Hexahedron 999®

INSTALLATION GUIDELINES

Commercial/Agricultural Applications

CONTENTS:

The Hexahedron 999® is a Flow Activated Device.

Zero External Energy - Zero Movable Parts
Zero Noise - Zero Maintenance -
Zero Man-Made Magnets

Note: The Hexahedron 999 unit are designed and made in Canada according to North American Standards. Therefore pipe threads are NPT, (National Pipe Threads) and dimensions are in Inches.

ILLUSTRATION No. 1
Single Point-of-Use Applications - FULL FLOW

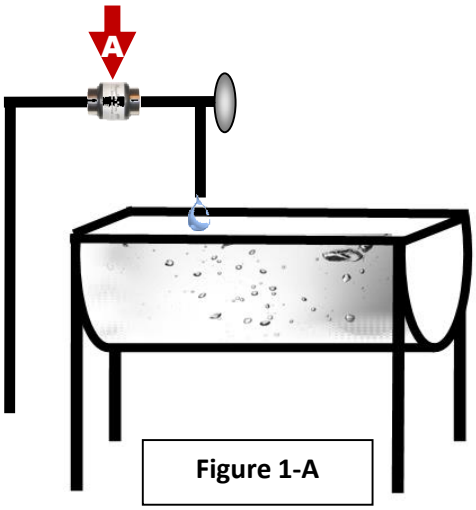

Figure 1-A

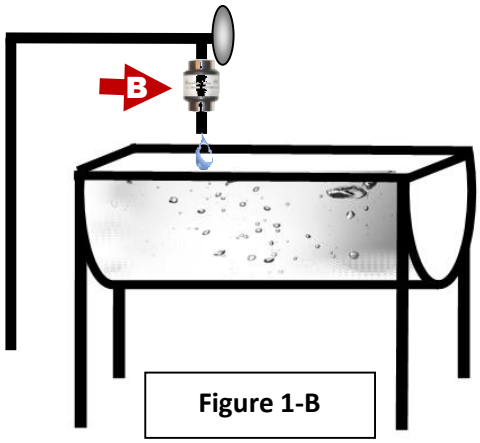

Figure 1-B

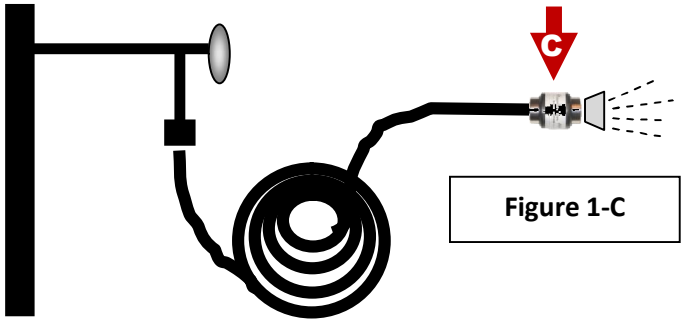

Figure 1-C

- *A Mini-Hexahedron 999® would be sufficient for most single point-of-use applications*
- **EXCEPT** *if the flow required is more than 5 GPM*
- *Installation :*
  - *A. Install onto the main watering pipe just before the valve*
  - *B. Install right after the valve on the down spout*
  - *C. Install at the end of a garden hose between the hose and the spray nozzle*
- *Use For : filling animal troughs or basins - watering plants by hand - all point-of-use applications*

ILLUSTRATIONS ARE NOT TO SCALE

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ILLUSTRATION No. 2
L-BRANCH : Multiple Short Feed Lines - FULL FLOW

Distribution Lines - (Red) Feed Lines - (Blue)

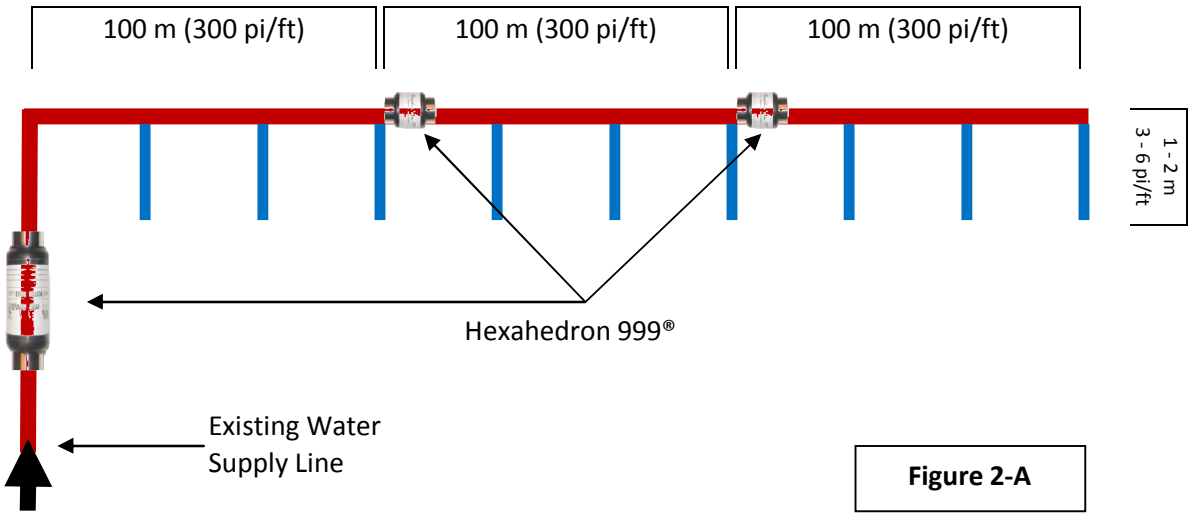

Figure 2-A

L- Branch :

- *Long distribution lines with short feed lines*
- *Distribution Lines - move the water to the feed line*
- *Feed Lines - dispense the water to the production*

Full Flow Requirement :

- *Full flow means that when a valve is opened at a point-of-use, it will flow according to the pipe size.*
- *For example, if the pipe size is 3/4" when a valve is opened it requires 3 to 7 GPM; or*
- *If the pipe size is 1.5" the required flow is 40 GPM.*

Installation :

- *Install the Hexahedron 999® Unit as close as possible to the first point-of-use*
- *Size the Unit according to the pipe size (see specifications sheet)*
- *An extra Hexahedron 999® Unit should be added if the distribution line is longer than 100 m (300 ft), and at every 100 m (300 ft) thereafter. Water will start to loose structure after travelling 300 feet in a straight pipe. NOTE: We know that the effect diminishes after 300 feet - we do not know at what rate the benefits are reduced. We need experimental data to establish these parameters per unit size.*
- *The extra Hexahedron 999 is called a BOOSTER unit. It can be one size smaller than the main unit to compensate for reduction in flow demand as you go down the line.*

Use L-Branch For :

- *Dairy production milk stalls*
- *Horse stables*
- *Breeding stalls, etc.*

ILLUSTRATIONS ARE NOT TO SCALE

ILLUSTRATION No. 3
T-BRANCH : Multiple Long Feed Lines - FULL FLOW

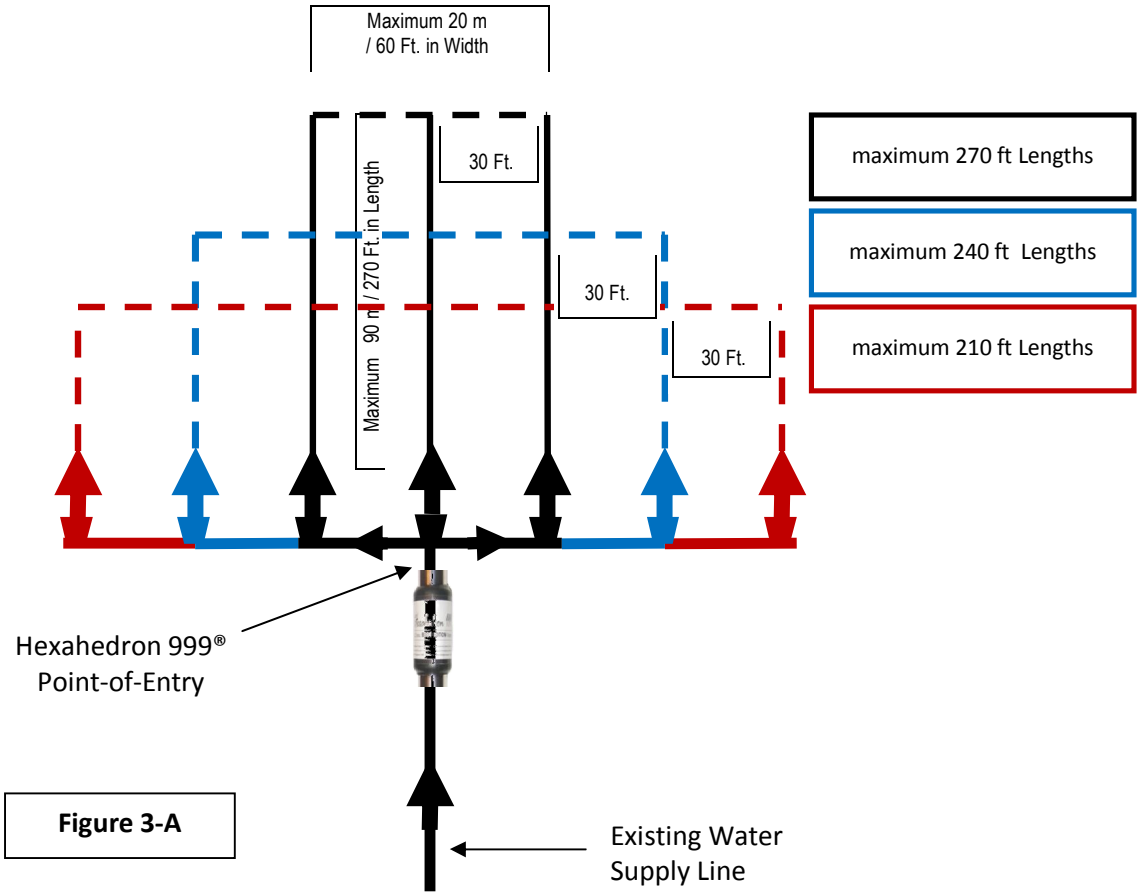

Figure 3-A

- **T-Branch** *means : Short Distribution Line with long Feed Lines using a single point-of-entry Hexahedron 999® to supply the Feed Lines. The Hexahedron is centered evenly on the Distribution Line to simultaneously flow both left and right potentially doubling its distribution capacity*
- *The minimum size of the Hexahedron 999® used for multiple long Feed Lines is a Whole House Unit*
- *If the diameter of the Distribution Line is larger than 3/4 inch increase the size of the Hexahedron 999® Unit accordingly*
- *Total length of Distribution* **and** *Feed Lines should NOT exceed 300 feet from the Hexahedron 999® Point-of-Entry. Water will start to loose structure after traveling 300 feet in a straight pipe.*
- *Length and Width can be scaled proportionately - a decrease in the length of the Feed Line allows for an increase in the number of Lines that can be installed (shown in blue and red above)*
- *Use For : Small producers with individual greenhouse enclosures - Larger producers with segmented production facilities - Overhead water misting in greenhouses or animal production facilties*

ILLUSTRATIONS ARE NOT TO SCALE

ILLUSTRATION No. 4
LOW FLOW Feed Lines with RECIRCULATION RESERVOIR

Distribution Lines - (Red) Feed Lines - (Blue)

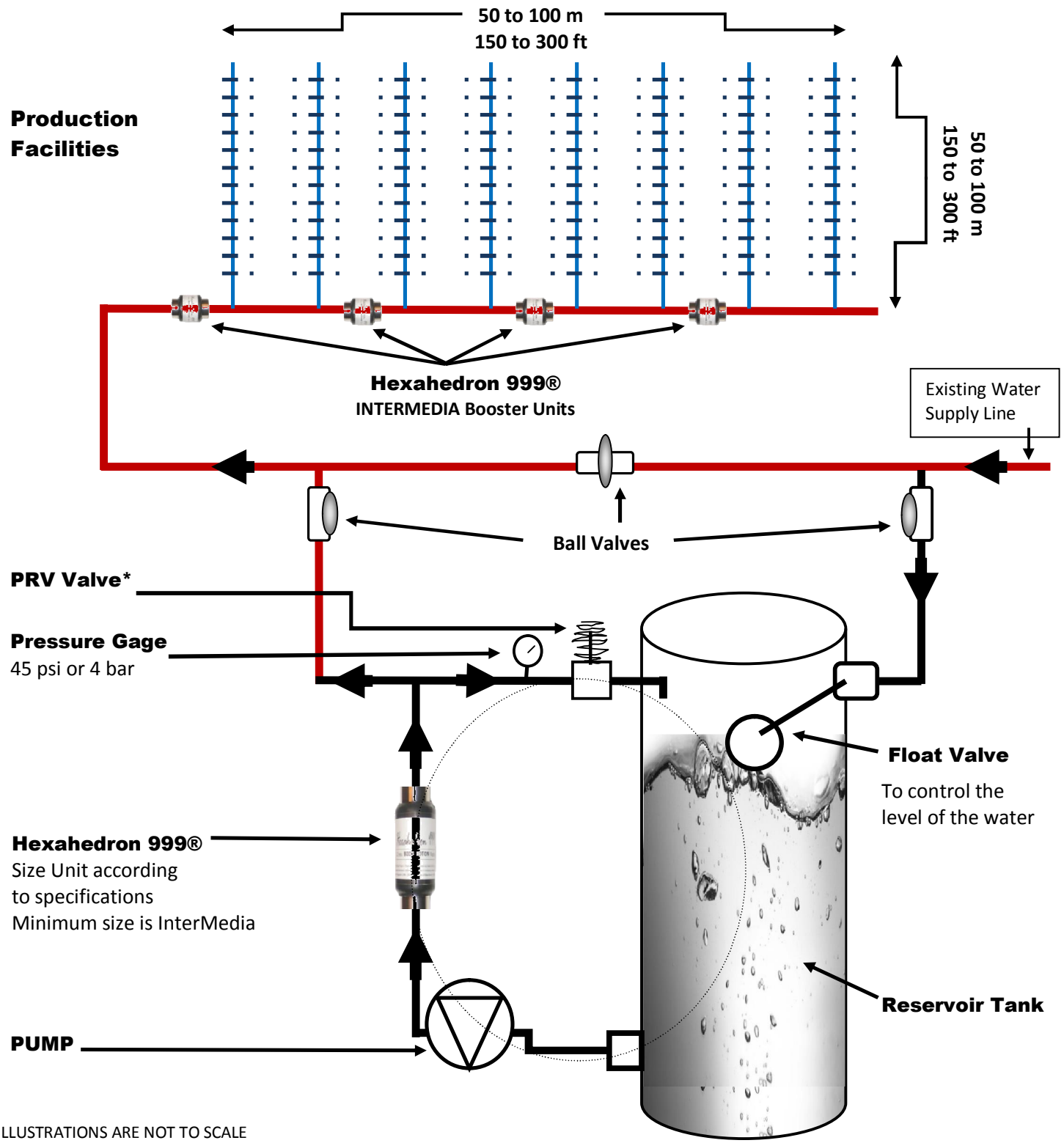

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ILLUSTRATION No. 4
Recirculation Reservoir for LOW FLOW Feed Lines

Low Flow Requirements :

- *Multiple points of use with very low flow requirements*
- *Low flow means that when a valve is opened only a small flow is actually distributed and used*
- *Examples :* **Chicken Growth Facilities** *and* **Hydroponics Drip Irrigation Systems** *used in greenhouses both require very low flow distribution.*
- *The Hexahedron 999® is a flow activated device. If the flow is insufficient there will be little or no benefits.*
- *Accordingly, low flow feed lines require the water to be pre-conditioned before distribution using a Reservoir Tank and Recirculation Pump design.*

Reservoir Tank :

- *The tank size should be in accordance with the safety requirements of the application.*
- *In a chicken coup - potential contamination in the tank favours a smaller tank but the chickens can die if they run out of water and this favours a larger tank.*
- *In a hydroponics drip feed system dosing the fertilizers in the tank is the issue for sizing.*

Recirculation Pump :

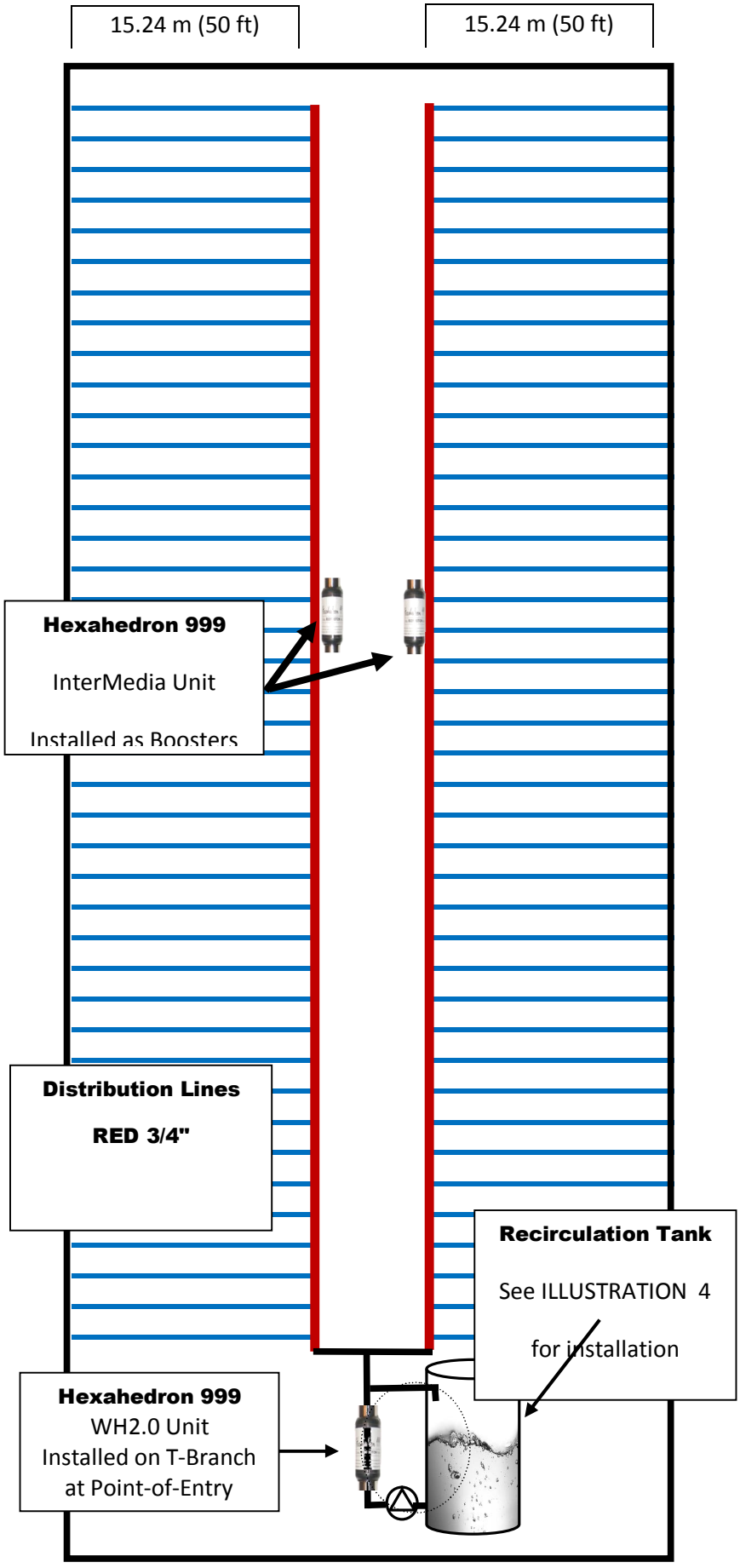
- *The pump should have enough capacity to pump all the water in the tank at least 5 times per day*
- *And enough capacity for all the feed requirements and pressure requirements to service the network*
- *For example : A chicken coup requires 500 gal/day, they only use water during an 18 hour day so the pump capacity for this part is 500/18= 28/60= 0.5 GPM rounded off.*
  - *If the tank chosen is 100 gallons - 5 changes per day is equivalent to one change every 5 hours (24/5 rounded off)*
  - *This means the pump must have the capacity to move 100 gallons every 5 hours or 20 GPH or 0.33 GPM.*
  - *In this case a pump that can supply at least 0.5 GPM at the pressure required for the loop is OK.*
- *The third parameter for sizing the pump is the choice of the Hexahedron 999® Unit. The minimum flow in a Hexahedron 999® InterMedia Unit, for good results, is 5 GPM. Accordingly, in the example above, the size of the pump would need to be revised to 5GPM (see specifications sheet).*

How It Works :

- *In these applications, the tank is filled through a float valve in order to control the level of the water.*
- *The pump feeds the recirculation loop and if there is no demand for the water it returns to the tank through a relief valve (PRV).*
- *The recirculation loop takes the water from the tank - passes it through the Hexahedron 999® Unit - and returns it back to the tank, continually building up the structure and biophotons in the water.*
- *Additional Hexahedron 999® Units (InterMedia Boosters) are installed for every 300 feet (100 m) of Distribution* **and** *Feed Line thereafter. Simply subtract the length of the Feed Line from 300 feet to determine the location where you will need to insert the Booster. Thus, if the Feed Line branches are 30 feet long you would install the Booster every 270 feet on the Distribution LIne.*

ILLUSTRATION No. 5

Installation in a Greenhouse Using LOW FLOW Hydroponics Drip Lines

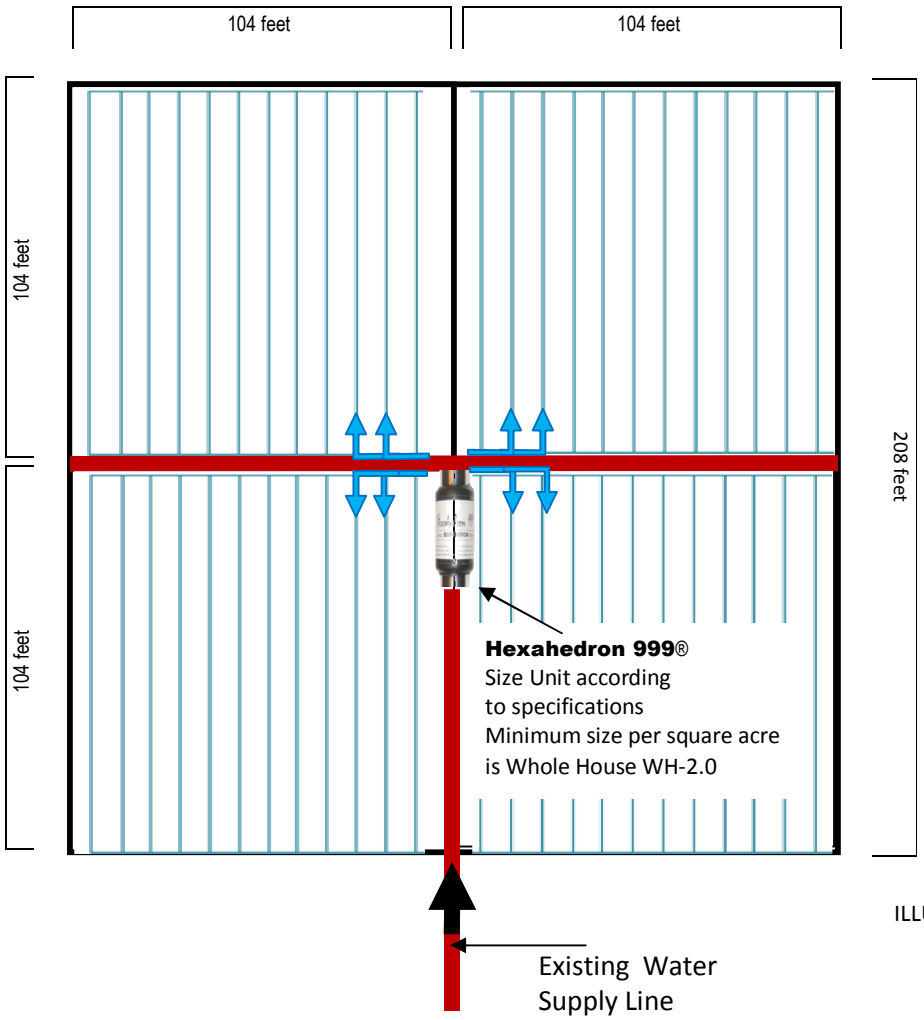


Distribution Lines are 3/4 inch (Red)
Feed Lines are 1/2 inch (Blue)

- Install a Hexahedron 999® Whole House Unit (WH2.0) into the Recirculation Loop at Point-of-Entry of the Distribution Lines (see Illustration 4)
- The WH2.0 Unit is good for 300 feet of distribution before starting to lose effect
- The Unit installed at the Point-of-Entry can service both Distribution Lines up to the 300 feet
- Subtract the length of the Feed Line from 300 feet to determine the location where you will need to insert another Hexahedron 999® Unit as a BOOSTER. On a 3/4 inch line you would use the InterMedia Unit for this purpose.
- In this example the Feed Line is 50 feet - accordingly you will need to insert another Hexahedron 999® on both sides of the Distribution Line every 250 feet
- Assuming that the Feed Lines are placed 10 feet apart - the first Hexahedron 999® Unit will service 25 Feed Line on each side for a total of 50 Feed Lines
- 50 Feed Lines at 50 foot lengths provides 2500 Linear feet of service from the first Point-of-Entry Hexahedron 999® Unit.
- The Booster Units installed every 250 feet thereafter - are only servicing one side of the Distribution Line, thus, one-half (25) the quantity of Feed Lines or 1250 Linear feet. On a 3/4" line the InterMedia Hexahedron 999® Unit would be used for the Booster.

ILLUSTRATIONS ARE NOT TO SCALE

ILLUSTRATION No. 6
Installation On One Square Acre



ILLUSTRATIONS ARE NOT TO SCALE

Distribution Lines (Red) - Feed Lines (Blue)

- Using a centred distribution line in the middle of the acre requires four flow directions through the feed lines. On a square acre, this may be the most effective configuration which requires a maximum 104 foot vertical and 104 foot horizontal lengths for a maximum total of 208 foot lengths in each direction from the exit point through the Hexahedron 999® Unit.
- Sizing of the Hexahedron 999® Unit is relative to the volume of water required and the size of the distribution and feed lines (see Flow Chart).
- If the Feed Line Draw exceeds the flow capacity, instead of upsizing the Hexahedron 999® Unit - you could alternatively install an additional distribution line or lines from the point-of-entry of the water supply line with a Hexahedron 999® Unit on each distribution line
- Use a Recirculation Reservoir in all Low Flow situations (see Illustration No. 4)

Hexahedron 999®
Flow Chart

The Hexahedron 999® is a FLOW ACTIVATED device. If the flow is insufficient there will be little or no benefits. The length of piping that follows the Hexahedron 999® Unit has a reducing impact on the quality of the results. As a general rule, this effect is progressive and become noticeable only after 300 feet (100 m). The flow rate of a unit is determined by the size of its inlet/outlet. Meaning, a 0.75" inlet/outlet has the same flow capacity as a 0.75" pipe. These flow rates produce a pressure loss that is less than 5 psi (0.5 barr). A Hexahedron 999 Unit should never be used at a flow rate lower than half of the specified full flow rate. The only disadvantage to using a Unit at a higher flow is the pressure loss.

NOTE: *Although we know that the effect diminishes after 300 feet - we do not know at what rate the benefits are reduced. We need experimental data to establish these parameters per unit size.*

Hexahedron 999 UNIT	FULL FLOW Capacity GPM	MINIMUM FLOW to activate Unit	Diameter of DISTRIBUTION LINE	Diameter of FEED LINES	Feed Line DRAW
1	**2**	**3**	**4**	**5**	**6**
NOTES:		**1/2 of Full Flow**			**GPM At FULL FLOW**
INT-1.5		5 GPM		1/2"	3
InterMedia	9 GPM		3/4 inch	3/4"	7
				1"	15
WH-2.0		9 GPM		1/2"	3
Whole House	17 GPM		3/4 inch	3/4"	7
				1"	15
M-2.0		13 GPM		1/2"	3
Mega 2.0	26 GPM		1 inch	3/4"	7
				1"	15
M-2.5		20 GPM		1/2"	3
Mega 2.5	40 GPM		1 1/2 inch	3/4"	7
				1"	15
M-3.5		65 GPM		1/2"	3
Mega 3.5	130 GPM		2 inch	3/4"	7
				1"	15

Chart Revision 3

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