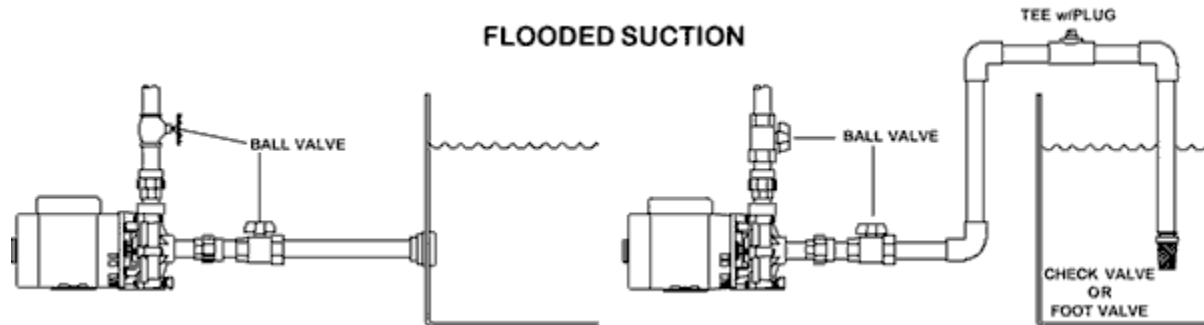


Plumbing and Pump Installation Suggestions

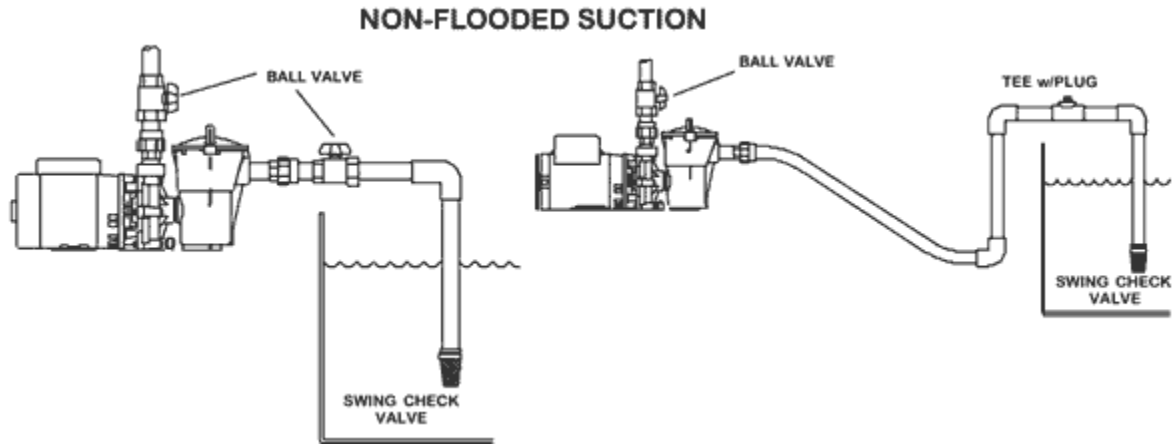
We hope you will find the following suggestions and comments regarding pump installation to be helpful. We do not claim that any of these suggestions are the only way to accomplish your job, but in general they will solve many of the commonly found problems and help you prevent many others.

Please note that Sequence pumps are out-of-pond pumps. Do not submerge!

1. Locate the pump as close to the source as possible. It is best to have your main (longest) run of pipe on the discharge side of the pump. The pump is designed to push water, not pull it.
2. Install the pump outside the pond, and if possible below the level of the surface of the pond (flooded suction). This will help insure a proper supply of water to the pump. Remember, a pump can't pump out water if there isn't any available. Even if your supply line comes up and over the top of the pond wall, it will still offer a flooded suction if it has no breaks to atmosphere before it goes back down below the surface level, and if all air is removed.



3. If it is not possible to provide a flooded suction installation then:
 - A. Position the pump as low as possible, and as near the source as possible. (A pump one foot above the surface works better than one six feet above the surface.)
 - B. Install basket strainer on the inlet of the pump or provide some other priming source.
 - C. Suction piping should slope gently upward to the pump or strainer inlet.
 - D. Install a foot valve or check valve in the inlet line below the water level.
 - E. Always prime the entire inlet line, basket strainer, and pump before turning it on.
 - F. If your pipe has a high spot (as in lower right illustration), install a tee at the highest spot and to prime the suction line, (or to bleed off air if pump is higher than the tee).



4. Always have your inlet pipe diameter equal to, or larger than, the discharge line. This helps prevent cavitation.

5. Minimize friction losses by using large diameter pipe. Determine the approximate flow rate you want, and the total length of your pipe. Consult a friction loss chart to choose the proper diameter pipe. **Please note that the size of the pump's suction and discharge ports does not indicate your proper pipe size.** Choose a pipe diameter that keeps your friction loss below about five feet per hundred feet of pipe. Even if you have a section of small diameter pipe that you can't change, as with a through the wall fitting, it is still beneficial to use larger pipe on the majority of the run. The following chart is provided as the minimum suggested pipe size relative to maximum flow.

Min. Pipe Size	Max. Suggested Flow GPM	Max. Suggested Flow GPH
1 inch	10	600
1-1/4 inch	20	1,200
1-1/2 inch	30	1,800
2 inch	60	3,600
2-1/2"	90	5,400
3 inch	175	10,500

6. Use a filtration system that does not require a lot of pressure. It costs money to create pressure. Biological filters work well and require very little pressure.

7. Never allow a out-of-pond centrifugal pump and motor unit to become submerged. Use a GFI circuit for protection. If this ever accidentally occurs, shut the unit down, disconnect it, and have a reputable service shop examine the motor before re-using it.

8. Never run a pump dry. This may damage the mechanical seal and impeller. They are designed to pump fluid, not air. Insure the pump is full of water before you turn it on, and that it doesn't out pump the supply. Note: if you have purchased a dry run seal, it can run without water for a limited period of time.

- 9.** Cover the pump and motor unit with a suitable shelter. When protected from rain and dust the motor will last longer. The covering should allow the motor to have suitable air recirculation for proper cooling.
- 10.** If your pump is producing too much flow, you can reduce the flow by partially closing a valve on the discharge line. Never restrict the inlet! Always allow a couple gallons per minute to flow to prevent heat build up inside the pump housing.
- 11.** If more flow is required than a single pump can produce, consider using two or more pumps in parallel. This also offers the benefits of being able to vary the flow rates, insure partial flow if one unit needs servicing, and can often save a substantial amount of electricity compared to using a single, larger pump.
- 12.** Choose a pump that can give you the required flows at the lowest possible power consumption. Since pumps often operate continuously, the power consumption (watts - not amps), and its effect on your monthly utility bill can be very significant.
- 13.** Check to be sure the motor electrical connections are set up to match the supply voltage.
- 14.** Install shut off valves before and after the pump, so you can easily remove it from the line without having to drain your system. Be sure to use ball valves, as they have low friction loss characteristics.
- 15.** Use Teflon paste (not tape) for sealing threaded joints.
- 16.** Make sure all your pipe joints are airtight. This is especially important on the suction side.