SECTION 08952

FIBERGLASS-SANDWICH-PANEL ASSEMBLIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes wall assemblies incorporating fiberglass sandwich panels and aluminum frame systems.

B. Related Sections include the following:
1. Division 5 Section "Structural Steel" for steel framing that supports skin-system assemblies.
2. Division 7 Section "Sheet Metal Flashing and Trim" for metal flashings installed at perimeters of assemblies.
3. Division 7 Section "Joint Sealants" for sealants installed at perimeters of assemblies.
4. Division 8 Section "Unit Skylights" for standard, factory-assembled skylight units.

1.03 PERFORMANCE REQUIREMENTS

A. Provide assemblies, including anchorage, capable of withstanding, without failure, the effects of the following:
1. Structural loads.
2. Thermal movements.
3. Movements of supporting structure.
4. Dimensional tolerances of building frame and other adjacent construction.

B. Failure includes the following:
1. Deflection exceeding specified limits.
2. Water leakage.
3. Thermal stresses transferred to building structure.
4. Noise or vibration created by wind and thermal and structural movements.
5. Loosening or weakening of fasteners, attachments, and other components.
6. Delamination of fiberglass-sandwich-panel faces from panel cores.

C. Structural Loads:
1. Wind Loads: As indicated by structural design data on Drawings.
2. Seismic Loads: As indicated by earthquake design data on Drawings.

D. Deflection of Assemblies:
1. Vertical Assemblies: Limited to 1/90 of clear span for each assembly component.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.04 SUBMITTALS

A. General: Submit in accordance with Section 01300.

B. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for assemblies.

C. Shop Drawings: For assemblies. Include plans, elevations, sections, details, and attachments to other work.

D. Samples: For components with factory-applied color finishes or panel translucency options.

E. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified, independent testing agency, for assemblies. Reports shall verify that materials meet all performance requirements of this specification. Previously completed test reports will be acceptable if current and indicative of products used on this project. Test reports shall confirm assemblies meet or exceed the following:
1. Burn Extent: ASTM D 635.
2. Color Difference: ASTM D 2244.
3. Impact Strength: (Free Falling Ball Method).
4. Bond Strength: ASTM C 297 and ASTM D 1002.
5. Accelerated Aging: ASTM D 1037.
6. Flame Spread and Smoke Developed: ASTM E 84.
7. Condensation Resistance Factor: AAMA 1503.1.
8. Insulated "U" Factor: NFRC-100.

G. Submit proof of regular, independent quality control monitoring under a building code review and listing program.

H. Maintenance Data: For assemblies to include in maintenance manuals.

I. Warranties: Special warranties specified in this Section.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Entity capable of performing work of this Section and who is acceptable to manufacturer; has been in business of erecting translucent panels for not less than 5 years; and can evidence a record of successful in-service performance.

B. Manufacturer Qualifications: For fiberglass sandwich panels, a qualified manufacturer whose facilities, processes, and products are monitored by an independent, accredited quality-control agency for compliance with applicable requirements in ICBO ES AC04, "Sandwich Panels." Fiberglass-sandwich-panel assemblies manufacturer shall have continuously fabricated assemblies for not less than 10 years and shall show evidence of these materials being satisfactorily used on at least 6 projects of similar size, scope and location with at least 3 projects having successful in-service performance for not less than 10 years.

C. Product Options: Information on Drawings and in Specifications establishes requirements for assemblies' aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including testing conducted by an independent testing agency and in-service performance.
1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Fire-Test-Response Characteristics: Where fire-test-response characteristics are indicated for assemblies and components, provide products identical to those tested per test method indicated by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

E. NFRC Certification: Provide fiberglass sandwich panels that are certified for U-factors indicated according to NFRC 100 and listed in its "National Fenestration Council Incorporated - Certified Products Directory."

1.06 PROJECT CONDITIONS

A. Field Measurements: Indicate measurements on Shop Drawings.

1.07 PRODUCT HANDLING

A. Store panels on long edge on blocking several inches above ground and under cover to prevent warping.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Kalwall Corporation. Contact Charles Shriner, (800) 258-9777.

2.02 ALUMINUM FRAME SYSTEMS

A. Aluminum: Alloy and temper recommended in writing by manufacturer for type of use and finish indicated.
1. Sheet and Plate: ASTM B 209 (ASTM B 209M).
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
3. Extruded Structural Pipe and Tubes: ASTM B 429.

B. Components: Manufacturer's standard extruded-aluminum members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken components; framing members are composite assemblies of two separate extruded-aluminum components permanently bonded by a material of low thermal conductance.

C. Exposed Flashing and Closures: Manufacturer's standard aluminum components not less than 0.040 inch (1.016 mm) thick.

D. Frame-System Gaskets: Manufacturer's standard.

E. Frame-System Sealants: As recommended in writing by manufacturer.

F. Anchors, Fasteners, and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding; compatible with adjacent materials.
1. At closures, retaining caps, or battens, use ASTM A 193/A 193M, 300 series stainless-steel screws.
2. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.

G. Anchor Bolts: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), hot-dip zinc coating, ASTM A 153/A 153M, Class C.

H. Frame System Fabrication:
1. Fabricate components before finishing.

2. Fabricate components that, when assembled, have the following characteristics:
   a. Profiles that are sharp, straight, and free of defects or deformations.
   b. Accurately fitted joints with ends coped or mitered.
   c. Internal guttering systems or other means to drain water passing joints, condensation occurring within components, and moisture migrating within the assembly to exterior.
3. Fabricate sill closures with weep holes and for installation as continuous component.
4. Reinforce components as required to receive fastener threads.
5. Weld components in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

2.03 FIBERGLASS SANDWICH PANELS

A. Panel Construction: Assembly of uniformly colored, translucent, thermoset, fiberglass-reinforced-polymer face sheets bonded to both sides of a grid core and complying with requirements applicable to panel materials in ICBO ES AC04, "Sandwich Panels."
   1. Face-Sheet, Self-Ignition Temperature: 650 deg F (343 deg C) or more per ASTM D 1929.
   2. Face-Sheet Burning Extent: 1 inch (25 mm) or less per ASTM D 635.
   3. Face-Sheet, Smoke-Developed Index: 450 or less per UL 723.
   4. Interior Face-Sheet, Flame-Spread Index: Not more than 45 per UL 723.

B. Panel Thickness: 2-3/4 inches (70 mm).

C. Panel U-Factor: Not more than 0.23 (1.31), measured in Btu/sq. ft. x h x deg F (W/sq. m x K) according to NFRC 100 or ASTM C 1363 using procedures described in ASTM C 1199 and ASTM E 1423.

D. Panel Strength Characteristics:
   1. Maximum Panel Deflection: 3-1/2 inches (89 mm) when a 4-by-12-foot (1.2-by-3.6-m) panel is tested according to ASTM E 72 at 34 lbf/ sq. ft. (1.6 kPa), with a maximum 0.090-inch (2.3-mm) set deflection after 5 minutes.
   2. Panel Support Strength: Capable of supporting, without failure, a 300-lbf (1334 N) concentrated load when applied to a 3-inch- (76-mm-) diameter disk according to ASTM E 661.

E. Grid Core: Mechanically interlocked extruded-aluminum I-beams, with a minimum flange width of 7/16 inch (11.1 mm).
   1. Extruded Aluminum: ASTM B 221 (ASTM B 221M), in alloy and temper recommended in writing by manufacturer.
   2. Condensation-Resistance Factor: Not less than 80 in accordance with AAMA 1503.1.
   3. I-Beam Construction: Thermally broken; two separate extruded-aluminum components permanently bonded by a material of low thermal conductance.
   4. Grid Pattern: Inline rectangle, nominal 12 by 24 inches (305 by 610 mm), symmetrical about panel centerlines.

F. Exterior Face Sheet:
   1. Thickness: 0.070 inches (1.778 mm). Thickness shall not vary more than 10%.
   2. Color: Crystal.
   3. Color Stability: Not more than 3.0 units Delta E when measured according to ASTM D 2244 after outdoor weathering in southern Florida according to procedures in ASTM D 1435 with panels mounted facing south and as follows:
      a. Panel Mounting Angle: Not more than 5 degrees from horizontal.
      b. Exposure Period: 60 months for vertical assemblies, 30 months for components of Class A roof assemblies.
   4. Erosion Protection: Integral, embedded glass erosion barrier. Plastic film overlays are not acceptable.
   5. Impact Resistance: No fracture or tear at impact of 60 ft. x lbf (81 J) by a 3-1/2-inch- (88.9-mm-) diameter, 6.37-lb (3.89-kg) free-falling ball according to test procedure in UL 972.

G. Interior Face Sheet: Shall not vary more than 10% and shall be of the following thicknesses and colors:
1. Thickness: Shall be hi-impact 0.052 inch (1.3 mm) thick.
a. Impact Resistance: No fracture or tear at impact of 230 ft. x lbf (81 J) by a 3-1/2-inch-(88.9-mm-) diameter, 6.37-lb (3.89-kg) free-falling ball according to test procedure in UL 972.
2. Color: White.

H. Fiberglass-Sandwich-Panel Adhesive: Shall be heat and pressure resin-type engineered for structural sandwich panel use. Adhesive shall comply with testing requirements specified by ICBO ES AC05, "Sandwich Panel Adhesives."
1. Compatible with facing and core materials.
2. Tensile Strength: Not less than 750 psi (5.17 kPa) per ASTM C 297after 2 exposures to 6 cycles each of the aging conditions prescribed by ASTM D 1037.
3. Shear Strength: After exposure to 5 separate aging conditions per ASTM D 1002 shall be as follows:
a. 540 psi (3.72 kPa) at 50% relative humidity at 73 deg F (22.7 deg C).
b. 182 deg F (83.3 deg C): 100 psi (0.69 kPa).
c. After accelerated aging per ASTM D 1037 at room temperature: 800 psi (5.52 kPa).
d. After accelerated aging per ASTM D 1037 at 182 deg F (83.3 deg C): 250 psi (1.72 kPa).
e. 500 Hour Oxygen Bomb by ASTM D 572: 1400 psi (9.65 kPa).

I. Panel Fabrication: Factory assemble and seal panels.
1. Laminate face sheets to grid core under a controlled process using heat and pressure to produce straight adhesive bonding lines that cover width of core members and that have sharp edges. Tape bond systems shall not be allowed.
a. White spots indicating lack of bond at intersections of grid-core members are limited in number to 4 for every 40 sq. ft. (3.7 sq. m) of panel and limited in diameter to 3/64 inch (1.2 mm).
2. Fabricate with grid pattern that is symmetrical about centerlines of each panel.
3. Fabricate panel to allow condensation within panel to escape.
4. Reinforce panel corners.

2.04 ACCESSORY MATERIALS

A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

B. All battens and perimeter closures shall be furnished with stainless steel fasteners.

2.05 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. Pigmented Organic Coating: Manufacturer's standard finish complying with AAMA 605.2.
1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.01 EXAMINATION

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

3.02 INSTALLATION

A. General:
1. Comply with manufacturer's written instructions.
2. Do not install damaged components.
3. Fit joints between aluminum components to produce hairline joints free of burrs and distortion.
4. Rigidly secure nonmovement joints.
5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Seal joints watertight, unless otherwise indicated. Clean all aluminum surfaces prior to applying sealants.
7. Fastening and sealing shall be in strict accordance with approved manufacturer's Shop Drawings.

B. Metal Protection: Where aluminum components will contact dissimilar materials, protect against galvanic action by painting contact surfaces with bituminous paint or by installing nonconductive spacers as recommended in writing by manufacturer for this purpose.

C. Install continuous aluminum sill closure with weatherproof expansion joints and locked and sealed corners. Locate weep holes at rafters.

D. Install components to drain water passing joints, condensation occurring within aluminum members and panels, and moisture migrating within assembly to exterior.

E. Install components plumb and true in alignment with established lines and elevations.

F. Erection Tolerances: Install assemblies to comply with the following maximum tolerances:
1. Alignment: Limit offset from true alignment to 1/32 inch (0.8 mm) where surfaces abut in line, edge to edge, at corners, or where a reveal or protruding element separates aligned surfaces by less than 3 inches (76 mm); otherwise, limit offset to 1/8 inch (3.2 mm).
2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet (3.2 mm in 3.7 m); 1/2 inch (13 mm) over total length.

G. After work is completed on adjacent materials, carefully inspect translucent panel installation and make adjustments necessary to insure proper installation and weathertight conditions.

END OF SECTION