

2020

POLY HOUSE/ GREEN HOUSE



Phans4 Consulting Pvt. Ltd.

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EVERYTHING ABOUT POLY HOUSE / GREEN HOUSE

EVERYTHING ABOUT POLY-HOUSE/ GREEN-HOUSE

Poly-house is a framed structure made of GI pipes/ MS angle with protective shade made up of polythene used for growing high value Agricultural Products.

- It is semi-circular, square or elongated in shape.
- Temperature, Humidity, Ventilation of air are controlled by the equipment's fixed in the poly-house.
- Poly-houses are used in Floriculture, Vegetables and Nurseries.

ADVANTAGES OF POLY-HOUSE/ GREEN-HOUSE

- The yield may go up to 10-12 times higher than that of outdoor cultivation.
- Reliability of crop increases under greenhouse cultivation.
- Ideally suited for Vegetables and Flower crops.
- Year-round production of floricultural crops and off-season production of Vegetable and Fruit crops.
- Disease-free and genetically superior transplants can be produced continuously.
- Water requirement of crops very limited and easy to control.
- Hardening of tissue cultured plants.
- Production of quality produce free of blemishes.
- Modern techniques of Hydroponic (Soil less culture), Aeroponics and Nutrient Film techniques are possible only under greenhouse cultivation.

POINTS TO BE CONSIDERED WHILE CONSTRUCTING GREENHOUSE

East and South sun is excellent for the greenhouse, which can remain open on both these sides, but it should be shaded on the north and the west to protect from winds.

Construction: A plan should be prepared before constructing the green house together with plan of beds and paths on the ground.

- Selection of plastic film structure and roof slope.
- Use of proper controlled climatic condition.
- Area and Green house structure.
- Plant protection measures.

TYPES OF GREENHOUSES

- Tunnel type (cold climate green house)
- Quonset (semi-circular/ subtropical green house)
- Gable type (sloping roof)
- Tropical region green house
- Ridges and furrows green house
- Ground to ground green house

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COMPONENTS OF GREEN HOUSE

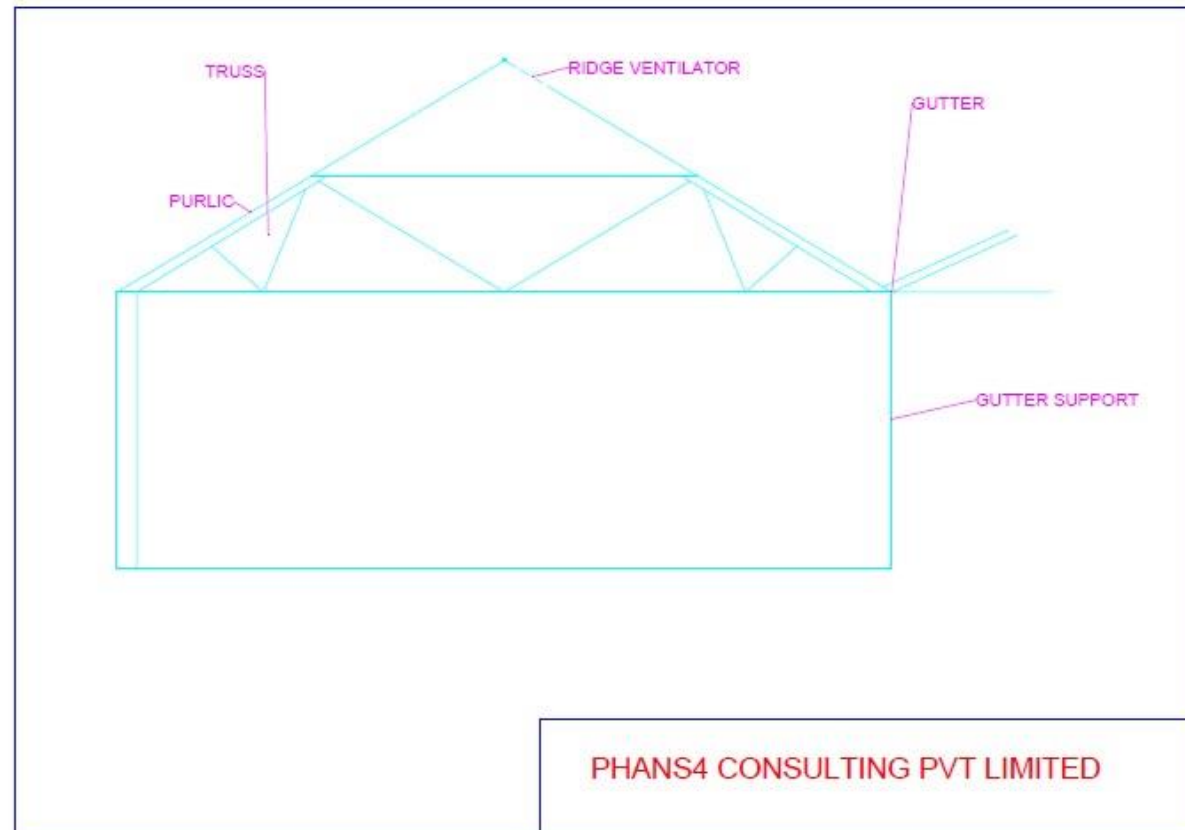
1. **Roof:** transparent cover of a green house
2. **Gable:** transparent wall of a green house
3. **Cladding material:** transparent material mounted on the walls and roof of a green house
4. **Rigid cladding material:** cladding material with such a degree of rigidity that any deformation of the structure may result in damage to it. Ex. Glass.
5. **Flexible cladding material:** cladding material with such a degree of rigidity that any deformation of the structure will not result in damage to it. Ex. Plastic.
6. **Gutter:** Collects and drains rain water and snow which is place at an elevated level between two spans.
7. **Column:** Vertical structure member carrying the green house structure
8. **Purlin:** A member who connects cladding supporting bars to the column
9. **Ridge:** Highest horizontal section in top of the roof
10. **Girder:** Horizontal structure member, connecting columns on gutter height
11. **Bracings:** To support the structure against wind.
12. **Arches:** Member supporting covering materials
13. **Foundation Pipe:** Connection between the structure and ground
14. **Span Width:** Centre to centre distance of the gutters in multi span houses
15. **Green House Length:** Dimension of the green house in the direction of gable
16. **Green House Width:** Dimension of the green house in the direction of the gutter.

DESIGN CONSIDERATION OF POLY-HOUSE

1. **Site selection**
2. **Orientation**
3. **Size**
4. **Cost**
5. **Height**

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POLYHOUSE COMPONENTS



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TECHNICAL STANDARDS OF NATURALLY VENTILATED POLYHOUSE/GREENHOUSE

ITEM	GENERAL SPECIFICATIONS
Type	1. Minimum top ventilation should be 10% of total Polyhouse/Greenhouse 2. Preferably Saw tooth design or Even Span, Ridge& Furrow depending upon suitability for naturally ventilated Polyhouse/greenhouse
Size	Area= As per the requirement. Length=Multiples of 8 Meter + 4 Meter. (Length is side along the gable or side along the truss lines) Width= Multiplies of 4 Meter. (Width is side along the gutter or side along the Purlin lines).
Grid	8M X 4M. 2 Meter corridors/balcony along all four sides. If the area is less than or equal to 250 Sq.m then it is better to go for single span green house.
Shape	Green house will be Aero Dynamic along all four sides with curvature shaped balcony pipes of 48mm OD/ 2 mm thick GI pipes.
Structure	Hot Dip Galvanized Tubular Structure.
Stability of Structure	Structure should withstand to minimum wind velocity of 80.6 miles per hr or 130 km/hr or 36 m/s. In case of high wind velocity zones, structure should withstand wind velocity upto 94 miles per hr or 150 km/hr or 42 m/s.
Foundations	Pit size should be min.450mm Dia. Depth 750 to 900mm Length of insert 1200 to 1300 mm & filling the pit with 1:2:4 concrete hand mixed with appropriate Grade cement.
Polythene	IS 15827:2009 Thickness of polythene should be minimum 200 micron (0.2mm). Polythene quantity accommodate maximum 5.4 Sq.m area in 1 Kg wt.

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SIZE OF THE STRUCTURAL MEMBERS

Members Name	Outside Diameter (mm)	Thickness (mm)
Columns	76	2
Top Purlins	48	2
Gutter Purlins	42	2
Top Arches of the truss	42	2
Bottom Chord of the truss	60	2
Internal Bracings of the truss	33	2
Corridors/Balconies	60	2
Curtain Runner	42	2
Flap control pipe	21	2
Curtain Shaft	27	2
Cross Bracing	33	2

Note: Welded pipes should not be used for structure erection except bottom pipe of 8m length.

OPTIONS IN GREEN HOUSE FILM

1. Compulsory Properties:

- UV Stabilization
- Diffusion/Clear (Light Transmission)

2. Optional Properties:

- UV Blocking/ Antivirus
- Sulphur Resistant
- Thermic
- Anti-Drip
- Anti-Mist
- Anti-Dust

3. Manufacturing Process:

- Three Layer/ Five Layer

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2. FAN AND PAD CONTROLLED POLU-HOUSES

Selection of Fan:

- The fans should deliver the required air at 15mm static pressure.
- The maximum centre to centre spacing between the two fans should be of 7.5m.
- The fan blades and frame are to be made of non-corrosive materials like Al/SS.

Design:

- The cross fluted cellulose pad is preferred.
- These are available mostly in 100m thickness.
- One meter of pad height is given for every 20m of pad to fan distance.
- Fan to pad distance should not exceed 60m.
- The air flow rate should be of 75 cubic meter/minute/Sq.m of pad.
- The water flow rate should be of 9 liters/minute/linear meter pad.
- The uniform distribution of water on pad is to be maintained.

TECHNICAL STANDARDS OF FAN AND PAD COOLING SYSTEM GREEN HOUSE:

With Fan Pad/ Fogging System

_ITEM	DEPARTMENTAL DESCRIPTION
Size	Area= As per the requirement. Length= Multiples of 8 Meter + 4 Meter. (Length is side along the gable or side along the truss lines) Width= Multiples of 4 Meter. (Width is side along the gutter or side along the Purlin lines).
Shape	1. Green house will be Aero Dynamic along all four sides with curvature shaped balcony pipes of 48mm OD/ 2 mm thick GI pipes. 2. Gutter Orientation: North South and may change according to wind direction. 3. PAD should be in wind direction and must have covered elevated balcony for shade.
Structure	Hot Dip Galvanized Tubular Structure.
Stability of Structure	Structure should withstand to minimum wind velocity of 80.6 miles per hr or 130 km/hr or 36 m/s. In case of high wind velocity zones, structure should withstand wind velocity upto 94 miles per hr or 150 km/hr or 42 m/s.
Foundations	Pit size should be min.450mm Dia. Depth 750 to 900mm Length of insert 1200 to 1300 mm & filling the pit with 1:2:4 concrete hand mixed with appropriate Grade cement.
Polythene	IS 15827:2009 Thickness of polythene should be minimum 200 micron (0.2mm). Polythene quantity accommodate maximum 5.4 Sq.m area in 1 Kg wt.

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ITEM	DEPARTMENTAL DESCRIPTION
Grid Size	1. 8m X 4m (Ideal Size) 2. Size can be less depending upon space availability but not more 8m X 4m.
Balcony and Corridor	2m wide, Vertical/curved pipe-60mm OD/2mm thick Gi pipe with 32mm OD/1.8mm thick horizontal GI pipe as supporting pipe.
Gutter Height & Slope	1. 4m to 4.5m 2. 1 to 1.5% to be provided in civil structural work.
Ridge Height/Centre Height	Minimum 5 to 6.5 meter
Fasteners	Cold Galvanized well compatible M6 toM10 bolts& Nuts, 50 to 150 mm long with plain washers as per requirement.
Thermal Net	<ul style="list-style-type: none"> ➤ 30 to 50%, Aluminate/Thermal net as per requirement ➤ Minimum 100 GSM ➤ Power operated crank mechanism should be provided for expanding and retracting the shade net.
Civil works	<ul style="list-style-type: none"> - Wall on fan side will be 35 mm thick and 80 cm high and - Wall on pad side will be 23 cm thick & 100 cm high from ground level in cm 1:6 with required foundation. - All the walls will be plastered in cm 1:4 on top and sides. - 80cm to 1m wide and 10 cm thick footpaths made of cement concrete ratio of 1:2:4 should .be provided as per the requirements.
Electrical Fittings	Conduit and wiring as required for connecting light, fan. motor and pumping to main electrical supplies.
Climate Control System	
Fan-Pad System	<ul style="list-style-type: none"> • Numbers of Fan depends upon size of Fan-pad house arid it should be capable of exhausting air volume in one minute. • Exhaust Fans- 50" however it depends upon size of fan-pad house with louvers, 1.5 HP -3 phase ISI standard electric motor. • Cellulose cooling pads of 1.8-meter height with 100mm /150 mm thickness covering the area properly, PVC water distribution system, screen/disc filter, valve and pumps etc. • Control panel with manual operation, temp. and humidity Sensor. • The necessary digital controller with sensory device & accessories of standard quality as per requirement should be provided to operate the fan & pad system for controlling temperature & humidity inside the Greenhouse.
Fogging System	In consist of four-way anti-leak fogger 28 lph flow and particle size 80-100-micron, 16 mm lateral class-3, PVC pipe 6kg/cm ² , valves, filter, pump, panel with volt meter, MCB, relay, temp arid humidity sensor etc. complete application rate 3 mm/hr.

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3. Manufacturing Process:

- Three Layer/ Five Layer

3. SHADE/ NET HOUSE

Specification for Shade House:

ITEM	SPECIFICATION
Size	According to requirement
Shape	As per design
Stability of Structure	Structure may be design to withstand wind velocity up to 104 km/hr. 120 km/hr in high wind velocity zone
Foundation	2mm thickness GI Pipes compatible with columns, Length 1.2m.
Main Column	Size 60 OD, Thickness 2mm, Wt. per Length 2.85 kg, length 4m.
Purlins	Purlin GI pipes- size 42/43 OD thickness 2mm length 4m. Purlin members-33/32mm OD thickness 2mm.
Corner	Size 48 OD, Thickness 2mm, length o.15
Nut Bolts	Size 3/8"
Grid Size	4X4, 8X4, 4X6 (m)
Gable length	4m
Center Height	Flat Structure- 4 m
Shade Net	UV stabilized, ranging from 30% to maximum 75% GSM shade depending upon the crop, made up of ISI.
Civil Work	Cement concrete 1:2:4 block of size 40cmX40cmX90cm for embedding vertical poll/pipe of shade net.
Overall Slope	1 to 1.5%

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