

SECTION 08630
METAL FRAMED SKYLIGHTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:

1. Metal Framed Structural Skylights.

- B. Related Sections may include, but are not limited to the following:

1. Division 5 Section "Structural Steel" for steel framing.
2. Division 8 Section "Translucent Plastic Glazing"
3. Division 7 Section "Joint Sealants" for sealants installed at metal-framed skylight perimeters.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Provide metal-framed skylights capable of withstanding loads and thermal and structural movements indicated without failure. Failure includes the following:

1. Deflection exceeding specified limits.
2. Thermal stresses transferred to the building structure.
3. Skylight framing members transferring stresses, including those caused by thermal and structural movement, to glazing.
4. Weakening of fasteners, attachments, and other components.

- B. Deflection Limits: As follows:

1. Deflection Normal to Glazing Plane: Limited to [edge of glass in a direction perpendicular to glass plane not exceeding $L/175$ of the glass edge length for each individual glazing lite] [$1/175$ of clear span for spans up to 13 feet 6 inches (4.1 m) and to $1/240$ of clear span plus $1/4$ inch (6.35 mm) for spans more than 13 feet 6 inches (4.1 m)] <Insert deflection limit> or an amount that restricts edge deflection of individual glazing lites to $3/4$ inch (19.1 mm), whichever is less.

- C. Structural Loads: Provide metal-framed skylights, including anchorage, capable of withstanding the effects of the following design loads when supporting full dead loads:

1. Roof Loads
 - a. Concentrated Load: 250 lbs applied to framing members at location that produces the most severe stress or deflection.
 - b. Snow Loads: Per current code
 - c. Roof Loads: Per current code

- d. Wind Loads: Per current code
- 2. Seismic Loads: Per current code
- D. Structural Performance: Provide metal-framed skylights, including anchorage, capable of withstanding pressures indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330.
- E. Air Infiltration: Provide metal-framed skylights with maximum air leakage of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of surface when tested according to ASTM E 283 at a minimum static-air-pressure differential of 6.24lb/sq. ft. (300 Pa).
- F. Water Penetration: Provide metal-framed skylights that do not evidence water penetration when tested according to ASTM E 331 at a minimum differential static pressure of 20 percent of positive design wind pressure, but not less than 15 lb/sq. ft. (718 Pa).
- G. Thermal Movement: Provide metal-framed skylights that allow for thermal movements resulting from the following maximum change (range) in ambient temperatures by preventing buckling, sealant failure, and other detrimental effects.
 - 1. Temperature Change (Range): 100 degrees F.

1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions and profiles of components, and finishes for metal-framed skylights.
- B. Shop Drawings: For metal-framed skylights. Include plans, elevations, sections, details, and attachments to other work as required.
- C. Samples for Initial Selection: Manufacturer's color charts consisting of sections of units showing the full range of colors available for factory-finished aluminum.
- D. Samples for Verification: Provide color sample of selected finish on 2"x3" aluminum sheet.
- E. Installer Certificates: If required, signed by manufacturer certifying that installers comply with requirements.
- F. Product Test Reports: From a qualified testing agency indicating skylights comply with requirements, based on comprehensive testing of current products.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing metal-framed skylights similar to those indicated for this Project and who is acceptable to manufacturer.
- B. Professional Engineer Qualifications: A professional engineer who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of skylights that are similar to those indicated for this Project in material, design, and extent.
- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

1.7 PROJECT CONDITIONS

- A. Field Measurements: Where metal-framed skylights are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating skylights without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 WARRANTY

- A. Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of metal-framed skylights that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures.
 - 2. Failure of systems to meet performance requirements.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Water leakage; defined as uncontrolled water appearing on normally exposed interior surfaces of skylights from sources other than condensation, resulting from defects in skylight materials or workmanship. (Water controlled by flashing and gutters and drained back to the exterior and that cannot damage adjacent materials or finishes is not water leakage). Water leakage resulting from improper installations not part of this warranty.
- B. System Warranty Period: 5 years from date of shipment from the manufacturer.
- C. Plastic Warranty: Provide written warranty signed by manufacturer agreeing to repair or replace work that has or develops defects in the plastic. "Defects" is defined as abnormal aging or deterioration.
 - 1. Warranty Period for polycarbonate: 10 years from date of shipment from the manufacturer.
- D. Finish Warranty: Provide written warranty signed by manufacturer agreeing to repair or replace work with finish defects. "Defects" is defined as peeling, chipping, chalking, fading, abnormal aging or deterioration, and failure to perform as required.
 - 1. Warranty Period for Anodized Finish: 1 year from date of shipment from the manufacturer.
 - 2. Warranty Period for Powder Coat Finish: 5 years from date of shipment from the manufacturer.
 - 3. Warranty Period for Kynar 500 Finish: 5 years from date of shipment from the manufacturer. (10 and 20 years available if specified).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide Pinnacle 350/600 system by Wasco Skylights part of the Velux Group, Wells, ME (800-388-0293) – Basis of design
- B. Substitutions: Manufacturers shall not be considered without prior approval in writing no later than ten (10) calendar days prior to bid. Substitute manufacturers must have been in the custom skylight business for not less than a period of 15 years and must submit to the Architect the following:
 - 1. List of similar projects successfully completed within the last five years.
 - 2. Proof of financial capability.
 - 3. Complete details of proposed skylight.
 - 4. Complete specifications for Architect's review.

2.2 FRAMING MATERIALS

- A. Framing Members: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 with minimum effective thickness of 0.109 inches.
- B. Exterior Pressure Caps: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 with minimum effective thickness of 0.090 inches.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding flashing; compatible with adjacent materials.
- D. Exposed Flashing and Closures: Aluminum sheet alloy and temper of 1100-H14, thickness as require for proper performance.
 - 1. Minimum Thickness: 0.032 inch Apron Flashing.
 - 2. Minimum Thickness: 0.062 inch Closures.
- E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories; compatible with adjacent materials.
 - 1. Aluminum Retaining Cap Fasteners and Framing Members Fasteners: ASTM A 193/A 193M, Series 300 stainless-steel screws; type as recommended by manufacturer.
 - 2. Connections to Supporting Structure: Series 300 Stainless Steel or ASTM A 307, hot dipped galvanized steel fasteners by installer.
- F. Framing-System Sealants: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane sealant furnished by skylight manufacturer.
 - 1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O. Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N.
 - 2. Sealant conforms to USDA approval standards.
- G. Bituminous Paint: Cold-applied asphalt mastic paint complying with SSPC-Paint 12, except containing no asbestos, and formulated for 30-mil thickness per coat.

2.3 GLAZING MATERIALS

- A. Multiwall Polycarbonate: 25MM multiwall polycarbonate panels
 - 1. Opal (3 wall); VT=35%, SHGC=0.50, U-factor=0..34

- B. Glazing Gaskets: Manufacturer's proprietary pressure-glazing gaskets of elastomer type and hardness selected by the skylight manufacturer to comply with requirements. Glazing gaskets to be extruded thermoplastic elastomer by the skylight manufacturer.
- C. Spacers, Edge Blocks, and Setting Blocks: Manufacturer's standard permanent non-migrating type of elastomer type and hardness selected to comply with requirements. Spacers, Edge Blocks, and Setting Blocks to be extruded thermoplastic elastomer by the skylight manufacturer.
- D. Glazing Weatherseal Sealant: Neutral-curing silicone sealant recommended by skylight and sealant manufacturers for this use and furnished by skylight manufacturer.
 - 1. Sealant is capable of withstanding 50 percent movement in both extension and compression (total of 100 percent movement) when tested for adhesion and cohesion under maximum cyclic movement according to ASTM C 719.
 - 2. Sealant complies with ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and, as applicable to substrates including other sealants with which it comes in contact, O.
 - 3. Color: Black.
- E. Flashing Sealant: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane sealant furnished by skylight manufacturer.
 - 1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O. Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N.
 - 2. Sealant conforms to USDA approval standards.

2.4 FABRICATION

- A. Framing Components: As follows:
 - 1. Factory fit and assemble components, where practical.
 - 2. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
 - 3. Fabricate components to drain water passing joints and to drain condensation and moisture occurring or migrating within skylight system to the exterior.
 - 4. Fabricate components to accommodate expansion, contraction, and field adjustment, and to provide for minimum clearance and shimming at skylight perimeter.
 - 5. Fabricate components to ensure that glazing is thermally and physically isolated from framing members.
 - 6. Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
 - 7. Fit and assemble components to greatest extent practicable before finishing.
 - 8. Reinforce members as required to retain fastener threads.
 - 9. Attach retainer bars with gasketed stainless steel fasteners spaced at a maximum of 12 inches on center.
 - 10. Weld components before finishing and in concealed locations to greatest extent practicable to minimize distortion.

11. Before shipping, shop assemble, mark, and disassemble components that cannot be permanently shop assembled.
- B. Provide continuous aluminum frame with weatherproof splice joints and locked and sealed or fully welded corners. Locate weep holes in the frame at each rafter connection to drain condensation.
- C. Prepare framing to receive anchor and connection devices and fasteners.
- D. Field Glazing: Locate and size extruded elastomeric setting blocks and spacers in accordance with the glazing manufacturer's recommendations. At no point shall the glazing come in contact with the skylight frame or fasteners.

2.5 ALUMINUM FINISHES

- A. General: Comply with NAAMM "Metal Finishes Manual" recommendations for application and designations of finishes.
- B. Finish designations prefixed by AA conform to the system for designations of aluminum finishes established by the Aluminum Association.
 1. Mill Finish: Manufacturer's standard mill finish.
 2. Clear-Anodized Finish, Class I: AA-C22A41 complying with AAMA 611.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting skylight performance.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Metal Protection: As follows:
 1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
 2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
 3. Where aluminum will contact pressure-treated wood, separate dissimilar materials by methods recommended by manufacturer.

3.3 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing skylight components.

1. Fit frame joints to produce hairline joints free of burrs and distortion.
 2. Rigidly secure non-movement joints.
 3. Accommodate thermal and mechanical movements.
 4. Install framing components to drain water passing joints and to drain condensation and moisture occurring or migrating within skylight system to the exterior.
 5. Coordinate installation of flashings at skylight perimeters to maintain continuity of water barriers.
 6. Set continuous curbs and flashings in a full sealant bed, unless otherwise indicated.
Comply with requirements in Division 7 Section "Joint Sealants."
- B. Erection Tolerances: Install skylight components true in plane, accurately aligned, and without warp or rack. Adjust framing to comply with the following tolerances:
1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 10 feet; 1/4 inch over total length.
 2. Alignment: Where surfaces abut in line and at corners and where surfaces are separated by less than 3 inches, limit offset from true alignment to less than 1/32 inch; otherwise, limit offset from true alignment to 1/8 inch.
- C. Field Glazing: Locate and size extruded elastomeric setting blocks and spacers in accordance with the glazing manufacturer's recommendations. At no point shall the glazing come in contact with the skylight frame or fasteners
- D. Install secondary-sealant weatherseal according to sealant manufacturer's written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.

3.4 CLEANING

- A. Clean skylights inside and outside, immediately after installation and after sealants have cured, according to manufacturer's written recommendations.
1. Remove temporary protective coverings and strippable coatings from pre-finished metal surfaces. Remove labels and markings from all components.
- B. Remove excess sealant according to sealant manufacturer's written recommendations.