

DIVISION 10 – SPECIALTIES

SECTION 10 73 16.36

POINT SUPPORTED GLASS CANOPIES

Items in **blue** indicate specification comments or choices to be selected, deleted or filled in as appropriate.

I. GENERAL

A. Work Included:

1. Manufactured and installed point supported glass canopy system with glass fittings, glass and sealant joints.
2. Perimeter trim, closures, and gutter, where shown in drawings, as described herein for a complete point supported glass canopy installation.
3. Engineering and drafting of production documents, including structural design calculations.
4. Shop drawing and other submittals as noted in item I.D below.
5. When shown on the drawings, fabrication and erection of the aluminum gutter system including insulation and pitched liners.
6. Applied finish to aluminum extrusions and flashings.

B. Related Work Not Included:

1. Section **051200**: Structural Steel.
2. Section **055000**: Metal Fabrications.
3. Section 076000: Flashing and Sheet Metal.
4. Section 088000: Glazing.
5. Section **089000**: Glazed Curtain Walls.
6. Section **xxxxxx**: Sealants.

C. Standards:

1. Comply with the standards that are applicable to the work of this Section except as otherwise indicated. Provide assembly that is Department of Industry, Labor and Human Relations approved.
2. American National Standards Institute (ANSI): Z 97.1 -1984- Safety Glazing Materials Used in Buildings -Safety Performance Specifications and Methods of Test.
3. American Society for Testing and Materials (ASTM):
 - i. C162: Standard Terminology of Glass and Glass Products.
 - ii. C1036: Standard Specification for Flat Glass.
 - iii. C1048: Standard Specification for Heat-Treated Flat Glass – Kind HS, Kind FT, Coated, and Uncoated Glass.
 - iv. C1172: Standard Specification for Laminated Architectural Flat Glass.
 - v. A193: Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service.

- vi. A307: Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- vii. B209: Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- viii. B211: Specification for Aluminum-Alloy Bar, Rod and Wire.
- ix. B221: Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
- x. B316: Specification for Aluminum and Aluminum-Alloy Rivet and Cold-Heading Wire and Rods.
- xi. C719: Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cycle Movement.
- xii. C794: Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants.
- xiii. C1036: Specification for Flat Glass.
- xiv. C1048: Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
- xv. D395: Test Methods for Rubber Property -Compression Set.
- xvi. D412: Test Methods for Rubber Properties in Tension.
- xvii. D1171: Test Method for Rubber Deterioration -Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens).
- xviii. D2240: Test Method for Rubber Property -Durometer Hardness.
- 4. Consumer Product Safety Commission (CPSC): 16CFR 1202 - Architectural Glazing Standards and Related Material.
- 5. Flat Glass Manufacturers Association (FGMA): Glazing Manual.
- 6. American Architectural Manufacturers Association (AAMA):
 - i. 501.2: Field Check of Metal Curtain Walls for Water Leakage.
 - ii. 603.8: Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
 - iii. 605.2: Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
 - iv. 606.1: Voluntary Guide Specification and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
 - v. 607.1: Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.

D. Submittals:

1. Prior to starting fabrication, submit manufacturers' product specifications, test results showing compliance with performance criteria described below, complete shop drawings, handling, installation and protection instructions. Indicate pertinent dimensioning, general construction, component connections and locations, anchorage methods, locations and installation details.
2. Submit structural calculations prepared in accordance with the Building Code for the state where the project is located. Calculations shall be by a licensed structural engineer qualified in the design of point supported glass canopies and licensed to practice in the state where the point supported glass canopy is manufactured.
3. Submit if specifically requested:
 - i. (2) 12-in. x 12-in. samples of each type of glass.
 - ii. (2) manufacturer's samples of each type of sealant.
 - iii. When system includes flashings or gutters, submit (2) 6-in. long samples of formed shapes or extrusions (with appropriate finish).
 - iv. (3) sets of as-built drawings and cleaning and maintenance manuals.
 - v. Certification that laminated glass units will withstand specified design loads.

E. Quality Assurance:

1. The point supported glass canopy installers shall be permanent full-time employees of the point supported glass canopy manufacturer.
2. Engage a single source manufacturer/installer for the point supported glass canopy. Point supported glass canopy source will assume undivided responsibility for all components, including structural design, engineering, fabrication, finishing, preparation at the job site, erection and glazing of the point supported glass canopy.
3. The point supported glass canopy manufacturer/installer shall be able to demonstrate that it has performed successfully on comparably sized projects and of comparable design complexity for ten years.
4. Point supported glass canopy fabrication shall be based upon structural calculations by a structural engineer qualified in the design of point supported glass canopies and licensed to practice in the state where the point supported glass canopy is manufactured.
5. Comply with recommendations of Flat Glass Marketing Association (FGMA) “Glazing Manual” and “Sealant Manual” except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this Section or referenced standards.

F. Design Loading requirements:

1. Design loads: as prescribed by governing building codes.
2. Concentrated load of 250lb applied at a location that will produce the maximum stress or deflection.
3. American National Standard “Minimum Design Loads for Buildings and Other Structures” ANSI A58.1 -- latest edition.
4. Design assembly to safely carry all dead, snow, wind, thermal and building movement loads, as well as any additional service and construction loads.
5. The deflection of glass, as measured at center of units, shall not exceed 1 inch.

G. Performance:

1. Thermal Movement: Provide for such expansion and contraction of component materials as will be caused by the ambient surface temperature range without buckling, stress on glass, failure of seals, undue stress on structural elements, reduction of performance or other detrimental effects.

H. Coordination:

1. Coordinate point supported glass canopy work with the adjoining work of other trades.
2. Verify field supporting structural steel dimensions when available.
3. Obtain “guaranteed dimensions” when obtaining actual field measurements will delay job progress.

I. Warranty:

1. Warranty period will be [choose one: two (2), five (5), ten (10)] years after the date of substantial completion.
2. Provide a written warranty from the point supported glass canopy manufacturer/installer stating that all work of this Section will remain free from defects including:
 - i. defective design, defective materials and construction.
 - ii. glass delamination, discoloration and defects in manufacture.
 - iii. harmonic vibration, wind whistles, noises caused by thermal movement, loosening, weakening or fracturing attachments to other adjacent components.

- iv. deterioration of finishes including checking, fading, peeling, crazing and chalking beyond normal weathering.

II. PRODUCTS

A. Manufacturers:

1. The specifications are based on the point supported glass canopy products of Wisconsin Solar Design, Inc., www.wisconsinsolardesign.com.
2. [Complete or delete this item.] Acceptable manufacturers:
 - i. [Manufacturer #2]
 - ii. [Manufacturer #3]
3. Other manufacturers may bid this project provided they comply with all of the performance requirements of this specification and pre-qualify with the Architect per section 016000 Product Requirements, [optional, specify how many days, i.e., no less than # days] prior to bid date.

B. Materials:

1. Point support fittings: 316 series stainless steel, [choose one: polished stainless, brushed stainless] finish.
 - i. Spiders and stand-offs: Manufacturer to provide stand-offs and/or 1-arm, 2-arm, 3-arm, or 4-arm spider fittings per design drawings and as appropriate.
 - ii. Spider and stand-off fasteners: [choose one: Standard, Exterior countersunk] disc, articulated swivel type to accommodate environmental live loads. Regular duty or heavy duty, dictated by required glass thickness as determined by manufacturer's licensed Professional Engineer.
 - iii. Fasteners, anchoring point support fittings to support structure: 316 series stainless steel.
2. Glass: [consult point supported glass canopy manufacturer for glass recommendations. Almost limitless glass options (tints, coatings and screenings) are available. The make-up for point supported glass canopy glass often placed in section 088000, Glass and Glazing, and may be referenced here as follows: *For glass composition, see glass schedule in Section 088000 - Glass and Glazing.* Glass thicknesses will depend on size and loading conditions. Wisconsin Solar Design Inc. notes one possible glass selection as follows:]
 - i. Overall Glass Thickness: 13/16".
 - ii. Laminated glass unit: Kind FT: Two lites of fully-tempered float glass
 - iii. Laminated Lite Upper Ply: Class 1 clear float glass.
 - a. Thickness: 10 mm
 - iv. Laminated Lite Interlayer: PVB (polyvinyl Butyral)
 - a. Thickness: 0.060 inch [optional, choose or delete: 0.090 inch]
 - b. Interlayer Color: Clear.
 - v. Laminated Lite Lower Ply: Class 1 clear float glass.
 - a. Thickness: 10mm
 - vi. Holes: Quantities, locations, and sizes as required for point support fittings; coordinated by point supported glass canopy manufacturer.
3. Closures, flashings, and gutters: [choose one: aluminum, stainless steel, copper] with a minimum thickness of [.040 inch for aluminum flashing and closures, .125 inch for aluminum gutters]. Furnished shop formed to profile in min. 10-ft. lengths. When lengths exceed 10-ft., field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Ends are to overlap 6-in. to 8-in. minimum, set in a

- full bed of sealant and riveted if required. Gutters shall be sloped to drain. Leaders and tie-in to stormwater drains shall be provided by other trades.
4. All aluminum to receive a factory applied [choose one: AAMA 2603-compliant, AAMA 2604-compliant, AAMA 2605-compliant] high performance oven baked two-step [optional: with clear topcoat] fluoropolymer [insert color here; full array of standard, premium, and custom colors available; reference Valdspar Fluropon and PPG Duranar lines for some options] painted finish or an Architectural Class I color anodized finish [insert color here; standard colors are clear, champagne, light bronze, medium bronze, dark bronze, extra dark bronze, black; other colors available] with a 0.7 mil minimum film thickness, conforming to Aluminum Association Standard AA-M21C22A42/A44 and AAMA 606.1 or AAMA 608.1.
 5. Sealant, at joints -- High performance neutral cure medium modulus silicone sealant applied in accordance with manufacturer's recommendations.

III. EXECUTION

A. Delivery:

1. Deliver manufactured units and component parts to the jobsite completely identified with labels corresponding to the erection drawings. Protect surfaces from damage during shipping. Inspect materials for damage upon delivery to the jobsite. Touch-up or replace items with minor defects or scratches with the appropriate material.

B. Pre-installation:

1. The protection of the point supported glass canopy area before and after the point supported glass canopy installation is excluded from the work of this section.

C. Installation:

1. Manufacturer shall be responsible for the installation and glazing of the point supported glass canopy system.
2. Prior to the installation of the point supported glass canopy system, arrange for the representative of the point supported glass canopy manufacturer to examine the supporting structure and adjacent construction to determine that they are properly prepared, sized and ready to receive the point supported glass canopy work specified herein.
3. Assist general contractor to coordinate installation with adjacent work such as structural steel, wall cladding and other work to ensure a complete and integrated assembly.
4. Contact between aluminum and dissimilar metals shall receive a protective coating of asphalt paint for the prevention of electrolytic action and corrosion.
5. Install point supported glass canopy fittings, glass and accessory items as needed in accordance with the manufacturer's printed instructions matching profiles, sizes and spacing indicated on approved shop drawings.
6. During installation, remove labels, part number markings, sealant smears, handprints and construction dirt from all components. Touch-up damaged coatings and finishes and repair minor damage to eliminate all evidence of repair. Remove and replace work that cannot be satisfactorily repaired.
7. Anchor work securely to supporting structure, but allow for differential and thermal movement.
8. Erect system plumb and true and in proper alignment and relation to established lines and grades as shown on the approved shop drawings.

9. Handle glass in accordance with the recommendations of the FNMA, latest edition. Use rubber spacers to maintain separation of glass and adjacent metal framework.
10. Touch-up areas damaged during installation.
11. Sealants to be installed per sealant manufacturers' instructions. Do not perform structural silicone sealant work when the metal temperature is below that recommended by the sealant manufacturer.
12. Before application, remove mortar dirt, dust moisture and other foreign matter from surfaces sealant will contact. Apply sealant in a tooled and uniform manner to completely fill joint. Remove excess sealant to leave uniform smooth edge.

D. Site Tolerances:

1. All supporting and adjacent construction will be held to within + ½" of theoretical.
2. Tolerances for the installation of related products: Refer to the sections noted in the "Related Work Not Included" paragraph above for specified tolerances for adjoining construction.

E. Water Test:

[Wisconsin Solar Design recommends considering field testing as an option for canopies at heavily-used entrances and for occasions when normal exposure to weather and product guarantee do not provide adequate assurance of serviceability. Alternatively, delegate the hiring of the testing agency to the Owner. Delete Section 'E' entirely if field water testing is deemed to be unnecessary.]

1. [Optional:] Engage a qualified testing agency to provide field hose testing in accordance with AAMA 501.2.
2. Tests will be conducted as soon as possible after the point supported glass canopy is installed while allowing time for wet applied sealants to cure.
3. In the event that leakage is detected, the point supported glass canopy is to be made watertight by the point supported glass canopy manufacturer/installer and subsequently retested by the testing agency.
4. Testing agency provides
 - i. Calibrated Type B-25 #6.030 brass nozzle
 - ii. All materials and labor necessary for testing.
 - iii. One test technician and one assistant, gauges and instrumentation for conducting the testing.
 - iv. A detailed report in electronic format (PDF) summarizing the results of the field tests.
 - v. Insurance.
5. General contractor provides [coordinate these GC requirements with project requirements noted elsewhere]
 - i. Source of water capable of delivering 30 to 35 psi to the nozzle.
 - ii. 110/120 volt power supply within 100 feet of test area.
 - iii. Access to the interior and exterior of the test area including any lifts and/or scaffolding as may be necessary.
 - iv. Repair of any damage which may result from testing.
 - v. [If Owner is providing the testing] Advance notification of testing schedule to allow point supported glass canopy manufacturer/installer to attend during testing.

F. Cleaning:

1. Remove any temporary protection of work area at the completion of point supported glass canopy installation. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.
2. The point supported glass canopy manufacturer/installer is required to leave glass and metal surfaces clean at the conclusion of the installation. Final cleaning is to be performed by the general contractor, not by the point supported glass canopy manufacturer/installer, just prior to acceptance of the project by the owner.

G. Protection:

1. Following conclusion of the installation by the point supported glass canopy manufacturer/installer, protection of the finished work shall become the responsibility of the general contractor.

END OF SECTION 10 73 16.36