resulting from construction operations.

END OF SECTION