

SECTION 13123 - GREENHOUSE SYSTEMS

PART 1 - GENERAL

1.01 GENERAL

A Furnish and install the greenhouse as hereinafter specified and shown on the drawings. Where the drawings and the specifications are in conflict the specifications shall govern. Dimensions shown are nominal and may vary according to manufacturers standards provided the area covered is not less than that shown. Ludy Greenhouse Mfg. Corp. standard clear span width is _____ (16'-0", 18'-9", 20'-6", 22'-0", 30'-0", 36'-0") center line to center line of post.

B General conditions that shall apply to this contract are the "General Conditions of the Contract for Construction" A.I.A. Document A201 current edition.

C The standard of quality for this particular greenhouse shall be Ludy Greenhouse Mfg. Corp. **Patriot Series II** rigid frame. If another make of greenhouse is substituted the substitute manufacturer shall apply for permission to quote 14 days prior to bid date and submit sufficient shop drawings to the owner (architect) for written approval prior to bid.

D The general contractor shall use as his base bid Ludy Greenhouse Manufacturing Corporation. If he desires to substitute another manufacturer, he shall so indicate and offer an alternate add or deduct for such substitution.

1.02 SCOPE

A This portion of the specifications does not cover the furnishing of the greenhouse concrete, grouting, masonry work of any description, plumbing, electrical (either power supply or control wiring), utility connections, flashing or counter-flashing. These items shall be the responsibility of the General Contractor or selected Sub-contractors rather than the Greenhouse Contractor.

1.03 PLANS AND SUBMITTALS

A A complete set of shop drawings including details shall be submitted by the greenhouse manufacturer for approval prior to fabrication. Submittals shall also include structural calculations and data on all equipment, glazing and doors

supplied by greenhouse manufacturer. Submittals shall meet structural requirements of applicable local or state building codes for building permits, except concrete and foundation design shall be by others. Plans and calculations shall be signed and sealed by a licensed engineer in the state of installation.

1.04 ERECTION OF GREENHOUSE

A The greenhouse shall be erected by the greenhouse manufacturer or by a qualified greenhouse specialty contractor approved in writing by the manufacturer. The greenhouse contractor shall have at least five years experience in building greenhouses of the type specified. The General Contractor shall have all site conditions correct and ready prior to greenhouse erection. No masonry, foundation, or footer installation shall be made prior to approval of greenhouse plans.

B **GROUTING:** After the greenhouse contractor has placed the wall glazing framing, the masonry contractor shall provide the necessary materials and labor to grout between the wall and the sill to eliminate any discrepancies between the two and produce a finished joint.

PART 2 - MATERIALS

2.01 STANDARD OF QUALITY

A All structures shall be designed to requirements of state/local building codes.

B Greenhouse structure(s) shall be designed in accordance with current AISI Specifications for Design of Cold - Formed Steel Structural Members and AISC Specifications for Structural Steel Buildings. Greenhouse structure(s) shall include sufficient bracing for the resistance to wind forces. Bottom chord members as well as other truss members shall be adequate to resist compressive loads produced by horizontal wind loads and roof uplift produced by wind.

2.02 MATERIALS AND COMPONENTS

A Structures shall be designed and detailed according to accepted engineering practice. Framing shall consist of trusses, hot dip galvanized after fabrication, on 12'-0" centers spanning the full width of the structure with a 6/12 roof pitch. No castings, either of aluminum or aluminum alloy, shall be permitted

for joining structural members at joints subject to stress in which tensile strength is a factor.

B Primary framing shall be 50,000 P.S.I. yield strength steel.

1 Trusses shall be of 2" square steel tube top chord with 1 1/2" square steel tube (or heavier) bottom chord and struts connected with welded plate connections and hot dip galvanized after fabrication. Trusses shall ship from factory assembled in no more than two pieces ready to attach at the post connection. All tolerances shall be held to an absolute minimum in order to secure proper fit of the steel members.

2 Truss support posts shall be 4" square steel tube (or heavier) furnished and placed at all truss bearing locations. Aluminum cast or aluminum alloy connectors are not acceptable.

3 Trusses shall be connected to the side wall post by a welded post top connector hot dip galvanized after fabrication.

4 Galvanized steel roof purlins, of size required, shall be prefabricated before shipment from greenhouse manufacturer.

5 Provide all other structural members required to complete the framework of the greenhouse that are not mentioned above such as; bracing, clips, lugs, girts, and fasteners.

C Secondary framing shall be extruded aluminum, members such as roof bars, ridge, sash, etc... Members shall be mill finish, with appropriate heat treatment of alloy 6063-T6 or 6063-T5. Sheet aluminum shall be of alloy 3003-h14.

2.03 FASTENERS

A All structural connections shall be attached with hot dip galvanized (ASTM-307 bolts) or stainless steel fasteners. All aluminum to aluminum connections shall have aluminum or stainless steel fasteners. All screws and self tapping screws shall be stainless steel or hot dip galvanized.

2.04 GUTTERS

A Gutters shall be 12 gauge steel fabricated for connection at the post tops, and also to accept roof and side wall glazing closures. Gutters shall be hot dip galvanized after fabrication. Outlet tube(s) shall be provided where indicated on the drawings.

2.05 EXPANSION AND CONDENSATION CONTROL

A All members shall handle expansion individually to prevent an accumulation of expansion in one direction from several members. Roof glazing bars shall incorporate condensation channels to conduct primary condensation to disposal points at gutter.

2.06 STANDARD ROOF GLAZING

(There can be any of following material listed below.)

A POLYETHYLENE - 6mil or 4 mil, single or double layers, captured by extruded aluminum clip and base system. Polyethylene sheets shall have UV protection.

B POLYCARBONATE 8mm, 10mm or 16mm, having UV protection, double or triple wall sheeting glazed into an extruded aluminum glazing system approved by the Polycarbonate manufacturer. Supplementary materials shall be compatible with Polycarbonate sheets. Expansion and contraction shall be provided for.

C POLYCARBONATE corrugated sheets - Supplementary materials shall be compatible with Polycarbonate sheets. Expansion and contraction shall be provided for. Polycarbonate sheets shall have UV protection.

2.07 GABLE OR SIDEWALL GLAZING

(There can be any combination of glazing or only one type listed below.)

A GLASS (Gable or sidewalls only) - All glass shall be 5/32 inch clear tempered. Sidewall will be 3' on center spacing and gable ends will be 2' on center. All cut lites to be annealed glass except lites around doors. All glazing compounds used for bedding of glass shall be extruded butyl compound with a continuous built in shim. The glass shall be sealed on the outside with gun grade butyl glazing compound throughout the length before applying extruded aluminum bar cap.

B ACRYLIC Double-skinned sheets (Gable or sidewalls only) - 8mm or 16mm Exolite No-Drip[®] or equivalent. Material shall be glazed into an extruded aluminum gasketed system approved by the acrylic manufacturer and designed to provide for expansion and contraction.

C POLYETHYLENE - 6mil or 4 mil, single or double layers, captured by extruded aluminum clip and base system. Polyethylene sheets shall have UV protection.

D POLYCARBONATE 8mm, 10mm or 16mm, having UV protection, double or triple wall sheeting glazed into an extruded aluminum glazing system approved by the Polycarbonate manufacturer. Supplementary materials shall be compatible with Polycarbonate sheets. Expansion and contraction shall be provided for.

E POLYCARBONATE corrugated sheets - Supplementary materials shall be compatible with Polycarbonate sheets. Expansion and contraction shall be provided for. Polycarbonate sheets shall have UV protection.

2.08 VENTS COMPONENTS

(There can be any combination of vents or only one type listed below.)

A SIDE VENTS: Single run of vent shall be made up of a top rail, bottom rail and mullions of extruded aluminum and bolted together in accordance with manufacturers instructions. All vents shall have provisions made at the hinge point to prevent creeping of the vents. Vents shall be the size indicated on the drawings with a continuous socket hinge, arranged to open out. Vents for any given compartments, when assembled and installed, shall be continuous from one end to the other.

B GABLE VENTS: Single run of vent shall be made up of a top rail, bottom rail and mullions of extruded aluminum and bolted together in accordance with manufacturers instructions. All vents shall have provisions made at the hinge point to prevent creeping of the vents. Vents shall be the size indicated on the drawings with a continuous socket hinge, arranged to open out. Vents for any given compartments, when assembled and installed, shall be continuous from one end to the other.

C ROOF VENTS: Single run of vent shall be made up of a top rail, bottom rail, of extruded aluminum and mullions bolted together in accordance with manufacturers instructions. All vents shall have provisions made at the hinge point to prevent creeping of the vents. Vents shall be the size indicated on the drawings with a socket hinge, arranged to open out. Vents for any given compartments, when assembled and installed, shall be continuous from one end to the other.

2.09 VENT OPERATORS

(There can be any combination of operators or only one type listed below.)

A RACK AND PINION ARMS: All vents shall be operated with rack and pinion system consisting of aluminum rack arm, aluminum housing and zinc pinion gear assemblies. Racks are attached to bottom rail of vents with aluminum clips and zinc plated steel cotter pins. No less than two sets of rack and pinion arms shall be provided for each 12' section on vent. Provide 1.66" diameter galvanized drive shaft with 6 bolt connection couplings. Shaft hangers with nylatron bushings shall be provided to support roof and side/gable vent drive shaft.

B ELBOW ARM: All vents shall be operated with elbow arm system consisting of aluminum arm and aluminum rod assemblies. Arm assemblies are attached to bottom rail of vents with aluminum clips and zinc plated steel cotter pins. No less than two sets of rack and pinion arms shall be provided for each 12' section on vent. Provide 1.66" diameter galvanized drive shaft with 6 bolt connection couplings. Shaft hangers with nylatron bushings shall be provided to support roof and side/gable vent drive shaft.

2.10 AUTOMATIC OR MANUAL MACHINES

(There can be any combination of machines or only one type listed below.)

A Ventilators as indicated on drawings shall be operated by:

1 Manufacturer shall provide a manual machine with a hand crank or chain pull for each vent.

2 Manufacturer shall provide an automatic machine. The power unit shall be provided with a quick reversing single phase motor with sufficient power to operate the sash as required, complete with open and close limit switches.

2.11 MECHANICAL

(Please contact your Ludy sales representative to help design the mechanical section of the greenhouse, such as heating, ventilation, cooling, shade systems, environmental controls etc...)

2.12 DOORS

(Please contact your Ludy sales representative to help design the door section of the greenhouse.)

2.13 BENCHES

A Bench specifications are of the Ludy Bench, manufactured by Ludy Greenhouse Mfg. Corp.. Standard width of benches is as follows:

1	Rolling	Stationary
	-----	3'-0"
	-----	3'-6"
	-----	4'-0"
	5'-0"	5'-0"
	5'-6"	5'-6"
	6'-0"	6'-0"

Rolling or stationary benches of the size and quantity shown on the drawings shall be provided. Support system shall be 1.5" square 16ga. galvanized steel tubing spaced at 6'-0" intervals. Bench tops shall include 1" square 18ga. galvanized steel tubing crosspieces spaced at 2'-0" on center, extruded aluminum side and end rails with 2 1/2" or 5" high side rails. Tops shall be covered with open mesh 3/4" - #13 hot dip galvanized expanded metal. Two runs of 1.315" O.D. 14ga. galvanized steel tubing shall be provided to support bench tops above the support system. Extruded aluminum fittings with aluminum bolts and stainless steel screws shall be used to assemble the benches. Bench height shall be 2'-6" from finished floor to expanded metal.

B For freestanding: two runs of 1.5" square 16ga. galvanized steel tubing shall be installed 10" above the finished floor to stabilize the support system. Elevator bolts shall be used to level benches.

PART 3 - EXECUTION

3.01 FLASHING

A All flashing and counter-flashing shall be furnished and placed by the Sheet Metal Contractor. All flashing and counter-flashing shall be either aluminum or lead coated copper.

3.02 INSTRUCTION

A Instruct owner on use of greenhouse and systems. Provide operation and maintenance manuals to owner.

3.03 WARRANTIES

A The greenhouse structure(s) shall be free from all defects in materials and workmanship for one year from construction completion. All coverings will carry the respective manufacturer's warranties.

END OF SECTION 13123