

SPECIFICATIONS FOR EAST HOLLAND STABLES VENT RIDGE SYSTEM & GABLE WALLS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and all of the Contract Documents, including General and Supplementary Conditions, and Division 1 General Requirements, apply to the work of this Section.
- B. Design, manufacturing, and installation of the translucent structural polycarbonate skylights as shown in the architectural drawings including aluminum framing, battens, closures, trim and flashings

1.2 RELATED SECTIONS

Related Sections: Other specifications sections, which directly relate to the work of this section include, but are not limited to the following:

- A. Section 033000 – Cast-In-Place Concrete
- B. Section 051200 – Structural Steel
- C. Section 061000 – Rough Carpentry
- D. Section 075000 – Membrane Roofing
- E. Section 076200 – Sheet Metal Flashing and Trim
- F. Section 079150 – Sealants, Caulking and Seals.

1.3 REFERENCES

- A. Aluminum Association Incorporated (AA)
 - 1. SAS-30: Specifications for Aluminum Structures.
- B. American Architectural Manufacturers Association (AAMA)
 - 1. AAMA 501.3: Field Check of Water Penetration Through Installed Exterior Windows, Curtain Walls, and Doors by Uniform Air Pressure Difference.
 - 2. AAMA 603.8: Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
- C. American Society for Testing and Materials (ASTM)
 - 1. ASTM A193: Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service or High Pressure Service and Other Special Purpose Applications.
 - 2. ASTM A307-10: Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - 3. ASTM B209: Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 4. ASTM B211-03: Standard Specification for Aluminum-Alloy Bar, Rod, and Wire.
 - 5. ASTM B221-08: Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 6. ASTM B316: Standard Specification for Aluminum and Aluminum-Alloy Rivet and Cold-Heading Wire and Rods.
 - 7. ASTM C719: Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cycle Movement (Hockman Cycle).
 - 8. ASTM C794: Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
 - 9. ASTM D395-03(2008): Standard Test Methods for Rubber Property- Compression Set.
 - 10. ASTM D412-06ae2: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
 - 11. ASTM D1171-99: Standard Test Method for Rubber Deterioration - Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens).

12. ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics.
ASTM D2240-05: Standard Test Method for Rubber Property - Durometer Hardness.
 13. ASTM E283-04: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 14. ASTM E330-02: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 15. ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
 16. ASTM E783-02: Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.
- D. Consumer Product Safety Commission (CPSC)
1. CPSC 16CFR 1201: Safety Standard for Architectural Glazing Materials

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide skylights capable of withstanding loads and thermal and structural movements as required by code without failure. Failure includes the following:
1. Supporting-frame deflection exceeding specified limits.
 2. Polycarbonate-insulating-panel deflection exceeding manufacturer's recommended limits or causing panel failure.
 3. Thermal stresses transferred to the building structure.
 4. Noise or vibration created by thermal and structural movement and wind.
 5. Loosening or weakening of fasteners, attachments, and other components.
 6. Sealant or gasket failure.
 7. Uncontrolled water in the integral weep transfer systems.
- B. Design thrust and loading of the framing system including translucent glazing material to support the following load requirements:
1. As required by local and State code.
 2. Dead load (12 PSF)
 3. Live load (25 PSF)
 4. Snow load (25 PSF)
 5. Seismic load as required by applicable code earthquake zone for project location.
- C. Thermal Movement: Provide skylights that are design to allow for thermal movement resulting from the following maximum changes in ambient and surface temperatures (-35__ To +120__)
- D. Air Infiltration: Provide skylights with maximum air leakage of 0.06-cfm/sq. ft. of surface when tested according to ASTM E 283 at a minimum static-air-pressure differential of 15 pounds force per square foot. Passive Roof Vent for Equestrian Applications.
- E. Water Penetration: Provide skylights that incorporate a weep system when tested according to ASTM E331 at a minimum static pressure differential of 20 percent of positive design wind load, but not less than of 15 pounds force per square foot.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data showing compliance with requirements specified under Paragraph: Performance Requirements. Include both published data and specific data prepared for this project.
- B. Shop Drawings: Submit shop drawings for approval prior to fabrication. Include detailed plans, elevations, and details of framing members, translucent glazing materials, sealants, fasteners, anchors, and thicknesses and types of formed flashing and closures in relationship to adjacent materials. Indicate maximum horizontal and vertical forces at rafters.

- C. Samples: Submit the following samples.
 - 1. Aluminum Finish: Submit color charts or range samples for initial color selection. Submit finished sample of color selected for use. Mill Finish
 - 2. Translucent Glazing Materials: Submit a verification sample of the specified translucent glazing material specified. 16 ml Triple Wall Opal Polycarbonate Sheet.
- D. Delegated-Design submittal: for panel assemblies indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- E. Selection Samples: Submit manufacturer's sample(s) of each type of finish and glazing material as requested before fabrication.
 - 1. Submit [__3__] 12-inch by 12-inch samples of each type of proposed polycarbonate panel.
 - 2. Submit [__3__] manufacturer's samples of each type of sealant.
 - 3. Submit [__3__] 6-inch long samples of gasket.
 - 4. Submit [__3__] sets of as-built drawings and cleaning and maintenance manuals upon completion of skylight installation.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: 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.
- D. Information on drawings and in specifications establishes requirements for panel assemblies aesthetic affects and performance characteristics. Aesthetics effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including testing conducted by an independent testing agency and in service performance.
 - 1. Do not modify intended aesthetic effects, as judge solely by Architect, except with architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

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 polycarbonate panel system is free of defects in design, material, and construction for a period of ten (10) years from the Date of Skylight Completion per the panel manufacturer warranty.
- C. Warrant polycarbonate panels against defective materials, delamination, seal failure, color changes exceeding requirements, losses in light transmission beyond 6% from original when measured per ASTM 0 1003, and defects in manufacture per the manufacturer's standard warranties. Structural failures including, but not limited to excessive deflection.
- 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. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- 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 MATERIALS

- A. Framing Materials:
 - 1. Principal Supporting Members: 0.280-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. Supporting Aluminum Gutters: Thickness as prescribed by skylight engineer based on skylight reactions and applied design loads.
 - 4. Principal Formed Metal Members: 0.040-inch minimum thickness aluminum, alloy 5052 or 6061-T6 per ASTM B209.
- B. Glazing Strips:
 - 1. Extruded EPDM rubber designed to comply with the following specifications:
 - a. Hardness: ASTM D2240, Type A: Durometer 50 (+/-5).
 - b. Tensile Strength: ASTM D412. 800 psi (min).
 - c. Elongation: 300% (min).
 - d. Color: Black.

2. Compression Set: ASTM D395 Method B, 22 hours at 212°F: 25% max.
 3. Heat Aging Characteristics:
 - a. 70 hours at 212°F.
 - b. Hardness: ASTM D2240, Type A: Durometer 50 (+/-5).
 - c. Tensile Change: ASTM D412: -10%.
 - d. Elongation Change: ASTM D412: -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. 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 6065-TC.
 - 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
 4. Finish: Exposed fasteners to match aluminum mill 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.

2.3 ALUMINUM FINISHES: Mill Finish Aluminum

2.4 GLAZING

- A. Translucent, extruded-polycarbonate sheet with cellular cross sections that provides isolated airspaces and that is coextruded with a UV-protective layer.
 - 1. Plastic self-ignition temperature: 650° F (343° C) or more per ASTM D 1929
 - 2. Smoke Developed Index: 450 or less per ASTM E 84, or 75 or less per ASTM D 2843
 - 3. Flamed-Spread Index: Not more than 25 per ASTM E84
 - 4. Combustibility Classification: Class CC1 per ASTM D 635
 - 5. Color Change: Not more than 30 units Delta E when measured according to ASTM D 2244 after outdoor weathering compliant with procedures in ASTM D 1435.
 - 6. Impact Resistance: No failure at impact of 200ft x lbf according ASTM D 384/SPL
- B. Panel Thickness as determined by manufacture to meet structural load requirements, but not less than 16mm.
- C. Panel Color: Opal White

FABRICATION

- A. Construct metal-framed using extruded aluminum members.
- B. Where detailed at the sill construct skylight(s) using a continuous aluminum curb with expansion joints as required.
- C. Insofar as practical fit and assemble work in the manufacturer's shop. Work that cannot be permanently assembled shall be shop-assembled, marked, and disassembled before shipment to the jobsite.
- D. Design rafter bars for slide-in-type spline glazing strips.
- E. Design polycarbonate panels retainer fasteners to resist uplift loadings. Spacing to be determined by structural calculations when applicable.
- F. Shop located drill and bolt, or tig/mig weld aluminum clips to framing members.
- G. Set polycarbonate panel with interior and exterior EPDM glazing strips.
- H. Use silicone setting blocks to support glass and to provide edge clearances and glass bites as outlined below.
 - 1. Polycarbonate panel Bite: Not less than 1/2-inch or more than 5/8-inch on any side of unit.
 - 2. Maintain 1/4-inch edge clearance between polycarbonate panel and adjacent metal framework.
- I. Locate weep holes in curb to positively drain condensation to exterior of skylight at each rafter connection and provide weep baffles at all weep holes.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Upon arrival to the jobsite for installation of the specified work, the manufacturer's erector 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. Notify Architect of conditions that would adversely affect installation or subsequent utilization

of skylights. Report any discrepancies to the General Contractor.

- C. Correction of faulty work to be at the expense of the responsible party. 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 all 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 to prevent 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 polycarbonate panel 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. Use high performance silicone sealants to seal horizontal joints between polycarbonate panel and silicone sealant to wet seal joints between snap-on cap retainers and structural polycarbonate.
- G. 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 join and provide a smooth finish.
- H. Isolate, with protective barrier, contact areas between aluminum and dissimilar metals.
- I. Sheet Metal Flashing: Install sheet metal flashing at skylight perimeter as specified in Section 07620.
- J. Sealants: Install sealants at sill flashing and perimeter framing as required to prevent air and water intrusion as specified in Section 07920.
- K. Provide all ridge skylights with sill vent/ridge system as detailed with architect approval.

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 required for thermo expansions

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 panels for deep scratches, and other damage prior to installation.

3.6 CLEANING

- A. Clean installed skylights in accordance with manufacturer's instructions.
- B. Clean skylights inside and outside prior to field installation, including member connections .
- 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: Protection of Openings to be Provided by G.C.

- A. Furnishing of temporary covering and weather-proofing of the skylight openings, if required by the General Contractor., Removal of protective measures during and after skylight installation is excluded by the manufacturer installers. Any temporary coverings that may be required are not to obstruct or interfere with the skylight installation in any way.

END OF SECTION