



**ADRITEC**  
YOUR WAY

# 5 GREENHOUSES & HYDROPONICS





## Greenhouses & Hydroponics

Green houses are used for vegetable cultivation and protected crops produced in off seasons. In addition, green houses are used as nurseries for different types of vegetables, trees, pot flowers.

Temperature, humidity, and lighting are well controlled in green houses whether manually or automatically. In addition to irrigation and the fertilization processes, greenhouses are designed to withstand different weather conditions and are manufactured as per international standards. Depending on the crop, the budget, or the location, greenhouses are offered in a wide range of models and specifications.

The single tunnel or multi tunnel greenhouses, whether with natural ventilation, or with a cooling and heating system, or the hydroponic system, and the shade net covered areas, all make up a major part of the new agricultural systems which enhance and increase productivity under very controlled conditions.

***“Higher Yeild ... Better Quality ”***

# GREENHOUSES & HYDROPONICS

# 5

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# Greenhouses & Hydroponics

## Greenhouses

# 5

5a1- Single Tunnel Greenhouse

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5a2- Multi-tunnel Greenhouse

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5a3- Net Shading



Greenhouse Tunnels are designed to withstand a wide scope of weather conditions such as wind, snow and high temperatures. The body is made of galvanized steel pipes as per international standards Z275. The width of a greenhouse tunnel ranges from 4.5m, 8.0m or 9.0 meters and does not exceed 61.5m in length, with a maximum 3.2 meters height. All metallic profiles and tubing are galvanized with 275 gr/m<sup>2</sup> zinc coating protection G90 through a continuous procedure to meet the quality requirements according to Sendizmir procedure. The pillars and doors are hot dipped galvanized. Available in a wide variety of heights and widths.

Single Tunnel Greenhouses		Model Code		
	Dimensions	5A1TUNNT0450	5A1TUNNT0800	5A1TUNNT0900
Length	mt.	40.0	61.5	56.5
Width		4.5	8.0	9.0
Height	mt.	2.5	3.0	3.2
Total Area	mt.2	180.0	492.0	508.5
Arches	No.	21	26	24
Arch Distance	mt.	2.0	2.5	2.5
Arches	Dia	32.0	60.0	60.0
	T	1.5	1.5	1.5
Purlins	Dia	32.0	32.0	32.0
	T	1.5	1.5	1.5
Wind Breakers	No.	4	6	6
	Dia	32.0	32.0	32.0
	T	1.5	1.5	1.5
Crop Support	Space	2.0	2.5	2.5
	Dia	27.0	27.0	32.0
	T	1.5	1.5	1.5
Entrance Doors	No.	2	4.0	4.0
	Dia	32.0	32.0	32.0
	T	1.5	1.5	1.5
Cover	Material	PE	PE	PE
	T Micron	200	200	200

\* Plastic cover has UV stabilization 3-7% depending on service life required

\* Arches and posts are connected with triangle type galvanized steel connectors

Single Tunnel Greenhouses with Cooling System		Model Code
	Dimensions	5A1MSSSTC900
Bays	No.	1.0
Length / Bay	mt.	39.0
Width / bay		9.0
Height	mt.	4.0
Total Area	mt.2	351.0
Upper Arches	Dia	60
	T	1.5
Side Post Dist.	mt.	2.5
Side Post	Dia	60.0
	T	2.0
Purlins	Dia	32.0
	T	1.5
	Space	2.5
Crop Support	Dia	32.0
	T	1.5
	No.	1
Entrance Sliding Doors	Width / m	2.0
	Height / m	2.0
Cover	Upper	PE or as required
	Sides	Fiberglass or Poly carbonate
Cooling Fan	No.	2.0
Carton Cooling Cells	Height / m	2.0
	Width / m	0.6
	Thick. / m	1.5

Multi span greenhouses is a group of tunnels interconnected to form a large undercover area where a typical bay length is 39 meters duplicated into several bays. A standard model has an area of 702 m<sup>2</sup> with the ability to be expanded by adding more bays. The body is made out of galvanized steel pipes as per international standards Z275. The height of the bay ranges from 4.0 to 4.2 meters. There are 2 to 3 doors per unit depending on the work requirements. Multi -span greenhouses come with different ventilation / cooling openings either in the roof, or a half moon opening at the front and back, or at the sides. It is also offered with a complete heating or cooling system. The climate can be controlled with a specially designed software in case of automatic climate control systems.



Multi Span Greenhouses		Model Code
	Size	5A2MSPMS0800
Bays	No.	As Req.
Length / Bay	mt.	40.0
Width / Bay		8.0
Height	mt.	4.5
Total Area	mt.2	320.0
Upper Arches	Dia	60
	T	1.5
Side Post Distance	mt.	2.0
Side Post Pipes	Dia	60.0
	T	2.0
Interior Post Distance	mt.	4.0
Interior Post	Dia	60.0
	T	2.0
Purlins	Dia	32.0
	T	1.5
Crop Support	Space	4.0
	Dia	32.0
	T	1.5
Entrance Sliding Doors	No.	1
	Width / m	2.8
	Height / m	2.0
Cover	Upper	PE
	Sides	Fiberglass or Poly Carbonate

Multi Span Greenhouses with Cooling System		Model Code	
	Size	5A2MSTSC0900	5A2MSMSC0800
Bays	No.	2.0	As Required
Length / Bay	mt.	39.0	39.0
Width / bay	mt.	9.0	9.0
Height	mt.	4.0	4.2
Total Area	mt.2	702.0	-
Upper Arches	Dia	60	60
	T	2.0	1.5
Side Post Distance	mt.	2.5	3.0
Side Post Pipes	Dia	60.0	60.0
	T	2.0	2.0
Interior Post Distance	mt.	4.0	4.0
Interior Post	Dia	60.0	60.0
	T	2.0	2.0
	Dia	32.0	32.0
Purlins	T	1.5	1.5
	Space	2.5	3.0
Crop Support	Dia	32.0	32.0
	T mm	1.5	1.5
	No.	1	1
Entrance Sliding Doors	Width / m	2.0	2.0
	Height / m	2.0	2.0
	Upper	PE or as required	PE or as required
Cover	Sides	Fiberglass or Poly Carbonate	Fiberglass or Poly Carbonate
	No.	1 - 2	1 / Bay
Carton Cooling Cells	Height / m	2.0	2.0
	Width / m	0.6	0.6
	Thick. / m	1.5	1.5



Shading nets are constructed to protect crops like citrus groves and banana plantations from severe weather changes mainly high winds, rain, or scorching heat. A network of galvanized tubes are mounted in different structures depending on the area of the farm, the type of crop, height required, and shading intensity. White plastic mesh with 50% shading is used to cover the farm or other types of shading covers depending on the crop and the prevailing weather conditions in the location of the farm. Construction of a shading net structure ensures a uniform growth of the fruit, a higher yield, and it helps protect the plantations from birds and insects. Pillars made of 2.5 inch galvanized pipes are fixed around the farm with spacing ranging from 3 to 6 meters depending on required design of the shade with 5 meters height while the internal pipes are with 6 - 8 meters height. Pipes are reticulated at top with 4 mm galvanized wires in such way to carry the net. The same type of net specifications is also installed on the sides.



Shading Net areas are specifically designed to suit a projects actual requirements, taking into consideration the location, crop type, weather conditions, and the purpose for which it is constructed. A wide range of designs are available with different specifications of the type of shading net that should be used.

Greenhouses & Hydroponics  
Hydroponics

5b

5b1- Hydroponics



Hydroponics is a new agricultural production system in which the production takes place in soil less mediums using either an artificial soil medium or water channels. Nutrients and fertilizers are supplied to the crop through drip irrigation in the soil medium system or through the water in the channel system. It is an efficient alternative to soil based agricultural production. It offers un-surpassed opportunities for environmental control resulting in a high production levels of small defined areas, a very high quality of product, an extremely efficient use of water, no waste of nutrient solutions, and adoption of biologically-based integrated pest management. Hydroponics is the production of crops in isolation from the soil, either with or without a medium (NFT or Substrate), with their total water and nutrient requirements supplied by the system. Production takes place either in a greenhouse or outdoors and systems can recirculate or allow nutrients to 'run-to-waste'. A wide variety of crops including 'fancy' types of lettuce, cut flowers such as roses, gerberas, carnations and lisianthus, and other crops such as tomatoes, capsicum, eggplant, strawberry and cucumbers are all grown under hydroponics.

### Advantages of hydroponic production

- \* No soil
- \* Control over nutrient, water pH, climate conditions
- \* Higher yield
- \* Pest & disease control and elimination of weed
- \* Best suited for crops requiring closed controlled environment
- \* Less land utilization and water requirements
- \* Higher product price
- \* An answer to urban encroachment on productive agricultural land
- \* Potentially lower labour costs
- \* Critical mass of production



**Hydroponics is a comprehensive greenhouse control system, optimized for the control of highly dynamic horticultural environments and specialized equipment control strategies employed to enhance plant growth processes. This includes:**

- \* Assimilation and photoperiodic lighting
- \* Complex irrigation and nutrient control
- \* Mist, fog, pad & fan evaporative cooling
- \* Precision humidity management
- \* Shade and thermal curtain systems
- \* CO2 measurement
- \* Daily or multi-day climate settings
- \* Heat storage
- \* Range of other crop specific control requirements



### Fully Controlled System:

A complete software package adapted for research and production control which includes many modules which give:-

- \* Event recording for logging equipment cycles, motor starts etc.
- \* Comprehensive programmable alarms and alarm display.
- \* The system differentiates between critical and non-critical alarms. It monitors outside and inside climate and equipment conditions with visual, audible, and signal output capabilities.
- \* Graphic display of all logged data in selectable parameter combinations. Data should be displayable in daily, weekly, monthly, or yearly graphic and tabular intervals.
- \* Long-term archival data storage
- \* Data export capability for all recorded data files to Microsoft Excel.
- \* User-programmable menus and graphical display options
- \* Comprehensive display on a control group basis of measured environmental conditions, set points, control parameters, and outputs.
- \* User-configurable display of current measured environmental conditions, set points, and control parameters.
- \* On-screen help files for all functions available at all times.
- \* A programmable start-up sequence to permit sequential starting of each piece of greenhouse equipment. The sequence will be initiated at each power up and after a power failure.
- \* A weather station to monitor global radiation, air temperature, rain detection, wind speed, and wind direction.
- \* Reference to absolute or relative time values i.e. before/after solar dawn/dusk vs. absolute time of day.
- \* Up to four diurnal (happening during the day as opposed to at night) climate temperature/humidity set point periods.



Greenhouses & Hydroponics  
Temperature Control  
Systems

5c

5c1- Temperature Control Systems

The heating and cooling process in any greenhouse is critical to reach optimum growing conditions. The cooling systems consist of two fans for each unit mounted on the front side of the unit. Carton cells are mounted on the opposite side of the fans connected with water streams and a water pump for cooling of the air going into the greenhouse. Light oil burners are mostly used as a heating system allowing continuous heating of the greenhouse. The single tunnel greenhouse requires one heating unit with a fan which distributes the hot air through a perforated plastic tube installed in its roof. For the Multi-span greenhouses, a complete different design is required depending on its area, crop, and prevailing weather conditions.

### Cooling System

Each single tunnel green house requires a cooling fan measuring 1.4 x 1.4 x 0.40 meters and a power requirement of 43,000 cubic meters suction per hour normally fixed at the front of greenhouse. Carton cells with 2 meters height are mounted on the front of the opposite side of the greenhouse. Dimensions of each carton 2H x 0.6W and 0.1 meter depth. Water pipes are installed and connected to pump for water circulation to the carton cells. This system is replicated in the multi-span green houses depending on the total area of the greenhouse.



### Heating System

Heating units come in different capacities depending on the area to be heated. It consists of a burner, light oil or gas version, and gives 130,000 kcal/hr for a single tunnel connected to a fan blower which distributes the hot air inside the greenhouse through special perforated plastic ducting pipes to cover the whole area. It comes with a mechanical thermostat, working by liquid dilatation, a stainless steel chimney kit in galvanized steel, and a round warm air outlet preset for the installation of the polyethylene duct.

