Pot Watering Systems

NETAFIM USA
PRECISION IRRIGATION™

The Netafim Solution

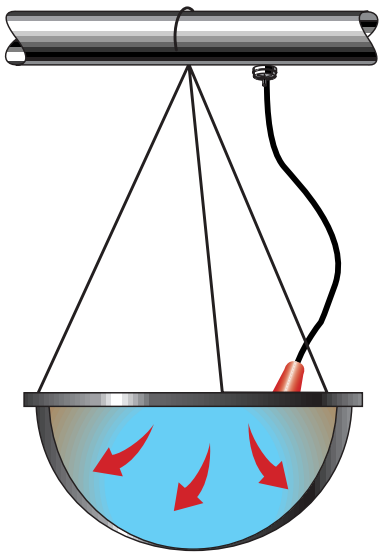
Why Netafim Systems Are Better

Payback Period *for a Netafim hanging basket watering system*

Hand Watering Schedule *(per plant)*	**3 seconds once a day**			
Cost per Plant (*for Netafim System)*	**$0.75**			
Wages & Benefits *(per hour)*	**$7.00**	**$8.00**	**$9.00**	**$12.00**
Netafim System Payback *(days)*	**129**	**113**	**100**	**76**

Low Cost & Fast Payback

Payback for a complete system is usually within the first season of operation.

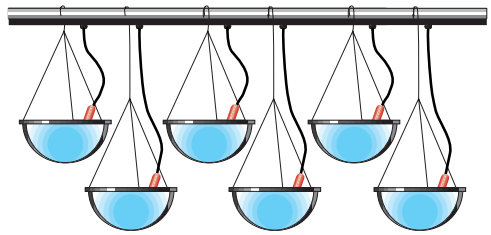


The Netafim Solution Slow, Low Flow

Netafim drippers flow slowly, and uniformly, so the soil media is easily wetted without any run-off around the edges of the basket. The PCNL features of the dripper ensure that each plant receives the same amount of water at the same time.

Multi-Tier Uniformity

Netafim Hanging Basket Drippers all flow precisely the same, regardless of the length of tube *(unlike lead weight drippers)*. This means that several lengths of drippers can be combined on the same line, with each dripper emitting precisely the same amount of water.



The NETAFIM Solution

Why Netafim Systems Are Better

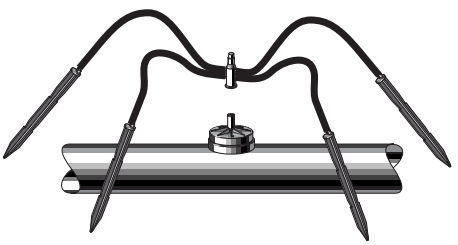
Payback Period *for a Netafim pot watering system*

Hand Watering Schedule *(per plant)*	**3 seconds once a day**			
Cost per Plant (*for Netafim System)*	**$0.50**			
Wages & Benefits *(per hour)*	**$7.00**	**$8.00**	**$9.00**	**$12.00**
Netafim System Payback *(days)*	**86**	**75**	**67**	**50**

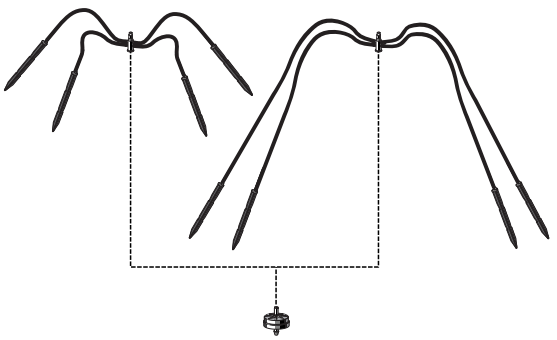
Low Cost & Fast Payback

Payback for a complete system is usually within the first season of operation.

Flexible & Portable



The 4-Way manifold separates for easy storage or transport in a box. The Dripper Supply Tubing *(with the dripper attached)* can then be rolled up without tangling the spaghetti tubes for easy transport or storage.



If a different plant spacing is desired, simply change the 4-Way manifold.

Up to 20,000 Pots From a Single Hose Bib!

When many small pots are to be watered, or in applications where very low flow is suitable, an 8-Way Multi Outlet Dripper can be used. The flow per pot is then 1/4 gallon per hour *(gph)*. Therefore, for every 10 gallons per minute *(gpm)* available, 2,000 pots can be watered.

By clipping the tip of one of the 4-Way manifolds, two manifold assemblies can be stacked together to give an 8-Way assembly.

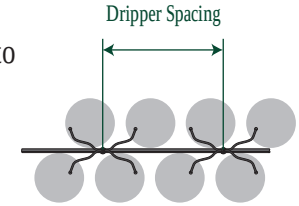
Drip System for Pots

4-Way MOD Dripper Supply Pipe Sizing

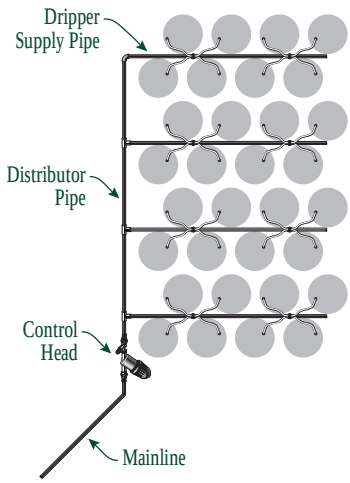
Assumes 35 psi inlet pressure, 10 psi at last dripper & no slope.

Length of Pipe *(in feet)*	Dripper Spacing *(in inches)* 6"	12"	18"	24"	36"
50	16mm poly	16mm poly	16mm poly	16mm poly	16mm poly
100	1/2"				
150	3/4" poly	1/2" poly			
200	1" poly	3/4" poly	1/2" poly		
250			3/4" poly	1/2" poly	
300				3/4" poly	1/2" poly
350		1" poly			
400					

1 Using the top row of the table at left, select the **dripper spacing** to be used. By matching this to the **length of pipe** column, the correct size Dripper Supply Pipe can be determined.



2 Use the ZONE FLOW CHART below to determine what will be the Flow Demand for the system. Select from the chart the number of plants that will be watered at the same time. Use the flow that results from this to determine the correct sizing for the pipe and control head components. Note that the 4-Way MOD has a flow of 0.5 gallons per hour *(gph)* per plant, and the 8-Way MOD has a flow of 0.25 gph per plant.



Gallons Per Minute *vs. number of plants*

Number of Plants	100	200	300	400	500	600	700	800	900	1000
GPM 4-Way MOD	1	2	3	3	4	5	6	7	8	8
GPM 8-Way MOD	0	1	1	2	2	3	3	3	4	4

Number of Plants	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
GPM 4-Way MOD	9	10	11	12	13	13	14	15	16	17
GPM 8-Way MOD	5	5	5	6	6	7	7	8	8	8

3 Size the Distributor and Mainline Pipes using the maximum Flow Demand from the largest zone or combination of zones which may be watered at the same time. Either PVC, or polyethylene pipe can be used for the Distributor and Mainline. If PVC is used above ground, it should be painted to prevent light penetration, which can result in the growth of algae within the pipe. These charts are appropriate for distributor lengths of up to 40 ft. and mainlines of up to 100 ft. When slopes are a factor, when longer length pipes are needed, or for other special conditions, please consult a certified Netafim System Designer for assistance.

Distributor Pipe Sizing

Pipe *Size*	Maximum *GPM*
1/2"	4
3/4"	7
1"	13
1 1/4"	30
1 1/2"	45

Mainline Pipe Sizing

Pipe *Size*	Maximum *GPM*
3/4"	8
1"	12
1 1/4"	22
1 1/2"	30
2"	45

4 Size the Head Control *(filter, pressure regulator, and valve)* based on the Flow Demand determined in step 2.

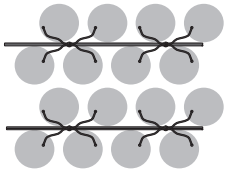
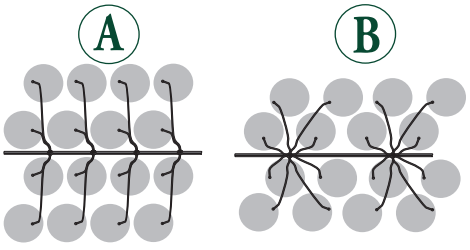
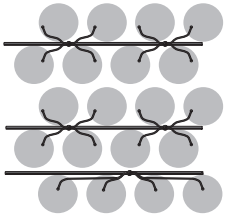
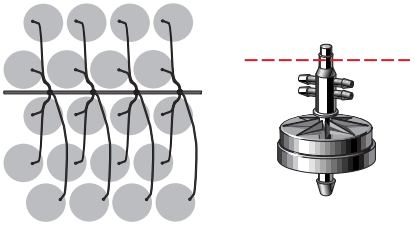
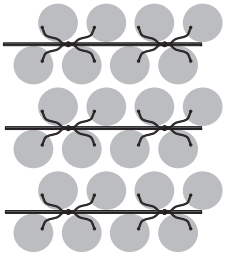
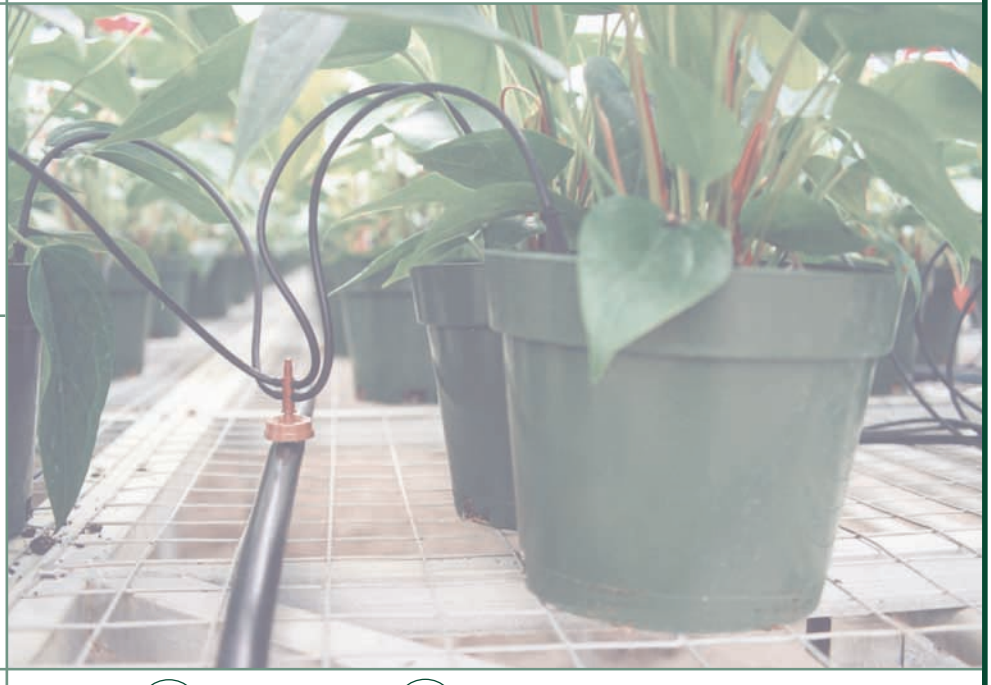
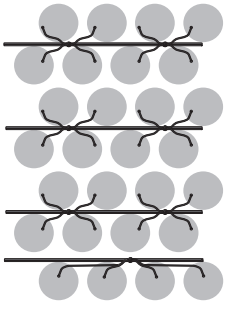
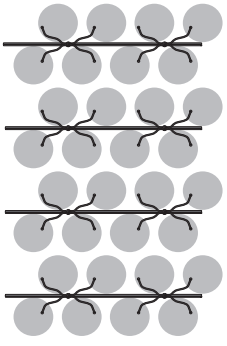
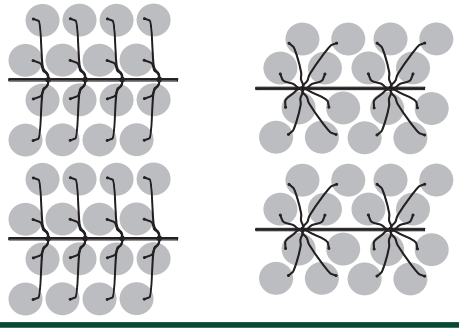
It is very important to recognize the minimum flow for the pressure regulator. Be sure to size the pressure regulator by determining both the minimum, and the maximum number of plants which may be watered at the same time.

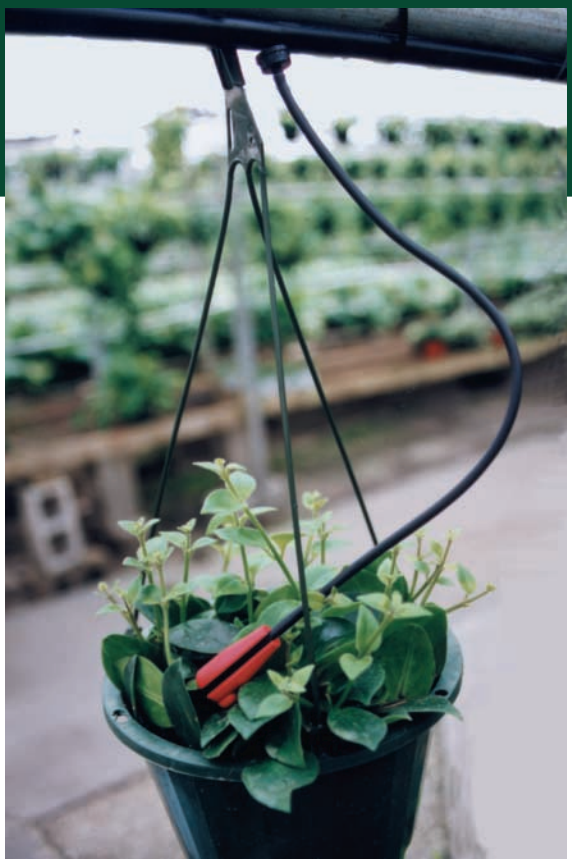
The size of the Head Control components should be determined by the flow demand, and not the size of the pipe that connects to them. Mixed size pipes and components (e.g. 1″ filter on 1 1/2″ pipe) will have no negative effect on the operation of the system if properly sized by the flow demand.

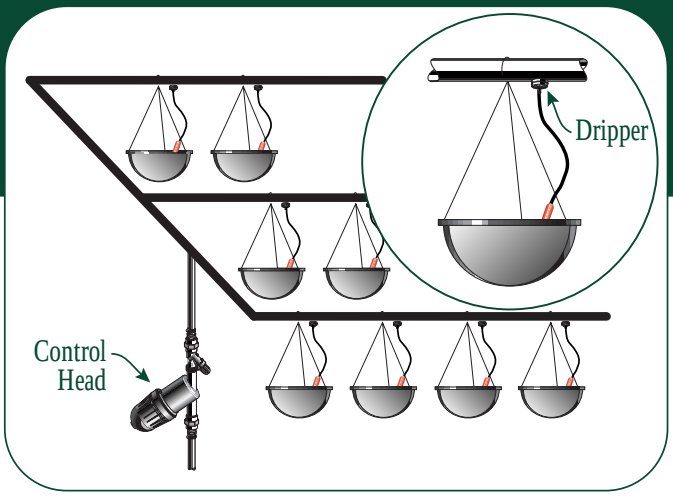
Filter, Valve & Pressure Regulator Sizing

	Flow Range *in GPM*	Unit *Size*
Electric Valve	Up to 15	3/4"
	Up to 20	1"
	Up to 60	1 1/2"
	Up to 100	2"
Disk Filter *(120 Mesh)*	Up to 18	3/4"
	Up to 26	1"
	Up to 53	1.5" (Super)
	Up to 120	2"
Pressure Regulator *(35 psi)*	0.5 to 5	3/4" Low Flow
	3.5 to 20	3/4"
	7 to 35	1 1/2"
	15 to 80	2" Model 4

How to Size a NETAFIM

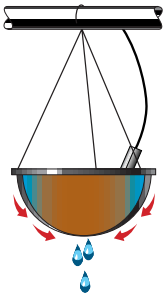
Rows of Plants	Typical Layout	Alternative Layouts
4		 The Typical layout usually has a lower cost than either Alternate layout. Alternate (B) illustrates the use of an 8-Way MOD. This is recommended for systems of many small pots (4”), or other applications where the water supply must be stretched, and low flow per plant (1/4 gph) is suitable.
5		 The 4-Way MOD can be converted into a 5-Way by clipping off the tip of the 4-Way manifold. Note that the flow to each pot in a 4-Way MOD is 0.5 gph, and the flow to each pot using a 5-Way will now be 0.40 gph. Therefore, it would not be prudent to combine both 4-Way and 5-Way MODs on the same system, as the flow per plant would not be uniform.
6		
7		
8		 The Typical layout usually has a lower cost than either Alternate layout. Alternate (B) illustrates the use of an 8-Way MOD. This is recommended for systems of many small pots (4”), or other applications where the water supply must be stretched, and low flow per plant (1/4 gph) is suitable.

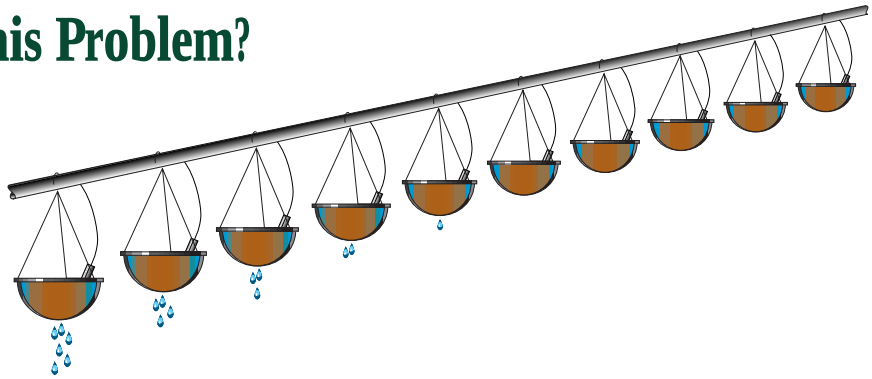


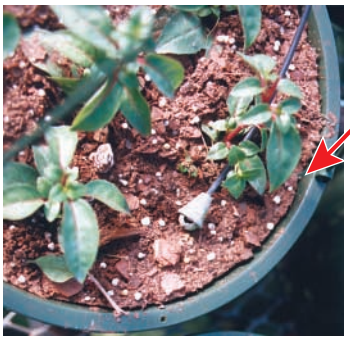


Higher Crop Value Results from having a highly uniform crop of top quality - which is what to expect when water and fertilizer uniformity are improved. Netafim's drippers for hanging baskets feature both pressure compensation and a built in check valve. This combination of features *(referred to as PCNL)* is the highest level of technology available in drippers today. This technology ensures that every plant will receive exactly the same amount of water and fertilizer regardless of where the plant is located within the system. Each dripper adjusts itself automatically to the system pressure resulting in a watering uniformity of 94%. The built in check valve assures that all the drippers will turn on at the same time *(when the system is fully pressurized)*, and prevents the drainage of the system onto the lowest plants when the system is turned off. Netafim drippers may be individually shut-off to prevent unwanted dripping when a basket is removed.

Have You Seen This Problem?





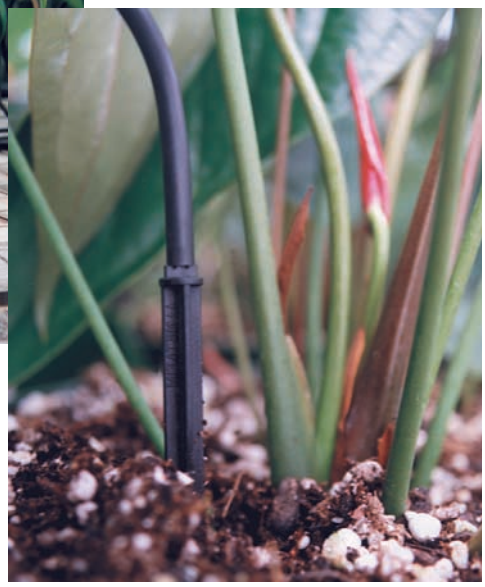


Most first generation drippers soak the baskets to overflowing at the beginning of the line by the time the baskets at the end of the line receive adequate water.

One cause for this is the very high flow of these drippers *(often 20 times higher than Netafim drippers)*. When the soil media dries and shrinks away from the wall of the basket, the high flow from the drippers runs to the edge, into this gap and around the soil mass itself, pouring out on the soil and plants below. The relatively low uniformity of these systems compounds this problem.

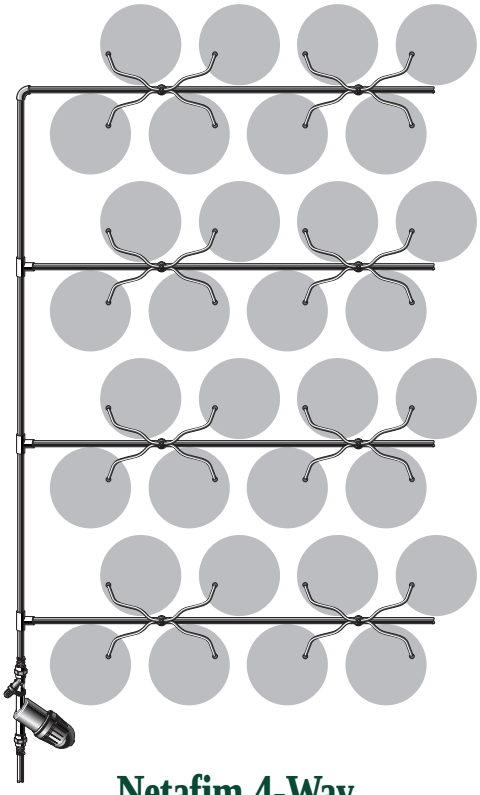
Production Tool

Comparing a Netafim system to hand watering is like comparing a hand saw to a power saw. A hand tool is fine if you have the time, but for production scale growing, power tools are a terrific step forward.



Less Disease

Water on foliage and flowers can spread disease rapidly. By applying water directly to the pot, the rest of the plant remains dry. Additionally, pesticides which are applied to the foliage are not washed off by daily watering. This can reduce the need for spraying - further lowering production costs - and decrease run-off contamination.



Netafim 4-Way Multi-Outlet Dripper (MOD) System

Higher Crop Value

Higher Crop Value results from having a highly uniform crop of top quality - which is what to expect when water and fertilizer uniformity are improved.

Netafim's Multi Outlet Drippers *(MOD)* feature both pressure compensation and a built in check valve. This combination of features *(referred to as PCNL)* is the highest level of technology available in drippers today. This technology ensures that every plant will receive exactly the same amount of water and fertilizer regardless of where the plant is located within the system. Each dripper adjusts itself automatically to the system pressure and elevation so that even on rolling or sloped ground, the uniformity of watering is 94%. Further, the built in check valve prevents unwanted drainage of the system onto the lowest plants when the watering cycle is completed.

How to Size a Netafim System for Hanging Baskets

1 Using the top row of the table, at right, select the **dripper spacing** to be used. By matching this to the **length of pipe** column, the correct size Dripper Supply Pipe can be determined. *(Note: This chart applies to PCNL equipped models only. For design information on non-compensating dripper assemblies, speak to your Netafim Dealer or Representative.)*

PCNL Dripper Supply Pipe Sizing

Assumes 35 psi inlet pressure, 10 psi at last dripper & no slope.

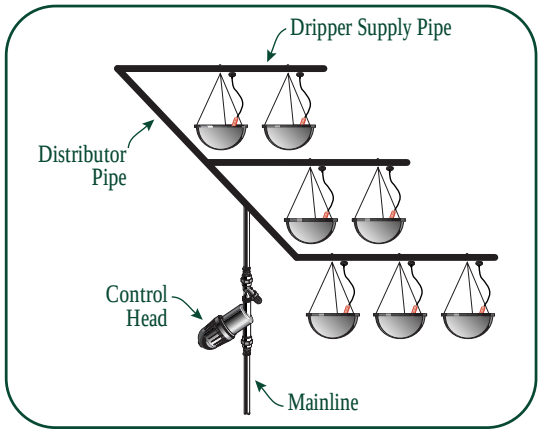
Length of Pipe *(in feet)*	Dripper Spacing *(in inches)* 6"	12"	18"	24"	36"
50	16mm poly	16mm poly	16mm poly	16mm poly	16mm poly
100					
150					
200	1/2" poly				
250					
300	3/4"				

2 Use the ZONE FLOW CHART to determine what will be the Flow Demand for the system. Select from the chart the number of baskets that will be watered at the same time. Use the flow that results from this to determine the correct sizing for the pipe and control head components. Each dripper has a flow rate of 0.5 gallons per hour *(gph)*.

Zone Flow Chart *(gpm)*

Number of Hanging Baskets	200	400	600	800	1000	1200	1400	1600	1800	2000
GPM	2	3	5	7	8	10	12	13	15	17

3 Size the Distributor and Mainline Pipes using the maximum Flow Demand from the largest zone or combination of zones which may be watered at the same time. Either PVC, or polyethylene pipe can be used for the Distributor and Mainline. If PVC is used above ground, it should be painted to prevent light penetration, which can result in the growth of algae within the pipe. Note that these charts are appropriate for distributor lengths of up to 40 ft. and mainlines of up to 100 ft. When slopes are a factor, when longer length pipes are needed, or for other special conditions, please consult a certified Netafim System Designer for assistance.



4 Size the Control Head *(filter, pressure regulator, and valve)* based on the Flow Demand determined in step 2.

It is very important to recognize the minimum flow for the pressure regulator. Be sure to size the pressure regulator by determining both the minimum, and the maximum number of plants which may be watered at the same time. The size of the Head Control components should be determined by the flow demand, and not the size of the pipe that connects to them. Mixed size pipes and components (e.g.. 1″ filter on 1 1/2″ pipe) will have no negative effect on the operation of the system if properly sized by the flow demand.

Distributor Pipe Sizing

Pipe Size	Maximum GPM
1/2"	4
3/4"	7
1"	13
1 1/4"	30
1 1/2"	45

Mainline Pipe Sizing

Pipe Size	Maximum GPM
3/4"	8
1"	12
1 1/4"	22
1 1/2"	30
2"	45

Filter, Valve & Pressure Regulator Sizing

	Flow Range in GPM	Unit Size
Electric Valve	Up to 15	3/4"
	Up to 20	1"
	Up to 60	1 1/2"
	Up to 100	2"
Disk Filter *(120 Mesh)*	Up to 18	3/4"
	Up to 26	1"
	Up to 53	1.5" (Super)
	Up to 120	2"
Pressure Regulator *(35 psi)*	0.5 to 5	3/4" Low Flow
	3.5 to 20	3/4"
	7 to 35	1 1/2"
	15 to 80	2" Model 4

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