water gardens
step 2 - streams & waterfalls

DETERMING THE PROPER FLOW

To determine the proper flow for a stream or waterfall, you will need to follow the steps listed below.

- First, calculate the GPH (Gallons Per Hour) flow needed based on the waterfall width at a 1' pumping height using the 100 GPH per inch of width formula.

- Second, determine the actual lift or pumping height (including adjustments for stream length).

- Third, use the chart to determine the correct GPH pump required.

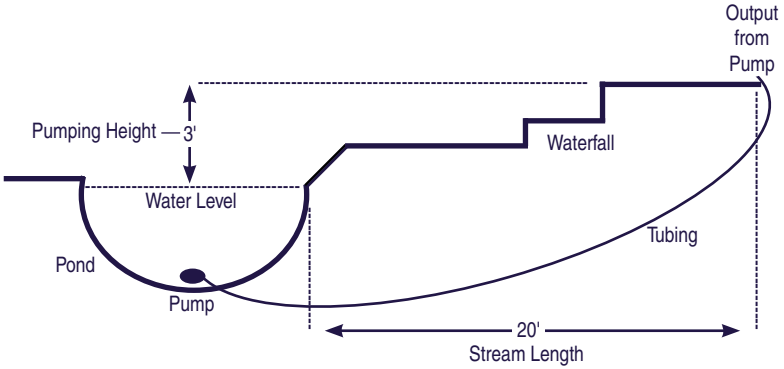
- Fourth, check that the water in the ponds will be recycled once every 1 to 2 hours.

- Finally, determine the tubing size required for the GPH.

You will need 100 gallons of water per hour for every inch of width in a stream or waterfall. (Ex. A stream that is 10" wide needs a 1000 GPH flow). One hundred gallons flowing per hour per inch of width of the stream will provide a 1/2" depth of water. A gentle flowing stream or waterfall will require a lower GPH flow and a rushing stream or waterfall needs a larger GPH flow. A larger GPH flow may also be used if you wish to increase the sound created by the waterfall or stream. Also add splash points (rocks) and create echo chambers to increase the sound.

The 100 GPH per inch formula is based on a pumping height of 1'. Most pumps are rated at a 1' lift or pumping height. A larger pump is required if the pumping height is greater than 1' or the stream length is greater than 10'. Pumping height starts at the pond water level and continues up to the top of the stream or waterfall.

If the stream length is greater than 10' you add one foot to the pumping height for every 10' of length. (Ex. If your pumping height is 3' and the stream length is 20', then the pumping height is equal to 5', 3' for the height plus 2' for the stream length of 20'. See diagram).



Refer to the chart to determine GPH pump required. Use the calculated pumping height (including adjustments for stream length) to follow down the corresponding lift column until you find the GPH required for the width of the waterfall or stream. Then move over to the left on the chart to the pump size column. This will give the proper GPH pump for your pond.

Example: You have a stream with a 10" width, a 3' waterfall and a 20' length. What size pump and tubing do you need?

A 10" width requires a 1000 GPH flow. Your adjusted height is 5' (see example above). Using the table and going down the 5' column the closest pump listed is 950 GPH. Moving over to the pump size column you will need at least a 1200 GPH pump to compensate for the additional height and length. A 3/4-1" tubing inner diameter is recommended for the 1200 GPH water flow.

Also note that some pumps use the term "Head" instead of "Lift". They are the same.

Approximate Gallons Per Hour at Various Lift Heights

PUMP SIZE	GPH (Gallons Per Hour)	LIFT HEIGHT					
		1'	3'	5'	10'	15'	20'
200		200	150	120	-	-	-
325		325	290	220	120	-	-
500		500	410	330	210	-	-
750		750	680	610	350	-	-
900		900	750	680	450	300	-
1200		1200	1050	950	740	600	450
2000		2000	1940	1890	1340	900	425
3000		3000	2780	2500	2000	1560	1000
4000		4000	3920	3850	3100	2250	1550

Check individual pump boxes for manufacturers recommendations. Pumps may vary. Use this chart as a general guide only. Mag-Drive pumps may run at lower rates than this chart and other pumps may run at higher rates.

Check that the water in the ponds will be recycled once every 2 to 3 hours. Example: A 1000 gallon pond needs to have 500 to 1000 gallons of water flowing through the pump per hour minimum. To calculate the gallons of water in a pond multiply length x width x average depth of the pond in feet x 7.5. There are 7.5 gallons in each cubic foot of water. Move up to a larger pump if you are not recycling all the water in the pond at least every 2 hours.

Recommended Tubing Inside Diameter for Pumps to the Waterfall

For flows up to:	Tube inner diameter:
120 GPH	3/8" - 1/2"
350 GPH	1/2" - 3/4"
1000 GPH	3/4" - 1"
1500 GPH	1" - 1¼"
3000 GPH	1¼" - 1¼"