

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Design, engineering, production drawings, and documents. Detailed design and attachment of metal-framed skylight will be provided as noted in the following specifications.
- B. Work included and is limited to, the skylight materials only and includes: single or double acrylic, polycarbonate, and segmented glass unit skylight system with thermally broken curb mount frame for installation on flashed curb by others.
- C. All verticals, head and sill sections will be capped with pressure caps and snaps to conceal all screws. All horizontals are to be glazed with two sided butt joint design silicone seal.
- D. All applied finishes of aluminum extrusions and sheet to be thermo set powder coat painted finish. All aluminum extrusions are to be finished after shop fabrication has been completed.
- E. Skylight related flashings to be provided as detailed on the drawings.

1.2 RELATED SECTIONS

- A. Section 076200 - Sheet Metal Flashing and Trim
- B. Section 079200 - Joint Sealants
- C. Section 077213 - Manufactured Curbs
- D. Section 088000 - Glazing

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)

1.4 SYSTEM DESIGN / PERFORMANCE REQUIREMENTS

- A. Design Requirements:
 - 1. Extruded aluminum members with an integral gasket slots, weep gutters, condensation gutters, and screw slots for the secure attachment of exterior glazing retainers and screws. Caps will conceal all fasteners and sealants used on vertical rafters.
 - 2. Condensation guttering and weep system to be integral with skylight framing members for positive drainage of condensation at the exterior sill.
 - 3. All purling segments will be sealed with two-sided continuous butt joint glazing.
- B. Performance Requirements:
 - 1. Structural Members: Metal-framed skylights are manufactured, fabricated, and installed as required to resist loads required by all applicable building codes and will provide performance standards required by these specifications without defects, damage, or failure.
 - 2. Water Penetration: No water penetration shall occur when the system is tested in accordance with ASTM E331 using a differential static pressure of 20 percent of the inward acting design wind load pressure, but not less than 12 pound per square foot. Water penetration is defined as the appearance of uncontrolled water other than condensation on the interior surface of any part of the skylight.
 - a. System is designed to drain water penetrating at joints, as well as condensation occurring within the system to exterior face of the work.
 - 3. Thermal Movement: System will provide for expansion and contraction of component materials as will be caused by an exterior surface range of (+/-) 85°F, ranging from -20°F to 150°F, and an interior surface temperature range of (+/-) 40°F, ranging from 40°F to 120°F. Adjustments in the exterior and interior temperature ranges should be made, based on specific project locations and conditions. The skylight system should allow for thermal movements without buckling, sealant failure, undue materials stress, and other detrimental effects.
 - 4. 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 stress.
5. *Optional Hurricane and Impact Resistant Skylight Systems:* If the project is located in or near coastal areas, an impact resistant skylight design may be required. Framing and Glazing manufacturers are to provide a tested system, in compliance with the IBC, Florida Building Code, and Miami-Dade County requirements having Notice of Acceptance Numbers;
 - a. Large and Small Missile Impact [insulated glass] [laminated glass]
 - b. Small Missile Impact: [insulated glass] [laminated glass]
- C. Design Loads: Framing components shall be designed to support following loads:
1. Live Load (downward):
 - a. _____ psf.
 - b. As indicated on the Drawings.
 2. Wind Load (horizontal):
 - a. _____ psf.
 - b. As indicated on the Drawings.
 3. Dead Load:
 - a. _____ psf
 - b. As indicated on the Drawings.
 4. Load Combinations:
 - a. Live + Dead
 - b. Wind + Dead
 - c. Negative Pressure - Dead
 - d. (Live + Wind + Dead) / 1.33
 5. Alternate Design Loads: Conform to applicable state and local codes.
- D. Physical Properties: Allowable stresses shall incorporate following safety factors, unless otherwise specified:
1. Air Infiltration:

Acrylic, polycarbonate, and glass unit skylights must meet the requirements of ASTM E283 that allows a maximum air infiltration of 0.06 CFM of the total glazed surface area.
 2. Static Water Penetration:

Acrylic, polycarbonate, and glass unit skylights must meet the requirements of ASTM E547/E331 that allows for no water infiltration at a test pressure of 12 PSF.
 3. Structural Load Test:

Acrylic, polycarbonate, and glass unit skylights must meet the requirements of uniform load test ASTM E330 that requires glazing to withstand a positive and negative test pressure of 60 PSF.

1.5 SUBMITTALS

- A. Submit [_____] copies of shop drawings including 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 to fully describe the skylight construction for the Architect's approval prior to the beginning of fabrication.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 1. Preparation instructions and recommendations.
 2. Storage and handling requirements and recommendations.
 3. Installation methods.
 4. Maintenance instructions.
- C. With regard to structural silicone joinery, if specifically requested, submit:
 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 2,000 - 4,000 micro watt ultra-violet radiation for twenty-one (21) days.
- D. Selection Samples: Submit manufacturer's sample(s) of each type of finish and glazing material as requested before fabrication.
1. Submit [] 12-inch by 12-inch samples of each type of proposed.
 2. Submit [] manufacturer's samples of each type of sealant.
 3. Submit [] 6-inch long samples of extrusions (with appropriate finish).
 4. Submit [] sets of as-built drawings and cleaning and maintenance manuals upon completion of skylight installation.

1.6 QUALITY ASSURANCE

- A. The manufacturer must demonstrate a minimum of ten (10) years documented experience in the fabrication of skylights of the type required for this project and be capable of providing field service representation during installation.
- B. The Installer is to have a minimum of five (5) years documented experience in the work of this section specializing in the installation of work similar to that required for this project and must be approved by the manufacturer.
- C. The Manufacturer shall be regularly engaged in the preceding phases of construction including pre-installation meetings requiring the attendance of parties directly affecting work of this section, including Contractor, Architect, installer, and manufacturer's representative. Review requirements for preparation, installation, cleaning, protection, and coordination with other work.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and location of installation.
- B. Storage: Store products above the floor and under cover in a clean, dry area until ready for installation. Any protection on the skylights during transportation should remain in place until installed.
- C. Handling: Protect materials and finish from damage during handling and installation.

1.8 WARRANTY

- A. Submit manufacturer's warranty certifying that skylight work was furnished and installed in accordance with the Contact Documents.
- B. Certify that the metal-framed skylight system is free of defects in design, material, and construction for a period of ten (10) years from the Date of Skylight Completion.
- C. Warrant glass against defective materials, delamination, seal failure, and defects in manufacture per the glass manufacturer's standard warranties. Glass breakage is not covered by warranty.
- D. Warrant structural sealant for a period of ten (10) years per sealant manufacturer's standard warranty of merchantable quality. Warranty shall certify that 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 materials.
 4. Will not bleed significantly.
- E. Warrant finish per the manufacturer's standard warranties.
- F. Optional extended warranties may be available on some products at an additional cost.
- G. Warranty service becomes effective only following payment in full for the contract amount.

PART 2 PRODUCTS

2.1 MANUFACTURER

- A. Contract documents are based on products manufactured by Energy-Glazed Systems Inc. (E-GSI), 350 Center St., Grayslake, IL. 60030 Phone: (847) 223-4500 Fax: (847) 223-6444, website: www.gsiskylights.com, email: sales@gsiskylights.com.
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 016000.

2.2 METAL-FRAMED SKYLIGHTS

- A. Standard Skylights:
 - 1. Overall Dimensions: [_____ width x _____ length x _____ height]
[As indicated on the drawings].

2.3 MATERIALS

- A. Framing Materials:
 - 1. Principal Supporting Members: 0.125-inch minimum thickness extruded aluminum, alloy 6005-T5 or 6061-T6 per ASTM B221. Sizes, shapes, and profiles as per E-GSI products, standards, and methodology of design as indicated on the Contract Drawings.
 - 2. Snap-on Covers and Miscellaneous Non-supporting Trim: 0.062-inch minimum thickness extruded aluminum, alloy 6063-T5 per ASTM B221.
 - 3. Principal Formed Metal Members: 0.040-inch minimum thickness aluminum, alloy 5052 or 6061-T6 per ASTM B209.
- B. Glazing Material:
 - 1. Acrylic, polycarbonate, and/or glass should be _____ (color). Glazing material shall be secured to frame with a fully welded retainer cap, minimum thickness of .060. Any custom color or alteration to be determined by architect.
- C. Flashing:
 - 1. Formed Aluminum Components and Flashing: Alloy 5005-H34 or equivalent.
 - 2. Minimum Thickness: 0.040 inch.
 - 3. Sheet metal flashings are to be furnished shop formed to profile in minimum 10-foot lengths. When lengths exceed 10-feet, field trimming and forming of the ends is necessary to suit as built-in conditions.
- D. Setting Blocks: Extruded Type II EPDM.
 - 1. Extruded Type II silicone rubber designed to permit adhesion and comply with the following specifications:
 - a. Hardness, ASTM D2240, Type A: Durometer 80 (+/-5).
 - b. Color: Black.
- E. Condensation Control System:
 - 1. Mechanically design entire condensation control system to function properly with minimal dependency upon sealants.
 - 2. Skylight system provided with an integral weep transfer system on all framing members, including rafters.
- F. Glazing Caps:
 - 1. Extruded aluminum, Alloy 6063-T6.
 - 2. Attach glazing caps with glazing cap fasteners located at a maximum of 9 inches on center or as required to resist negative loading.
- G. Fasteners:
 - 1. For Framing Connections: As required by connection.
 - a. Aluminum: ASTM B211, Alloy 2024-T4.
 - b. Stainless Steel: ASTM A193, Series B8 300.
 - c. Aluminum Rivets: ASTM B316.

2. For Exterior Cap Retainers: Stainless steel screws, ASTM A193, Series B8 300.
 3. For Anchoring: skylight to treated wood support structure ASTM A307 zinc / galvanized plated steel fasteners.
 4. Finish: Exposed fasteners to match aluminum finish
- J. Sealants:
1. Structural Flush Glazed Joints: High performance silicone sealant applied in accordance with manufacturer's recommendations.
 2. Nonstructural Flush Glazed Joints and Weather Seal Joints: Silicone sealants. Apply in accordance with sealant manufacturer's instructions.
 3. Structural silicone sealant performance requirements:
 - a. Hardness: ASTM D2240 Type A: Durometer 30.
 - b. Ultimate Tensile Strength: ASTM D412, 170 psi.
 - c. Tensile at 150% Elongation: ASTM D412, 80 psi.
 - d. Joint Movement Capability After 14 Day Cure: ASTM C719, (+/-) 50%.
 - e. Peel Strength (aluminum, glass, concrete) After 21 Day Cure: ASTM C794, 50 ppi.
 4. Structural silicone shall not be used to support dead weight of vertical glass or panels.

2.4 ALUMINUM FINISHES

- A. High-Performance Pigmented Organic Coating: AAMA 2605-05: All aluminum components shall be mechanically processed for proper adhesion of paint. All paint shall be thermo set electrostatic powder coat paint. Painting process shall be done in-house to maintain quality control, warranties, and sole responsibility of skylight system. Color (Axalta Coatings, Tiger Drylac, architect shall specify). Paint shall pass Mandrel Bending Test ISO1519/ASTM D522 Results 5/32 in/4mm. Impact test 1/10 in. Distortion ISO 6272/ STMD 2794-90 up to 40in/lbs.
1. Color: _____.
 2. Color: As selected by Architect from manufacturer's standard colors.
 3. Color: As indicated on the Drawings.

2.5 FABRICATION

- A. Construct metal-framed skylight using extruded aluminum members.
- B. Where detailed at the sill construct skylight(s) using a continuous aluminum curb with expansion joints as required.
- C. All skylights shall be factory assembled and factory glazed. Field assembly if required on large units.
- D. Design rafter bars for slide-in-type spline glazing strips.
- E. Design glass retainer fasteners to resist uplift loadings.
- F. Use snap-on beauty caps to conceal glass retainers and glass retainer fasteners.
- G. Shop located drill and bolt, or weld aluminum clips to framing members.
- H. Set glazing material with interior and exterior EPDM glazing strips.
- I. Use silicone setting blocks to support glass and to provide edge clearances and glass bites as outlined below.
- J. Locate weep holes in curb to positively drain condensation to exterior of skylight at each rafter connection.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Upon arrival to the jobsite the installer is to examine the structure and substrate to determine that they are properly prepared, dimensionally accurate, and ready to receive the skylight work included herein.

- B. Installer shall notify General Contractor and Architect of conditions that would adversely affect installation or subsequent utilization of skylights.
- C. Correction of faulty work to be at the expense of the responsible party/s. Do not proceed with installation until unsatisfactory conditions are corrected.
- D. The skylight manufacturer is not responsible for faulty structure or substrate.

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: Contact between aluminum and dissimilar metals shall receive a protective coating of asphaltic paint for the prevention of electrolytic action and corrosion.
- D. Skylight manufacturer and manufacturer's erector excludes all field measuring, demolition, removal, replacement, or re-work of any existing material.

3.3 INSTALLATION

- A. Install metal-framed skylight including frame, glazing, and accessory items in accordance with manufacturer's instructions at locations indicated on the drawings.
- B. Install skylights level, plumb, square, properly aligned, correctly located, and without warp or rack.
- C. Do not install skylight components with deficiencies or dimensional errors. Do not proceed with installation until unsatisfactory components are replaced.
- D. Anchor skylights securely in place to supports. Use attachment methods permitting adjustment for construction tolerances, irregularities, alignment, and expansion and contraction as demonstrated in shop drawings.
- E. Install skylights including flashings, fasteners, hardware, sealants, and glazing materials required for a complete, weatherproof installation.
- F. Apply sealing materials in strict accordance with sealant manufacturer's instructions. Before application, remove dirt, dust, moisture and other debris from contact surfaces. Tool compounds to fill the joint and provide a smooth finish.
- G. Isolate, with protective barrier, contact areas between aluminum and dissimilar metals.
- H. Sheet Metal Flashing: Install sheet metal flashing at skylight perimeter as specified in Section 07620.
- I. Sealants: Use high performance silicone sealants for horizontal joints and between snap-on retainers and glazing material. Install sealants at sill flashing and perimeter framing to prevent air and water intrusion. No sealants shall be applied if temperature is below 32° F.

3.4 TOLERANCES

- A. All parts of the work, when completed, shall be within the following tolerances:
 - 1. Maximum variation from plane or location shown on approved shop drawings: 1/8-inch per 12- foot length, or 1/2-inch in total length.
 - 2. Maximum offset from true alignment between two members abutting end-to-end, edge-to-edge in line or separated by less than 3-inches: 1/32-inch.

3.5 FIELD QUALITY CONTROL

- A. Inspect installed skylights for required fasteners, wet-sealing and uniformity of retaining caps.
- B. Inspect skylight framing members for level and plumb.
- C. Inspect installation of sheet metal flashing and sealants.
- D. Inspect glazing units for cracks, deep scratches, and other damage.

3.6 CLEANING

- A. Clean installed skylights in accordance with manufacturer's instructions.

- B. Clean skylights inside and outside, including member connections and inside corners, immediately after installation and after sealants have cured.
- C. Remove temporary protective coverings and strippable coatings from prefinished metal surfaces.
- D. Remove labels and part number markings from components.
- E. Remove excess sealant in accordance with sealant manufacturer's instructions.
- F. Do not use harsh cleaning materials or methods that would damage metal finishes or glazing.

3.7 PROTECTION

- A. No more than two bays are to be removed per crew. Bays are to be closed off at the end of each work day with tarps if not completed.
- B. The work areas as well as the area under the sections being replaced are to be secured daily.
- C. Furnishing of temporary covering and weather-proofing of the skylight openings, if required by the General Contractor and removal of protective measures during and after skylight installation is excluded by the manufacturer. Any temporary coverings that may be required are not to obstruct or interfere with the skylight installation in any way.
- D. Protect installed products until completion of project in accordance with manufacturer's instructions.
- E. Maintain protection to ensure that, except for normal weathering, skylights will be without deterioration at time of substantial completion.
- F. Remove and replace glazing units that are chipped, cracked, abraded or otherwise damaged.

END OF SECTION