SECTION 084513 – STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES

TIPS:

To view non-printing **Editor's Notes** that provide guidance for editing, click on MasterWorks/Single-File Formatting/Toggle/Editor's Notes.

To read **detailed research, technical information about products and materials, and coordination checklists**, click on MasterWorks/Supporting Information.

To view non-printing **Editor's Notes** that provide guidance for editing, on Master spec-File Formatting/Toggle/Editor's Notes click on (link to hidden text activation instructions).

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes aluminum-framed assemblies glazed with translucent polycarbonate panels as follows:

~~1. Wall assemblies.~~
~~2. Roof and skylight assemblies.~~
~~3.~~1. Canopy assemblies.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at [**Project site**] <**Insert location**>.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for aluminum components of panel assemblies.

B. Sustainable Design Submittals:

1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
2. Product Data: For sealants, indicating VOC content.
3. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
4. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.

C. Shop Drawings: For panel assemblies.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include details of provisions for assembly expansion and contraction and for draining moisture within the assembly to the exterior.

D. Samples: In manufacturer's standard size.

1. For each type of structured-polycarbonate panel.
2. For each type of exposed finish for framing members.

E. Fabrication Samples: Of each framing system intersection and adjacent panels, made from 12-inch (305-mm) lengths of full-size framing members and showing details of the following:

1. Joinery.
2. Anchorage.
3. Expansion provisions.
4. Translucent polycarbonate panels.
5. Flashing and drainage.

F. Submittal: For panel assemblies indicated to comply with performance requirements and design criteria, including analysis data[**signed and sealed by the qualified professional engineer responsible for their preparation**].

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified [**Installer**] [**testing agency**].

B. Product Test Reports: For each translucent polycarbonate-panel assembly, for tests performed by a qualified testing agency.

C. Evaluation Reports: For translucent polycarbonate-panel assemblies from ICC-ES.

D. Field quality-control reports.

E. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For panel assemblies to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical panel assemblies as shown on Drawings.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of panel assemblies that fail in materials or fabrication workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Deterioration of metals[**, metal finishes,**] and other materials beyond normal weathering.
c. Water leakage.

2. Warranty Period: [**Two**] [**Five**] years from date of Substantial Completion.

B. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace translucent polycarbonate panels that exhibit defects in materials or workmanship within specified warranty period.

1. Defects include, but are not limited to, the following:

a. Delamination.

b. Color changes exceeding requirements.
c. Losses in light transmission beyond 6 percent from original when measured after 10 years according to ASTM D 1003.

2. Warranty Period: 10 years from date of Substantial Completion.
3. Warranty Period for Hail Damage: Five years from date of Substantial Completion for hail stone penetration exceeding requirements.

C. Special Aluminum-Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.

1. Failures include, but are not limited to, checking, crazing, peeling, chalking, and fading of finishes.
2. Warranty Period: [**Five**] [**10**] [**20**] <**Insert number**> years from date of Substantial Completion.

D. Installer's Warranty: Installer agrees to repair or replace components of panel assemblies that fail in installation workmanship within specified warranty period.

1. Failures include, but are not limited to, installation defects and water leakage.
2. Warranty Period: [**Two**] [**Five**] years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design translucent polycarbonate-panel assemblies.

B. Structural Loads: [**As indicated on Drawings**] <**Insert loads**>.

C. Deflection Limits:

1. Vertical Panel Assemblies: Limited to 1/120 of clear span for each assembly component of aluminum framing and panel joint in accordance with IBC Table 1604.3 for exterior walls with flexible materials.
2. Overhead Panel Assemblies: Limited to 1/60 of clear span for each assembly component of aluminum framing and panel joint in accordance with IBC Table 1604.3, footnote h.

D. Structural-Test Performance: Panel assemblies tested according to ASTM E 330, as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not show evidence of deflection exceeding specified deflection limits.
2. When tested at [**150**] <**Insert number**> percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not show evidence of material failures, structural distress, and permanent deformation of main framing members exceeding [**0.2**] <**Insert number**> percent of span.

3. Test Durations: As required by design wind velocity, but not less than [**10**] <**Insert number**> seconds.

E. Windborne-Debris-Impact-Resistance Performance: Panel assemblies that pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and the testing information in ASTM E 1996 for Wind [**Zone 1**] [**Zone 2**] [**Zone 3**] [**and**] [**Zone 4**].

1. Large-Missile Test: For glazed openings located within 30 feet (9.1 m) of grade.
2. Small-Missile Test: For glazed openings located more than 30 feet (9.1 m) above grade.

F. Hail Stone Impact Resistance: Panel assemblies that resist penetration by hail stone smaller than 1-3/16 inch (30 mm) diameter, impacting panel surface at a final velocity up to 44 ft/sec (13.4 m/s) per ASTM E 822.

G. Panel Clip Performance: Corrosion-resistant clips tested to meet a minimum 90 lb/sq. ft. (4.3 kPa) wind uplift when tested according to ASTM E 330.

H. Panel End Seals: [**Continuous factory-applied, self-adhered micro-filter tape over open panel cells**] [**and**] [**Factory heat seal crimped open panel cells**].

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I. Panel Performance:

1. Smoke-Developed Index: 450 or less according to ASTM E 84, or 75 or less according to ASTM D 2843.
2. Flame Spread: 25 or less when tested according to ASTM E 84.
3. Combustibility Classification: Class CC1 based on testing according to ASTM D 635.
4. Interior Finish Classification: Class A based on testing according to ASTM E 84.
5. Visible Light Transmittance (VT) Loss: 6 percent maximum over 10 years, measured in accordance with ASTM D 1003.
6. Thermal Aging: When exposed to 300 deg F (149 deg C) for 25 minutes, interior and exterior panels tested in accordance with ASTM D 2244.
   a. Color Retention: 0.75 (Hunter) units ΔE maximum fade.
   b. Color Darkening: 0.3 (Hunter) units ΔL maximum.
   c. Cracking or Crazing: None when exposed to 300 deg F (149 deg C) for 25 minutes.
   d. Delamination: None when exposed to 300 deg F (149 deg C) and 0 deg F (-17.8 deg C) for 25 minutes.
7. Impact Resistance: No failure at an impact of 500 lbf (677.9 Nm) when tested according to ASTM E 695.
8. Concentrated Loading: No damage while applying a load of 600 lbf (813.5 Nm) over 1 sq. ft. when tested according to OSHA, 29 CFR Section 1910.23(e)(8); and no damage while applying a load of 400 lbf (542.3 Nm) over 3 inches (152 mm) in diameter according to ASTM E 661.

J. Water Penetration under Static Pressure: Provide panel assemblies that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).

K. Thermal Movements: Allow for thermal movements from ambient- and surface-temperature changes. Base calculations 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)**] <**Insert temperature range**>, material surfaces.

L. Energy Performance: Provide panel assemblies with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below**[and certified and labeled according to NFRC**].

1. Thermal Transmittance (U-Factor): Fixed glazing and framing whole assemblies shall have U-factor of not more than [**0.28 Btu/sq. ft. x h x deg F (1.59 W/sq. m x K) vertical application**] [**and**] [**0.31 Btu/sq. ft. x h x deg F (1.76 W/sq. m x K) sloped application**] <**Insert value**> as determined according to NFRC 100.
2. Solar-Heat-Gain Coefficient (SHGC): Fixed glazing and framing whole assemblies shall have an SHGC of no greater than [**0.40**] <**Insert value**> as determined according to NFRC 200.
3. Visible Light Transmittance (VT): [**42**] <**Insert value**> percent or greater in accordance with NFRC 202 for fixed glazing and framing whole assemblies.
4. Air Infiltration: Maximum air leakage through fixed glazing and skylight framing assemblies of [**0.30 cfm/sq. ft. (1.50 L/s per sq. m)**] [**0.20 cfm/sq. ft. (1.02 L/s per sq. m)**] <**Insert value**> of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
5. Air Infiltration: Maximum air leakage through fixed window glazing and framing assemblies of 0.20 cfm/sq. ft. (1.02 L/s per sq. m) of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
6. Air Infiltration: Maximum air leakage through fixed [**curtain wall**] [**and**] [**storefront**] glazing and framing assemblies of [**0.06 cfm/sq. ft. (0.30 L/s per sq. m)**] <**Insert value**> of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).

2.2 TRANSLUCENT POLYCARBONATE-PANEL ASSEMBLIES

A. Translucent Polycarbonate-Panel Assemblies: Translucent assemblies that are supported by aluminum framing and glazed with translucent polycarbonate panels.

1. Basis-of-Design Product: Subject to compliance with requirements, provide CPI Daylighting, Inc.; [**BriteWay-PentaGlas**] [**and**] [**BriteWay-U-Lite**] or a comparable product by one of the following:
   a. <**Insert manufacturer's name**>.

B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than [**25**] <**Insert number**> percent.

2.3 TRANSLUCENT POLYCARBONATE CANOPY PANELS

A. Translucent, Multiwall Cellular Polycarbonate Panel Assembly: Consisting of multiwall, cellular cross-section polycarbonate standing seam glazing panels with batten panel connectors, providing air-insulated spaces and coextruded UV protection. Incorporate glazing panel system into a complete aluminum framed assembly.

B. Translucent, Monolithic Solid Polycarbonate Panel Assembly: Consisting of monolithic, solid cross-section polycarbonate standing seam glazing panels with batten panel connectors, providing coextruded UV protection. Incorporate glazing panel system into a complete aluminum framed assembly.

C. Translucent Polycarbonate Panels: Translucent, extruded-polycarbonate sheet with multiwall cellular cross-section that provides isolated airspaces and that is coextruded with a UV-protective layer. Monolithic Polycarbonate Panels: Extruded polycarbonate sheet (not cellular) that is coextruded with a UV-protective layer.

D. Panel Thickness: Overall minimum [**0.158 inch (4 mm)**] [**and**] **0.47 inch (12 mm)**] [**0.63 inch (16 mm)**].

E. UV Resistance: Coextruded on exposed surfaces during glazing panel manufacture.

F. Color:

1. Multiwall, Cellular Glazing Panel Color: **[Clear matte] [Ice white matte] [White matte] [White pearl low-E] [Bronze matte] [Gray matte] [Reflective gray matte] [Green matte] [Blue matte] [Clear] [Ice white] [White] [White pearl low-E] [Bronze] [Gray] [Reflective gray] [Green] [Blue]** [**As selected by Architect from manufacturer's full range**] [**and**] [**Custom**] <**Insert color**>.
2. Monolithic, Solid Glazing Panel Color: [**Clear**] [**Ice white**] [**White**] [**Bronze**] [**Gray**] [**Reflective gray**] [**Green**] [**Blue**] [**Custom**] [**As selected by Architect from manufacturer's full range**] <**Insert color**>.

2.4 ALUMINUM FRAMING SYSTEMS

A. Components: Manufacturer's standard extruded-aluminum members of thickness required and reinforced as required to support imposed loads.

B. 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 429M).
4. Structural Profiles: ASTM B 308 (/B 308M).

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning skylight components.

D. Fasteners and Accessories: Manufacturer's standard, corrosion-resistant, nonstaining, and nonbleeding fasteners and accessories; compatible with adjacent materials.

1. At closures, retaining caps, or battens, use ASTM A 193 (/A 193M), 300 series stainless-steel screws.
2. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
3. At movement joints, use slip-joint linings, spacers, and sleeves of material and type recommended in writing by manufacturer.

E. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123 (/A 123M) or ASTM A 153 (/A 153M) requirements.

F. Anchor Bolts: ASTM A 307, Grade A, galvanized steel.

G. Concealed Flashing: Corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

H. Exposed Flashing and Closures: Aluminum sheet not less than 0.040-inch (1.02-mm) thick, finished to match framing.

I. Framing Gaskets: Manufacturer's standard gasket system with low-friction surface treatment designed specifically for retaining translucent polycarbonate panels.

J. Frame-System Sealants: As [**recommended in writing by manufacturer.**] [**specified in Section 079200 "Joint Sealants."**]

1. Sealant shall have a VOC content of 250 g/L or less.
2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

K. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 FABRICATION

A. Fabricate aluminum components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Internal guttering systems or other means to drain water passing through joints and moisture migrating within assembly to exterior.

B. Fabricate aluminum sill closures with weep holes and for installation as continuous component.

C. Reinforce aluminum components as required to receive fastener threads.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, [**AA-M12C22A41, Class I, 0.018 mm**] [**AA-M12C22A31, Class II, 0.010 mm**] or thicker.

B. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.

1. Color: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**].

C. Baked-Enamel or Acrylic Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color and Gloss: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] <**Insert color and gloss**>.

D. High-Performance Organic Finish: Two-coat [**AAMA 2604, fluoropolymer containing not less than 70 percent PVDF resin by weight in color coat**] [**AAMA 2605, polyester**] finish. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] <**Insert color and gloss**>.

E. High-Performance Organic Finish: Three-coat fluoropolymer finish including a clear topcoat complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Color and Gloss: [**As indicated by manufacturer's designations**] [**Match Architect's sample**] [**As selected by Architect from manufacturer's full range**] <**Insert color and gloss**>.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written instructions.

1. Do not install damaged components.

2. Fit joints between aluminum components to produce hairline joints free of burrs and distortion.
3. Rigidly secure nonmovement joints.
4. Install anchors with separators and isolators to prevent metal corrosion, electrolytic deterioration, and immobilization of moving joints.
5. Seal joints watertight unless otherwise indicated.

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

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

D. Skylight Assemblies: Install continuous aluminum sill closures with weatherproof expansion joints and locked and sealed corners. Install components to drain water passing through joints and moisture migrating within assembly to exterior.

E. Erection Tolerances: Install panel 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), but no greater than 1/2 inch (12 mm) over total length.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: [**Owner will engage**] [**Engage**] a qualified testing agency to perform tests and inspections.

1. Water-Spray Test: Before installation of interior finishes has begun, panel assemblies shall be tested according to AAMA 501.2 and shall not show evidence of water penetration.
2. Water Penetration under Static Pressure: Before installation of interior finishes has begun, areas shall be tested according to ASTM E 1105.

a. Test Procedures: Test under [**uniform**] [**and**] [**cyclic**] static-air pressure.
b. Static-Air-Pressure Difference: <**Insert pressure**>.
c. Water Penetration: None.

B. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.

END OF SECTION 084513