SECTION 08 6200—UNIT SKYLIGHTS

ASTM, UFC, GSA Blast Resistant
Miami-Dade County, Florida Building Commission (FBC) & Texas Department of Insurance (TDI) Approved
OSHA Fall Protection Compliant Unit Skylight(s)

Curb Mount Model BCM or Thermal Break Curb Mount Model BTCM & Maxim(um) Insulated Curb – 9”, 12” or Special Height

PART 1: General

1.01 Section Includes:

. Scope:

This section includes everything necessary for and incidental to the execution and completion of the Polycarbonate Dome and 5 layer multiwall polycarbonate glazed unit skylight assembly as shown on all drawings and specified herein that complies with;

1. ASTM F1642-12
2. ASTM F2912-11
3. GSA-TS01-2003
4. PDC-TR 10-02
5. UFC 4-010-01
6. OSHA Fall Protection Guidelines for roof openings
7. TAS 201 – Miami-Dade County /Florida Building Code air/water/structural Protocol(s)
8. TAS 202 – Miami-Dade County /Florida Building Code air/water/structural Protocol(s)
9. TAS 203 – Miami-Dade County /Florida Building Code air/water/structural Protocol(s)
10. ASTM E1886/E1996 – Large & Small Missile Impact Resistance
11. AAMA/WDMA/CSA 101/I.S.2/A440-08

**Reference must be made to Report No. F5594.01-119-12, dated 03/15/16 for complete test specimen description and detailed test results.*

B. Work Included and is limited to, the skylight materials only and includes the following:

1. Polycarbonate dome and 16mm 5 Layer Multiwall Polycarbonate Curb Mount unit skylight complete with curb mount frame for installation on flashed curb by others with anchoring per test protocol.

2. Polycarbonate dome and 16mm 5 Layer Multiwall Polycarbonate Curb Mount unit skylight complete with Maxim(um) insulated Curb; 1.75” thick with concealed 2X4 wood nailer and 1.5” polyisocyanurate insulation. Curb height to be 9” wall, 12” wall or **height as specified**. Anchoring of Curb Mount Skylight to Maxim(um) curb to comply with anchoring per test protocol; minimum penetration of 1.25” into minimum 2X SYP wood substrate. All curbs include an integral 3” counterflashing for anchoring to roof system as required to comply with UFC/GSA/ASTM standards.

C. Related Work:

1. Division 7: Thermal & Moisture Protection.
2. Division 8: Windows & Doors.
3. Section_____ final cleaning.
4. AAMA

a. 2605 – Voluntary Specification, performance requirements and test protocols for high performance organic coatings on aluminum extrusions and shapes
b. Work Item WK17797 – Fall Through Resistance of Unit Skylights (protocol pending)

5. ASTM
   a. ASTM D1003 – Light transmission of thermoplastic
   b. ASTM D638 – Tensile strength of thermoplastic
   c. ASTM D793 – Flexural properties – polycarbonate thermoplastic
   d. ASTM D732 – Shear strength properties – polycarbonate thermoplastic
   e. ASTM D648 – Heat deflection – polycarbonate thermoplastic
   f. ASTM D635 – Burn rate

   g. ASTM D1929 – Flammability – self ignition
   h. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy

6. OSHA Protection for roof openings
   a. 29 CFR 1910.23 – protection for roof opening during and after roof construction.

7. UL
   a. UL 972 – Burglar resistant glazing material
   b. UL F588 – Forced entry protection

1.02 References and Approvals:

Architectural Testing, Inc., 130 Derry Court, York, PA 17402 – **REPORT#: G5934.01-801-18**
Performance Protocols: TAS 201, TAS 202, TAS 203

Architectural Testing, Inc., 130 Derry Court, York, PA 17402 – **REPORT#: G5934.03-801-18**
ASTM E1886-05; Missile Impact & Cyclic Pressure Differential ASTM E1996-06; Impact Performance Protocol for Wind Borne Debris in Hurricane Zones

Architectural Testing, Inc., 130 Derry Court, York, PA 17402 – **REPORT#: G5934.02-801-18**
AAMA/WDMA/CSA 101/I.S.2/A440-11 including: ASTM E283, ASTM E330, ASTM E331 ASTM E547—Standard specification for windows, doors & skylights

Architectural Testing, Inc., 130 Derry Court, York, PA 17402 – **REPORT#: F5594.01-119-12**
ASTM F1642-12 – *Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loading*
ASTM F2912-11 – *Standard Specification for Glazing and Glazing Systems Subject to Airblast Loading*
GSA-TS01-2003 – *US General Services Administration Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings*
PDC-TR 10-02 – Blast Resistant Design Methodology for Window Systems Designed Statically and Dynamically
UFC 4-010-01 – DoD Minimum Antiterrorism Standards for Buildings

Miami-Dade County Building Code Compliance Office
Model BCM: Product Control Notice of Acceptance (NOA): 18-0301.01

Florida Building Commission 2555 Shumard Oak Blvd., Tallahassee, FL 32399-2100
Model BCM: **2017 Version of the Florida Building Code (6th Edition): FBC Approval: FL #21896-R1**

Texas Department of Insurance 333 Guadalupe Austin, TX 78714-9104

Texas Department of Insurance Evaluation Report SK approved for use in all zones of the designated catastrophe area**

National Accreditation & Management Institute 11870 Merchants Walk Newport News VA 23606
Product, Manufacturing and Quality Assurance Certification No.: NI013491.01

PalRam Americas, Inc., 9735 Commerce Circle Kutztown, PA 19530
Miami-Dade County Product Control Notice of Acceptance (NOA)
ASTM D1929/2843/635/638
ASTM D2565
ASTM E84

Covestro LLC, Inc., 119 Salisbury Road Sheffield, MA 01257
Miami-Dade County Product Control Notice of Acceptance (NOA)
ASTM D1929/2843/635/638
ASTM D2565
ASTM E84

Gallina USA, 4335 Capital Circle Janesville, WI 53546
Miami-Dade County Product Control Notice of Acceptance (NOA)
A. Impact Resistance:
Polycarbonate meets requirements of Protocol TAS—201-94. Large Missile Impact resistance conforming to ASTM E1886 & ASTM E1996 Missile Level D, wind zone
B. Static Air Pressure, Cyclic Wind Pressure Loading, Structural Loads:
Polycarbonate meets requirements of Protocol TAS—202-94 and TAS—203-94. Test Load & Design Load = +60 psf/ -60 psf

OSHA Fall Protection Guidelines: OSHA 29 CFR 1910.23 & 1926.501 Fall Protection Protocols
Required for Roof Openings with no additional coverage/screen required:
A. Skylight Assembly meets 200lb drop test from ≥3.875' (minimum 775 ft/lbs) without delamination or breakage to glazing.
****Product exceeds testing anticipated in ASTM Work Item Number WK17797.*
ASTM Fall protection protocol of multiple drops of 300lbs from 48". Standard is under review

1.03 Quality Assurance:

Skylight manufacturer shall specialize in the manufacture of high performance impact and pressure resistant skylight assemblies with no less than ten years experience. Manufacturer shall maintain a Quality Assurance program with a third party monitor and provide a current certificate of compliance that manufacturer participates within a Quality Assurance Program that complies with ISO/IEC 17020 and Guide 53.

1.04 Performance Criteria:

A. ASTM F1642-12:
Standard Test Method for Glazing and Glazing Systems Subject to Airblast Loading

Minimum Hazard Rating per Table 2.6 PDC-TR 10-02:
- No Hazard @ 6.97 psi, 40psi-msec impulse, 11.45-msec duration

Minimum System Rating:
- H1 @ 6.97 psi, 40psi-msec impulse, 11.45-msec duration

B. ASTM F2912-11:
Standard Specification for Glazing and Glazing Systems Subject to Airblast Loading

Minimum Hazard Rating:

- No Hazard @ 6.97 psi, 40psi-msec impulse, 11.45-msec duration

Minimum Hazard Level:

- H1 @ 6.97 psi, 40psi-msec impulse, 11.45-msec duration

C. GSA-TS01-2003:

US General Services Administration Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings

Table 1. GSA/ISC Performance Conditions for Window Systems Response:

- Performance Condition 2
- Protection Level: Very Safe
- Hazard Level: None

D. UFC 4-010-01:

DoD Minimum Antiterrorism Standards for Buildings

Table 2.1 Levels of Protection – New and Existing Buildings

- Medium – "Minor Damage – Building damage will be economically repairable. Space in and around damaged area can be used and will be fully functional after cleanup and repairs."

Maxim Skylights test specimen maintained a "High" level of protection as "Innermost glazing will not break" was accomplished.

***UFC Level of Protection in accordance with table 2.1 of UFC 4-010-01 (9 February 2012 with change 1, 1 October 2013)*

***Angle of incident to be considered for rooftop skylight installation; The Architect, Specifier or Engineer will allow performance variance due to angle of incidence for skylights that are installed on a roof top but are tested in a vertical test chamber.*

***Supporting Structural Elements under Chapter 4 of PDC-TR 10-02 are to be calculated by others*

1.05 Performance Criteria:

A. Impact Resistance:

Polycarbonate glazed unit skylights must meet the requirements of Protocol TAS—201-94. Impact resistance conforming to ASTM E1886 & ASTM E1996 Missile Level D, wind zone 4.

B. Static Air Pressure:

Polycarbonate glazed unit skylights must meet the requirements of Protocol TAS—202-94. Test Load = +120 psf/ -120 psf, Design Load = +60.0 psf/ -60.0 psf

C. Cyclic Wind Pressure Loading:

Polycarbonate glazed unit skylights must meet the requirements of Protocol TAS—203-94. Test Load = +120 psf/ -120 psf, Design Load = +60.0 psf/ -60.0 psf

D. Structural Loads:

Polycarbonate glazed unit skylights must meet the requirements of Protocol TAS—202-94; Test Load = +120 psf/ -120 psf, Design Load = +60.0 psf/ -60.0 psf

E. Cyclic Wind Pressure Loading:

Polycarbonate glazed unit skylights must meet the requirements of Protocol

TAS—203-94; Test Load = +120 psf/ -120 psf, Design Load = +60.0 psf/ -60.0 psf

F. Forced Entry Protection:

Polycarbonate glazed unit skylights must meet the requirements of ASTM F588, including UL972 for all glazing materials.

G. Thermal & Optical Performance Criteria:

Polycarbonate Outer Dome and 16mm RDC 5 Layer Multiwall Flat Polycarbonate Inner Panel must meet minimum standards for yellowing, YI – yellowing Index, per ASTM D1925 and Haze and Luminous Transmittance of Transparent Plastics per ASTM D1003.

PalRam or Covestro UV Enhanced Polycarbonate Dome/ 16mm RDC CLEAR 5 Layer Multiwall Flat Polycarbonate

	High Light Transmission White UV Enhanced Polycarbonate Dome	**Gallina 16mm RDC Clear**	**Total**
Summer U factor =	0.90	0.36	0.324
SC =	0.96	0.78	0.748
SHGC =	0.83	0.68	0.564
Visible Transmissivity =	0.74	0.65	0.481

PalRam or Covestro UV Enhanced Polycarbonate Dome/ 16mm RDC OPAL (white) 5 Layer Multiwall Flat Polycarbonate

	Clear UV Enhanced Polycarbonate Dome	**Gallina 16mm RDC Opal (white)**	**Total**
Summer U factor =	0.90	0.36	0.324
SC =	1.02	0.52	0.530
SHGC =	0.88	0.45	0.396
Visible Transmissivity =	0.92	0.40	0.368

1.06 Submittals:

A. Shop Drawings:

Submit manufacturer's standard approval drawing(s) including elevation and section details for architect review and approval.

B. Test Reports:

Submit, or make available, test reports that confirm product submitted meets or exceeds specific project requirements. Test reports must be current and less than Ten (10) years.

1.07 Warranty:

Skylight manufacturer shall provide a written warranty against defects in materials and workmanship for a minimum period of five (5) years, or as specified, from date of installation for frame and finish, ten (10) years for polycarbonate glazing components. Polycarbonate manufacturer warranty are separate and are to be included in submittal package.

1.08 Manufacturer:

Blast Resistant Curb Mount skylight(s) with or without thermal break frame (as specified) shall be Maxim Industries, Inc. Model BCM/BTCM or BCM/BTCM & Maxim(um) Insulated Curb as manufactured by **Maxim Industries, Inc., 1630 Terre Colony Dallas, Texas, 888-222-4898** with sizes as shown on drawings. Thermal break and/or Maxim(um) Insulated Curb and height shall be specified where required.

Part 2: Products:

2.01 Materials:

A. Curb Mount or Thermal Break Curb Mount Frame:

Curb mount frame shall be fabricated from 6063-T5/T6 extruded aluminum with a minimum thickness of .060 and include a condensation gutter. All corners shall be welded using the heliarc process. Thermal break curb mount frame with urethane filled pocket will be provided fully de-bridged by Maxim Industries, Inc.

B. PalRam or Covestro UV Enhanced Polycarbonate Dome:

UV Enhanced Polycarbonate dome shall be consisting of Clear, High Light Transmission White Translucent or as selected. Domes shall be secured to assembly as shown in drawings, sections and elevations and include a fully welded extruded aluminum retaining angle with a minimum thickness of 0.125" as required.

C. PalRam Breeze IR Blocking Polycarbonate UV Enhanced Polycarbonate Dome:

UV Enhanced Polycarbonate dome shall be consisting of Breeze *"blueish tone with ultra high clarity"* (71% vlt) Domes shall be secured to assembly as shown in drawings, sections and elevations and include a fully welded extruded aluminum retaining angle with a minimum thickness of 0.125" as required.

D. Gallina USA 16mm RDC 5 Layer Multiwall UV Enhanced Polycarbonate Panel:

UV Enhanced Multiwall Polycarbonate glazing shall consist of Clear (65% vlt), Opal (white) (40% vlt), Bronze (30% vlt), or Reflecto (35% vlt). Multiwall shall be secured to assembly as shown in drawings, sections and elevations and include a fully welded extruded aluminum retaining angle with a minimum thickness of 0.125" as required.

E. Aluminum Finish:

All exposed aluminum to be Mill Finish, Clear Anodized, Bronze Anodized, or Powder Coated. Custom colors as selected by architect. Powdercoat finished meet or exceed the following ASTM and AAMA standards: Gloss: ASTM D-523, Adhesion: ASTM D-3359, Flexibility: ASTM D-522, Pencil Hardness: ASTM D-3363, Impact Resistance: ASTM D-279, Corrosion Resistance: ASTM G-85, Salt/Fog Spray: AAMA 2605 (4000 hrs), Humidity: ASTM D-4585

F. Sealants:

1. Dow Corning 795 sealant:

   Dow Corning 795 structural sealant applied continuously around perimeter of skylight between extruded aluminum retaining angle and Polycarbonate outer dome.

2. Schnee-Morehead 5127 or Edge Adhesives 7254 sealant tape:

   Sealant Tape applied continuously between polycarbonate dome and multiwall polycarbonate and T6063 extruded aluminum frame.

G. Fasteners:

All fasteners used in the factory assembly process shall be stainless steel. All fasteners and screws used for securing skylight to structure shall be by others and are to be stainless steel.

2.02 Assembly:

All skylights shall be factory assembled and factory glazed.

Part 3 Installation:

3.01 Site Inspection:

Installer shall notify the architect, specifier or consultant of any structural or dimensional deficiencies immediately. No work shall proceed without the correction of all deficiencies or written authorization is given to proceed.

3.02 Installation:

Skylight shall be installed in strict accordance with drawings, section details, elevations, and installation drawings and instructions provided by Maxim Industries Inc. Any deviation must be within the product approvals and shall only be through written authorization from Maxim Industries, Inc. and approved by the architect, specifier or consultant.

A. Sealants:

Under no circumstance will an acetoxy sealant be used on, near or in any proximity to the thermoplastic glazing(s). No sealants shall be applied to aluminum if temperature is below 32 degrees F.

3.03 Protection:

Protection of skylights during construction shall be the responsibility of the general contractor or project manager. ***The protective masking on the exterior dome must not be exposed to sunlight and removed immediately after installation. Exposure of the masking to sunlight will permanently bond the masking to the dome and this will not be covered under any warranty under any circumstance.

3.04 Cleaning:

A. General Cleaning:

Installer shall remove all protective coverings immediately from frames and/or domes and prevent exposure to sunlight or UV light and shall leave installation free from heavy debris and/or sealant markings.

B. Polycarbonate Cleaning:

Final cleaning must be in strict accordance with skylight and thermoplastic manufacturers recommendations and shall be by the general contractor or project manager. Cleaning instructions shall be located on manufacturers label. Thermoplastic cleaning instructions from PalRam Americas, Covestro LLC and Gallina USA must be followed exactly and are available upon request.

End of Section