

## SECTION 08630

### METAL-FRAMED SKYLIGHTS

#### PART 1 GENERAL

##### 1.1 SECTION INCLUDES

- A. Removal and disposal of existing skylight, to make way for new skylight.
- B. Metal-framed skylights and their glazing.
- C. Motor-operators for skylights.

##### 1.2 RELATED SECTIONS

- A. Section 05120 - Structural Steel: Structural supports for skylights.
- B. Section 05162 - Space Frames: Structural supports for skylights.
- C. Section 07620 - Sheet Metal Flashing and Trim.
- D. Section 08900 - Glazed Curtain Walls.
- E. Section 12500 - Window Treatment: Anchors and brackets for window treatments attached to skylights.

##### 1.3 REFERENCES

- A. AA - Aluminum Design Manual; The Aluminum Association.
- B. AAMA 501.1 - Standard Test Method for Metal Curtain Walls for Water Penetration Using Dynamic Pressure; part of AAMA 501; American Architectural Manufacturers Association.
- C. AAMA 603.8 - Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum; American Architectural Manufacturers Association.
- D. AAMA 605.2 - Specification for High Performance Organic Coatings on Architectural Extrusions and Panels; American Architectural Manufacturers Association.
- E. AAMA 606.1 - Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for

Architectural Aluminum; American Architectural Manufacturers Association.

- F. AAMA 607.1 - Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum; American Architectural Manufacturers Association.
- G. AAMA GDSG-1 - Glass Design for Sloped Glazing; American Architectural Manufacturers Association.
- H. AAMA SDGS-1 - Structural Design Guidelines for Aluminum Framed Skylights; American Architectural Manufacturers Association.
- I. AAMA TSGG-90 - Two-Sided Structural Glazing Guidelines for Aluminum Framed Skylights; American Architectural Manufacturers Association.
- J. ASTM C 509 - Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
- K. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
- L. ASTM C 864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks and Spacers.
- M. ASTM C 1036 - Standard Specification for Flat Glass.
- N. ASTM C 1048 - Standard Specification for Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.
- O. ASTM D 1149 - Standard Test Method for Rubber Deterioration--Surface Ozone Cracking in a Chamber.
- P. ASTM E 283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
- Q. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- R. ASTM E 773 - Standard Test Methods for Seal Durability of Sealed Insulating Glass Units.

- S. ASTM E 774 - Standard Specification for Sealed Insulating Glass Units.
- T. FGMA Glazing Manual; Glass Association of North America.
- U. IGCC Certified Products Directory; Insulating Glass Certification Council.

#### 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's descriptive literature, specifications, and installation instructions.
- C. Test Reports: Show compliance with specified performance requirements.
- D. Shop Drawings: Prepare specifically for this project. Include:
  - 1. Detailed plans and elevations, details of framing members, glazing materials, sealants, fasteners, anchors.
  - 2. Types and thicknesses of formed flashing and closures.
  - 3. Interface with adjacent construction.
  - 4. Horizontal and vertical forces at rafters.
- E. Selection Samples: Two sets of color charts or samples, for selection of colors of finishes, glazing, and sealants.
- F. Glazing Samples: Two pieces, 12 inches (300 mm) square, of glazing in specified color, pattern, and coating, for verification.
- G. Metal Finish Samples: Two pieces of aluminum with specified finish and color, for verification.
- H. Certification for Structural Sealant: Written documentation from sealant manufacturer:
  - 1. Statement that the sealant selected has been tested for adhesion and compatibility on representative samples of metal, glass and other glazing components.
  - 2. Statement that the sealant joint design and application procedures shown on the shop drawings are suitable for this project.

3. List of recommended cleaning methods and priming recommendations.
4. Results of adhesion tests for sealants proposed for use on the project.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum of 10 years experience in the fabrication and installation of similar products.
- B. Installer Qualifications: The manufacturer of the skylight or his authorized representative.
- C. Pre-Installation Meeting: Convene just prior to start of site operations.
  1. Require attendance of installer and installation personnel.
  2. Cover procedures required to maintain proper working conditions, to coordinate with other work, and to protect roofing and flashings as required by roofing manufacturer.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Arrange deliveries to avoid delays but to minimize on-site storage.
- B. Deliver products in labelled protective packages.
- C. Deliver, handle, and store in strict compliance with manufacturer's instructions and recommendations.

#### 1.7 WARRANTY

- A. Skylight Warranty: Provide written warranty signed by manufacturer that products are free of defects in material and workmanship. Include repair or replacement of work for five years from date of completion. Defects are defined to include uncontrolled leakage of water and abnormal aging or deterioration.
- B. Fluoropolymer Finish Warranty: Provide written warranty signed by manufacturer and finisher that finish is free of defects in material and workmanship. Include repair or replacement of work which exhibits defects for five years from date of completion. Defects are defined to include peeling, chipping, chalking, fading, abnormal

aging or deterioration, and failure to perform as required.

- C. Glazing Warranty: Provide written warranty signed by manufacturer that glazing is free of defects in material and workmanship. Include repair or replacement of work which exhibits defects for five years from date of manufacture. Defects are defined to include delamination, seal failure, and deterioration of film coatings.

#### 1.8 EXTRA MATERIALS

- A. Extra Materials: If 50 or more glazing units of the exact same size are required, provide 1 percent, or a minimum of 1 unit, for Owner's use; pack in sturdy containers, label, and store in the area designated by the Owner.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURERS

- A. Provide products made by Naturalite Skylight Systems, Butler Manufacturing Company, P.O.Box 629, 750 Airport Road, Terrell, TX 75160. ASD. Tel: (800) 527-4018. Fax: (972) 551-6420.
- B. Requests for substitution will be considered in accordance with provisions of Section 01600.
- C. Substitutions: Not permitted.
- D. For manufacturers not listed, submit evidence of ability to provide products that meet both performance and product requirements, including list of projects of similar design and complexity completed within the last 5 years.
- E. Provide primary materials that are made by a single manufacturer.

#### 2.2 METAL-FRAMED SKYLIGHTS

- A. Metal-Framed Skylights - Performance Requirements:
  - 1. Design framing system to exert no horizontal forces on supporting structure.
  - 2. Design to withstand the following:

- a. Snow load: \_\_\_ psf (\_\_\_ kPa) snow load.
  - b. Wind load: \_\_\_ psf (\_\_\_ kPa) positive and \_\_\_ psf (\_\_\_ kPa) negative.
  - c. Dead loads.
  - d. Concentrated live load: 250 pounds (113 kg) applied to any framing member at a location that will produce the most severe stress or deflection.
  - e. Temperature range: 70 degrees F (39 degrees C) above and below ambient temperature.
  - f. Temperature range: 50 degrees F (28 degrees C) above and below ambient temperature.
3. Deflection of Any Glazing Support Member Under Load: Not more than 1/180 of the unsupported span.
  4. Air Infiltration: Not more than 0.06 cfm per sq ft (1.1 cu m/h per sq m) of glazed surface area, when tested in accordance with ASTM E 283 at a static pressure differential of 6.24 psf (3.0 kPa).
  5. Water Penetration: No uncontrolled water leakage, when tested in accordance with ASTM E 331 at a static pressure differential of 12 psf (5.7 kPa).
  6. Water Penetration: No uncontrolled water leakage, when tested in accordance with AAMA 501.1 at a static pressure differential of 12 psf (5.7 kPa).
- B. Metal-Framed Skylights: Naturalite BMS 3000 system; aluminum framing system with glazing, manufacturer-engineered and factory-fabricated, complete with all glazing accessories, flashings, connections, and anchors.
1. Glazing Method: Cap glazing.
  2. Glazing Method: Two sides structural silicone glazing; other two sides cap glazing.
  3. Glazing Method: Four sides structural silicone glazing.
  4. Include steel structural members indicated on drawings as part of the skylight system.
  5. Fabricate to actual dimensions of constructed work where possible; otherwise, allow for field adjustment using trim or flashing of adjustable size or configuration.
  6. Fabricate work straight, plumb, level and square, of sizes, shapes, and profiles indicated on approved shop drawings, with uniform, tight joints.
  7. Exterior Aluminum Finish: Clear anodized.
  8. Exterior Aluminum Finish: Color anodized.
  9. Exterior Aluminum Finish: Fluoropolymer coating.
  10. Color: Medium bronze.

11. Color: Dark bronze.
12. Color: Black.
13. Color: As selected from manufacturer's standard colors.
14. Color: Custom color to match Architect's sample.
15. Color: \_\_\_\_\_.
16. Interior Aluminum Finish: Same as exterior finish.
17. Interior Aluminum Finish: Clear anodized.
18. Interior Aluminum Finish: Color anodized.
19. Interior Aluminum Finish: Baked enamel coating.
20. Interior Aluminum Finish: Fluoropolymer coating.
21. Color: Medium bronze.
22. Color: Dark bronze.
23. Color: Black.
24. Color: As selected from manufacturer's standard colors.
25. Color: Custom color to match Architect's sample.
26. Color: \_\_\_\_\_.

C. Framing Members: Extruded aluminum, 6063-T5, 6063-T6, or 6061-T6 alloy and temper, as recommended by the manufacturer for design loading, cross-sectional configuration, fabrication requirements and finish required.

1. Provide tubular rafter and purlin framing members.
2. Provide \_\_\_\_\_-shaped rafter and purlin framing members.
3. Design to collect and channel condensation and water infiltration to the exterior through weep holes or drain tubes in the sill or perimeter framing members.
4. Design condensation gutters so they are concealed and flush with framing.
5. Reinforce butt, mitered, and splice joints with internal aluminum splice plates where possible; mechanically fastened with stainless steel truss head fasteners in accordance with manufacturer's standard connection details.
6. Include a positive stop to control compression in the glazing rabbet.
7. Cap Glazing: Glazing caps mechanically secured with thermally broken glazing clips at purlins and sills; sealed at corner intersections.
8. Cap Glazing: Provide a full perimeter exterior wet seal.
9. Two-Sided Structural Silicone Glazing: Two sides of glazing retained with glazing caps mechanically secured with thermally insulated glazing clips; two

remaining sides secured to continuous aluminum fin using structural silicone glazing sealant in shear-type joint design; comply with AAMA Two-Sided Structural Glazing Guidelines for Aluminum Framed Skylights.

10. Four-Sided Structural Silicone Glazing: Factory glazed using perimeter frame secured to the inside surface of the glazing using structural silicone glazing sealant; mechanically fastened to the support framing system with retainer clips spaced as required to support design loads; design to allow for exterior glazing replacement without disrupting adjacent glazing.
  11. Do not anchor sill members through integral secondary gutter area on pitches less than 4 in 12 (1:3) from horizontal.
  12. Welding: Factory-performed heliarc welding with all exposed welds finished to match adjacent material.
- D. Formed Flashing and Closures: Aluminum sheet.
1. Anodized: Minimum 0.040 inch (1.0 mm) thick.
  2. Coated Finish: Minimum 0.062 inch (1.6 mm) thick.
- E. Anchors and Fasteners:
1. Not Exposed to Weather: Cadmium plated lag, sleeve and stud bolt anchors.
  2. Exposed to Weather: Stainless steel, 300 series.
  3. Where bolted connections penetrate secondary gutter of sill member: Same as if exposed to weather.
- F. Finishes:
1. Clear Anodizing: Class I, AA-M10C22A41 clear anodized coating complying with AAMA 607.1, 0.7 mils (0.018 mm) or thicker.
  2. Clear Anodizing: Class II AA-M10C22A31 clear anodized coating complying with AAMA 607.1, 0.4 to 0.7 mils (0.010 to 0.018 mm) thick.
  3. Color Anodizing: Class I, AA-M10C22A44 anodized coating electrolytically deposited complying with AAMA 606.1, 0.7 mils (0.018 mm) or thicker.
  4. Baked Enamel Coating: Polyester, complying with AAMA 603.8.
  5. Fluoropolymer Coating: Two coats 70 percent Kynar 500/Hylar 5000 resin base fluoropolymer finish complying with AAMA 605.2.



6. Fluoropolymer Coating: Three coats 70 percent Kynar 500/Hylar 5000 resin base fluoropolymer finish complying with AAMA 605.2.
7. Fluoropolymer Coating: Four coats 70 percent Kynar 500/Hylar 5000 resin base fluoropolymer finish complying with AAMA 605.2.

### 2.3 GLAZING AND INFILL MATERIALS

- A. Glazing: Glass as specified in Section 08800.
- B. Glazing: Single; 1/2 inch (13 mm) laminated glass:
  1. Outboard Ply: 1/4 inch (6 mm) clear heat-strengthened glass.
  2. Interlayer: 0.030 inch (0.08 mm) clear polyvinyl butyral (PVB) sheet.
  3. Interlayer: 0.060 inch (1.5 mm) clear polyvinyl butyral (PVB) sheet.
  4. Inboard Ply: 1/4 inch (6 mm) clear heat-strengthened glass.
- C. Glazing: Sealed insulating units:
  1. Exterior Lite: 1/4 inch (6 mm) clear heat-strengthened glass.
  2. Air space: 1/2 inch (12 mm).
  3. Interior lite: Laminated glass:
    - a. 2 plies of 1/8 inch (3 mm) clear glass.
    - b. 2 plies of 3/16 inch (5 mm) clear glass.
    - c. 2 plies of 1/4 inch (6 mm) clear glass.
    - d. Heat-strengthened.
    - e. Interlayer: 0.030 inch (0.8 mm) clear polyvinyl butyral (PVB) sheet.
    - f. Interlayer: 0.060 inch (1.5 mm) clear polyvinyl butyral (PVB) sheet.
- D. Glazing: Plastic glazing sheet:
  1. Single glazed.
  2. Double glazed.
  3. Glazing Sheet: Continuous cast acrylic sheet.
  4. Glazing Sheet: Continuous cast polycarbonate sheet.
  5. Thickness: As determined by skylight manufacturer.
  6. Color: Selected by Architect from skylight manufacturer's standard selection.
  7. Color: \_\_\_\_\_.
- E. Glazing for Vertical Framing: Same as for skylight.
- F. Glazing for Vertical Framing: Single glazing.
  1. 1/4 inch (6 mm) thick clear glass.

2. Heat-strengthened.
  3. Fully tempered.
- G. Glazing for Vertical Framing: Sealed insulating units:
1. Exterior Lite: 1/4 inch (6 mm) clear heat-strengthened glass.
  2. Exterior Lite: 1/4 inch (6 mm) clear fully-tempered glass.
  3. Air space: 1/2 inch (12 mm).
  4. Interior Lite: 1/4 inch (6 mm) clear heat-strengthened glass.
  5. Interior Lite: 1/4 inch (6 mm) clear fully-tempered glass.
- H. Insulated Panels: Flat, metal faced panels with insulating core.
1. Face Sheets: Prefinished 0.040 inch (1.0 mm) thick aluminum, alloy 5005-H34.
  2. Core: Polyisocyanurate structural foam core with R-value of 5.9 per inch (1.04 W/(m K)/M) thickness.
  3. Thickness: Same as adjacent glazing unit.
  4. Finish: Same as for framing.
  5. Color: Same as for framing.
  6. Colors: Different from framing and different colors are required for interior and exterior faces.
  7. Two-Sided Structural Silicone Glazing Applications: Purlin edges with panned edges or 1/2 inch (12 mm) returns as indicated on the Drawings.
- I. Glass: Conform to applicable requirements of ASTM C 1036 and ASTM C 1048.
1. Determine glass strengths using AAMA Glass Design for Sloped Glazing guidelines.
  2. Glaze in accordance with FGMA Glazing Manual and glass fabricator's guidelines.
  3. Sealed Insulating Units: Dual sealed with primary seal of polyisobutylene and secondary seal of two-part silicone equal to Dow Corning 982 or GE Silicone 4200.
  4. Sealed Insulating Units: Class A rated when tested in accordance with ASTM E 773 and ASTM E 774; IGCC certified.
- J. Gaskets: Provide continuous cushion below and continuous spacer above glazing.
1. Ozone Resistance: Withstand one part per million ozone for 500 hours at 20 percent elongation at 100

- degrees F (38 degrees C) when tested in accordance with ASTM D 1149.
2. Gaskets Below Glazing: Extruded, dense EPDM black rubber, Shore A durometer of 60 plus or minus 5, complying with ASTM C 864.
  3. Gaskets Below Glazing: Extruded, silicone rubber, Shore A hardness of 40 plus/minus 5 when tested in accordance with ASTM C 1115.
  4. Gaskets Above Glazing: Extruded, closed-cell, sponge EPDM black rubber, complying with ASTM C 509.
- K. Sealants: As required by skylight manufacturer.
1. Adhesion: Show adequate adhesion to samples of metal and glass, when tested in accordance with ASTM C 794.
  2. Exterior Metal-to-Glass Corner and Cap Seals: Black.
  3. Exposed Metal-to-Metal Joints: Any standard color silicone sealant.
- L. Structural Silicone Glazing Sealant: Type as required by skylight manufacturer; compatible with all contact components.
1. Insulating Glass Applications: Limit depth of silicone joint to design thickness of exterior lite; use temporary clips to secure purlin edge of unit in place until sealant has fully cured.
  2. Comply with AAMA Two-Sided Structural Glazing Guidelines for Aluminum Framed Skylights for design and field procedures.

## 2.4 ACCESSORIES

- A. Operable Skylights: Include all components required to make skylight operable, including steel track, support brackets, mechanical drive system, electric motors, limit switches, control panel, key operated switches and accessories.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Take field measurements to verify that fabricated work will fit spaces intended.
- B. Verify that areas in which work is to be installed are ready for installation and that supports are installed correctly.

- C. Do not proceed until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove existing skylight and other components and prepare for new construction. Do not overload adjacent construction. Remove debris from site and dispose of legally.

### 3.3 INSTALLATION

- A. Install in strict accordance with manufacturer's instructions and recommendations and with approved shop drawings; provide a complete weatherproof assembly.
- B. Anchor securely to supporting structure, but allow for differential and thermal movement.
- C. Do not perform structural silicone sealant work when the metal temperature is below 32 degrees F (0 degrees C).
- D. Separate aluminum members from dissimilar metals with protective coating or sheet capable of preventing electrolytic action.
- E. Ensure that weep and condensation control measures function properly.
- F. Field-Applied Sealants: Clean and prime surfaces as required to assure proper adhesion; apply in accordance with sealant manufacturer's guidelines and joint dimensions shown on approved shop drawings.
- G. Coordinate with other work.

### 3.4 CLEANING AND REPAIR

- A. Remove labels, part number markings, sealant smears, handprints, and construction dirt; protect installed work from damage.
- B. Clean all exposed surfaces immediately prior to final inspection, using non-abrasive materials and methods recommended by manufacturer.
- C. Repair damaged components and finishes in accordance with manufacturer's recommendations; replace work that cannot be repaired to the satisfaction of the Architect.

D. Protect completed work from damage.

END OF SECTION