

SECTION 13135 – GREENHOUSE

PART 1 – GENERAL

1.1 SUMMARY

A. Description of Work: Work of this Section includes, but is not limited to, the following:

1. Aluminum-framed greenhouse
2. Glazing
3. Sealants, calking, and gaskets
4. Doors
5. System design
6. Vents with motor operation
7. Circulation fans
8. Evaporative coolers
9. Gas fired unit heater
10. Exhaust fans
11. Plant benches
12. Irrigation
13. Controller

1.2 SUBMITTALS

A. Provide Job Specific Shop Drawings: four (4) copies to review and approve in which 1 will be returned to manufacturer to build to. Since each manufacturer may be slightly different in member design, these approved shop drawings will need to comply with the existing conditions as detailed on the architectural plans. Vendor is responsible for field verifying all existing conditions.

B. Product Data: Submit manufacturer's specification cut-sheets on accessories to be provided.

1. Show plans, elevations and typical details of each condition for every member, joint, anchorage and glazing system.
2. Include hardware details, locations and mounting heights.
3. Show locations of, and mounting for any heating and cooling equipment provided by manufacturer.

1.3 SYSTEM REQUIREMENTS

A. Design Requirements: Size glazing channels to provide adequate bite on glazing as recommended by greenhouse manufacturer.

B. Structural Performance Requirements: Design loads: Design, fabricate and install component parts so that completed systems will meet IBC 2009 structural snow and wind loading and in accordance with the Laws of the State of Alabama.

C. Visual Requirements:

1. Metal surfaces: Fabricate surfaces exposed to view from materials which are smooth and free of surface blemishes. Do not use materials which have stains and discolorations, including

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welds, exposed in completed Work.

2. Surface flatness and edges: Provide flat surfaces with machine cut edges and corners sharp and true to angle or curvature required.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver fabricated units and component parts to site identified in accordance with erection diagrams prepared by manufacturer.
- B. Store in accordance with manufacturer's instructions, properly protected from weather, and construction activities.

1.5 PRODUCTS AND MANUFACTURERS

- A. Acceptable Products and Manufacturers:

In order to maintain quality standards the following systems will be used for a basis of design

1. Geneva System Model No. BWS-SG22b, 16-bay unit, 2 gable ends, 1 partition, by Florian Solar Products LLC, to establish a standard of quality. Contact Jim Hannon at 888-950-8505.
2. Other manufacturers: Four Seasons Solar Products, Amdega, Blue Diamond, or Town & Country may be acceptable, provided they comply with requirements.
3. No other greenhouse system substitutes shall be allowed without written request for prior approval 10 days BEFORE the bid opening date. Any bid from a non-pre-approved greenhouse manufacturer may not be used or accepted by any bidding General Contractor.

1.6 MATERIALS

- A. Aluminum Extrusions:

1. ASTM B221; shapes and thicknesses as indicated and as required to fulfill performance requirements.
2. Suitable alloy for extruding with adequate structural characteristics and suitable for finishing as specified.

- B. Aluminum Sheets and Plates:

1. ASTM B209; sizes and minimum gages as indicated and as required to fulfill performance requirements.

- C. Glazing: Hermetically sealed, factory insulated, dual sealed, 7/8" O.A. Made with a molecular sieve desiccant, primary seal of polyisobutylene and a secondary seal of polyurethane. Proprietary (exclusive) glass will not be allowed. All glass to comply with the Insulated Glass Certification Council with ASTM E 773-83 and E 774-84a class CBA requirements (IGCC No. IGCC-514CBA) Glazing as listed:

1. Solarban60 MC Low-E clear tempered over clear tempered safety glass, dual sealed.

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Solar Heat Gain Co-efficient: no higher than .37;

Outdoor visible reflectance: no higher than 12%

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Visible light Transmittance: no higher than 69%

1.7 COMPONENTS

A. Aluminum Framing System:

Glazing Bars are to be I-beam extrusions. The vertical and horizontal extrusions shall have internal and external weep/condensation channels to direct moisture, which could collect on the interior of the glass, to the exterior of the greenhouse. The sill member shall be sloped and weep channeled to the exterior to force moisture, which may be collected, to exit to the exterior. The moisture shall weep/exit through a small hinged weep hole covers located periodically along the length of the sill member at the center of each bay. Finish for all aluminum framing members and trim shall be manufacturer's standard high solids baked-on Polycron bronze or white enamel finish. Framework to be standard extruded aluminum frame, pre-cut, pre punched and pre-drilled consisting of roof, front wall, and gable end walls. Vertical support pipes may be required for maintaining loads; these support pipes will be schedule 40 welded and seamless wrought steel pipe with galvanized coating--1" with 1.315 o.d. minimum. Spacing of vertical pipe columns will be determined by the factory.

Doors: Access doors shall be: 36" (39 3/4" x 86" R.O.) commercial quality narrow style, single swing door, 1" o.a. glazing. Manufacturer's standard push/pull hardware, 1pair of pivot hinges and push/pull hardware is required.

E.P.D.M. Glazing Gaskets shall be used throughout to seal glass on interior and exterior. (No rope caulking, putty or neoprene spline will be used.) All edges of glass to be engaged by gaskets. (No overlapped, stacked or unsupported glass is allowed.)

Natural Ventilation Package consists of: (1) 10-bay motorized roof vent & (1) 6-bay motorized roof vent. (1) 10-bay motorized side vent & (1) 6-bay motorized side vent. Roof-Vent framing to be all extruded aluminum type 6063-T6. Operated by elbow arm mechanism and driven by a vent shaft suspended from the structural main bars. Action of vent sash to open no more than parallel to ground (approx. 16 degrees) by use of a thermostatically controlled electric vent motor actuator operation on 110 VAC. Vent perimeter to be full perimeter weather stripped with 1/4" x 1/2" E.P.D.M. gasketing system. Insect screen units are required for vent openings. Finish of vent to match frame finish. Aluminum lifting mechanisms to remain mill finish and steel drive pipe to remain galvanized finish.

Cooling: (3) Florian's 4000 self-contained evaporative coolers 120vac, 1/3hp with duct and gravity damper.

Heating: Reznor (1) UDAP60 & (1) UDAP30 gas-fired unit heaters with hanging kits. Gas, wiring, & flue by GC.

Air circulation: (4) Florian's 14" 115vac water resistant HAF fans.

Plant benches: Florian's Polyresin tops with rustproof 30" high aluminum frames with stainless steel hardware. Sizes as listed on bid documents.

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Irrigation: (5) zones of thru bench misting systems with timer solenoids, filters, regulators, and misting heads

Controller: (2) Florian's 4-stage temperature controllers. LCD Digital temperature thermostat with remote sensor & day/night setback mode. Simplifies heating and cooling stages for the greenhouse user. On-site training not required. Wiring & relays by E.C.

GREENHOUSE DESIGN COOLING STAGES: C1: ROOF VENT OPENS C2: MOTORIZED SIDE VENTS OPEN C3: COOLERS ACTIVATE

1.8 FABRICATION

- A. Fabricate in accordance with final Shop Drawings and component manufacturer's instructions.
- B. Separate dissimilar metals or alloys with heavy coating of bituminous coating or other suitable permanent separation as required to prevent galvanic action.

2.0 INSTALLATION:

- 1. Set all items in their correct locations as shown in the details level, square, plumb, at proper elevations and in alignment with other work in accordance with the manufacturer's installation instructions and approved shop drawings.
- 2. All joints between framing and the building structure shall be flashed and sealed in order to secure a water tight installation.
- 3. Fasten all frame materials in place using backing masonry plugs or anchor straps as required.
- 4. Mount accessories in place according to approved shop drawings. Electrical wiring, gas, flue, permits is not the responsibility of the greenhouse contractor.
- 5. When the erecting is substantially complete, it will be necessary for a representative of the contractor and owner to inspect the installed product & issue a letter of acceptance or a punch list which the installer can address at that time, and immediately thereafter obtain a letter of acceptance.

3.0 WARRANTY:

- 1. a. Anodized Finish – Lifetime or Minimum Forty-Year Limited – Please provide factory warranty information in the bid documents.
- 2. b. Baked-On Enamel Finish – Five (5) Year Limited Warranty Please provide factory warranty information in the bid documents.
- 3. Glass – Lifetime Limited Warranty - Please provide factory warranty information in the bid documents.

END SECTION 13135

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