SECTION 084523 - FIBERGLASS-SANDWICH-PANEL ASSEMBLIES

Revise this Section by deleting and inserting text to meet Project-specific requirements.

Specifier: Consult Kalwall for assistance at [info@kalwall.com](mailto:) or 1-800-258-9777.

Some specification choices are very involved and require consultation in order for the project’s performance to be as desired by the Owner and Architect.

1. GENERAL
   * + 1. SUMMARY
          1. Section includes the insulated sandwich panel system and accessories as shown and specified. Work includes providing and installing:

Select from the following:

Wall assemblies

Roof assemblies

Skylight assemblies

Canopy assemblies

* + - * 1. Related Sections:

Insert sections in subparagraph below that contain requirements the Contractor might expect to find in this section but are specified in other sections.

**<Insert Related Sections>**

* + - 1. SUBMITTALS
         1. Submit manufacturer’s product data. Include construction details, material descriptions, profiles and finishes of components.
         2. LEED Submittals:

Retain paragraphs below if LEED V3 is required. Insert information for Product Data in notes 2 and 3.

Laboratory Test Reports for Credit SS 7.2: For roofing materials with a Solar Reflectance Index (SRI) for a minimum of 75% of the roof’s surface of 29 or higher for a steep sloped roof (>2:12) per ASTM E 1980. Emittance to be greater than .90 per ASTM E 408 or ASTM C 1371.

Product Data for Credit MR 4: Provide documentation demonstrating use of materials with a minimum **[10%] [20%]** <**Insert Number**> **%** recycled content (post-consumer + ½ pre-consumer).

Product Data for Credit IEQ 8.1: Provide Daylight Autonomy Report showing that the proposed translucent daylighting system will provide <**Insert Number**> lux in the daylit areas for an average of <**Insert Number**> **%** of the daylight hours for the entire year.

Provide computer simulation (RADIANCE) that demonstrates that 75% or more of all regularly occupied spaces achieve daylight illuminance levels of a minimum of 25 footcandles (fc) and a maximum of 500 footcandles (fc) in a clear sky condition on Sept. 21 at 9 a.m. and 3 p.m.

* + - * 1. Submit shop drawings. Include plans, elevations and details.
        2. Submit manufacturer’s color charts showing the full range of colors available for factory finished aluminum.

When requested, submit samples for each exposed finish required, in same thickness and material indicated for the work and in size indicated below. If finishes involve normal color variations, include sample sets consisting of two or more units showing the full range of variations expected.

Sandwich panels: 14” x 28” units

Factory finished aluminum: 5” long sections

* + - * 1. Submit Installer Certificate, signed by installer, certifying compliance with project qualification requirements.
        2. 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.

Delete product reports below that are not applicable.

Reports required (if applicable) are:

International Building Code Evaluation Report (AC 177)

Flame Spread and Smoke Developed (UL 723) – Submit UL Card

Burn Extent (ASTM D 635)

Color Difference (ASTM D 2244)

Impact Strength (UL 972)

Bond Tensile Strength (ASTM C 297 after aging by ASTM D 1037)

Bond Shear Strength (ASTM D 1002)

Beam Bending Strength (ASTM E 72)

Insulation U-Factor (NFRC 100)

NFRC System U-Factor Certification (NFRC 700)

Solar Heat Gain Coefficient (NFRC or Calculations)

Condensation Resistance Factor (AAMA 1503) (Thermally Broken only)

Air Leakage (ASTM E 283)

Structural Performance (ASTM E 330)

Water Penetration (ASTM E 331)

1200°F Fire Resistance (SWRI)

ASTM E1886/1996 or TAS 201, 202 and 203 (Optional-Windborne Debris)

Performance for Windows (AAMA/WDMA/CSA-101/I.S.2/A440) (Optional)

Fall Through Resistance (ASTM E 661) (Optional)

Class A Roof Covering Burning Brand (ASTM E 108) (Roof/Skylight only)

UL Listed Class A Roof System (UL 790) (Optional) – Submit UL Card

LEED Credits (Optional)

Daylight Autonomy (Optional)

* + - 1. CLOSEOUT SUBMITTALS
         1. Provide field maintenance manual to include in project maintenance manuals.
      2. QUALITY ASSURANCE
         1. Manufacturer’s Qualifications:

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.

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.

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.

* + - * 1. Installer’s Qualifications: Installation shall be by an experienced installer, which has been in the business of installing specified panel systems for at least two consecutive years and can show evidence of satisfactory completion of projects of similar size, scope and type.
      1. PERFORMANCE REQUIREMENTS
         1. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system.

When requested, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

Standard panel 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.

Insert structural loads, as determined by project’s structural engineer in subparagraphs below.

Insert all loads in PSF, not wind speed.

Structural Loads (Wall Assemblies). Provide system capable of handling the following loads:

Positive Wind Load (PSF): <**Insert Number**> **PSF**

Negative Wind Load (PSF): <**Insert Number**> **PSF**

Structural Loads (Roof/Skylight/Canopy Assemblies). Provide system capable of handling the following loads:

Live Load (PSF): <**Insert Number**> **PSF**

Snow Load (PSF): <**Insert Number**> **PSF**

Drift Load (PSF): <**Insert Number**> **PSF**

Wind Load (PSF): <**Insert Number**> **PSF**

* + - * 1. Windborne Debris Impact Resistance Performance (Optional):

Retain subparagraphs below if required. The International Building Code establishes criteria for buildings in hurricane prone regions. Level of Protection, Wind Zone and Elevation above grade determine required Missile. Insert Missile required, more than one type may be required on a project (walls and roofs/skylights may vary).

Translucent panels must be impact-resistant meeting the requirements of an approved impact-resisting standard: ASTM E 1996 and ASTM E 1886 or TAS 201, 202 and 203.

Panel System designed to meet Missile <**Insert Missile**> per ASTM E 1996.

* + - * 1. Deflection Limits:

Based on project conditions or requirements of authorities having jurisdiction, more stringent deflection criteria than those specified in options in subparagraphs below may be required. Building codes include different deflection criteria depending on whether panel assemblies are classified as components and cladding or as part of the main wind-force-resisting system (for example, where a panel assembly is the structural roof). For discussion of deflection criteria, see "Deflection" Article in the Evaluations in Section 084500 "Translucent Wall and Roof Assemblies."

Wall Panel Assemblies: Limited to [**L/60**] **or** <**Insert Deflection**> of clear span for each assembly component.

Roof/Skylight Panel Assemblies: Limited to [**L/60**] **or** <**Insert Deflection**> of clear span for each assembly component.

* + - 1. 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.
      2. WARRANTY

Extended Warranties may be available depending on project design, scope, location and exposure at additional cost.

Options for extended Panel Warranties are:

1. Up to 5 years Materials and Workmanship.
2. Up to 10 years Limited Warranty covering separation of faces from grid core affecting structural strength, reinforcing fiberbloom and/or abnormal color change of the exterior face sheet.
3. Up to 20 years Limited Warranty against reinforcing fiberbloom.

Option for extended Finish Warranty is:

1. Up to 10 years Limited Warranty for Manufacturer's factory applied finish, covering cracking, peeling and adhesion failure.

Extended Warranties will not apply to all systems, designs, or applications. Please consult Kalwall.

* + - * 1. Provide manufacturer's and installer's written warranty agreeing to repair or replace panel system work, which fails in materials or workmanship within one year from the date of delivery. Failure of materials or workmanship shall include 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. Extended Panel Warranty: <**Insert Extended Warranty if required**> **years** from date of delivery.
        3. Extended Manufacturer’s factory applied Finish Warranty: <**Insert Extended Warranty if required**> **years** from date of delivery.

1. PRODUCTS
   * + 1. MANUFACTURER
          1. The basis for this specification is for products manufactured by Kalwall Corporation. Other manufacturers may bid this project subject to compliance with the performance requirements of this specification and submission of 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.
          2. Kalwall Corporation, Tel: (800) 258-9777 – Fax: (603) 627-7905 – Email: [info@kalwall.com](mailto:info@kalwall.com)
       2. PANEL COMPONENTS
          1. Face Sheets:

Translucent faces: Manufactured from glass fiber reinforced thermoset resins, formulated specifically for architectural use.

Thermoplastic (e.g. polycarbonate, acrylic) faces are not acceptable.

Face sheets shall not deform, deflect or drip when subjected to fire or flame.

Interior face sheets:

Specify 50 for the standard panel, which meets IBC Class B Interior Finish requirements for most building spaces.

Specify 25 which meets IBC Class A which may be required in unsprinklered, occupied spaces or exitways, see IBC Chapter 8.

Specify 25 or less for canopies per IBC 3105.4.

Flame spread: Underwriters Laboratories (UL) listed, which requires periodic unannounced retesting, with flame spread rating no greater than **[50] [25] [25 or less for canopies]** and smoke developed no greater than 250 when tested in accordance with UL 723.

Burn extent by ASTM D 635 shall be no greater than 1”.

Exterior face sheets:

Color stability – For standard exterior face: select 5 years exposure.

If for UL Listed Class A Roof or Canopy, Class A sheet face required: select 3 years.

Color stability: Full thickness of the exterior face sheet shall not change color more than 3 CIE Units DELTA E by ASTM D 2244 after **[3] [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 color stability. Color stability shall be unaffected by abrasion or scratching.

Projects requiring Windborne Debris Impact Resistance: Retain paragraphs c and d (delete b).

Projects requiring standard impact resistance: Retain paragraphs b and d (delete c).

For paragraph b, the impact strength of the standard .070” thick SW exterior face sheet is 70 ft. lbs. The optional Hi-Impact face sheet is 230 ft. lbs. which may be required in vandal prone exposures among others. Hi-Impact color is available in white only.

Strength: Exterior face sheet shall be uniform in strength, impenetrable by hand held pencil and repel an impact minimum of **[70 ft. lbs.)] [230 ft. lbs.)]** without fracture or tear when impacted by a 3-1/4” diameter, 5 lb. free-falling ball per UL 972.

Strength: Exterior face sheet shall be uniform in strength, with panel meeting ASTM E1996 and ASTM E1886 or TAS 201, 202 and 203.

Erosion Protection: Integral, embedded-glass erosion barrier.

Appearance:

CAUTION: Face sheet colors affect solar properties. [**Refer to Light Transmission/SGHC chart**](http://www.kalwall.com/spec/lt-shgc.htm)**.**

Exterior face sheets: Enter thickness and color.

Standard exterior face sheet is .070” thick and is available in standard White or Crystal.

Optional Kal-tints are available in Greenish-Blue, Aqua, Rose and Ice-Blue.

Optional Hi-Impact is .052” thick in White only.

UL Class A roof – Enter .070” thick and is available in standard White Type A or Crystal Type A

Canopy – Enter .070” thick and is available in standard White Type A or Crystal Type A.

Missile D – Enter .060 Hurricane Hi-impact and White in color.

Missile C – Enter .052” Hi-impact and White in color.

Missile A – Enter .070” and White or Crystal (standard colors) or Kal-tints (optional colors)

Interior face sheet: Enter thickness and color.

Standard interior face sheet, either flame spread, is .045” thick and is available in White or Crystal.

Optional Hi-Impact is .052” thick in White only.

Canopy- Enter .045” thick and is available in standard White Type A or Crystal Type A.

Exterior face sheet: Smooth, <**Insert Thickness**> thick and <**Insert Color**> in color.

Interior face sheet: Smooth, <**Insert Thickness**> thick and <**Insert Color**> in color.

Face sheets shall not vary more than ± 10% in thickness and be uniform in color.

* + - * 1. Grid Core:

The grid core may be Aluminum for flat and curved panels, or a Thermally Broken composite of aluminum and fiberglass for maximum thermal efficiency for flat panels only.

Note 1: select Aluminum or Thermally Broken composite.

Delete note 2 if Aluminum I-beam grid core is selected.

**[Aluminum][Thermally Broken Composite]** 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”.

I-beam Thermal break: Minimum 1”, thermoset fiberglass composite.

* + - * 1. Laminate Adhesive:

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".

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.

Minimum shear strength of the panel adhesive by ASTM D 1002 after exposure to four separate conditions:

50% Relative Humidity at 68° F: 540 PSI

182° F: 100 PSI

Accelerated Aging by ASTM D 1037 at room temperature: 800 PSI

Accelerated Aging by ASTM D 1037 at 182° F: 250 PSI

* + - 1. 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. Select 2 ¾” or 4” panels.

2-4. Light Transmission, Solar heat gain coefficient and Panel U-factor are closely linked and must be specified accordingly. [**Refer to Light Transmission/SHGC Chart.**](http://www.kalwall.com/spec/lt-shgc.htm)

Furthermore, light transmission needs to be carefully chosen to meet the daylighting expectations of the owner to avoid too much light with resulting unwanted glare and solar heat, or too little light to be useful. Kalwall offers a modeling service – See [**www.DaylightModeling.com**](http://www.daylightmodeling.com/), which should be performed and agreed upon prior to final design and specification.

5. Panel U-factors specified are for just the panel itself. The National Fenestration Rating Council has established standardized procedures for comparing fenestration systems based on a complete installed system. View the [**NFRC Certified Systems values chart**](http://www.kalwall.com/spec/nfrc.htm) for most Kalwall systems. In order to find the appropriate value, specifier must know the properties of the panel specified above as well as the nature of the installation system for the project.

6. Insert Grid nominal size (as viewed) and pattern. Standard grids 12 x 24 shoji, 24 x 12 shoji, 8 x 20 shoji, 20 x 8 shoji, or 12” x 12” square pattern called Tuckerman. Custom sizes and patterns available.

Thickness: **[ 2-3/4 inches ] [ 4 inches ]**

Light transmission: <**Insert Value**> %

Solar heat gain coefficient <**Insert Value**>

Panel U-factor by NFRC certified laboratory:

**[2-3/4”] [4”]** thermally broken grid <**Insert U factor**> **OR**

2-3/4” aluminum grid <**Insert U factor** >

Complete insulated panel system shall have NFRC certified U-factor of <**Insert NFRC U factor** >

Grid pattern as viewed: Nominal size <**Insert Grid Size**> ; pattern <**Insert Pattern**>

* + - * 1. Standard panels shall deflect no more than 1.9” at 30 PSF in 10’-0” span without a supporting frame by ASTM E 72.
        2. Standard panels shall withstand 1200° F fire for minimum one hour without collapse or exterior flaming.
        3. Thermally broken panels: Minimum Condensation Resistance Factor of 80 by AAMA 1503 measured on the bond line.

The following two paragraphs apply to Roof/Skylight Assemblies.

Delete paragraphs E and F if not applicable. Consult IBC or local Code authority for requirements.

Standard roof/skylight panels pass Class A Burning Brand.

UL790 Class A Built Up Roof construction is available as an option. Delete line 2 if not required.

* + - * 1. Roof/Skylight System:

Roof/Skylight system shall pass Class A Roof Burning Brand Test by ASTM E 108.

**(Optional)** Roof/Skylight system shall be UL listed as a Class A Roof by UL 790, which requires periodic unannounced factory inspections and retesting by Underwriters Laboratories.

* + - * 1. Roof/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.
      1. BATTENS AND PERIMETER CLOSURE SYSTEM

Note: Wall closure system - There are several alternative system designs with varying structural, thermal and aesthetic properties available including back-fasten closure system, wide battens, structural battens and concealed fasteners.

Delete one of the following two paragraphs if not applicable.

Select Standard or Thermally Broken for wall closure system.

* + - * 1. Closure system (Roof/Skylight):

Extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.

Curved closure system may be roll formed.

Skylight perimeter closures at curbs shall be factory sealed to panels.

* + - * 1. Closure system (Wall):

**[Standard] [Thermally Broken]** extruded aluminum 6063-T6 and 6063-T5 alloy and temper clamp-tite screw type closure system.

* + - * 1. Sealing tape: Manufacturer's standard, pre-applied to closure system at the factory under controlled conditions.
        2. Fasteners: 300 series stainless steel screws for aluminum closures, excluding final fasteners to the building.
        3. Finish:

Delete finish not selected. The standard finish for the perimeter system is factory applied finish available in 13 standard colors meeting the performance requirements of AAMA 2604.

Review the [**standard color chart**](http://www.kalwall.com/colorchip.htm). Enter the color and number.

Options include anodized, available with a maximum 1 year finish warranty.

Alternate finishes are discouraged due to cost and delivery delay, but may be available for specific projects.

Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Color to be <**Insert Color and Number> [selected from manufacturer's standards].**

Mill (optional)

Anodized

Section 2.5 Delete section if windows are not included.

Otherwise in paragraph B retain HC-2000 windows or E-Series windows as selected.

In paragraph E retain HC-2000 windows or E-Series windows as selected and Insert Glazing specification.

Delete paragraph G if insect screens are not included.

If windows are required to meet Windborne Debris Resistance, delete Section 2.5 and edit Section 2.6 Windows for Windborne Debris Resistance.

Section 2.5 Edit for selection of window [HC-2000 or E-Series], hardware, glazing, and screens.

* + - 1. WINDOWS (OPTIONAL)
         1. Windows shall be designed specifically for inclusion in the translucent panel unit wall system and factory unitized to panels.

Units shall be of the following type(s):

Project-out bottom

Project-in top

Fixed lite

* + - * 1. Performance: Windows shall pass or exceed requirements of AAMA/WDMA/CSA-101/I.S.2/A440-05 (08).

**HC-2000 Projected windows: PI-AW50, PO-HC55**; shall pass requirements at 75 PSF uniform structural load with air infiltration <.01 CFM/FT2 at 6.24 PSF and no water penetration at 10 PSF (PI) and 8 PSF (PO)

**HC-2000 Fixed widows: F-AW80**; shall pass requirements at 120 psf uniform structural load with air infiltration <.01 CFM/FT2 at 6.24 PSF and no water penetration at 12 PSF.

**E-Series Projected windows: PI-AW60, PO-AW70**; shall pass requirements of 90 PSF (PI) and 105 PSF (PO) uniform structural loads with air infiltration <.01 CFM/FT2 at 6.24 PSF and no water penetration at 15 PSF. Poured and debridged thermal breaks are not acceptable.

**E-Series Fixed windows: F-AW80**; shall pass requirements at 120 PSF uniform structural load with air infiltration <.01 CFM/FT2 at 6.24 PSF and no water penetration at 15 PSF. Poured and debridged thermal breaks are not acceptable.

* + - * 1. Construction: All window frame members shall be of heavy gauge 6063-T5 extruded aluminum with a thermal break. Frame sections shall be coped and joined by stainless steel screws at each corner. All joints exposed to the weather shall be sealed with an elastic compound. All openings shall be double weather stripped using T-slot bulb gaskets to insure minimum air infiltration.

Operating sash shall be hollow extruded design, mitered and joined with heavy reinforcing corners.

Both operable and fixed lites shall be inside glazed with an expanded EPDM closed cell sponge gasket to exterior, with aluminum glazing bead and a driven EPDM wedge gasket to the interior for rapid removal and replacement.

* + - * 1. Hardware:

Hinges on operating windows shall be four bar stainless steel with adjustable friction blocks.

**HC-2000 Projected windows:** Locking hardware shall be of cam lever design and shall be made of cast white bronze.

**E-Series Projected windows:** Locking hardware shall consist of a single centered cast aluminum handle with concealed multi-point locking elements (locking handles optional). Handles are available in **[white] [black] or [silver].**

* + - * 1. Glazing:

**[Heavy commercial (HC2000) windows] [E-Series windows]** shall be glazed with 1” **[double] [triple]** insulated glass.

(Optional) 1” translucent panels with <**Insert Value**> U-factor and faces to match 2-3/4” translucent panels.

Glazing Specification: <**Insert Glazing Specification**> <**Refer to Glazing Section**>

* + - * 1. Finish is to be coordinated with closure system.
        2. Insect Screens (Optional):

Constructed of hollow box extruded frame

Mitered with reinforcing corners mechanically joined

Screens for project-out windows shall be equipped with wickets for access to handles

Screen cloth shall be of 18-16 aluminum mesh and held in place by spline

Section 2.6 Delete section if windows for windborne debris resistance are not included.

In paragraph E insert Glazing specification.

Delete paragraph G if insect screens are not included.

* + - 1. WINDOWS FOR WINDBORNE DEBRIS RESISTANCE (OPTIONAL)
         1. Windows shall be designed specifically for inclusion in the translucent panel unit wall system and factory unitized to panels.

Units shall be of the following type(s):

Project-out bottom

Fixed lite

* + - * 1. Performance: Windows shall pass or exceed requirements of AAMA/WDMA/CSA-101/I.S.2/A440-05 (08).

**E-Series Project out Large Missile windows:** Design Pressure 80 PSF. Tested and certified to TAS 201, TAS 202, TAS 203, ASTM E1886 and ASTM E1996. Poured and debridged thermal breaks are not acceptable.

**E-Series Fixed Large Missile windows:** Design Pressure 80 PSF. Tested and certified to TAS 201, TAS 202, TAS 203, ASTM E1886 and ASTM E1996. Poured and debridged thermal breaks are not acceptable.

* + - * 1. Construction: All window frame members and sash shall be of tubular extruded 6063-T5 aluminum. Frame and sash to have enhanced thermal performance and mechanical strength using polyamide Insulbar® thermal strut construction. Frame sections shall be mitered and joined using heavy internal aluminum corner gussets that are mechanically staked and epoxy sealed. All openings are double sealed using continuous EPDM bulb, foam and wedge weather stripping to insure minimum air infiltration and maximum water resistance. Both project-out and fixed lites to have snap-in aluminum glazing bead for ease of field glazing.
        2. Hardware:

Hinges on project out windows shall be four bar stainless steel with adjustable friction blocks.

Locking hardware shall consist of a single centered cast aluminum handle with concealed multi-point locking elements (locking handles optional). Handles are available in **[white] [black] or [silver].**

* + - * 1. Glazing:

E-Series Large Missile windows shall be factory glazed with 1” nominal laminated insulated large missile resistant glass.

Glazing Specification: <**Insert Glazing Specification**>

* + - * 1. Finish is to be coordinated with closure system.
        2. Insect Screens (Optional):

Constructed of hollow box extruded frame

Mitered with reinforcing corners mechanically joined

Screens for project-out windows shall be equipped with wickets for access to handles

Screen cloth shall be of 18-16 aluminum mesh and held in place by spline

Section 2.7 Delete section if louvers are not included.

* + - 1. LOUVERS (OPTIONAL)
         1. Drainable Fixed Louver, 45°, 2-3/4” deep, shall be designed specifically for inclusion in the translucent panel unit wall system and factory unitized to panels.
         2. Performance:

Free Area 4 ft. by 4 ft. louver: 6.38 sq. ft.

Percent Free Area: 40%

Free Area Velocity at beginning point of water penetration 0.01 oz. of water per sq. ft. of louver free area: 1230 fpm

Maximum Pressure Drop at 2,000 fpm: 0.612” H2O in, 0.439” H2O out

* + - * 1. Construction: Frames and blades shall be manufactured of commercial quality 6063-T6 extruded aluminum conforming to ASTM B221. Frame and Blade thickness shall be 0.081” thick. Louver shall have 100% welded construction.
        2. Finish is to be coordinated with closure system.
        3. Options:

In Section E, delete options not required.

**Bird Screens**: ¾" flat expanded alum. 0.051" thick set in an extruded tubular aluminum screen frame.

**Insect Screens**: 18-16 aluminum mesh set in an extruded tubular aluminum screen frame.

**Blank-off plates**: 0.063" thick.

Section 2.8 Delete section if opaque panels are not included.

Select Fiberglass faces or Aluminum face paragraph options.

Fiberglass faces available in White Opaque, Colonial Blue, Jade Green, Covert Grey or Teal Blue.

Insert interior and exterior face sheet colors in paragraph A.

* + - 1. OPAQUE PANELS (OPTIONAL)
         1. **Fiberglass faces (Optional):**

Exterior face sheets: Smooth, **.070** thick and **<Insert Color>** in color.

Interior face sheets: Smooth, **[.045 S-171] [.045 Type 25]** thick and **<Insert Color>** in color.

Light Transmission 1%.

* + - * 1. **Aluminum faces (Optional):**

Materials: Panel face shall be two ply construction consisting of .063” aluminum and .125” thick hardboard.

“U” factor: [**.17 “U” Alum I-beam] OR [.11 “U” Thermally broken I-beam]**

Construction: Components shall be laminated as one monolithic unit by a laminator with minimum 15 years of experience. Adhesive shall be permanent elastic type neoprene rubber based applied to 100% of the surface.

Finish:

Manufacturer's factory applied finish, which meets the performance requirements of AAMA 2604. Finish is to be coordinated with closure system.(maximum length 5’-0”)

Mill finish (maximum length 10’-0”)

1. 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:

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.

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.

* + - 1. INSTALLATION
         1. Install the panel system in accordance with the manufacturer's suggested installation recommendations and approved shop drawings.

Anchor component parts securely in place by permanent mechanical attachment system.

Accommodate thermal and mechanical movements.

Set perimeter framing in a full bed of sealant compound, or with joint fillers or gaskets to provide weather-tight construction.

* + - * 1. Install joint sealants at perimeter joints and within the panel system in accordance with manufacturers suggested installation instructions.
      1. FIELD QUALITY CONTROL (Roof/Skylight)

Delete Section 3.4 if not applicable.

* + - * 1. Water Test: Installer to test skylights according to procedures in AAMA 501.2.
        2. Repair or replace work that does not pass testing or that is damaged by testing and retest work.
      1. CLEANING
         1. Clean the panel system interior and exterior, immediately after installation.
         2. Refer to manufacturer's written recommendations.

END OF SECTION 084523