SECTION  – translucent sandwich-panel skylights

1. General
   1. summary
      1. Section includes the pre-engineered self-supporting insulated translucent sandwich panel skylight system and accessories as shown and specified. Work includes providing and installing:
         1. Flat factory prefabricated structural insulated translucent sandwich panels.
         2. Aluminum installation system.
         3. Aluminum flashing attached to skylights.
      2. Related Requirements:
         1. Section 05 50 00 – Metal Fabrications.
         2. Section 07 01 50 – Maintenance Roofing Work.
         3. Section 07 92 00 – Joint Sealants.
   2. SUBMITTALS
      1. Submit submittals in accordance with Section 01 33 00 – Submittal Procedures.
      2. Submit manufacturer's product data. Include construction details, material descriptions, profiles and finishes of skylight components.
      3. Submit shop drawings. Include elevations and details.
      4. Submit manufacturer's colour charts showing the full range of colours available for factory-finished aluminum.
      5. Samples: Provide samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal colour variations, include sample sets consisting of two or more units showing the full range of variations expected.
         1. Sandwich Panels: 14" x 28" units.
         2. Factory Finished Aluminum: 5" long sections.
      6. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.
      7. Submit product reports from a qualified independent testing agency indicating each type and class of panel system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed reports will be acceptable if for current manufacturer and indicative of products used on this project.
         1. Reports required are:
            1. International Building Code Evaluation Report.
            2. Flame Spread and Smoke Developed (UL 723) - Submit UL Card.
            3. Burn Extent (ASTM D 635).
            4. Colour Difference (ASTM D 2244).
            5. Impact Strength (UL 972).
            6. Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037).
            7. Bond Shear Strength (ASTM D 1002).
            8. Beam Bending Strength (ASTM E 72).
            9. Fall Through Resistance (ASTM E 661).
            10. Insulation U-Factor (NFRC 100).
            11. NFRC System U-Factor Certification (NFRC 700).
            12. Solar Heat Gain Coefficient (NFRC or Calculations).
            13. Condensation Resistance Factor (AAMA 1503).
            14. Air Leakage (ASTM E 283).
            15. Structural Performance (ASTM E 330).
            16. Water Penetration (ASTM E 331).
            17. Class A Roof Covering Burning Brand (ASTM E 108).
            18. UL Listed Class A Roof System (UL 790) (Optional) - Submit UL Card.
   3. QUALITY ASSURANCE
      1. Manufacturer's Qualifications:
         1. Material and products shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least ten consecutive years and which can show evidence of those materials being satisfactorily used on at least six projects of similar size, scope, and location. At least three of the projects shall have been in successful use for ten years or longer.
         2. Panel system must be listed by an ANSI accredited Evaluation Service, which requires quality control inspections and fire, structural and water infiltration testing of sandwich panel systems by an accredited agency.
         3. Quality control inspections shall be conducted at least once each year and shall include manufacturing facilities, sandwich panel components and production sandwich panels for conformance with AC177 "Translucent Fiberglass Reinforced Plastic (FRP) Faced Panel Wall, Roof and Skylight Systems" as issued by the ICC-ES.
      2. Installer's Qualifications: Installation shall be by an experienced installer, which has been in the business of installing specified skylight systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.
   4. PERFORMANCE REQUIREMENTS
      1. The manufacturer shall be responsible for the configuration and fabrication of the complete skylight panel system.
         1. When requested, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
         2. Standard skylight system shall have less than 0.01 cfm/ft² air leakage by ASTM E 283 at 6.24 PSF (50 mph) and no water penetration by ASTM E 331 at 15 PSF; and structural testing by ASTM E 330.
      2. Structural Loads: Provide metal framed skylights, including anchorage, capable of withstanding the effects of the following design loads when supporting full dead loads in accordance with NBC Climatic Design Data (30-year probability):
         1. Wind Loads.
         2. Snow Loads.
         3. Rain Loads.
         4. Live Loads.
         5. Seismic Loads.
   5. DELIVERY STORAGE AND HANDLING
      1. Deliver panel system, components, and materials in manufacturer's standard protective packaging.
      2. Store panels on the long edge; several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.
   6. WARRANTY
      1. Submit manufacturer's and installer's written warranty agreeing to repair or replace panel system work, which fails in materials or workmanship within one year of the date of delivery. Failure of materials or workmanship shall include leakage, excessive deflection, deterioration of finish on metal in excess of normal weathering, defects in accessories, insulated translucent sandwich panels and other components of the work.
2. Products
   1. manufacturer
      1. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project provided they comply with all of the performance requirements of this specification and submit evidence thereof. Listing other manufacturers' names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.
         1. Kalwall Corporation, Tel: (800) 258-9777 - Fax: (603) 627-7905 - Email: info@kalwall.com
   2. PANEL COMPONENTS
      1. Face Sheets:
         1. Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.
         2. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
         3. Face sheets shall not deform, deflect, or drip when subjected to fire or flame.
      2. Interior Face Sheets:
         1. Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than 50 and smoke developed no greater than 250 when tested in accordance with UL 723.
         2. Burn extent by ASTM D 635 shall be no greater than 1".
      3. Exterior Face Sheets:
         1. Colour stability: Full thickness of the exterior face sheet shall not change colour more than 3 CIE Units DELTA E by ASTM D 2244 after five (5) years outdoor South Florida weathering at 5° facing south, determined by the average of at least three white samples with and without a protective film or coating to ensure long-term colour stability. Colour stability shall be unaffected by abrasion or scratching.
         2. Strength: Exterior face sheet shall be uniform in strength, impenetrable by handheld pencil and repel an impact minimum of 70ft. lbs. without fracture or tear when impacted by a 3-1/4" diameter, 5 lb. free-falling ball per UL 972.
      4. Appearance:
         1. Exterior face sheets: Smooth and Crystal in colour.
         2. Interior face sheets: Smooth and White in colour.
         3. Face sheets shall not vary more than ± 10% in thickness and be uniform in colour.
      5. Grid Core:
         1. Aluminum I-beam grid core shall be of 6063-T6 or 6005-T5 alloy and temper with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I-beam shall be no less than 7/16".
         2. I-beam Thermal break: Minimum 1", thermoset fiberglass composite.
      6. Laminate Adhesive:
         1. Heat and pressure resin type adhesive engineered for structural sandwich panel use, with minimum 25-years field use. Adhesive shall pass testing requirements specified by the International Code Council "Acceptance Criteria for Sandwich Panel Adhesives".
         2. Minimum tensile strength of 750 PSI when the panel assembly is tested by ASTM C 297 after two exposures to six cycles each of the aging conditions prescribed by ASTM D 1037.
         3. Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:
            1. 50% Relative Humidity at 68 deg F: 540 PSI.
            2. 182 deg F: 100 PSI.
            3. Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI.
            4. Accelerated Aging by ASTM D 1037 at 182 deg F: 250 PSI.
   3. PANEL CONSTRUCTION
      1. Provide sandwich panels of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking I-beams. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.
         1. Thickness: 2-3/4".
         2. Visual Light Transmission: 0.14 U (13%).
         3. Solar Heat Gain Coefficient 0.14 U (0.18).
         4. Complete insulated panel system shall have an R-Value of R-7.
         5. Grid Pattern: Nominal size 12" x 24"; Pattern: Shoji pattern.
      2. Standard panels shall deflect no more than 1.9" at 30 PSF in 10' span without a supporting frame by ASTM E 72.
      3. Standard panels shall withstand 1200° F fire for minimum one hour without collapse or exterior flaming.
      4. Thermally broken panels: Minimum Condensation Resistance Factor of 80 by AAMA 1503 measured on the bond line.
      5. Skylight System:
         1. Skylight system shall pass Class A Roof Burning Brand Test by ASTM E 108.
         2. Skylight System shall meet the fall through requirements of OSHA 1910.23 as demonstrated by testing in accordance with ASTM E 661, thereby not requiring supplemental screens or railings.
   4. BATTENS AND PERIMETER CLOSURE SYSTEM
      1. Closure System:
         1. Extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.
         2. Skylight perimeter closures at curbs shall be factory sealed to panels.
      2. Sealing Tape: Manufacturer's standard, pre-applied to closure system at the factory under controlled conditions.
      3. Fasteners: 300 series stainless steel screws for aluminum closures, excluding final fasteners to the building.
      4. Finish:
         1. Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604.
         2. Colour: Black 95.
   5. STRUCTURAL SUPPORT FOR STANDARD MODELS
      1. Center Ridge Skylights: Center Ridge Skylights to 22' span shall have concealed support integral with the installation system. (33.33-degree slope).
      2. Aluminum curb cap extrusions and flashing shall be supplied.
3. Execution
   1. examination
      1. Installer shall examine substrates, supporting structure and installation conditions.
      2. Do not proceed with panel installation until unsatisfactory conditions have been corrected.
   2. PREPARATION
      1. Metal Protection:
         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, masonry or pressure treated wood, protect against corrosion by painting contact surfaces with bituminous paint or method recommended by manufacturer.
   3. INSTALLATION
      1. Install the skylight system in accordance with the manufacturer's suggested installation recommendations and approved shop drawings.
         1. Anchor component parts securely in place by permanent mechanical attachment system.
         2. Accommodate thermal and mechanical movements.
         3. Set perimeter framing in a full bed of sealant compound, or with joint fillers or gaskets to provide weather-tight construction.
      2. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturer's installation instructions.
      3. 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 3 mm in 3 m (1/8" in 10'); 6 mm (1/4") over total length.
         2. Alignment: Where surfaces abut in line and at corners and where surfaces are separated by less than 75 mm (3"), limit offset from true alignment to less than 0.8 mm (1/32"); otherwise, limit offset from true alignment to 3 mm (1/8").
   4. FIELD QUALITY CONTROL
      1. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field quality control tests and to prepare test reports.
      2. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field quality control tests and to prepare test reports.
      3. Sealant Adhesion Tests: Test installed sealant in a minimum of two areas and as follows:
         1. Test structural silicone sealant according to field adhesion test method described in AAMA CW 13, "Structural Sealant Glazing Systems (A Design Guide)."
         2. Test weatherseal sealant as recommended in writing by sealant manufacturer.
      4. Water Spray Test: Test skylights for compliance with requirements according to procedures in AAMA 501.2.
      5. Air Infiltration: Test skylights according to AAMA 503, which requires testing according to ASTM E 783.
         1. Static Air Pressure Differential: 75 Pa (1.57 lbf/sq. ft.) minimum.
         2. Air Leakage: 0.03 L/s per sq. m (0.06 cfm/sq. ft.) of surface maximum.
      6. Water Penetration: Test skylights for compliance with requirements according to AAMA 503, which requires testing according to ASTM E 1105.
         1. Uniform Static Air Pressure Difference: 20 percent of positive design wind load, but not less than 300 Pa (6.24 lbf/sq. ft.).
      7. Repair or replace Work that does not meet requirements or that is damaged by testing; repair or replace to comply with specifications.
   5. CLEANING
      1. 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 prefinished metal surfaces. Remove labels and markings from all components.
      2. Remove excess sealant according to sealant manufacturer's written recommendations.

END OF SECTION