

PART 1 – GENERAL

1.01 Description

A. Work Included

1. Design, fabrication and erection of aluminum frames.
2. Skylight glass and glazing.
3. Skylight related flashings.

B. Related Work

- Structural steel.
- Metal fabrications.
- Roofing.
- Flashing and sheet metal not associated with skylights.
- Roof accessories.
- Sealants and caulking not associated with skylights.
- Glass and glazing not associated with skylights.
- Glazed aluminum framing systems.

1.02 Quality Assurance

A. Reference Standard

1. Aluminum Association Incorporated (AA): SAS-30 Specifications for Aluminum Structures.
2. American Architectural Manufacturers Association (AAMA).
 - a. 501.1 “Standard Test Method for Metal Curtain Walls for Water Penetration Using Dynamic Pressure.”
 - b. 501.2 “Field Check of Metal Curtain Walls for Water Leakage.”
 - c. 501.3 “Field Check of Water Penetration Through Installed Exterior Windows, Curtain Walls and Doors by uniform Air Pressure Difference.”
 - d. 603.8 “Performance Requirements and Test Procedures for Pigment Organic Coatings on Extruded Aluminum.”
 - e. 606.1 “Voluntary Guide Specification and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.”

- f. 607.1 “Voluntary Guide Specification and Inspection Methods for Clear Anodized Finishes for Architectural Aluminum.”
- 3. American National Standards Institute (ANSI):
 - 297.1 “Safety Glazing Materials Used in Buildings Safety Performance Specifications and Methods of Test.”
 - 4. American Society for Testing and Materials (ASTM):
 - a. A193 “Alloy-Steel and Stainless Steel Bolting Materials for Temperature Service.”
 - b. A307 “Carbon Steel Bolts and Studs, 60,000 psi Tensile.”
 - c. B209 “Aluminum and Aluminum-Alloy Sheet and Plate.”
 - d. B211 “Aluminum-Alloy Bar, Rods, and Wire.”
 - e. B221 “Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
 - f. B316 “Aluminum and Aluminum-Alloy Rivet and Cold Heading Wire and Rods.”
 - g. C719 “Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement.”
 - h. C794 “Adhesion-in-Peel of Elastomeric Joint Sealants.”
 - i. C1096 “Flat Glass.”
 - j. C1048 “Heat-Treated Flat Glass--Kind HS, Kind FT Coated and Uncoated Glass.”
 - k. D395 “Rubber Property--Compression Set.”
 - l. D412 “Rubber Properties in Tension.”
 - m. D1171 “Rubber Deterioration--Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens).”
 - n. D2242 “Rubber Property—Durometer Hardness.”
 - o. E283 “Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors.”
 - p. E330 “Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.”

- q. E331 “Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.”
 - r. E773 “Seal Durability of Sealed Insulating Glass Units.”
 - s. E774 “Sealed Insulating Glass Units.”
 - t. E783 “Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.”
5. Consumer Product Safety Commission (CPSC). 16CFR 1202—Architectural Glazing Standards and Related Material.
 6. Flat Glass Manufacturers Association (FGMA): Glazing Manual.
 7. Insulating Glass Certification Council (IGCC): Classification of Insulating Glass Units.

B. Design Responsibility:

1. System Design is the sole responsibility of the Contractor who shall provide a watertight, structurally sound, self-draining system. All components, assemblies and completed work shall conform to all governing codes and regulations and shall be designed to allow for thermal movement, positive and negative wind loads and seismic forces.
2. The systems shown on the Drawings and specified herein are for the defining design intent and minimum performance requirements. Profiles and sight lines may not be changed without written consent of the Architect.

C. Performance Requirements:

Skylight system including glazing materials shall be designed, certified, reviewed and inspected by a professional engineer, licensed in the state of Florida in accordance with the following requirements:

1. Structural members: Of sufficient sizes to support design loads as prescribed by governing building codes and as outlined below.
2. The deflection of a framing member in a direction normal to the plane of glass when subjected to a uniform load deflection test in accordance with ASTM E330, and per the above specified loads, shall not exceed 1/175 nor 1” of its clear span for clear spans less than 20 feet or 1/240 of clear spans greater than 20 feet.
3. The deflection of a framing member in a direction parallel to the plane of the glass, when carrying its full dead load, shall not exceed an amount which will reduce the glass or panel bite below 75% of the design dimension and the member shall have a 1/8” minimum clearance between itself and the edge of the fixed panel, glass, or component immediately adjacent, nor shall it impair the function of or damage any joint seals.

4. Water Penetration” No water penetration shall occur when system is tested in accordance with ASTM E331 using a differential static pressure of 20% of the inward acting design wind load pressure, but not less than 6.24 psi. Water penetration is defined as the appearance of uncontrolled water other than condensation on the interior surface of any part of the skylight.
 - a. Drain water penetrating at joints as well as condensation occurring within the system to exterior face of the work.
5. Thermal movement: Provide for such expansion and contraction of component materials as will be caused by a surface temperature ranging from 20 degrees Fahrenheit to 140 degrees Fahrenheit without causing buckling, stresses on glass, failure of seals, undue stress on structural elements, reduction of performance detrimental effects.
6. Where permitted by code, a 1/3 increase in allowable stress for wind or seismic load shall be acceptable, but not in combination with any reduction applied to combined loads. In no case shall allowable values exceed the yield stresses.
7. Compression flanges of flexural members may not be assumed to receive effective lateral bracing only from anchors to the building structure and, horizontal glazing bars or interior trim which are in contact with 50% of the member’s total depth.
8. Thermal breaks shall be assumed to have no ability to transfer shear stress for composite action of flexural members. Elements joined by a thermal break shall be assumed to act separately.

D. Acceptable Manufacturers:

Regularly engaged in the fabrication and installation of skylights of this scope for a minimum of 10 years. Demonstrate to the Architect’s satisfaction that projects of equivalent size and complexity have been successfully completed.

1. Metcoe Specialty Co., Inc., Gardena, California
Tel: (954) 776-7616 Fax: (954) 772-1915 e-mail: mkg@skylightconcepts.com

1.03 Submittals

- A. Comply with requirements of Section 01340.
- B. Shop Drawings: Submit full scale Shop Drawings indicating methods of construction, location and spacing of anchorage, joinery, finishes, size, shape, thickness and alloy of framing materials, glazing materials and relationships to adjoining work.

C. Samples

1. METAL: Submit samples of each required type and color of aluminum finish on 4" to 6" squares of sheet aluminum as required for the skylights units. Where color or texture of finish will vary slightly to show the limits of such variations. Samples will be reviewed by the Architect for color and texture only. Compliance with other requirements is the exclusive responsibility of the Contractor.
2. GLASS: Submit 12" square samples of each type of sealant.

D. Certificates

1. Certification that adhesion of sealant to samples of metal and glass is adequate when tested in accordance with ASTM C794.
2. Certification that materials in contact with sealant are compatible with sealant after being exposed to 2000-4000 microwatt ultra-violet radiation for 21 days.
3. Statement that stress on each detailed sealant joint will not exceed design stress or sealant when exposed to specified wind loads.

E. Submittal to Building Department for approval where required.

F. Test Reports

1. Submit Metro-Dade County product approval

1.05 Warranty

- A. Submit manufacturer's warranties, commencing from date of substantial completion, and installed in accordance with Contract Documents.
- B. Certify that skylight frame is free of defects in design, material and construction, and that the skylight installation is warranted against leakage for a period of two (2) years.
- C. Warrant glass against defective materials delamination, seal failure, and defects in manufacture per the glass manufacturer's standard warranties.
- D. Warrant structural sealant for a period of 20 years per sealant manufacturer's standard warranty of merchantable quality. Warranty shall certify the cured sealant:
 1. Will not become brittle or crack due to weathering or normal expansion and contraction of adjacent surfaces.

2. Will not harden beyond a Shore A durometer of 50, nor soften below a minimum of 10 points.
3. Will not change color significantly when used with compatible back up material.
4. Will not bleed significantly.

PART 2 – PRODUCTS

2.01 Materials

A. Framework

1. Principal supporting members: 0.100” minimum thickness extruded aluminum, alloy 6063-T5, 6063-T6, or 6061-T6 per ASTM B221. Sizes, shapes, and profiles as indicated on Contract Documents.
2. Snap-On covers and miscellaneous non-supporting trim: 0.062”, per ASTM, B221.
3. Principal formed metal members: 0.125” minimum thickness aluminum, alloy 5052 or 6061-T6, per ASTM B209.

B. Glazing Strips

1. Type I, extruded heat-cured silicone rubber designed to prevent adhesion, and comply with the following specifications:
 - a. Hardness: ASTM D2240 Type A50+/-5 durometer.
 - b. Tensile Strength: ASTM D412 800 psi (min.)
 - c. Elongation: 300% (min.).
 - d. Tear, Die B, psi: 65 (min.).
 - e. Color: Black.
2. Composition set: ASTM D395 Method B, 22 Hours @ 212-degrees Fahrenheit: 20% max.
3. Heat Aging Characteristics:
 - a. 70 Hours @ 212 degrees Fahrenheit.
 - b. ASTM D2240 hardness change: +3 durometer.
 - c. ASTM D412 tensile change: -10%.

- d. ASTM D412 elongation change: 20%.
- 4. ASTM D1171 weather resistance at 1 part ozone per million, 500 hours at 20% elongation: No cracks.
- 5. No visual checks, cracks or breaks after completion of tests.

C. Setting Blocks

- 1. Extruded Type II silicone rubber designed to permit adhesion and comply with the following specifications:
 - a. Hardness: ASTM D2240 Type A 80+/-5 durometer.
 - b. Color: Black.

D. Fasteners

- 1. For exterior cap retainers: ASTM A193 B8 300 series stainless steel screws.
- 2. For framework connections: ASTM A193 B8 300 series stainless steel, and ASTM B316 aluminum rivets, as required by connections.
- 3. For anchoring skylight to support structure: ASTM A307 zinc plated steel fasteners.

E. Flashing

- 1. 5005-H34 aluminum 0.032" minimum thickness.
- 2. Welding and brazing: Field weld by Gas Tungsten Arc Welding (TIG) or Gas Metal Arc Welding (MIG) processes only. Use Oxy-gas welding flux residue upon completion of welding and brazing.

F. Finish

Kynar 500 standard color (selected by architect), two coat

G. Glass

- 1. 9/16" thick heat strengthened laminated with .090 SGP as selected by architect in compliance with requirements of Section 08800.
- 2. Performance requirements:
 - a. Probability of breakage not to exceed 8/1000 for vertical glass and 1/1000 for sloped glass upon first application of design wind and live load pressures. For glass selection, design wind pressure for a one-minute duration. For

loads of longer duration, use standard engineering practices for glass selection.

- b. Probability of breakage due to anticipated thermal stress not to exceed 8/1000 for vertical glass and 1/1000 for sloped glass.

Consult with Design, Mechanical Consultant, and Andre Sarai of Metcoe Specialty Co., Inc. at Tel: (310) 354-0030 Fax: (310) 523-5805 e-mail: andre@metco.com

H. Sealants

1. N/A
2. Non-structural flush glazed joints and weather seal joints: Silicone sealants applied in accordance with manufacturer's recommendations.
3. Structural silicone sealant performance requirements:
 - a. Hardness: ASTM D2240 Type A, 30 durometer.
 - b. Ultimate tensile strength: ASTM D412, 170 psi.
 - c. Tensile at 150% elongation: ASTM D412, 80 psi. ASTM C719, +/-50%.
 - d. Peel strength (aluminum, glass, and concrete) after 21-day cure: ASTM C794, 32 lb./in.
4. Structural silicone shall not be used to support dead weight of vertical glass or panels.

K. N/A

L. Insulation:

N/A

2.02 Fabrication

- A. Construct skylight(s) using extruded aluminum members.
- B. Construct skylight(s) using a continuous aluminum curb with expansion joints as required.
- C. Insofar as practicable, fit and assemble work in manufacturer's shop. Work which cannot be permanently assembled shall be shop assembled marked, and disassembled before shipment to the jobsite.
- D. Design rafter bars for snap-in type glazing strips.
- E. Attach Snap-On cap retainers using stainless steel fasteners with neoprene washers into a system of alternate serrations, at a maximum spacing of 12" on center.

- F. Design Snap-On retainer fasteners to provide not more than 10lbs. per lineal inch of compression on the glazing strips and glass edge.
- G. Use Snap-On type caps to conceal Snap-On retainer fasteners.
- H. Where applicable, shop rivets or welded aluminum clips to framing members, or field bolt at installation.
- I. Set glass with exterior silicone glazing strips.
- J. Use silicone setting block to support glass and to provide proper edge clearance and glass bites as outlined below, in accordance with FGMA recommendations:
 - 1. Set blocks not less than 6" from edge of glass for support of unit.
 - 2. Glass bite: Not less than 1/2" nor more than 5/8" on any side of a glass unit.
 - 3. Maintain 1/4" edge clearance between glass and adjacent metal framework.
 - 4. Use rubber spaces to maintain separation of glass and adjacent metal framework.
- K. Locate weep holes in curb to positively drain condensation to exterior of skylight at each rafter connection.

PART 3 - EXECUTION

3.01 Examination

- A. Prior to installation of the skylight system, arrange for representative(s) of the skylight sealant and glazing manufacturers to examine the structure and substrate to determine that they are properly prepared, sized, and ready to receive the skylight work included herein.

3.03 Preparation

- A. Contact between aluminum and dissimilar metals shall receive a protective coating of asphaltic paint for the prevention of electrolytic action and corrosion.
- B. Install skylight system under the direction of the skylight manufacturer's own experienced mechanics.
- C. Erect system plumb and true, proper alignment and relation to established lines and grades as shown on approved Shop Drawings.
- D. Anchor skylight to structure in strict accordance with approved Shop Drawings.
- E. Use high performance silicone sealants to seal horizontal joints between glass panel and silicone sealant to wet seal joints between Snap-On cap retainers and glass.

- F. Apply sealing materials in strict accordance with sealant manufacturer instructions. Before application, remove mortar, dirt, dust, moisture, and other foreign matter from surfaces it will contact. Mask adjoining surfaces to maintain a clean and neat appearance. Tool sealing compounds to fill the joint and provide a smooth finish.

3.04 Galvanic Protection

- A. Aluminum surfaces in contact with masonry concrete or dissimilar metals if not organically coated shall be given a heavy coat of zinc chromate primer or bituminous paint.

3.05 Tolerances

- A. All parts of the work, when completed, shall be within the following tolerances:
 - 1. Maximum variation from plan or location shown on approved Shop Drawings: 1/8" per 12 feet or length or 1/2" in total length.
 - 2. Maximum offset from true alignment between two numbers abutting end-to-end, edge-to-edge in line or separated by less than 3": 1/32.

3.07 Cleaning

- A. Install skylight frame and associated metal to avoid soiling or smudging finish.
- B. Clean glass, oil, and smudge marks from aluminum at time of installation.