



COVER STORY

PHOTO BY CARL BRADY.

An Oase Aquarius 480 pump was chosen for this small fountain because its flow rate provided the desired effect while also diverting water through a UV sterilizer.



PHOTOS COURTESY OF SAVIO ENGINEERING.

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Water Pump Primer

Key points to consider

by Carl Brady

A key decision when designing and building water features is which pump to use. Many factors go into that choice, but analysis of the site and the feature generally provide the answer.

Types of pumps

There are different styles of pumps: magnetically driven pumps (or mag drives); direct drives; hybrid pumps, which are a combination of direct drive and mag drive; centrifugal pumps; and inline pumps.

Allen Stiner, CEO of 123ponds.com, discusses the main types of pumps. "Mag drives use electromagnetic pulsing to turn an impeller. The direct drives tend to be like the eight-cylinder car versus the four-cylinder car, which is the direct drive. The direct drive are going to be a bit stronger and have more torque behind them. Direct drives are typically a vertically standing pump, and mag drives have always been the horizontal type, although these days, that's not necessarily true. With hybrids, you get the energy efficiency and durability of a mag drive pump and the power of a direct drive. Centrifugal pumps are mostly external pumps. They are used when you need a pump to be a little stronger or have a little higher pressure than other types might have. Inline pumps are capable of being placed outside of the pond water, but they must be located below the water level."

Pump lubrication

Stiner says, "Most of the pumps for the water gardening industry do not have oils of any kind. The water is often the lubricant. Some direct-drive pumps will actually have a breather hole on the side, and you'll see water spurting out of the side if the water becomes too low. There are pumps that have oil lubrication, but generally speaking, in the pond industry, these are vegetable oil-based, so they're not harmful. There are industrial pumps that have hydraulic oils that would be unsafe." If a leak or break occurs, the results could be catastrophic to fish and plant health.

On the cover

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Built at a Pittsburgh, Pa., residence, this total water feature consists of three ponds, four waterfalls, a 75-foot stream area, dozens of aquatic plants and koi. It is equipped with an Aquascape biological filtration system. It consists of four skimmers, three biofalls and four 1 hp pumps.

Location and tubing size

Obviously, an important decision to make is whether the pump will be placed in or out of the pond. Joe Sokol, of Fourth Generation Nursery in Massachusetts, says that the nature of the pond and whether it has a skimmer or not often determines the style of pump. "For a koi pond, everybody wants an outside-of-the-pond pump. If it's going in the bottom of the pond, it's got to be a solids-handling pump, but if it's going into a skimmer, it doesn't necessarily need to be a solids-handling pump, but you have to consider head height. If it's a replacement pump, the most important factor is the size of the tubing that you're already working with. As more ponds are built, more people are just replacing a pump, but there's already a tubing line there. They need to make sure that the tubing sizes are correct."

Electrical availability

Sokol emphasizes the importance of knowing what the amperage is of the pond's service receptacle and what else is on the circuit. This is especially important when upsizing a pump. "A lot of the larger pumps have a startup amperage of 15 or 16 amps, the running amps may be only 7 or 8, but now you're talking about needing at least 15 amps or higher. You may need 20 amps, but what else is on that same line? Just because you have 20 amps going out there doesn't mean that it's available. You don't want to trip it."

Flow rate and head height

Figuring out what sort of flow rate you need is important and not just to circulate and cycle the water effectively. Flow also affects the aesthetics if the feature has visibly moving water. Head is the maximum height a pump can lift water from the surface of a pond. A formula for calculating total head height, suggested by 123ponds.com, is: "Take your horizontal length and count 1.5 per 10 feet of distance, so 20 feet would be 3.0. Add that number to your total vertical height [and] keep your elbows, couplers, etc., to a minimum. Each one you add will increase your total dynamic head." Once you know your total head height, you can reference the flow-rate charts provided by the pump manufacturers to see what the flow rate is at that level of head height.

Efficiency, price and warranty

Dan Berg, from Laguna, a manufacturer of pond hardware and supplies, cites desired head pressure as a chief consideration in what style of pump to

Factors for choosing the correct pump:

1. Total amount of water the feature holds. Every square inch of water in a koi pond should be turned over at least once every two hours for proper oxygenation.
2. Width and length of waterfall. Need enough water volume coming over falls area to create the desired effect.
3. The total dynamic head. The linear footage and elevation difference from the pump to the waterfall source.

4. Where the pump will be housed, whether it be a pump vault or skimmer box. A pump should never be placed in the bottom of a pond unprotected. It will suck up debris and cut the life expectancy of the pump in half.
5. Always double-check your figures with the manufacturer or distributor. They will have the inside information about their products.
6. A pump should have at least a two-year warranty.

Courtesy of Jeff Blunkosky, CEO Pittsburgh Stone and Waterscapes.

choose, but stresses that electrical efficiency is often overlooked. "When pumps are continuously run, the electrical consumption can be a lot more than people think about in the long run. When you look at a mag drive pump, you do give up a little bit of head pressure, but you gain so much more in electrical efficiency. I think mag drive is the best way to go in any kind of a small application, like a smaller-type fountain. It's different when you get into big waterfall features and you're moving a tremendous amount of water. I always tell people that the one thing you should do your homework on is the pump. It's the one thing that comes back to visit you every month in the form of an electric bill."

Berg says that if a manufacturer is confident about a pump, "They're going to stand behind it with a good warranty, and that in itself is a selling point for most pumps when it comes to any application, whether it's for a pond, a fountain or a waterfall."

Waterfall size

Erik Wicklein of Wicklein's Water Gardens in Baltimore, Md., says waterfall width and whether or not the pond has a skimmer are his initial concerns. "Usually, as far as the size, I'll do a 1,000 to 1,500 GPH pump for every foot of width I have in the waterfall. If we're putting a skimmer in, we'll use a sump pump-style Daner PondMaster Hy-Drive. If we're not using a skimmer, I like the PondMaster Mag-Drive, and they've got a three-year warranty."

Wicklein also says, "I always tell people to get a diverter valve so you can put the flow rate right where you want it." He adds that a diverter valve also can be used to divert water more slowly into a UV sterilizer because, "a lot of times your waterfall pump is too strong."

Other factors

For many pond owners, pump noise is an issue. In a quiet location, a loud pump can interfere with enjoyment of the water feature. The closer the pump is to areas where people gather, the more important this becomes. Some pumps may produce heat while running. That may or may not raise the temperature of the water enough to affect fish health, but it may be an indication that the pump isn't as efficient as it should be. One of my main considerations in buying pumps is cord length. You

don't want to use an extension cord or have a receptacle conspicuously close to an ornamental water feature.

When you look at all the details and consider the specific circumstances of each water feature, pump selection shouldn't be too difficult. Remember, it's better to buy a bigger pump than you need and dial the flow down with a diverter than it is to buy a pump that falls short of the flow rate you need for your water feature. ■

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