



*This product guide specification is written according to the Construction Specifications Institute (CSI) Format, including MasterFormat 2012 Edition and SectionFormat/ PageFormat 2005, in the CSI Project Resource Manual. The section must be carefully reviewed and edited by the Architect to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the drawings.*

## **SECTION 08 45 23.13**

### **FIBERGLASS SANDWICH PANEL SKYLIGHTS**

**Specifier Note:** This section covers "Guardian 275<sup>®</sup>" Translucent Panel Skylights from Major Industries. The skylights are self-supporting, structural composite sandwich panels with translucent skins and aluminum interlocking grid framework. Consult Major Industries for assistance in editing this section for the specific application.

#### **PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Translucent sandwich panel skylights.
- B. Curved translucent sandwich panel skylights.

**Specifier Note:** Edit the following as required. List items specified elsewhere that are directly related to this section.

##### **1.2 RELATED REQUIREMENTS**

- A. Structural Steel/Metal Fabrications/Rough Carpentry - Section \_\_\_\_\_.
- B. Sheet Metal Flashing and Trim - Section \_\_\_\_\_.
- C. Roof Accessories: Manufactured curbs - Section \_\_\_\_\_.
- D. Joint Sealants - Section \_\_\_\_\_.

##### **1.3 ADMINISTRATIVE REQUIREMENTS FOR SEQUENCING**

- A. Ensure that locating templates and other information required for installation of skylight(s) are furnished to affected trades in time to prevent interruption of construction progress.
- B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

##### **1.4 SUBMITTALS**

- A. Product Data: Manufacturer's data sheets on each product to be used, including preparation instructions and recommendations, storage and handling requirements, installation methods and maintenance instructions.
- B. Shop Drawings: Include plans, elevations, sections, and details, indicating dimensions, tolerances, profiles, anchorage, connections, fasteners, provisions for expansion and contraction, drainage, flashing, finish, glazing, and attachments to other Work.
- C. Samples:
  - 1. Submit sample sets of color chips for initial selection representing manufacturer's full range of available colors and finishes.
  - 2. Submit samples for verification, consisting of at least one sample, minimum 6 inches high by 12 inches wide, representing actual product (including framing) and color(s).
- D. Design Data:
  - 1. Submit manufacturer's structural calculations showing sizes of framing members and loads applied to supporting structure based on design loads.
  - 2. Submit any required signed and sealed structural calculations prepared by a qualified professional engineer who is licensed in the state where system is to be installed.
- E. Manufacturer's Certificates: Submit documentation in writing certifying that products meet or exceed the specified requirements.
- F. Sustainable Design Submittals:
  - 1. Submit material as requested – including percentages by weight of post-consumer/ post-industrial recycled content, locally manufactured/ harvested materials and any applicable VOC content.
- G. Test Reports: Submit certified test reports from a qualified independent testing agency, indicating skylights comply with specified requirements. Submit results from the following:
  - 1. Flame spread and smoke development, ASTM E 84.
  - 2. Burn extent, ASTM D 635.
  - 3. Color change, ASTM D 2244 in accordance with ASTM D 1435.



4. Impact strength, exterior face sheets, UL 972.
5. Accelerated aging, ASTM D 1037.
6. Bond strength, ASTM C 297.
7. Insulating U-factor, ASTM C 1199.
8. Self-ignition, ASTM D 1929.
9. Class A burning brand, ASTM E 108.
10. Air infiltration, ASTM E 283.
11. Water penetration, ASTM E 331.
12. Uniform load deflection, ASTM E 72 and E 330.
13. Concentrated and Impact, ASTM E 661.
14. Certification authorization under the NFRC PCP (Framing and Panel).

## 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum ten years documented experience in the fabrication of skylights of the type required for this project and capable of providing field service representation during installation.
- B. Installer Qualifications: Minimum five years documented experience in the work of this section, specializing in work similar to project requirements and approved by manufacturer.
- C. Quality control inspections conducted at least once each year to include manufacturing facilities, sandwich panel components and production sandwich panels for conformance with AC177 - Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems - as issued by the ICC-ES.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and installation location.
- B. Storage/Handling: Store products above the floor and under cover in a clean, dry area until installation. Protect materials and finish from damage during handling and installation.

## 1.7 SITE CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

## 1.8 WARRANTIES

*Specifier Note: Delete items not required. Major will provide the standard warranty unless otherwise specified. Optional warranties available at additional cost. Contact Major Industries for specific warranty information and details.*

- A. Material Workmanship (select one):
  1. Provide manufacturer's standard 1 year or <as specified>.
  2. Optional: 5 years / 10 years.
- B. Exterior Fiberglass Color Change (select unless otherwise specified):
  1. Provide manufacturer's standard 10 years or <as specified>.
  2. Optional: 10 years / 20 years.
- C. Fiberglass Fiberbloom: Provide manufacturer's standard 25 year warranty or <as specified>.

*Specifier Note: Choose one finish/warranty option below. Delete items not required.*

- D. Metal Finishes: (Please consult Major Industries for assistance).
  1. Anodize: Provide manufacturer's standard 5 year / optional 10 year or <as specified>.
  2. 50% Kynar® Paint: Provide manufacturer's standard 5 year / optional 10 year or <as specified>.
  3. 70% Kynar® Paint: Provide manufacturer's standard 10 year / optional 20 year or <as specified>.

## PART 2 PRODUCTS

### 2.1 TRANSLUCENT SKYLIGHTS

*Specifier Note: Specify Guardian 275® or TransCURVE™ Translucent Skylight System. Delete items not required.*

- A. Guardian 275® Translucent Skylight System.
- B. Guardian 275® TransCURVE™ Curved Translucent Skylight System.



## 2.2 DESIGN / PERFORMANCE REQUIREMENTS

- A. Performance Requirements: Framing Members: Sufficient sizes as required to support design loads.
- B. Deflection Limits: Shall not exceed  $L/120$  per IBC code requirements.
- C. Safety Factors: Allowable stresses shall incorporate following safety factors, unless otherwise specified:  
Load Carrying Members: 1.65, Load Carrying Fasteners: 2.0.
- D. Expansion and Contraction: Design and install components with provisions for expansion and contraction due to a 100 degree F (56 degrees C) temperature variation.
- E. Design Loads: Framing components shall be designed to support following loads:
  - 1. Live Load (Select One):
    - a. \_\_\_\_\_ psf.
    - b. As indicated on the Drawings.
  - 2. Wind Load (Select One):
    - a. \_\_\_\_\_ psf.
    - b. As indicated on the Drawings.
  - 3. Alternate Design Loads: Contact Major Industries for assistance.

**Specifier Note:** Delete the following if not applicable. The International Building Code (IBC) establishes criteria for buildings in regions susceptible to hurricanes. Verify requirements before proceeding.

- F. Windborne Debris/Impact Resistance: Provide systems that pass missile-impact and cyclic pressure tests according to ASTM E 1886 and ASTM E1996 for Wind (Select One): Zone 1/ Zone 2 / Zone 3
- G. Design Calculations:
  - 1. Prepare structural calculations in accordance with Aluminum Association Specifications for Aluminum Structures SAS30.
  - 2. Provide calculations prepared and stamped by a registered professional engineer, qualified in the design of sloped glazed systems and licensed in the state where skylights are to be installed.

## 2.3 MANUFACTURERS

- A. Acceptable Manufacturer: Major Industries Inc., 7120 Stewart Ave, Wausau, WI 54401;  
Tel: 888-759-2678 / 715-842-4616; Fax: 715-848-3336; info@majorskylights.com.
- B. Requests for substitutions considered in accordance with provisions of Section 01600.

## 2.4 COMPONENTS

- A. Translucent Panel Units:
  - 1. Construction: Architectural-grade fiberglass reinforced polymer sheets bonded under controlled heat and pressure to a mechanically-interlocked aluminum I-beam grid core to form double-faced, self-supporting, structural composite sandwich panels.
    - a. Thickness: 2-3/4 inches (699 mm) [4 inches (101.6mm) optional].

**Specifier Note:** Contact Major for restrictions related to panel widths and lengths for your specific system.

- b. Panel Maximums: 5 feet (1.52 m) wide / 16 feet (4.88m) long.

**Specifier Note:** Specify one of the following insulating U-factors. Center of Panel numbers are listed in section "c" below and are determined using NFRC test methods and are for glazing comparisons only. NFRC 100-2010 certified system values are listed in section "d" and are available for standard configurations. Test sample 78 3/4 inches x 78 3/4 inches, consisting of two translucent panels, three vertical rafters and perimeter head and sill. Consult Major Industries for assistance.

- c. U-Factor: Center of Panel U-factor (for glazing comparison only).
      - 1) 0.48 (No insulation).
      - 2) 0.20 (Insul 24).
      - 3) 0.17 (Insul 15).
      - 4) 0.08 (IMG 125).
    - d. U-Factor: NFRC 100-2010 certified values for complete skylight system (including internal grid and perimeter framing - thermally broken)
      - 1) 0.64 (No insulation).
      - 2) 0.36 (Insul 24).
      - 3) 0.33 (Insul 15).
      - 4) 0.25 (IMG 125).
    - e. Grid Pattern (Select One – Contact Major for Custom Pattern and Size Options):
      - 1) In-line Shoji (12 inch x 24 inch [304 mm by 610 mm] maximum grid size).



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- 2) Staggered Shoji (12 inch x 24 inch [304 mm by 610 mm] maximum grid size).
  - 3) Tuckerman (Square - 12 inch x 12 inch [304 mm by 304 mm] maximum grid size).
  - f. Unbonded Areas: Maximum of 4 unbonded areas, a maximum of 3/64 inch (.11 mm) in diameter, in an area a maximum of 40 square feet of panel surface.
  - g. Panel Weeps: Weep holes provided on down slope side of installed panels to permit condensation to leave panel interior.
  - h. Panel Corners: Notch and interlock or reinforce with aluminum for radius conditions.
  - i. Assembly: Factory assembled. Field assembly of panels not allowed.
2. Physical Properties:
    - a. ASTM E 108 - Burning Brand: Class A rating.
    - b. ASTM E 72 and E 330 - Uniform Load Deflection.
    - c. ASTM E 661 - Concentrated and Impact.
    - d. ASTM E 283 - Air Infiltration through fixed panel system and perimeter framing: less than 0.01 cfm/ft air leakage at 6.24 psf air pressure.
    - e. ASTM E 331 - Water penetration through fixed panel system and perimeter framing. No leakage when water is applied to entire panel surface at rate of 5 gal/hr/sq ft for 15 minutes at 12 psf air pressure.
  3. I-Beam Grid Core:
    - a. Material: Mechanically interlocked Aluminum Alloy 6061-T6.
    - b. 7/16 inch (11 mm) minimum flange width, 0.050 inch (1.27 mm) web thickness.
    - c. Full surface contact with face sheets.
    - d. Thermal Break (optional): Poured and debridged structural polyurethane.
  4. Adhesive:
    - a. Waterproof resin for use in laminating face sheet to aluminum grid core.
    - b. Impact and Thermal Shock: Adhesive capable of withstanding impact and thermal shock normally encountered in exterior construction.
    - c. Adhesive Bond Line: Straight, black, cover entire width of I-beam, with neat edge.
    - d. Initial Adhesive Bond Strength: Shear Strength, ASTM D 1002: 563 psi., Tensile Strength, ASTM C 297: 557 psi minimum.
    - e. Aged Adhesive Bond Strength, ASTM D 1037: Shear Strength, ASTM D 1002: 1212 psi., Tensile Strength, ASTM C 297: 914 psi.
  5. Thermal Breaks (optional):
    - a. Perimeter Framing System: Poured and debridged structural polyurethane.
  6. Translucent Face Sheets:
    - a. Appearance of Face Sheets:
      - 1) Uniform in color to prevent splotchy appearance.
      - 2) Free of ridges, wrinkles, clusters of air bubbles and pinholes.
    - b. Exterior Face Sheet:
      - 1) ASTM D 2244: Color change shall not exceed 3.0 Delta E units after 5 years of weathering (accelerated Arizona / simulated South Florida testing).
      - 2) Protective Weathering Surface:
        - a) Application: Factory-applied.
        - b) Minimum Thickness: 1.0 mil.
        - c) Repairs: Fully field repairable.
      - 3) Impact Strength, UL 972 / Thickness (Select One):
        - a) Standard - 70 foot-pounds / 0.070 inches.
        - b) High-impact (optional) - 360 foot-pounds / 0.070 inches.
      - 4) Color (Select One - Consult Major for availability of Custom Colors):
        - a) White.
        - b) Crystal.
        - c) Ice Blue.
        - d) Aqua.
        - e) Tan.
        - f) Desert Rose.
    - c. Interior Face Sheet:
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- 1) Flame Spread, ASTM E 84: 10 maximum.
  - 2) Smoke Development, ASTM E 84: 300 maximum.
  - 3) Burn Rate, ASTM D 635: 1.0 inch per minute maximum.
  - 4) Self-Ignition, ASTM D 1929: Greater than 650 degrees F.
  - 5) Thickness (Select One):
    - a) Standard - 0.045 inches.
    - b) High-impact - 0.060 inches (optional).
  - 6) Color (Select One - Consult Major for availability of Custom Colors):
    - a) White.
    - b) Crystal.
- B. Components and Framing:
1. Aluminum:
    - a. Extruded Aluminum: ASTM B 221, Alloy 6063-T5/T6, 6061-T5/T6.
    - b. Formed Aluminum Components and Flashing: ASTM B 209, Alloy 5005-H34.
    - c. Minimum Thickness: 0.040 inch.
  2. Glazing Gaskets:
    1. Factory installed (in extruded dovetail slots) EPDM hybrid, 9/16 inch wide.
    2. Compression Deflection, 25% Deflection Limits, ASTM D 1056, 13 to 24 psi.
    3. Compression Set, 22 Hours at 158 Degrees F, ASTM D 395, Method B: 30 psi.
    4. Heat Aging, 70 Hours at 212 Degrees F, Change in Compression Values, ASTM D 865 and D 1056: 0 to 10 psi.
    5. Ozone Resistance at 40% Elongation, 100 Hours at 104 Degrees F, ASTM D 1149: Type I, 1 Ppm Ozone: No cracks / Type II, 3 Ppm Ozone: No cracks.
    6. Straining of Surface, ASTM D 925: Non-straining, no migratory strain.
    7. Exterior Skylight Glazing Gaskets: Butyl tape with integral polypropylene backer rod.
- C. Condensation Control System:
1. Mechanically design to function properly with minimal dependency upon sealants.
  2. Provide an integral gutter system on all framing members, including rafters.
- D. Custom Designs: 3D modeling used to verify custom fitting and assembly.
- E. Expansion and Contraction: Design and install components with provisions for expansion and contraction due to a 100 degree F temperature variation.
- F. Glazing Caps:
1. Extruded aluminum.
  2. Attach glazing caps with glazing cap fasteners located at a maximum of 12 inches on center or as required to resist negative loading.
- G. Fasteners:
1. Clips for Attachment of Rafter Bars: Aluminum - attach using bolted fastening methods.
  2. Construction and Glazing Cap Fasteners: 18-8 stainless steel - include gasketed sealing washers.
  3. Field Anchors: Cadmium plated, unless otherwise specified.
  4. Exposed Fasteners: Finish to match aluminum.

## 2.5 FABRICATION

- A. Weep Holes in Sill Components: Located as required to control condensation that may enter system by allowing it to pass to exterior.
- B. Construct skylights of extruded aluminum shapes similar to sections indicated on the Drawings.

## 2.6 ALUMINUM FINISHES

*Specifier Note: Specify one of the following finishes. Custom colors available. Consult Major for assistance.*

- A. Anodized Coating: Architectural Class I clear anodized, Type AA-M10C22A41.
- B. Anodized Coating: Architectural Class II clear anodized, Type AA-M10C22A31.
- C. Anodized Coating: Architectural Class I pigmented anodized, Type AA-M10C22A42/A44.
  1. Color: \_\_\_\_\_ / or <as indicated on the drawings>.
- D. Pigmented Organic Coating: 50% Kynar® / AAMA 2604.
  1. Color: \_\_\_\_\_ / or <as indicated on the drawings>.



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- E. High-Performance Pigmented Organic Coating: 70% Kynar / AAMA 2605.  
1. Color: \_\_\_\_\_ / or <as indicated on the drawings>.

### **PART 3 EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine areas to receive translucent skylights with installer and manufacturer's representative present, including supporting structure and substrate for dimensions, tolerances, material conditions, and support.
- B. Notify Architect of conditions that would adversely affect installation or subsequent utilization of skylights and do not proceed until conditions are corrected.

#### **3.2 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Ensure supports to receive skylights are clean, flat, level, plumb, and square.
- C. Aluminum Protection: Where aluminum will contact dissimilar materials, apply a coating of bituminous paint or other neutral material or separate with a nonabsorbent isolator.

#### **3.3 INSTALLATION**

- A. Install skylights level, plumb, square, and accurately aligned, and in accordance with manufacturer's instructions at locations indicated on the approved drawings.
- B. Do not install skylight components with deficiencies or dimensional errors. Do not proceed with installation until unsatisfactory components are replaced.
- C. Anchor skylights securely to supports using attachment methods that permit adjustment for construction tolerances, irregularities, alignment, and expansion and contraction.
- D. Install skylights including flashings, fasteners, hardware, sealants, and glazing materials required for a complete, weatherproof installation.

#### **3.4 FIELD QUALITY CONTROL**

- A. Water Test: Test skylights according to procedures in AAMA 501.2.
- B. Repair or replace work that does not comply with specified requirements and retest work.
- C. Examine installation of sheet metal flashing and sealants.
- D. Examine all face sheets for cracks, deep scratches, and other damage, and inspect protective weathering surface of exterior sheet. Repair in accordance with manufacturer's instructions.

#### **3.5 CLEANING**

- A. Clean skylights inside and outside, including member connections and inside corners, immediately after installation and after sealants have cured, but not more than 10 days after installation.
- B. Follow related cleaning instructions in accordance with manufacturer's recommendations.

#### **3.6 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

#### **END OF SECTION**