

SECTION 084513

STRUCTURED-POLYCARBONATE-PANEL ASSEMBLIES

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. This Section includes aluminum-framed assemblies glazed with multiwalled (structured) polycarbonate panels as follows:
 - 1. Wall assemblies.
 - 2. Roof (sloped, overhead) assemblies.
- B. Related Sections include the following:
 - 1. Division 05 Section "Structural Steel Framing" for steel framing that supports skin-system assemblies.
 - 2. Division 07 Section "Thermal Insulation" for insulation materials field installed with assemblies.
 - 3. Division 07 Section "Flashing and Sheet Metal" for metal flashings installed at perimeters of assemblies.
 - 4. Division 07 Section "Joint Sealants" for sealants installed at perimeters of assemblies.

1.3 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.
- C. Structural Loads:
 - 1. Wind Loads: As indicated by structural design data on Drawings.
 - 2. Snow Loads: As indicated by structural design data on Drawings.

3. Concentrated Live Loads on Overhead Assemblies: 300 lbf applied to assemblies at locations that will produce greatest stress or deflection.
 4. Seismic Loads: As indicated by earthquake design data on Drawings.
 5. Load Combinations: Calculate according to requirements of applicable code indicated on Drawings.
- D. Deflection of Assemblies:
1. Vertical Assemblies: Limited to $1/180$ of clear span for each assembly component.
 2. Overhead Assemblies: Limited to $1/180$ of clear span for each assembly component.
- E. Roof Assemblies: Class C per ASTM E 108 or UL 790.
- F. 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, ambient; 180 deg F, material surfaces.

1.4 PERFORMANCE TESTING

- A. Provide assemblies that comply with test-performance requirements indicated, as evidenced by reports of tests performed on manufacturer's standard assemblies by a qualified independent testing agency.
- B. Structural-Performance Test: ASTM E 330.
1. Performance at Design Load: When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 2. Performance at Maximum Test Load: When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main supporting members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity but not less than 10 seconds.
- C. Air-Infiltration Test: ASTM E 283.
1. Minimum Static-Air-Pressure Difference: 1.57 lbf/sq. ft..
 2. Maximum Air Leakage: 0.06 cfm/sq. ft..
- D. Test for Water Penetration under Static Pressure: ASTM E 331.
1. Minimum Static-Air-Pressure Difference: 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..
 2. Water Leakage: None.

1.5 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for assemblies.
- B. Shop Drawings: For assemblies. Include plans, elevations, sections, details, and attachments to other work. Include isometric drawings of

details.

1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

- C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

1.6 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for assemblies.
- B. Field quality-control test reports.
- C. Warranties: Special warranties specified in this Section.

1.7 CLOSEOUT SUBMITTALS

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

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Entity capable of assuming engineering responsibility and performing work of this Section and who is acceptable to manufacturer.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 699 for testing indicated.
- 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. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.9 PROJECT CONDITIONS

- A. Field Measurements: Indicate measurements on Shop Drawings.

1.10 WARRANTY

- A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer and Installer agree to repair or replace components of assemblies that fail in materials or 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: Five years from date of Substantial Completion.
- B. Special Structured-Polycarbonate-Panel Warranty: Manufacturer's standard form agreeing to replace polycarbonate sheet that breaks or develops defects from normal use that are attributed to manufacturing process and not to practices for maintaining and cleaning products contrary to manufacturer's written instructions.
1. Defects include, but are not limited to, the following:
 - a. Delamination.
 - b. Color changes from original in excess of 3.0 units Delta E when measured per ASTM D 2244.
 - c. Losses in light transmission beyond 6 percent from original when measured per ASTM D 1003.
 2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: The design for assemblies is based on Pool Enclosures, Inc. Subject to compliance with requirements, provide the named product or approved equal.

2.2 ALUMINUM FRAMING 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.
 2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 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: One-piece extruded-aluminum components thermally isolated by gasketing or Thermally broken; 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 thick.
- D. Framing Gaskets: Manufacturer's standard.
- E. Framing Sealants: As recommended in writing by manufacturer.
1. Sealants used inside the weatherproofing system shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA

Method 24).

- 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. 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.
- H. Anchor Bolts: ASTM A 307, Grade A, hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- I. Framing 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 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.

2.3 STRUCTURED POLYCARBONATE PANELS

- A. General: Translucent, extruded-polycarbonate sheet with cellular cross section that provides isolated airspaces and that is coextruded with a UV-protective layer.
 - 1. Plastic Self-Ignition Temperature: 650 deg F or more per ASTM D 1929.
 - 2. Burning Extent: 1 inch or less per ASTM D 635.
 - 3. Smoke-Developed Index: 450 or less per ASTM E 84, or 75 or less per ASTM D 2843.
 - 4. Flame-Spread Index: Not more than 25 per ASTM E 84.
 - 5. Exterior-Fire-Exposure Class: Class A B or C per ASTM E 108 or UL 790.
- B. Panel U-Factor: Not more than 0.24 , measured in Btu/sq. ft. x h x deg F according to ASTM C 1363 and using procedures described in ASTM C 1199 and ASTM E 1423.
- C. Color Stability: Not more than 3.0 units Delta E when measured according to ASTM D 2244 after outdoor weathering according to procedures in ASTM D

1435 or not more than 5% when measured according to ASTM D 1925.

1. Outdoor Weathering Conditions: 60 months in Arizona or 120 months in a moderate North American climate.

D. Impact Resistance: No failure at impact of 200 ft. x lbf according to free-falling-ball impact test using a 3-1/2-inch- diameter, 6.3-lb ball.

2.4 ACCESSORY MATERIALS

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

2.5 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. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry-film thickness of 1.0 mils (0.025 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 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.

3.2 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.

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 closures with weatherproof expansion joints and locked and sealed or welded corners. Locate weep holes at

rafters.

- D. Install components to drain water passing joints, condensation occurring within aluminum members, 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 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; otherwise, limit offset to 1/8 inch.
 - 2. Location and Plane: Limit variation from true location and plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: Testing and inspecting of representative areas to determine compliance of installed assemblies with specified requirements shall take place as follows and in successive stages as indicated on Drawings. Do not proceed with installation of the next area until test results for previously completed areas show compliance with requirements.
 - 1. 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: 13 percent of positive wind-load design pressure, but not less than 10 lbf/sq.ft.
 - c. Water Penetration: None.
 - 2. Water-Spray Test: Before installation of interior finishes has begun, assemblies shall be tested according to AAMA 501.2 and shall not evidence water penetration.
- C. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

- - - E N D - - -