



**PRE-ENGINEERED STRUCTURAL SOLAR SUPPORTS
For SOLAR PANEL INSTALLATIONS**

[Solar Canopies for Parking Areas / Surface Lots]

Designed and Manufactured by:
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PART 1 – GENERAL

PART 2 – PRODUCTS

PART 3 – EXECUTION



PART 1 – GENERAL

1.01 SCOPE:

- A. This section covers the design, supply and installation of the structures, foundations and all other items required to furnish and install a complete structural system capable of supporting solar panel installations.

1.02 DESIGN CRITERIA AND PERFORMANCE REQUIREMENTS:

- A. Structural framing for the Solar Parking Canopies shall be designed in accordance with all applicable state and local building codes. Manufacturer shall provide written structural analysis prepared and certified by a Professional Engineer licensed in the applicable State indicating that the structures and the foundations satisfy the required design criteria. At a minimum, the structures shall meet the following design criteria as specified by code:
 - a. Dead Load: As Required by Code
 - b. Roof Live Load: As Required by Code
 - c. Snow, Wind and Seismic Loading: As Required by Code

1.03 QUALITY ASSURANCE:

- A. Installation shall be by certified erectors employed by the Solar Canopy Manufacturer having a minimum of five (5) years of experience erecting similar structures. The canopies shall be erected in accordance with manufacturer's instructions and approved drawings.
- B. The structure shall be manufactured by certified facilities in accordance with standard approved practices. Testing shall be performed in accordance with ASTM standards, and test reports shall be certified and submitted by an independent test laboratory.

1.04 SUBMITTALS:

- A. Signed and sealed drawings shall be submitted by the manufacturer prior to manufacturing and ordering / fabrication of materials shall commence only upon notice to proceed by the owner.
- B. Manufacturer shall submit three (3) sets of signed and sealed drawings for approval.
- C. The submittal package shall include drawings signed and sealed by a Professional Engineer licensed in the applicable State in addition to a full equipment submittal.
- D. At a minimum, submittal drawings shall include the following sheets:
 - a. Title/Cover Sheet
 - b. Column / Layout Details



- c. Structure Elevations
- d. Truss Framing Details
- e. Column Anchoring Details
- f. Gutter Framing and Metal Roof Details (if applicable)
- g. Solar Panel and Racking Details
- h. Lighting Fixture Installation Plans (if applicable)

1.05 MATERIAL DELIVERY, STORAGE AND HANDLING:

- A. Materials shall be delivered to the jobsite in manufacturer's packaging.
- B. Access from unloading area to construction site shall be clear and unrestricted.
- C. Materials shall be stored in a clean, dry and covered area that is secure and protected from weather.
- D. Upon delivery, inspect and report any freight or handling damage to the manufacturer immediately. Manufacturer cannot be held responsible for damages occurring during storage prior to construction.

PART 2 – PRODUCTS, MATERIALS AND COMPONENTS

2.01 MANUFACTURER:

- A. The manufacturer of the Solar Canopies shall meet certification standards and have a minimum of 5 years of experience in the design and installation of similar systems.

2.02 GENERAL STRUCTURE DESIGN AND COMPONENT DETAILS:

- A. The structure shall be designed and detailed according to good engineering practice. The Solar Canopies shall consist of interconnected columns and truss chords with solar modules installed in either portrait or landscape orientation connected to the purlins. Columns shall be located between parking stall spaces with truss chords cantilevered to either side of the column for both dual entry (aisle) and single entry (perimeter) parking structures. The total coverage width shall not exceed 36'-0" for aisle canopies or 18'-0" for perimeter canopies unless otherwise specified.
- B. A minimum of clearance of 8'-6" shall be maintained at the lowest point of the canopy truss.
- C. Both aisle and perimeter canopies shall have a nominal roof slope between 5 and 10 degrees unless otherwise specified.
- D. Concrete used for foundations shall have a minimum 28-day compressive strength of 4,000 psi.



- E. Reinforcing steel used in the foundations shall be ASTM A615 Grade 60 deformed billet steel.
- F. HSS column sections shall be ASTM A500 Grade B steel tubing with a minimum yield stress of 46 ksi. Plate material used for connections shall be ASTM A36 material. Formed brackets and/ or connection plates and clips shall be shop welded to the columns. Field welding is not required. After fabrication, all columns shall be Hot Dipped Galvanized to specification ASTM A 123 or shot blasted and coated with an approved 3-part industrial / marine grade coating to an RAL color specified by the owner. “Pre-galvanized” components to a G-90 finish shall not be permitted.
- G. Truss chords and web members shall be ASTM A500 steel tubing with a minimum yield stress of 46 ksi. All trusses shall be assembled in the shop and shipped to the site and connected to the column as a single (full length) assembly. Formed brackets and/or connection plates and clips shall be shop welded to the upper truss chord. No field welding is required. After fabrication, trusses shall be Hot Dipped Galvanized to specification ASTM A 123 or shot blasted and coated with an approved 3-part industrial / marine grade coating to an RAL color specified by the owner.
- H. Purlins shall be either hollow ASTM A500 steel tubing or a specially formed section which upon installation shall not retain standing water. Typical “C” or “Z” purlins shall not be permitted. After fabrication, purlins shall be Hot Dipped Galvanized to specification ASTM A 123 or shot blasted and coated with an approved 3-part industrial / marine grade coating to an RAL color specified by the owner.
- I. Purlins shall be mounted between the truss top chords unless otherwise noted. Top of purlins shall be flush with the top of the upper truss chord to provide a flat plane for uniform mounting of solar panel and integrated racking system. Purlins shall be bolted to clips on truss top chords with zinc plated Grade 5 bolts. Number of purlins and purlin spacing shall be determined by solar module and integrated rack layout. Mounting holes for the racking system and solar module installation shall be pre-located and pre-drilled prior to finishing and coating operations.

2.03.1 Hot Dipped Galvanized ASTM A 123 (optional metal finish)

- A. Hot Dipped Galvanizing shall be conducted according to Standard Specification ASTM A 123/A-02 for Zinc Coating on Iron and Steel Products

2.03.2 PERFORMANCE COATING / PAINT: (optional metal finish)

- B. The following coating / paint specification defines the minimum coating standards required for exposed Solar Structures for service within Institutional and Commercial markets. The specified industrial /marine grade coating/s provide adequate corrosion resistance consistent with a low or no maintenance 25 year structure as measured by



ASTM-B117. At a minimum, the specified coating process will require metal preparation and (3) coats of corrosion resistant barriers

C. Metal Preparation Process

- a. All structural components; columns, base plates, trusses, purlins and steel clips shall be abrasively cleaned after fabrication to a near white metal surface which meets SSPC- SP6 (NACE 3) Near-White Blast Cleaning.

D. Layer 1 – Base Zinc Coat

- a. All structural components; columns, base plates, trusses, purlins and steel clips shall receive an approved and tested undercoat of Zn rich primer applied to all exposed surfaces.

E. Layer 2 – Intermediate Epoxy Coat

- a. All structural components; columns, base plates, trusses, purlins and steel clips shall receive an approved and tested intermediate Epoxy or equivalent coating applied to all exposed surfaces

F. Layer 3 – Top Coat

- a. All structural components; columns, base plates, trusses, purlins and steel clips shall receive a minimum of one top coat as either an approved and tested Superdurable Polyester Powder Coat or Sherwin Williams Urethane Finish Coat.

2.04 GENERAL NOTES:

- A. All steel products shall be from a North American source accompanied by mill certifications.
- B. All welding shall be done by tested and certified facilities.
- C. All canopy bolts, nuts and washers, unless otherwise noted, shall have a hot dip galvanized finish.
- D. All special inspectors shall be retained by the owner / customer. The extent of the inspection shall comply with the contract document, applicable code requirements and the local jurisdiction.
- D. All materials shall be new, of good quality and without defects which would lessen quality of work.



- E. All materials shall conform to the requirements, tolerances, etc. of the latest editions of the AISC Manual of Steel Construction, AISI Specifications for the Design of Cold Formed Steel Members, ASTM Standard Specifications for General Requirements for rolled steel plates, shapes, sheets and bars for structural use.
- F. All welding shall be done in accordance with the latest version of the American Weld Society's Specification – AWS D1.1. Electrodes shall be E70 series unless otherwise noted.
- G. Canopy erection drawings shall be furnished at time of material shipment.

PART 3 – EXECUTION

3.01 SITE PREPARATION AND INSPECTION:

- A. General Contractor shall direct, oversee and inspect all site work related to the Solar Canopy Installation. Site preparation shall be in accordance with final drawings and specifications provided by manufacturer.
- B. Canopy contractor shall inspect site and notify general contractor in writing of any condition(s) that may inhibit the proper and timely construction of the canopies. Canopy contractor shall be under no obligation to proceed until conditions have been sufficiently corrected.

3.02 INSTALLATION:

- A. Canopy contractor shall be responsible for installation of foundations and placement of anchor bolts and for removal of any spoil due to foundation drilling from the site daily.
- B. Installation of the entire system and all components shall be in strict accordance with manufacturer's recommendations.

3.03 CLEANING AND GROUTING:

- A. After the system has been fully erected, the canopy contractor shall provide the materials and labor to grout the base of the column to produce a finished joint.
- B. Canopy contractor shall place all trash and debris into appropriate receptacles provided by the general contractor.

3.04 WARRANTY:

- A. Canopy manufacturer shall provide a one (1) year warranty on materials and workmanship from the date of substantial completion.
- B. Canopy manufacturer shall provide complete warranty information on all manufacturers providing accessories within the system.