

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. Aluminum-framed pyramid skylights.
 2. Aluminum-framed octagonal skylights.
 3. Aluminum-framed single pitch skylights.
 4. Aluminum-framed double pitch skylights.
 5. Aluminum-framed hipped end skylights.
 6. Aluminum-framed lean-to skylights.
 7. Aluminum-framed structural ridge 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 "Plastic Unit Skylights" for domed-acrylic units.
 3. Division 7 Section "Joint Sealants" for sealants installed at metal-framed skylight perimeters.
 4. Division 8 Section "Roof Windows" for fixed and operable windows installed in roof areas.

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 of the entire length of framing members in direction normal to glazing plane is limited to 1/175 of clear span.
- C. Lateral Support: Compression flanges 75% of flexural members requiring lateral be laterally braced by cross members with minimum depths equal to flexural member depth and by anchors to the building structure. Glazing material does not provide lateral support.

- D. 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 lb applied to framing members at location that produces the most severe stress or deflection.
 - b. Snow Loads: As indicated.
 - c. Roof Loads: As indicated.
 - 2. Seismic Loads: As indicated.
- E. Structural Performance: Provide metal-framed skylights, including anchorage, capable of withstanding test pressure 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.
 - 1. Test Pressure: 104 psf of positive and 95 psf of negative wind-load design pressures.
- F. 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 deg F.
- G. 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).
- H. 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).
- I. Condensation Resistance: Provide aluminum-framed systems that when tested with fixed glazing, have a frame condensation-resistance factor (CRF) of not less than 54 when tested according to AAMA 1503 when clear over clear insulated glass is used.

1.4 SYSTEM DESCRIPTION

- A. Aluminum-framed pyramid skylights: Provide Model PY meeting the following requirements:
 - 1. Size: O.D. of curb by others.
 - 2. Pitch: Variable from 3:12 minimum
- B. Aluminum-framed octagonal skylights: Provide Model OPY meeting the following requirements:
 - 1. Size: O.D. curb by others across flats of polygon.
 - 2. Pitch: Variable from 3:12 minimum
- C. Aluminum-framed single pitch skylights: Provide Model SP meeting the following requirements:
 - 1. Span: O.D. of curb up slope
 - 2. Length: O.D. of curb length
 - 3. Min Pitch: of curbs by others 3:12.
- D. Aluminum-framed double pitch skylights: Provide Model DP meeting the following requirements:
 - 1. Span: O.D. of Curb, (horizontal)
 - 2. Length: O.D. of curb along length
 - 3. Pitch: Variable from 3:12 minimum
 - 4. Vertical Glazed End(s): Provide on one end or both ends.

5. Ends: Butt wall(s)
- E. Aluminum-framed hipped end skylights: Provide Model PYH meeting the following requirements:
 1. Span: O.D. Curb (horizontal)
 2. Length: O.D. of curb along length
 3. Pitch: Variable from 3:12 minimum
- F. Aluminum-framed lean-to skylights: Provide Model LT meeting the following requirements:
 1. Span: O.D. curb (horizontal) to face of vertical wall
 2. Length: O.D. curb along lengthPitch: Variable from 3:12 minimum
 3. Vertical Glazed End(s): Provide on one end or both ends.
 4. Ends: Butt wall(s)
- G. Aluminum-framed structural ridge skylights: Provide Model SR meeting the following requirements:
 1. Span: O.D. curb (horizontal)
 2. Length: O.D. curb along length
 3. Pitch: Variable from 3:12 minimum

1.5 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.
 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation licensed in state of manufacturer.
- 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 12-inch long sections of extrusions or formed shapes in same thickness and material indicated for the Work. Mill finished sampler to be provided on piece of 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.
- G. Sealant Compatibility and Adhesion Test Reports: From sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with sealants; include sealant manufacturer's interpretation of test results for sealant performance and recommendations for primers and substrate preparation needed for adhesion.
- H. Field Test Reports: Not required.

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.
- D. Pre-construction Testing: Not required.
- E. Pre-construction Sealant Compatibility and Adhesion Testing: Not required.
- F. Welding: Qualify procedures and personnel according to AWS D1.2, "Structural Welding Code-- Aluminum."
- G. Pre-installation Conference: When required, conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Review methods and procedures related to metal-framed skylights including, but not limited to, the following:
 - 1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
 - 2. Review structural load limitations.
 - 3. Review skylight curb structural requirements.
 - 4. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 5. Review required testing procedures.
 - 6. Review weather and forecasted weather conditions and procedures for unfavorable conditions.
 - 7. Review protection of adjacent roof areas.
 - 8. Review preparation and other requirements for installing structural silicone sealant.

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.
5. Warranty Period: Five years from date of shipment from the manufacturer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide Pinnacle 350 or 600 system by Wasco Products, Inc., Commercial Division, Sanford, ME (800-388-0293)
- 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.
 3. Color: Gray or Dark Bronze.
- 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. Insulating Glass: 1-1/8 inch consisting of 1/4 inch clear tempered exterior lite, 1/2 inch sealed air space and 3/8 inch clear laminated safety glass interior lite. (*Other as required-specify).
*Glass must meet the requirements of the AAMA for the project.
- B. Insulating Glass for Vertical Glazed End: 1 inch consisting of 1/4 inch clear tempered exterior lite, 1/2 inch sealed air space and 1/4 inch clear tempered interior lite. (Other as required-specify).
- C. 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.
- D. 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.
- E. 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.
- F. 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.
 3. Color: Gray or Dark Bronze.

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. Fit and secure joints by heliarc welding.
 9. Reinforce members as required to retain fastener threads.
 10. Attach retainer bars with gasketed stainless steel fasteners spaced at a maximum of 12 inches on center.
 11. Weld components before finishing and in concealed locations to greatest extent practicable to minimize distortion.
 12. Before shipping, shop assemble, mark, and disassemble components that cannot be permanently shop assembled.
- B. Provide continuous aluminum curb with weatherproof splice joints and locked and sealed or fully welded corners. Locate weep holes in the curb 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's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- C. Mill Finish: Manufacturer's standard mill finish.
- D. Class I, Clear Anodic Finish: AA-M10C22A41 (Mechanical Finish: as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.7 mil or thicker) complying with AAMA 607.1.
- E. Class I, Color Anodic Finish: AA-M10C22A42/A44 (Mechanical Finish: as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.7 mil or thicker) complying with AAMA 606.1 or AAMA 608.1.
1. Color: Light bronze.
 2. Color: Medium bronze.
 3. Color: Dark bronze.
 4. Color: Black.
- E. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 605.2.
 - a. Color and Gloss: As indicated by manufacturer's designations.
 - b. Color and Gloss: Match Architect's sample.
 - c. Color and Gloss: As selected by Architect from manufacturer's standard range.
 - d. Color and Gloss: Custom color as selected by Architect.

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.

END OF SECTION 08625