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STRUCTURES UNLIMITED, INC.
88 Pine Street
Manchester, NH 03103-5650
Tel: 800-225-3895 Fax: 603-625-0798
Email: info@structuresunlimitedinc.com

SECTION 13 34 13.19
INSULATED TRANSLUCENT POOL ENCLOSURE SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. All requirements of the contract documents form an integral part of the work specified herein; in particular, refer to the conditions (general or otherwise) and Division 1 of the specifications, including all subdivisions thereof.

B. This specification covers the design, manufacturing and installation of a (Prefabricated enclosure/Skylight), to be fabricated with a tubular aluminum structural framing system and a thermally broken translucent roof panel system. Field fabricated systems shall not be allowed.

C. Requests for substitutions must be approved by addendum no later than ten (10) days prior to bid due dates and in keeping with Division 1 (Substitutions) of the specifications.

D. Should the Contractor propose to make any changes or substitutions to the specification and drawings, such changes or substitutions shall be made only upon approval of the Owner. All changes proposed by the Contractor and approved by the Owner shall be made at no additional cost to the Owner. If substitutions require design or other engineering/architectural services, the services shall be provided by the architect. The cost of engineering/architectural services for substitutions shall be at the expense of the Contractor.

E. Work included: Supply all material (and labor) required to deliver (and install) the insulated (Building /skylight) system. The following major items included are:

1. Aluminum box beam superstructure
2. Thermally broken insulated translucent sandwich panels
3. Aluminum installation system
4. Aluminum/flexible flashing

F. Related work specified elsewhere:

1. Structural steel: Section _____
2. Curbs and supporting members: Section _____
3. Metal counter-flashing: Section_____
4. Anchor bolts (by others): Section_____

1.02 SUBMITTALS

A. Submit shop drawings and color samples in accordance with Division 1, Submittals.
1. Sandwich panel 7" x 12"
2. Metal finish sample 1" x 5"

B. Test reports to be furnished by skylight system manufacturer in accordance with Division l, Submittals. Submit product test reports from a qualified independent testing agency indicating each type of panel system that complies with the project performance requirements, based on comprehensive testing of current products. Previously completed test reports will be acceptable if current manufacturer and indicative of products used on this project. Test reports required are:

1. Class A Roof Covering Burning Brand (ASTM E-108)
2. Flame Spread and Smoke Developed (UL 723) – Submit UL Card
3. Burn Extent (ASTM D-635)

4. Color Difference (ASTM-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. Insulation "U" Factor (by NFRC-100)
9. Condensation Resistance Factor (AAMA 1503)
10. Abrasion/Erosion Resistance (ASTM D-4060)
11 Erosion Resistance (ASTM D-4060)
12 Beam Bending Strength (ASTM E-72)
13. UL Listed Class A Roof System (UL 790) (Optional) – Submit UL Card
14. Fall Through Resistance (ASTM E-661)
15. Solar Heat Gain Coefficient

C. Proof of regular, independent quality control monitoring under a nationally recognized building code review and listing program shall be submitted.

1.03 QUALITY ASSURANCE

A. Manufacturer's and Erector's Qualifications.

1. Panel system must be listed by the International Code Council-Evaluation Service (ICC-ES), which requires quality control inspection and, fire, structural and water infiltration testing of sandwich panel systems by an approved agency.

2. 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 "Acceptance Criteria for Sandwich Panels" as regulated by the ICC-ES.

3. 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 (10) consecutive years and which can show evidence of those materials being satisfactorily used on at least six (6) projects of similar size, scope and location within such a period. At least three (3) of the projects shall have been in successful use for ten (10) years or longer.

B. Installers Qualification – Erection shall be by an installer, which has been in the business of erecting specified materials for at least two (2) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.

C. Performance Requirements:

1. The manufacturer shall be responsible for the configuration and fabrication of the Structural Aluminum System and the Thermally Broken Structural Translucent Roof system with specified thermal properties.
2. When requested, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.04 DESIGN

A. Description: (Rigid frame /Truss/MOT/)

1. (Enclosure /Skylight)
    a. Size_____
    b. Aluminum Box Beam rafter Size_____
    c. Aluminum Box Beam Column Size_____
    d. Roof Pitch:_____degrees
    e. Thermally broken Insulated Sandwich Panels – 2-3/4" (4") thick double-faced fiberglass, insulated, translucent, structural sandwich panel with a 12" x 24" mechanically interlocking internal grid

B. Structural framing size shall be as required for design based upon following design criteria:
1. Roof live load: based on ground snow load. Minimum_____PSF
2. Base wind load of_____PSF

3. Earthquake Zone, in accordance with applicable building code

C. Aluminum structural system design and calculations must be furnished in accordance with the Aluminum Association "Specifications for Aluminum Structures" and the (IBC) Building Code. Design calculations must be prepared and stamped by a Licensed Professional Engineer.

1.05 PRODUCT HANDLING

A. Deliver panel system, components and materials in manufacturer's standard protective packaging.

B. Store skylight panels on the long edge, several inches above the ground, blocked and under cover in accordance with manufacturer's storage and handling instructions.

1.06 WARRANTY

(suggested) Submit manufacturer's and installer's written warranty agreeing to repair or replace panel system work which fails in materials or workmanship within one (1) year of the date of delivery. Failure of materials or workmanship shall include leakage, excessive deflection, and deterioration of finish on metal in excess of normal weathering and defects in accessories insulated translucent sandwich panels and other components of the work. (contact local representative for extended warranty periods)

Part 2 - PRODUCTS

2.01 MANUFACTURER

This specification is based on materials supplied by STRUCTURES UNLIMITED, INC. Tel: 800-225-3895 Fax: 603-625-0798; e-mail: info@structuresunlimitedinc.com

2.02 SUPERSTRUCTURE

A. The superstructure shall be pre-fabricated of extruded aluminum alloy 6005 T5 or 6061 T6 box beams. Ferrous metals shall not be allowed. All structural components, gusset plates and fasteners shall be aluminum. All parts shall be pre-assembled at the factory, and knocked down for shipment. System shall be of a Rigid Frame, Truss or Minimum Outward Thrust design.

B. All exposed aluminum to have an architectural corrosion resistant finish equal to ANSI/AAMA 2604. Color to be selected from manufacturer's standards.

C. All Structural bents shall have internal gussets connection at the ridge, (knees and base) connections. Fastening of components will be with aluminum drive rivets, screws/bolts and galvanized bolts. Steel bolts, nuts and washers shall not be permitted.

D. Thermal breaks and rigid insulation shall be used to increase thermal performance.

E. Wind Bracing will be located and sized as shown on the drawings. Tubular sections shall be used to reduce the flex that can occur in strap and angle bracing.

F. Structural system and roof system shall have equivalent coefficients of linear expansion.

2.03 PANEL COMPONENTS

A. Structural Roof panel shall have an overlap leading edge of 1 5/8 inches to provide a water shedding weather tight seal at horizontal lap-joint panel connections. Overlap system shall not cause damming of water.

B. Structural Roof Panels shall expand and contract at the same ratio as the aluminum structural system (1.24x10-5.in/in/degree F).

2.04 TRANSLUCENT FACING

A. Translucent faces: manufactured from glass fiber reinforced thermoset resins formulated specifically for architectural use.
   1. Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
   2. Face sheets shall not deform, deflect or drip when subjected to fire or flame.
   3. Face sheets shall not delaminate when exposed to 200º F for 30 minutes per IBC or 300º F for 25 minutes.

B. Interior Face Sheets:
   1. Flamespread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting,with flamespread rating no greater than 50 (20) and smoke developed no greater than 250 (200) when tested in accordance with UL 723/ASTM E 84.
   2. Burn extent by ASTM D 635 shall be no greater than 1".

C. Exterior Face Sheets:

   1. Color Stability - Full thickness of the exterior face shall not change color more than 3.0 (5.0) CIE Units DELTA E by ASTM D-2244 after 5 (3) years outdoor South Florida weathering at 5 degrees facing South, determined by the average of at least three (3) white samples with and without a protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
   2. Erosion Resistance - Exterior face shall have a permanent glass erosion barrier embedded beneath the surface to provide long-term resistance to reinforcing fiber exposure. Exterior face surface loss shall not exceed .7 mils and 40 mgs when tested in accordance with ASTM D-4060 employing CS17 abrasive wheels at a head load of 500 grams for 1000 cycles.
   3. Strength – The exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact equal to 70 ft. lbs. Without fracture or tear when impacted by a 3 ¼" diameter, 5lb. free-falling ball per UL 972.

D. Appearance:
   1. Exterior face sheets shall be smooth, .070" thick and _____ in color.
   2. Interior face sheets shall be .045" thick and _____ in color.
   3. Faces shall not vary more than ± 10% in thickness and be uniform in color.

2.05 GRID CORE

A. Thermally broken (aluminum) I-beam grid core or 6063-T6 or 6005-T5 with provisions for mechanical interlocking of muntin-mullion and perimeter. Width of I- beam shall be no less than 7/16". The I-beam grid shall be machined to tolerances of not greater than ± .002".

B. Thermal break shall be minimum 1". Thermoset. Urethane poured and debridged is not acceptable.

2.06 LAMINATE ADHESIVE

A. Heat and pressure resin-type 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".

B. Minimum tensile strength shall be 750 PSI when the panel assembly is tested by ASTM C-297 after two (2) exposures to six (6) cycles each of the aging conditions prescribed by ASTM D-1037.

C. Minimum shear strength of the panel adhesive by ASTM D-1002 after exposure to five (5) separate conditions:
   1. 50% Relative Humidity at 68° F: 540 PSI
   2. 182° F: 100 PSI
   3. Accelerated Aging by ASTM D-1037 at room temperature: 800 PSI
   4. Accelerated Aging by ASTM D-1037 at 182° F: 250 PSI

2.07 PANEL CONSTRUCTION

A. Provide sandwich panel of flat fiberglass reinforced translucent face sheets laminated to a grid core of mechanically interlocking thermally broken (aluminum) 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 ¾" (4")
2. Light transmission_____
3. Solar Heat Gain Coefficient_____
4. Overall panel U-Factor by NFRC certified laboratory: 2 ¾" thermally broken I-beam (0.23, 0.14, 0.10, 0.05) or 4" thermally broken I-beam (0.55, 0.15, 0.08). A complete insulated panel system shall have NFRC certified U-Factor of_____.
5. Grid Pattern: Nominal 12" x 24" (8" x 20", 12" x 12", other) shoji.

B. Panels shall deflect no more than 1.9" at 30 psf in 10' span without a supporting frame by ASTM E-72.

C. Panels shall show evidence of withstanding 1200º F fire for minimum one (1) hour without collapse or flame penetration.

D. Thermally Broken Panels
1. Minimum Condensation Resistance Factor of 80 by AAMA 1503.1 measured on the bond line.
2. Minimum CRF of 90 for center of grid cell.

E. Skylight system shall pass Class A Roof Burning Brand Test by ASTM E-108 (or Skylight system shall be UL listed as a Class A Roof by UL 790 which requires periodic unannounced inspections and retesting by Underwriters Laboratories).

F. 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.

2.08 BATTENS AND PERIMETER CLOSURE SYSTEMS

A. Closure system shall be extruded 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.

B. Sealing tape shall be manufacturer's standard pre-applied to closure system at the factory under controlled conditions.

C. Aluminum closures to be supplied with 300 series stainless steel screws (excluding final fasteners to the building) and shall be factory sealed to the panels. Aluminum battens and cap plates shall be field installed.

D. Finish: Exposed aluminum shall be manufacturer's standard, which meets the performance requirements of AAMA 2604.
1. Color to be selected from manufacturer's standards.

2.09 MOTORIZED ROOF

A. Operable sections are 2 ¾" thick translucent sandwich panels comprised of a composite aluminum thermally broken I beam core mechanically fastened, with reinforced polyester sheets bonded to each side of aluminum grid core. Screens are to be provided that will cover area to be opened.

B. Operation: Roof panels to slide down by gravity and pull up under power by use of 1 horsepower, single phase 60 cycles 208 volts/6.5 AMPS totally enclosed gear motor and stainless steel aircraft cable systems.

1. Power drop and pull up system is optional.

2.10 SLIDING GLASS DOORS

A. Sliding Glass Doors shall be Wells Aluminum M-1100 SGD. Sliding glass doors are 8'0" x 6'8" with 5/8" tempered insulated clear glass. Main frame and panel members shall be constructed of extruded aluminum alloy 6063-T5 with a thermal break separating the exterior and interior portions of the frame.

B. Sliding glass doors are equipped with an interior latch and interior and exterior door pulls.

2.11 EGRESS DOOR

A. Kawneer 350 medium stile and rail door with full glass. Door to be complete with 1 ½ pair hinges (US26D) Dor-o-matic concealed vertical rod exit device with an exterior pull handle, concealed overhead closer, standard weatherstrip and threshold.

2.12 SIDEWALL AND GABLE INFILL MATERIAL

A. Fixed Glass: All glass shall be insulated tempered 5/8" clear. (1" Optional)

B. Translucent Insulated wall panels with insulations value and interior and exterior face sheets similar to the roof panels.

Part 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, supporting structure and installation conditions. Do not proceed with system installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. The general contractor shall prepare openings including isolating dissimilar materials from aluminum system, which may cause damage by electrolysis.

B. The general contractor shall install a structural curb designed to withstand the thrust generated by the skylight.

C. Anchor Bolts shall be supplied and installed by the general contractor. Skylight anchoring system will be as per manufacturer's standards.

3.03 ERECTION

A. The manufacturer shall erect the enclosure/structural skylight in strict accordance with approved shop drawings. Fastening and sealing shall be in strict accordance with manufacturer's shop drawings. All aluminum shall be cleaned before sealants are applied.

B. No finish work, such as painting, plastering, or interior trim items to be supplied or installed by the enclosure/structural skylight manufacturer.

C. After other trades have completed work on adjacent material, carefully inspect translucent panel installation and make adjustments necessary to ensure proper installation and weather tight conditions.

D. All staging, lifts and hoists required for field measuring, shall be provided by, set up and maintained by the general contractor.