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JOB NAME & LOCATION

SECTION 08 63 00
INSULATED STRUCTURAL SKYLIGHT SYSTEM SPECIFICATION

PART 1 - GENERAL

1.01 SUMMARY

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. The specification covers the design, manufacture and installation of the skylight system comprised of a two and three-quarter inch (2 3/4") [or four inch (4")] thick double-faced, insulated, translucent fiberglass structural sandwich panel system. The sandwich panel skylight systems shall be permanently secured to an aluminum box beam superstructure.

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

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 skylight system. The major items included are:

1. Structural aluminum box beam superstructure
2. Insulated translucent skylight panels
3. Aluminum installation system
4. Flexible flashing

F. Related work specified elsewhere:

1. Structural steel/concrete/wood framing: Section _____
2. Curbs and supporting members: Section _____
3. Roofing: Section _____
4. Metal flashing and counter-flashing: Section _____

1.02 QUALITY ASSURANCE

A. Manufacturer's and Erector's Qualifications

1. Skylight system panel must be listed by the International Conference of Building Officials, which requires quality control inspections and fire, structural and water infiltration testing of sandwich panel systems by an approved agency, and the National Evaluation Service of International Building Code.

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

4. Erection shall be by an installer that has been in the business of erecting similar materials for at least two (2) consecutive years; and show evidence of satisfactory completion of projects of similar size, scope and type.

B. Performance Requirements: The manufacturer shall be responsible for the configuration and fabrication of the skylight system including the aluminum box beam superstructure.

1.03 SUBMITTALS

A. Submit shop drawings. Include elevations, details and dimensions.

B. Submit manufacturer's color charts showing the full range of colors available for factory finished aluminum.

C. Submit product test reports from a qualified independent testing organization indicating each type and class of skylight system complies with the project performance requirements, based on comprehensive testing of current products. Previously completed test reports will be acceptable if for current manufacturer and indicative of products used on this project. Test reports required are:

1. Flame Spread and Smoke Development (UL 723) – submit UL card
2. Burn Extent (ASTM D-635)
3. Color Difference (ASTM D-2244)
4. Abrasion/Erosion Resistance (ASTM D-4060)
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 after five (5) separate conditions)
8. Beam Bending Strength (ASTM E-72)
9. Fall-Through Resistance (ASTM E-661)
10. Insulation "U" Factor (by NFRC-100)
11. NFRC Skylight System U-Factor Certification
12. Solar Heat Gain Coefficient
13. Condensation Resistance Factor (AAMA 1503.1)
14. Class A Roof Covering Burning Brand (ASTM E-108)
15. UL Listed Class A Roof System (UL 790) (Optional) – Submit UL Card

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

E. Minimum panel sample size to be 7" x 12" x 2-3/4"

1.04 DESIGN

A. Description: Skylight System

1. Size: _____
2. Aluminum Box Beam Size: _____
3. Eave Height: _____
4. Roof Pitch: _____
5. Insulated Sandwich Panels – 2-3/4" thick double-faced fiberglass, insulated, translucent, structural sandwich panels with a 12" x 24" (8' X 20", 12" x 12") mechanically interlocking internal grid.

B. Box beam size shall be as required for design based upon following design criteria:

1. Roof live load, on horizontal projected surface, minimum ___ PSF.
2. Snow drift load: ____ PSF.
3. Base wind load of ____ PSF factored per applicable Building Code
4. Deflection Criteria _____

1.05 PRODUCT HANDLING

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

1.06 WARRANTY

Submit manufacturer's standard 1 year material and workmanship warranty.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Structures Unlimited, Inc. 800-225-3895 – e-mail: www.skylightinfo.com

B. Kalwall Corporation 603-627-3861 – e-mail: www.kalwall.com

Provided design intent and all performance requirements of this specification are satisfied, the following manufacturers will be considered:

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 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 architectural corrosion resistant finish equal to ANSI/AAMA 2604. Color to be selected from manufacturer's standards.

C. Aluminum structural system design and calculations must be furnished in accordance with the Aluminum Association "Specifications for Aluminum Structures" and the applicable building code. Design calculations must be prepared and stamped by a Licensed Professional Engineer.

2.03 PANEL COMPONENTS

A. Face Sheets

1) Translucent faces: Manufactured from glass fiber reinforced thermoset resins formulated specifically for architectural use.
   (a) Thermosplastic (e.g. polycarbonate, acrylic) faces are not acceptable.
   (b) Face sheets shall not deform, deflect or drip when subjected to fire or flame.
   (c) Face sheets shall not delaminate when exposed to 200° for 30 minutes per IBC or 300° for 25 minutes

2) Interior face sheets:
   (a) 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.
   (b) Burn extent by ASTM D-635 shall be no greater than 1"

3) Exterior face sheets:
   (a) Color stability: Full thickness of the exterior face sheet 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° facing south, determined by the average of at least (3) white samples with and without protective film or coating to ensure long-term color stability. Color stability shall be unaffected by abrasion or scratching.
   (b) 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.
   (c) Strength: Exterior face sheets shall be uniform in strength, impenetrable by hand-held pencil and repel an impact equal to 70 (230) ft. lbs. without fracture or tear when impacted by a 3-1/4" diameter, 5 lb. free-falling ball per UL 972.

4) Appearance:
   (a) Exterior face sheets: Smooth, 0.070" thick and _____in color.
   (b) Interior face sheets: Smooth, 0.045" thick and _____in color.
   (c) Face sheets shall not vary more than +/- 10% in thickness and be uniform in color.

2.04 ADHESIVE

A. The laminate adhesive shall be 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 Conference of Building Officials "Acceptance Criteria for Sandwich Panel Adhesive".

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

2.05 PANEL CONSTRUCTION

A. Skylight panels shall have an overall panel "U" factor by an NFRC certified laboratory of _____ 2-3/4" thermally broken I-beam (0.23, 0.14, 0.10, 0.05) [OR 2-3/4" aluminum I-beam (0.53, 0.29, 0.22, 0.18) aluminum I-beam], or 4" thermally broken I-beam (0.55, 0.15, 0.08) light transmission of _____% and solar heat gain coefficient of _____. Complete skylight system shall have NFRC certified U-factor of _____.

B. Skylight panels shall be a true sandwich panel of flat fiberglass sheet bonded to a grid core of mechanically interlocking thermally broken (aluminum) I-beams. Panels shall be resin laminated under a controlled process of heat and pressure, and deflect no more than 1.9" at 30 PSF in 10' span without a supporting frame by ASTM E-72. (Thermal break shall be minimum 1".) (Urethane poured and debridged type thermal breaks are not acceptable.)

C. 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.)

D. Grid pattern shall be nominal 12" x 24" (8" x 20", 12" x 12", other) shoji.

E. The adhesive bonding line shall be straight, cover the entire width of the I-beam and have a neat, sharp edge.

F. Skylight panels and aluminum box beams shall be pre-fabricated and assembled, where practical, at the factory.

G. Skylight System shall meet the fall-through requirements of OSHA 1910.23 as demonstrated by testing in accordance with ASTM E661, thereby not requiring supplemental screens, grates or railings.

H. Panel shall show evidence of withstanding 1200° fire for minimum one (1) hour without collapse or flame penetration.

I. Thermally broken panels shall have a minimum Condensation Resistance Factor of 80 by AAMA 1503.1 measured on the grid frame line and a minimum CRF of 90 for center of grid cell.

2.06 BATTENS AND PERIMETER CLOSURE SYSTEMS

A. Extruded 6063-T6 and 6063-T5 aluminum screw clamp-tite closure system.

B. Aluminum closures to be supplied with stainless steel screws (excluding final fasteners to the building).

C. All exposed aluminum to be architectural corrosion resistant finish equal to AAMA 2604 – color _____ (to be selected from manufacturer's standards).

2.07 FLEXIBLE SEALING TAPE

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

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine substrates, supporting structure and installation conditions. Do not proceed with structural skylight system erection 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, and shall provide temporary enclosures if required.

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.

3.03 ERECTION

A. The erector shall erect translucent skylight system in strict accordance with approved shop drawings as supplied by manufacturer. Fastening and sealing shall be in strict accordance with manufacturer's shop drawings and installation instructions. All surfaces shall be cleaned before sealants are applied.

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

-END OF SECTION 08 63 00-