

Aqua-Trough™

Growing and Irrigation System



- Expands growing space in existing greenhouses without adding benches.
- Increases growing area more than 1 sq. ft. for each linear foot.
- Operates as a subirrigation system, providing uniform application of water or nutrient solutions. U-shaped channel in trough bottom drains excess water from pots.
- Can be used to recirculate irrigation water and nutrient solutions, reducing water and fertilizer waste.
- Engineered to support reasonable weights of potted plants and irrigation water.
- Can be used with or without attachment to the irrigation system.
- Accepts most 4, 5 and 6 inch standard pots.
- Over 600,000 linear feet are in use in Europe today.
- Available in 18 foot standard lengths.

Aqua-Trough is a trademark of Phytotronics, Inc.



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The Aqua-Trough™ System

The **Aqua-Trough™** system provides greenhouse growers with a means of expanding the growing area of their greenhouses without adding new benches. **Aqua-Trough™** channels are made of a heavy gauge PVC and are suspended from greenhouse purlins or trusses. Their design employs a sub-irrigation mode of watering and feeding. Water flows into the **Aqua-Trough™** channels under pressure and subsides or drains automatically when the water supply is cut off. The long, narrow profile of **Aqua-Trough™** casts a minimal shadow and will not adversely affect the growth of plants on benches below.

A System to Maximize Existing Growing Area

Each linear foot of **Aqua-Trough™** is approximately equal to one square foot of bench area, but actually adds only 1/3 of a square foot. Six runs of **Aqua-Trough™** 90 feet long, effectively adds 540 square feet of growing space. In a 30' x 96' greenhouse, this is an increase of almost 20% in additional growing space.

Suspension of Aqua-Trough™

Aqua-Trough™ is suspended by a PVC coated, multi-strand steel wire placed over a purlin or truss. The wire is threaded into a simple bracket adjusting plate that permits the small adjustments necessary to level a run of **Aqua-Trough™**. The adjusting plate is attached to a rigid steel wire hanger which fits snugly under the outward folded edges of the trough (Figure 1).

The amount of weight that **Aqua-Trough™** will support has been carefully worked out. The weight supported per foot of trough determines the distance between suspension points (see Table 1). Steel reinforcing bands that run under the rims of the trough are available and permit heavier loads with a wider hanger spacing.

The alternate suspension method shown here (Figure 2) nearly doubles the distance between primary suspension points. If normal hanger spacing is 5 feet according to Table 1, it could be extended to 7-10 feet with the mid-point attachment. This arrangement requires an additional hanger.

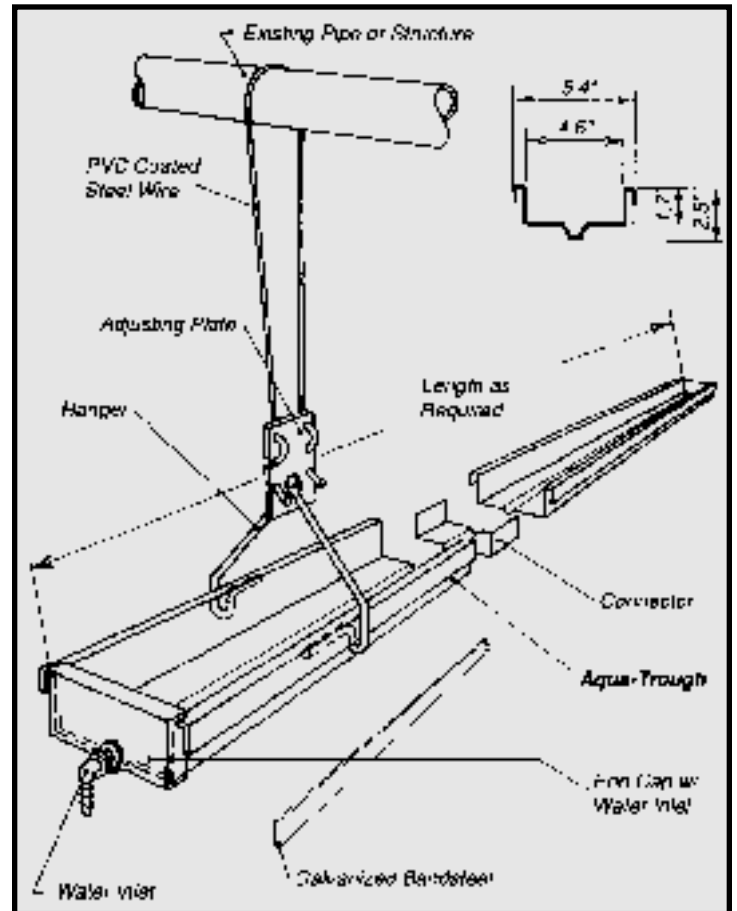


Figure 1 – Overall detail of **Aqua-Trough™** construction and suspension. Adjustable Hanger Assembly comes complete with coated wire, adjusting plate and hanger.

Without Bandsteel Reinforcement		With Bandsteel Reinforcement	
Wt./foot, lbs.	Hanger Spacing, ft.	Wt./foot, lbs.	Hanger Spacing, ft.
6.5	4.0	6.5	5.0
6.0	4.25	6.0	5.5
5.5	4.5	5.0	6.0
5.0	4.75	4.5	6.5
4.0	5.0	4.0	7.0

Figure 2 – “Suspension bridge” method for mid-trough support.

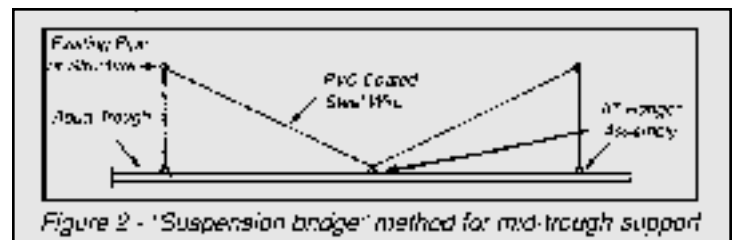


Figure 2 - “Suspension bridge” method for mid-trough support

Aqua-Trough™ Applications

There are several variations in the use of **Aqua-Trough™**, but only 2 basic approaches to its operation. The first is an automatic system (Figure 3a) which is operated by an electric timer and solenoid valve. Most European installations are operated automatically. The second application is a manual operation, under the supervision of the grower, (Figure 3b). Both approaches use the water supply method designed for the system. Troughs can be used without the water supply system by filling them with a hose or from an existing drip tube system, and drained manually as illustrated in figures 7 and 8. **Aqua-Trough™** channels may also be placed on benches or other support systems and used as an ebb and flow system. Special wire cradles are available for surface-mounting **Aqua-Trough™** sections. All runs of **Aqua-Trough™** in the same system should be level and suspended at the same height and all supply tubes cut to the same length (Figures 3a & 3b). Supply tubes, inserted into the supply header (Figures 4 & 5) deliver water to the troughs. A 3/4" supply header will serve 6 to 8 runs of trough 90 feet long. A 1" supply header will serve 15 trough the same length. Maximum water pressure to the system is 45 psi. A 10-foot section of **Aqua-Trough™** holds 2.34 gallons of water 1 inch deep and 3.5 gallons 1-1/2" deep.

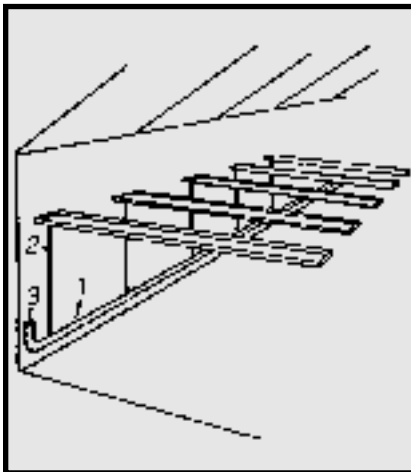
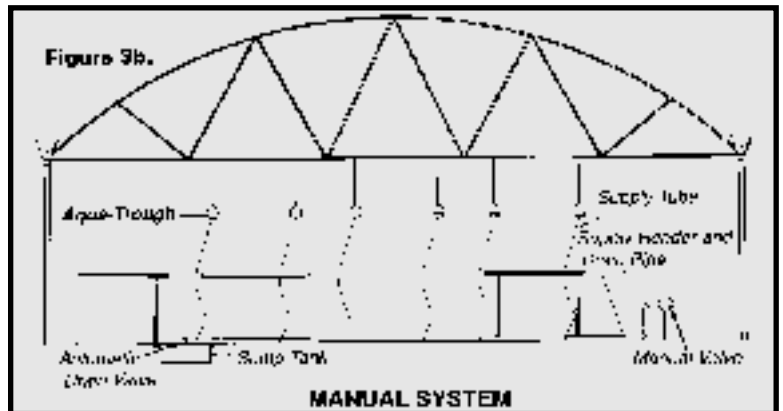
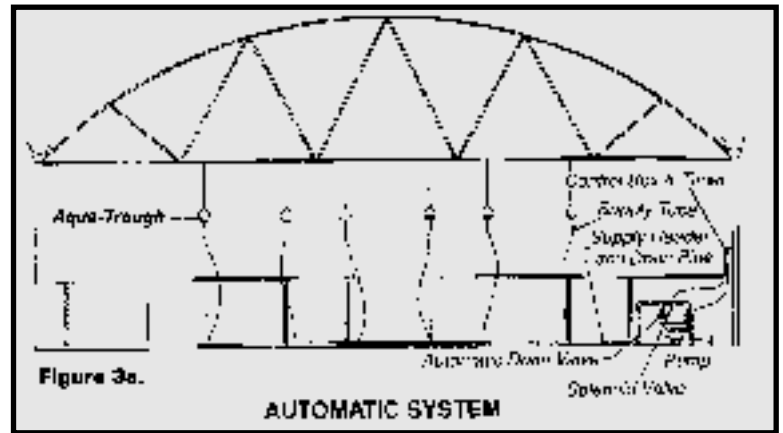


Figure 4 – Generalized perspective of greenhouse installation of **Aqua-Trough™** showing spatial relationship of troughs, supply tubes (2) and water supply header (1). Water enters the system at (3).

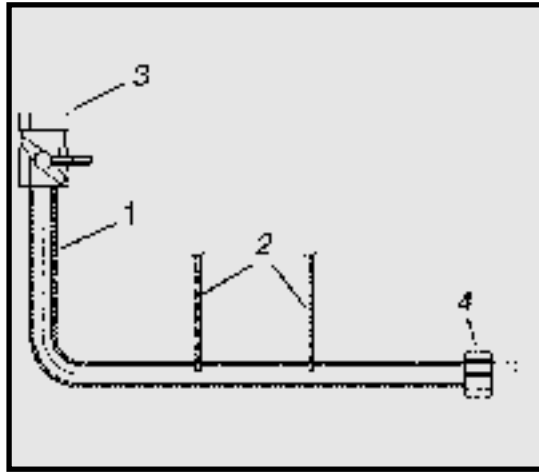


Figure 5 – Detail of water delivery system. Water enters through system at valve (3) and passes into supply header (1). Water to **Aqua-Trough™** channels passes through supply tubes (2). When valve (3) is closed, excess water drains from troughs as automatic drain valve (4) opens.

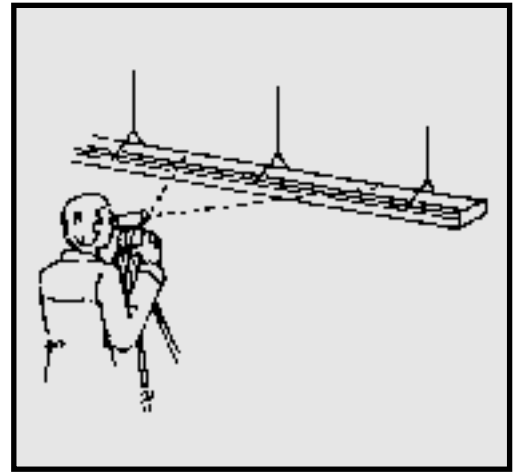


Figure 6 – For best performance, **Aqua-Trough™** channels should be suspended in a level position.

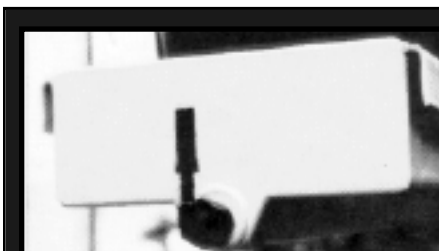


Figure 7 – To Hold Water

Figures 7 and 8 show the manual method of using **Aqua-Trough™**. Water inlet fitting is turned up (Figure 7) and trough is filled to desired level with a hose or existing drip line. When plants have absorbed sufficient water, the inlet fitting is turned down (Figure 8) to drain excess water.



Figure 8 – To Drain

Aqua-Trough™

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Aqua-Trough™



End Caps Plain & With Watering Inlet



Connector



PVC Silicone

AQUA-TROUGH™ COMPONENTS

- AT 18** AQUA-TROUGH™-PVC CHANNEL, 18' standard length. Inside dimensions: 4.6" wide, 1.7" deep; weight, 8.5 lbs/18'. 6' lengths are available for UPS shipments; allow for additional connectors, cement, etc.
- ATEP** AT ENDCAPS, PLAIN - Closes the downstream end of the Aqua-Trough™ channel. Sealed with AT Silicone.
- ATEWI** AT ENDCAPS, WITH WATERING INLET - Closes the Aqua-Trough™ channel at the up stream end.
- ATC** AT CONNECTORS - Used to join 2 or more lengths of Aqua-Trough™ channels together with AT Silicone.
- ATSIL** AT SILICONE -(Silglaze II™) Used for mounting endcaps and connectors to Aqua-Trough™ channels. Uses standard caulk gun for application. Manufactured for industrial use. Long Lasting and pliable.

AT HANGING ACCESSORIES

- ATHA** AT HANGER ASSEMBLY - Adjustable. Complete with 7' of PVC coated steel wire, adjusting plate and 8 gauge galvanized steel hanger the connects under outer flange of Aqua-Trough™ rims. Wire allows 40" suspension from above support.
- ATPVCW** PVC COATED STEEL WIRE - Heavy gauge stranded steel wire, coated with PVC. Used to suspend AT channels from greenhouse trusses or other support members.
- ATAP** AT ADJUSTING PLATE - For use with PVC coated wire in customized suspension systems to level Aqua-Trough™ sections.
- ATBS** AT REINFORCING BANDSTEEL- Requires 2 linear feet (2 separate pieces) for every 1 linear foot of Aqua-Trough™; rigid galvanized steel, 1/8" x 3/4" x 12'; placed under the outer flanges of trough for reinforcing to hold more weight or allow for greater "on-center" spacings of hangers.
- ATBC** AT BANDSTEEL CONNECTOR BRACKET - Made of galvanized steel, for connecting 2 pieces of bandsteel.



AT Hanger Assembly



Bandsteel & Connector

AT BENCHING ACCESSORIES

- ATCR** AT CRADLE - Designed for holding the Aqua-Trough™ upright on any existing bench system.

WATER SUPPLY COMPONENTS

- ATST** AT SUPPLY TUBING - 1/8" (.125) I.D. polyethylene tubing connecting at endcaps with water inlet to AT header line water supply.
- ATSP** AT SUPPLY TUBING PUNCH - Used to punch holes in the header line in which supply tubes are inserted.
- ATHL** AT HEADER LINE - 3/4" I.D. Heavy duty poly pipe for delivering water to AT supply tubing.
- ATDV** AT DRAIN VALVE - 3/4" Female hose swivel adapter to allow automatic draining of system when PSI is reduced to zero.



PVC Coated Wire



AT Cradle



Water Supply Accessories

MODEL NUMBER	DESCRIPTION	QTY U/M	UNIT OF MEASURE	WEIGHT BDLCS OR EACH	CATALOG NUMBER	GROWER PRICE	
						LESS THAN CASE	CASE OR BDL
AT18*	AQUA-TROUGH™ 18' STD	5	BUNDLE	42.5	6000-	\$ 37.10	\$ 166.95
AT6	AQUA-TROUGH™ 6' (UPSable)	6	BUNDLE	17.0	6010-	13.10	70.74
ATEP	AT ENDCAPS, PLAIN	12	CASE	1.0	6020-	8.00	86.40
ATEWI	AT ENDCAPS, WATERING INLET	12	CASE	1.0	6030-	10.50	113.40
ATC	AT CONNECTORS	12	CASE	1.0	6040-	6.40	69.12
ATSIL	AT SILICONE	12	CASE	1.0	6195-	12.00	129.60
ATHA	AT HANGER ASSEMBLY	25	CASE	4.0	6080-	6.50	146.25
ATPVCW	PVC COATED STEEL WIRE 500' COILS	1	EACH	12.0	6090-	47.20	
ATAP	ADJUSTING PLATE	25	CASE	1.0	6095-	1.90	42.75
ATBS	AT REINFORCING BANDSTEEL, 10'	16	BUNDLE	52.0	6100-	8.00	115.20
ATBC	AT BANDSTEEL CONNECTOR	25	CASE	3.5	6110-	.90	20.25
ATCR	AT CRADLE	25	CASE	4.0	6200-	1.70	38.25
ATST	AT SUPPLY TUBING, 100' COILS	1	EACH	2.0	6150-	4.10	
ATSP	AT SUPPLY TUBING PUNCH	1	EACH	.15	6155-	5.60	
ATHL	AT HEADER LINE, 3/4" x 100'	1	EACH	11.0	6175-	21.20	
ATDV	AT DRAIN VALVE 3/4" HOSE SWIVEL	12	CASE	1.0	6190-	1.10	
ATAF	AT ANGLE FITTING 1/4"	25	CASE	1.0	6205-	2.80	63.00

* 18' Aqua-Trough™ must be shipped by truck.

Freight prepaid on orders of \$2,500 or more in Continental U.S. Please call us for help in designing your system.

DISTRIBUTED BY:

Call or write for your nearest stocking distributor.

Phytotronics, Inc.

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