



# pumps & electrical



Now, I'm going to tell you this story here today, but you gotta promise not to tell any of our new pond building employees, because we use it as kind of an introductory, initiating, "howdy from the guys," kind of experience.

## A Shocking Experience

We have an elderly customer who lives on the south side of Chicago. It's really a cool pond, one of my favorites. Due to its age, and the customer's preference, it has no GFCI (ground fault circuit interruption). I'm sure you know what's coming now. I went right to the skimmer to check out the pump, and as I put my hand down into the water, I received this, shall we say, shocking experience. It felt like I'd put my finger into an electric light socket. I got a buzz all right, but I had to be near the skimmer and pump in order to get its

full effect. If you get close, there's no mistaking what's going on.

In any case, for several years now we have gone out of our way to send one of our new guys on that particular clean out, and we let him discover for himself, what a shocking experience cleaning out a pond can be. Actually, we give him specific instructions, telling him that the easiest way to clean this pond out is to reach right down into the skimmer water and grab out all the junk and debris. Now, the surprise obviously doesn't last very long, but we all get a "charge" out of it each and every spring.

*Ed Beaulieu*  
*Vice President of Field Research*





## Selecting the Proper Pump for the Job

You're just about finished with the project. The pond looks awesome and the homeowner is anxiously waiting to see the water make its way down the 70' long, 10' high, meandering stream and waterfalls. All that's left is to plug in the pump and let her fly.

The homeowner gets the go-ahead and plugs in the pump, and the birth of a new waterfall is about to begin. All eyes are fixed on the beginning of the stream to witness the first drop of water. The first drop of water finally makes its way over the BIOFALLS® filter, and then the second drop, the third... wait a second... the waterfall looks more like a leaky faucet than the beautiful cascading falls that you promised your clients.

You frantically call the Aquascape Technical Department and are stunned to find out that the pump you've selected is not capable of pushing enough water for the height and distance of this project.



### Determining the Best Pump for the Job

The pump included in each of the PRO-Fit™ System kits will provide the proper flow rate as long as the elevation change between the pond and the BIOFALLS® filter is 5' or less, and the pipe run is no longer than 50'.

What if you want to create a custom project, one that has a long stream, multiple streams, or extra wide waterfalls? Maybe you've come across a client that has a 10' drop in their backyard, similar to the scenario described in the first paragraph, and you salivate at the thought of the waterfalls that you can create. Before you bid this project, there are a few steps you need to take in order to make sure the right pump(s) is specified for the job.

### Establishing the Flow Rate

The first, and most important step, before you even begin to look for a pump, is to establish a desired flow rate for the waterfalls and stream.

For each foot of spillway width you need 1,500 gph of water flow. We have determined that this is a good “rule of thumb” for figuring the proper flow rate over a waterfall. This flow rate will help ensure that you have enough water to cover the entire width of the waterfall and stream.

#### Example #1:

If you're building a waterfall that is 2' wide, you want a pump that will produce approximately 3,000 gph.

#### Example #2:

If you're building a waterfall that is 10' wide, you want to bid a pump(s) that would produce a total of 15,000 gph.

This “rule of thumb” does not mean that the entire stream has to be the same width. Be creative by narrowing down the stream in spots to create racing rapids, or expand the stream slightly to create a babbling brook. From our experiences in the field, this rate provides an attractive amount of water, not so much that it's overpowering, and not so little that it looks like a leaky faucet.



*Rule of Thumb: We recommend trying to activate 1,500 gph of flow for every foot of waterfall width.*



### How Much Water Will the Pump Actually Produce?

Many people assume that a pump rated at 3,000 gph will always push 3,000 gallons per hour. This is far from true. In reality, under a light workload, 3,000 gph will typically be the most that this pump will push.

The pump, as soon as you subject it to higher waterfall heights or longer pipe runs, will push less and less water until it reaches its “shut-off height.”

The shut-off height, which is listed in our catalog for every pump, is the point at which the pump is exposed to such a high workload that it can no longer push any water...zero, zilch, no mas. Avoid the “leaky faucet” waterfall dilemma by using the shut-off height as a guideline. If your waterfall height comes near the listed shut-off height, you can quickly eliminate that pump from your selection.

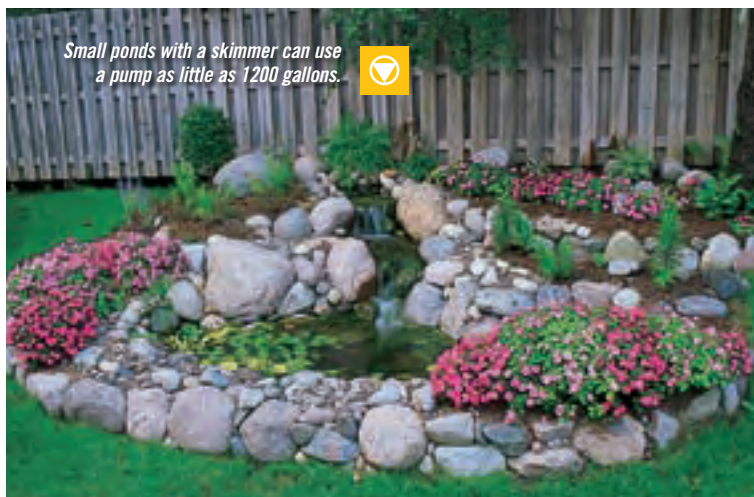
There are two basic factors associated with how a pump performs in a given situation:

#### Static Head

- In the world of hydraulics, the static head is the overall height that the pump is going to have to push.
- This refers to the elevation change from the surface of the lower pond, up to the spillway on the front of the BIOFALLS® filter.

#### Friction Head

- The amount of resistance caused by the plumbing.
- It’s affected by the diameter of pipe, the type of pipe, and how many fittings are used.



All of the factors listed above provide resistance to the pump, and unfortunately, contribute to an overall reduction in water flow. The products we recommend, such as flexible PVC pipe, help reduce friction by eliminating the need for multiple 90 degree and 45 degree elbow fittings that are normally required with rigid pipe, thus allowing the pump to push more water.

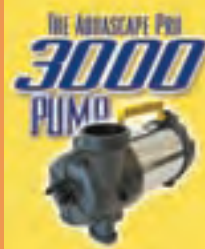
#### What Is Total Dynamic Head?

The two resistance factors, static head and friction head, combined with the flow rate of a chosen pump, will help you compute the total dynamic head or TDH.

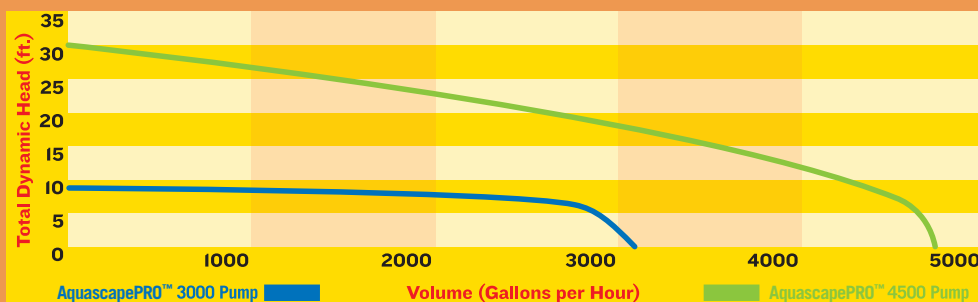
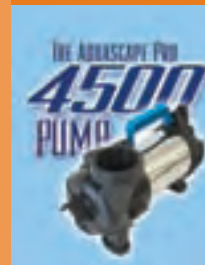
The TDH is extremely important in order to determine how much water the pump is actually going to push under a given circumstance. We have found many useful sites on the Internet specializing in pumps and pump performance. A few of these sites, such as [www.pumpworld.com](http://www.pumpworld.com), contain TDH calculators and will quickly compute the amount of resistance a pump will be up against. Using these calculators is a heck of a lot easier than doing the calculation by hand.

# How to Read a Pump Performance Chart

Performance from the AquascapePRO™ 3000 Pump	
Flow Rate @ 5 ft. Head	2,900 gph
Flow Rate @ 10 ft. Head	2,000 gph
Watts	280
Operating Cost	\$20.43/mo.
Volts	120
Max Amps	2.6
Shut-off Height	18 ft.
Discharge	2" female
Cable length	20 ft.



Performance from the AquascapePRO™ 4500 Pump	
Flow Rate @ 5 ft. Head	4,500 gph
Flow Rate @ 10 ft. Head	3,800 gph
Watts	625
Operating Cost	\$45.60/mo.
Volts	120
Max Amps	5.4
Shut-off Height	33 ft.
Discharge	2" female
Cable length	20 ft.



▲ TDH chart for our sample pumps above.

Every pump manufacturer has performance charts based on TDH (Total Dynamic Head) for each of their pumps (see performance chart). These charts list the flow rates for a pump when exposed to different levels of TDH, allowing you to calculate the approximate flow rate the pump will produce. Please feel free to call the Aquascape technical department if you need a chart for a specific pump. We will be more than happy to fax or mail one to you.

Once you've figured out the TDH, you can easily determine if that pump will meet your 1,500 gph per foot of spillway requirement. If it will produce too little, you may want to try the next larger pump. If it is too much, you may want to drop down a pump size. The key is to get as close as possible to the target flow rate.

**Example:** Let's take a scenario and try to pick out a pump. Let's say the pond is going to be 11' x 16' and 2 feet deep. The stream is 70 feet long (approximately 80 feet of pipe), 10 feet high and is, on average, 2 feet wide.

• **Determine your goal:** We are looking for 1,500 gph for each foot of spillway width. So, since this stream is 2 feet wide, we want to get approximately 3,000 gph out of the pump at the top of the stream.

• The 11' x 16' PRO-Fit™ System comes with a 3,000 gph pump (the AquascapePRO™ 3000). *Remember, the performance of the pumps listed in the catalog are based on waterfalls that are 5 feet or less in height, and pipe runs of 50 feet or less, so we'll want to make sure this pump can handle that scenario.*

PUMP FLOW RATE (GPH)	PIPE DIAMETER (IN.)	PIPE LENGTH (FT.)	DIFFERENTIAL ELEVATION (FT)	PIPE MATERIAL	TOTAL DYNAMIC HEAD (TDH)
3000 GPH	2"	80 FT	10 FT	PLASTIC (PVC)	14 FT

▲ TDH Calculators can be found on the web like this one from [www.pumpworld.com](http://www.pumpworld.com)

• **What flow rate do we actually get?** Simply enter into the TDH calculator (found on the Internet at [www.pumpworld.com](http://www.pumpworld.com)), the overall height (10 feet), pipe run and diameter (80 feet of 2 inch pipe), and the maximum flow rate for the AquascapePRO™ 3000 (3,100 gph). The calculation comes out to approximately 14 feet TDH. Using 14 feet of TDH on the AquascapePRO™ 3000 performance chart, you will notice that the pump will produce approximately 1,000 gph (nowhere near the design goal of 3,000 gph). Good thing we checked.

• **Try a bigger pump:** Let's try the AquascapePRO™ 3000's "bigger brother," the AquascapePRO™ 4500, to see if it is more suited for this application. The AquascapePRO™ 4500 pushes 4,500 gph under light load circumstances, but is capable of pushing a much higher TDH than the AquascapePRO™ 3000 (33-foot shut-off vs. 20 foot shut-off).

• **What flow rate do we actually get now?** The calculated TDH for the AquascapePRO™ 4500 comes out to 16 feet TDH. The larger volume of water through the 2" plumbing creates extra friction causing the TDH to go from 14 on the AquascapePRO™ 3000 to 16 for the AquascapePRO™ 4500. Based on the AquascapePRO™ 4500's performance chart at 16 feet TDH, the pump would push approximately 3,400 gph. It looks like the AquascapePRO™ 4500 pump will be close enough to our desired flow rate. Now we can feel confident when the pump is plugged in on this project, that we'll have the water flow needed to produce the beautiful cascading falls promised to your client.

# CONSTRUCTION GUIDELINES



## How Using Multiple Components Can Affect Pump Usage

The K.I.S.S. philosophy we follow would indicate that we should always go with a single pump. After all, this is a heck of a lot simpler than using multiple pumps, right? Not always. There are many times where multiple pumps are necessary, or are better than using just one pump.

### Large Water Volume

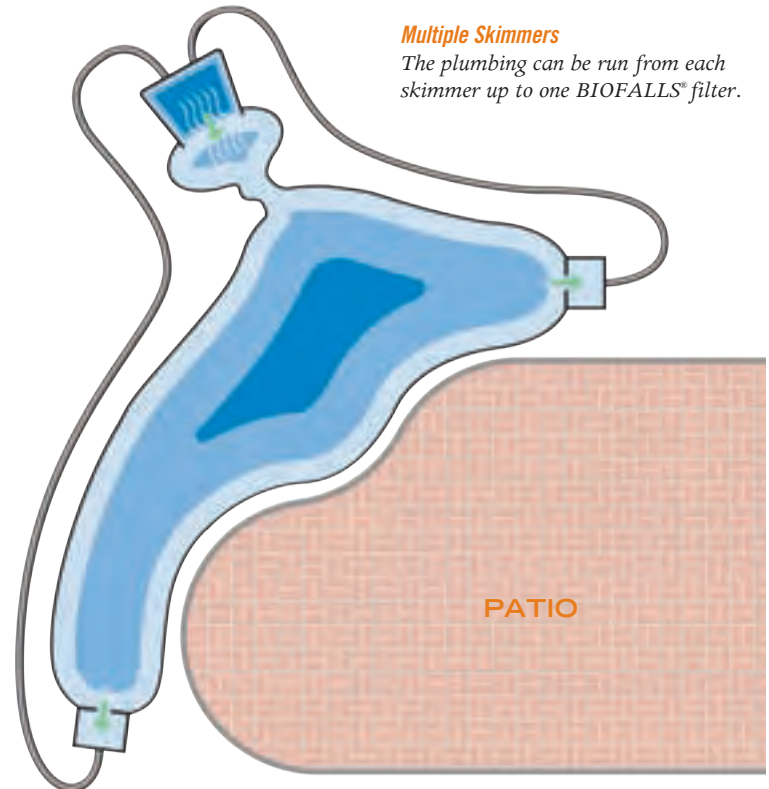
You may come across an area that would just look great with a large waterfall or long, fast-running stream. Your mind goes to work thinking of all of the possibilities. You sit down to calculate the water flow that you'll need to achieve the desired look. You say out loud, to no one in particular, "Boy, do I need a lot of water coming down this waterfall to make it look good!" Actually, a project like this may require multiple pumps. And, believe it or not, two pumps can be better than one big one. Why?

What if the pump breaks down? If one large, special-order pump fails for any reason, the waterfall must be completely shut down. Designing the pond with two pumps allows the waterfall to still operate, even though one of the pumps has failed.

### Multiple Skimmers

Or maybe you've designed an irregular shaped pond – one that bends and curves around a brick patio (see diagram). The unique design does not allow you to place the BIOFALLS® filter on one end and the skimmer on the opposite end like you normally would. Instead, the waterfall is placed along the backside of the pond and skimmers are put at opposite ends of the pond to reduce any skimming "dead" spots, as well as to handle the excess leaf debris caused by the mature trees in the area. Having two skimmers requires the use of two pumps.

- The plumbing can run from each skimmer up to one BIOFALLS® filter.
- One plumbing line can be connected to the existing bulkhead fitting provided with the BIOFALLS® filter, and the other can be run into a second bulkhead fitting purchased separately (see diagram).
- Now, all that's needed to install the second bulkhead is a drill and a 3" hole saw. It takes a matter of seconds to drill another hole in the back of the BIOFALLS® filter for the second plumbing line.



### Multiple Skimmers

*The plumbing can be run from each skimmer up to one BIOFALLS® filter.*



## Use a Grande Skimmer for Multiple Pumps

Grande skimmers are great for installing a combination of pumps. The Grande skimmer's vault size is approximately three times bigger than the large skimmer. The size of the Grande skimmer allows the use of two pumps in one skimmer.

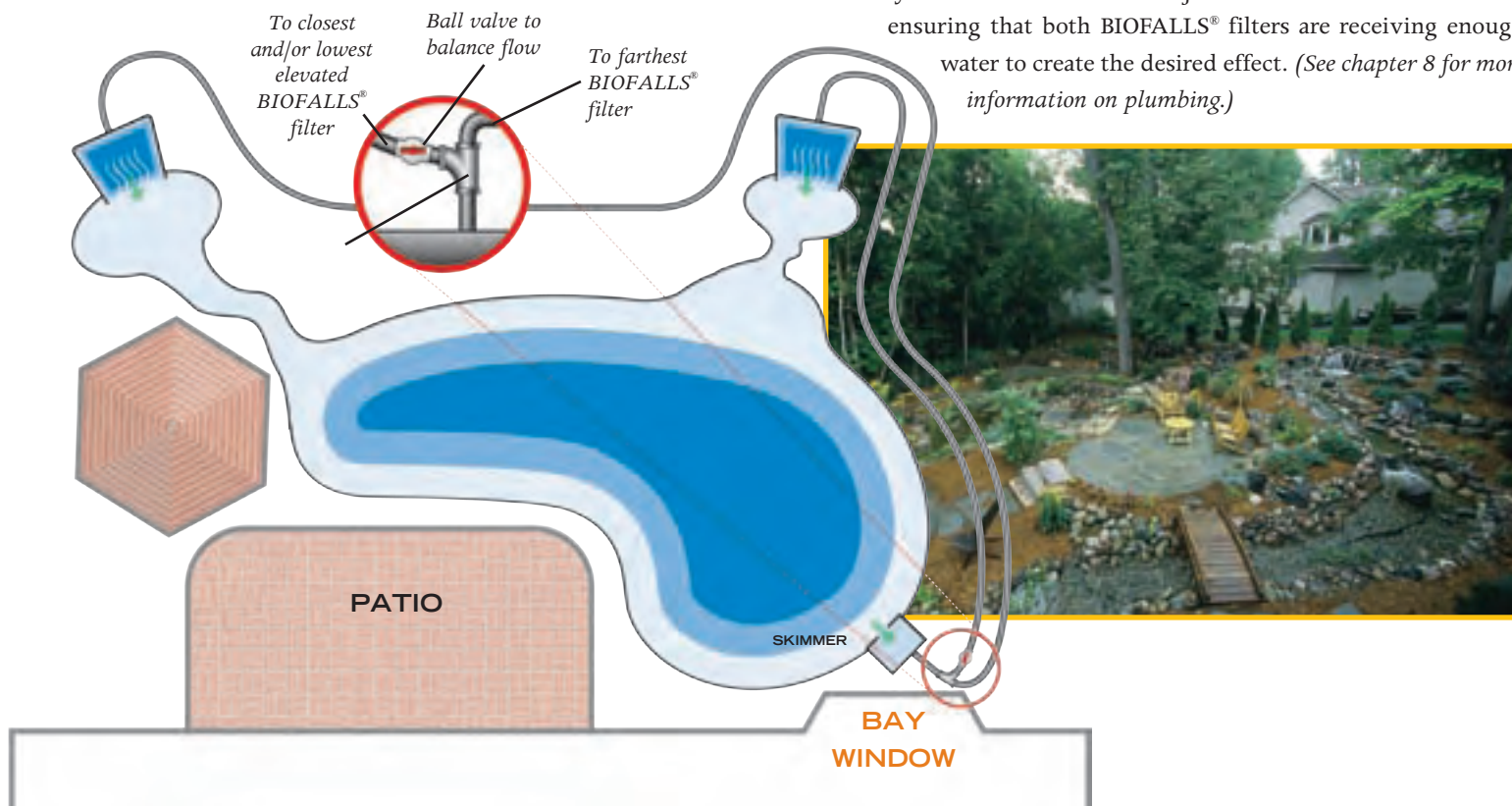
- It is capable of handling up to 20,000 gph so you could easily install two Aquascape 9500 pumps in one Grande Skimmer, and ideally provide 19,000 gph to the top of your waterfall and stream.
- That's enough water to make a nice 10 to 12' wide waterfall (based on 1,500 gph/ft. of waterfall width).

## Multiple Waterfalls/Streams

Now you need to build a pond with multiple waterfalls. The client wants to be able to see the waterfalls from the bay window by the dining room table, but also wants a waterfall near their gazebo in the

backyard. What's a contractor to do? It sounds as though you need two BIOFALLS® filter! (See diagram below)

- Use a BIOFALLS® filter to start off each of the waterfalls/streams. The use of two BIOFALLS® filter doesn't always mean you have to use two pumps. Using a few plumbing fittings allows one pump to supply water to both BIOFALLS® filter.
- Just make sure the pump is big enough to achieve an adequate flow over both waterfalls.
- The pump's plumbing can be split into two lines right behind the skimmer using a 2 x 2 manifold assembly (see inset). Simply run one line to each of the BIOFALLS® filter.
- Remember, the flow rate will be affected if one of the two plumbing lines connected to each of the BIOFALLS® filter is shorter and/or doesn't have as much elevation gain as the other plumbing line. When the pump is turned on, the water will follow the path of least resistance. A standard ball valve can alleviate this problem. Connect the ball valve to the shorter plumbing line right after the manifold assembly. The ball valve can be adjusted to balance the resistance, ensuring that both BIOFALLS® filters are receiving enough water to create the desired effect. (See chapter 8 for more information on plumbing.)





# Electrical Costs

## Keep It Real Man!

This is something that the Technical Agents at Aquascape address daily when working on designs. Quite frankly, it's kind of a "head-slapper" once it's pointed out. We refer to it as "realistic waterfalls/streams."

It's safe to say that the majority of homeowners want a pond and waterfall for the relaxing natural character it brings to their yard. They imagine themselves kicking back on their deck or patio, while the soothing sounds of the waterfall numb the stresses of everyday life. However, there are some who want a 10 or 15' wide gusher of a waterfall, racing it's way through their backyard. This can be done, but there is a price to pay ... electricity. Unfortunately, electricity costs money. The more water you push, the more electricity it requires.



## Multiple Pumps

When you start getting into multiple pumps to push enough water to fill large waterfalls and streams, you start talking about a significant electrical cost per month just to operate the pumps. For those with an infinite income, this may not be an issue. But for most people, this is not a realistic waterfalls/stream design. Contractors quickly slim down the size of the waterfalls when Aquascape's Technical Department informs them that it will cost Mr. and Mrs. Jones approximately \$175 per month to run their pond.

Typically, The Pond Guys™ install streams/waterfalls at a varying width of 2 to 4'. This seems to fit well into most backyards, isn't overpowering, and doesn't require a second income to operate the pump.

Understanding proper pump selection will help instill confidence when bidding jobs, allowing you to become more creative in your designs. The greater variety of ponds you build, the more experience you'll have working with different pumps. Being able to identify and avoid the common pitfalls in project design and pump selection will make the designing/building aspects of water feature installation more enjoyable and profitable.

*The head pressure was the biggest challenge!*



*Large pumps can produce beautiful high volume waterfalls. Keep in mind that they also can be costly to operate.*

## Always Use a Qualified Electrician!

There are a number of reasons why Aquascape strongly recommends using a qualified electrician to install the electrical supply for the pond.

### Safety

A professional electrician is responsible for understanding and practicing all codes and regulations required for outdoor electricity.

### The Right Materials

It is extremely important that the correct materials be used in order for the electrical devices, such as the pumps, to perform properly. Using the wrong electrical components can cause premature pump failure.

### Quality

A professional electrician will install components that are rated for outdoor use, and provide long lasting, trouble-free service.



### Liability

Bottom line, you can't afford the risk of installing the electrical yourself unless you or someone on your staff, is a qualified electrician.

## Placement of the Electrical Source

The ideal location for a permanent electrical supply is near the back of the skimmer. The outlet should be close enough so the power cord for the pump can easily reach the outlet. The transformer for the lights will also need to be mounted near the outlet if the pond is going to have underwater lighting.

Keep in mind that the pond owners won't want to see the electrical box from the pond's viewing area. Try to have the electrician position the outlet in an area so that it can be easily camouflaged with objects such as plants, boulders, driftwood, or other landscape materials.

## What Kind of Electrical Supply Should Be Installed?

### Volt

A unit of electrical measurement, volts measure the ability of an electric field to give energy to electric charges. The vast majority of pumps used for residential applications will require 115 volt, standard household





*Every waterfall will have a unique head pressure which will effect how much water gets pushed and how much it costs to run. The higher the head, the less the flow, the cheaper it becomes to run the pump.*



electricity. Ponds and waterfalls for commercial sites or large residential applications may require large pumps that operate on higher voltage, such as 230 volt. The electrician will review all of the pump specifications to make sure the proper electric supply is installed for the application.

### Amperes

Amperes are the units used to measure the rate of flow of an electric current. Typically, the requirements of one pump and a light transformer will need no more than a 20 amperes circuit. The electrician, after reviewing all of the electrical devices being plugged into the outlet, will know how many amperes will be required.



### Ground Fault Circuit Interrupter (GFCI)

The National Electrical Code requires GFCI protection of receptacles located outdoors and in bathrooms, garages, and spa areas. The GFCI provides protection against overloads, short circuits, and ground faults. It detects very low levels of electrical current leaks (ground faults), and acts quickly to shut off power, preventing serious shock.

Most GFCI protectors have a spring-loaded breaker button. When the GFCI senses a problem, the breaker button is “tripped.” The breaker button needs to be manually reset in order for the power to be re-established to the outlet. The breaker button will trip again if the electrical problem still persists. Continuously tripping breakers indicate that there is an electrical problem. Call an electrician if the GFCI continues to indicate there is a problem.

*esp* ¿Cuándo se debe instalar permanentemente el sistema eléctrico?

## When should the permanent electrical be installed?



Quite often the future pond owner wants to get things started in the yard well before the day their pond is scheduled to be installed. Explain to them that they will want to wait until after the pond is built to have the electrician install the electric power. Why? It's fairly simple. Imagine if you will, the electrician coming out to the site, spending labor to bury the conduit to the proposed location of the skimmer, and install the GFCI outlet on a post. Now, imagine yourself a few days later, digging the skimmer hole in the ground and coming upon a large boulder, tree root or other difficult object to remove. The easiest thing to do might be to move the skimmer to a different location. Unfortunately the electric is already installed where the skimmer is supposed to be. Bottom line, it is much easier for both the pond installer and electrician if the electric is installed after the pond is in place.

### Who is responsible for the electric?

As a contractor, this is up to you ... but let us give you some advice from our own experience. We used to subcontract the electric for the customer. We thought of this as an added convenience to the client. The only problem was the enormous amount of time lost trying to coordinate with the electrician to get the job completed. Multiple job site visits with the electrician became extremely frustrating, and above all, a waste of time that could be spent on other, more profitable aspects of the business.

Now, we simply let the homeowner know that they are responsible for contracting an electrician. To this day, we have had no complaints. We ask the homeowner to have an extension cord on hand the day we build the pond, in order for us to plug in the pump and underwater lights. After the pond is completed, they can call an electrician of their choice to complete the permanent electrical.

*esp* *Frecuentemente los dueños futuros de estanques quieren hacer muchas cosas en su jardín antes de que el estanque este terminado. Explícales que es mejor esperar hasta que se construye el estanque antes de traer al electricista. ¿Por qué? Es bien sencillo. Imagínes que el electricista llegue a su casa, termina con todo el trabajo electrónico y al terminar descubre que hay muchas raíces donde se va a instalar el skimmer. Lo más facil seria mover el skimmer al otro lado, pero si toda la electricidad ya está instalada, esto va a complicar la situación enormemente. Por está razón es importante seguir paso por paso.*

### ¿Quién es responsable por la electricidad?

*Como contratista, esto es determinado por Ud. ... pero por medio de nuestra propia experiencia le damos un consejo. Antes nosotros subcontratamos el electricista para el cliente. Pensabamos que era más conveniente y agradable para nuestro cliente. El problema fue tiempo enorme que tomó para coordinar todos los detalles con el electricista. Múltiples visitas al sitio de trabajo con el electricista llegaron a ser extremadamente frustrantes, y sobre todo, una perdida de tiempo que podría haber sido invertido mejor en otros aspectos del negocio.*

*Ahora le decimos a los dueños que ellos son responsables para contratar a un electricista. Hasta ahora no hemos tenido quejas. Pedimos que el dueño tenga una extensión en mano el día que construimos el estanque para poder conectar la bomba y las luces submarinas. Después de completar el estanque, ellos pueden llamar a cualquier electricista para terminar la electricidad.*

### Common Reasons for a GFCI to Trip

*There is an electrical malfunction in whatever is plugged into the outlet.*

- Remove all electrical devices from the GFCI outlet. Reset the breaker button and, by process of elimination, plug in each electrical device until you are able to determine what is tripping the GFCI.
- To be more precise, an electrician is capable of using equipment to confirm if there is a ground fault (electrical malfunction) in the electrical device.

*There may be a malfunction within the electrical system itself.*

- There quite possibly could be a problem such as a short in the wiring or a problem with the GFCI. This can be confirmed by plugging other electrical devices into the GFCI outlet to see if they trip the breaker. Call the electrician if the GFCI trips no matter what is plugged into it, since this indicates there is something wrong with the electrical supply.

*The GFCI is not working*

*properly and is falsely tripping.*

- GFCI breakers are designed to cut the power in the blink of an eye if electrical fluctuations of as little as .005 amperes are detected. Because the GFCI is so sensitive, it is most effective when wired to protect a single location. The more outlets any one GFCI protects, the more susceptible it is to phantom tripping or shutting off power because of tiny, but normal, fluctuations in current flow.
- GFCI breakers can also be tripped by occurrences such as electrical storms and by moisture from rainfall. It is important that the outlets for the GFCI be kept dry and protected from the elements. Most GFCI's rated for outdoor use come with a protective cover.

*Some GFCI's are more sensitive than others.*

- It may be that the GFCI is too sensitive. It is normal for continuous running motors, such as pumps, to sometimes have small electrical fluctuations. Sensitive GFCI's may detect this and falsely trip. You may want to have the electrician try a new GFCI or a different brand of GFCI if this problem persists.



### **esp** Razones Comunes De Falla de un GFCI

*Hay un defecto electrónico en lo que está conectado al desagüe eléctrico.*

- *Se remueva todos los dispositivos eléctricos del desagüe eléctrico. Oprima el botón del fusible y, con el proceso de eliminación, enchufa cada parte eléctrica hasta que pueda determinar que es lo que está afectando el GFCI.*
- *Para ser más específico, un electricista es capaz de usar el equipo necesario para confirmar si hay un defecto eléctrico en el dispositivo.*

*Es posible que haya un defecto dentro del sistema eléctrico.*

- *Puede haber un defecto dentro del sistema eléctrico (GFCI). Podría ser un problema tal como un corto en el alambre o un problema con el sistema GFCI. Se puede confirmar esto enchufando otros motores eléctricos al enchufe de GFCI para ver si esos tropiezan (apagan o terminan la corriente electrónica) el sistema. Llame al electricista si el GFCI tropieza porque esto indica que hay algo mal en la fuente eléctrica.*

*El GFCI no funciona bien y tropieza indebidamente.*

- *Sistemas de GFCI están diseñados para cortar la corriente en un milise-gundo si hay fluctuaciones eléctricas tan poco como .005 amperios. El GFCI es muy sensible y es más efectivo cuando está diseñado a proteger un solo lugar. Entre más salidas protege el GFCI, más susceptible para que tropiece y apage la corriente a causa de fluctuaciones diminutivas pero normales. Sistemas de GFCI puede tropezar también por tempestades o humedad de la lluvia. Es importante que las salidas del GFCI sean mantenidas secas y protegidas de los elementos. La mayoría de los GFCI vienen con una cubierta protectora.*

*Algunos GFCI son más sensibles que otros.*

- *Puede ser que el GFCI es demasiado sensible. Es normal para motores con bombas que trabajan continuamente ocasionen problemas que son falsos con el GFCI. Si esto pasa pídale al electricista que pruebe el sistema o recomiende otro GFCI.*

**esp** Como Solucionar Fallas de la Bomba

## Troubleshooting Pump Problems

The pump can be called the “heart” of the pond. Without it, the relaxing, rushing sound of the water over the rocks would not exist. The fish and the filtering bacteria in the BIOFALLS® filter, also depend on the pump to provide fresh, oxygenated water. Thankfully, all of the pumps Aquascape carries should provide three or more years of maintenance-free service in the pond. Our own construction crew has had pumps last over five years... not too bad.

Regardless, sooner or later you will have to go out and replace the pump. Hopefully, all of the pumps you install will perform for a number of years without a problem. You do, however, want to be prepared for the unusual case when a relatively new pump is experiencing problems. How can the pump not be working? Odds are the pump is actually fine, there is just some troubleshooting that needs to be done.

The troubleshooting steps listed in this chapter will help you quickly identify and solve the problem with a failed pump.

**esp** Los pasos en este capítulo le ayudarán identificar y reparar fallas en la bomba en poco tiempo.

### Proceed With the Following Actions Until the Problem Is Found

- First of all, is the pump receiving water? This sounds like an obvious question, but we have had clients call and state that their pump is not working only to find that they haven't added water to the pond in the past few weeks and the skimmer ran dry. The pump in this situation may actually be running, but just not receiving enough water. A lot of times you can actually hear the “hum” or “gurgle” of the pump while it's in the skimmer.



Photo by Mark Pastor

### **esp** Proceda con las siguientes acciones hasta encontrar el problema

- *Ante de todo, ¿la bomba recibe agua? Parece una pregunta obvia, pero hemos tenido llamadas de clientes que tienen problemas con sus bombas y al llegar encontramos que no han añadido agua al estanque y se secó el skimmer. En este caso, puede ser que la bomba está funcionando pero sin recibir suficiente agua. Muchas veces se puede escuchar el ruido o jemido de la bomba mientras está en el skimmer.*

- Make sure nothing is blocking the flow of water to the pump, such as large boulders, debris blocking the front of the skimmer opening, a clogged skimmer net, or clogged skimmer filter mat that has not been emptied or cleaned in a long time.
- The pump may be vapor locked. This term sounds complicated, but it simply means that air is trapped in the volute of the pump. The pumps are designed to push water, not air ... so an air bubble gets trapped, and the pump becomes vapor locked. In this situation the impeller is basically spinning, but water is not being pushed. Listen to see if you hear the hum of the pump. A vapor lock can be fixed by tilting the pump to allow the air to escape from the intake. You may even be able to accomplish this without disconnecting the fitting on the end of the check valve.

*esp* Asegúrese que nada bloquea la corriente del agua a la bomba, como piedras grandes o escombros, que se encuentran en frente de la boca del skimmer, una red sucia del skimmer, escombros bloqueando el filtro del skimmer que no se haya limpiado o vaciado en mucho tiempo.

- Puede ser que la bomba se apagó debido a vapor. Suena complicado pero simplemente significa que el aire está atrapado dentro de la bomba. Las bombas son diseñados a empujar agua, no el aire...una burbuja de aire sea atrapa y la bomba se apaga por vapor. En está situación el succionador hidráulico gira, pero no empuja el agua. Escuche para ver si se oye el ruido de la bomba. Una apagado de vapor se puede reparar inclinando la bomba para permitir que el aire escapa. Ud. puede hacer esto sin desconectar el ajuste en al final de la válvula de chequeo.

Make sure the skimmer net and filter pad are not clogged.



- It is also effective to check and see if the electrical supply is operating properly. Premature pump failures can occur due to faulty electrical supplies. For example, pumps hooked up to extension cords may cause potential problems. While this electrical setup usually works for testing the pump soon after the water feature is built, it is not recommended for permanent installations, and may end up causing the pump to fail. Using an extension cord, especially one over 25 feet long, may cause irregular power to the pump. The voltage and amperage supplying the pump may be affected, causing performance problems with the pump, and possibly reducing the pump's lifespan. Always insist that the homeowner have a qualified electrician install the electric to the pond.



*esp Es también eficaz comprobar y ver si el sistema eléctrico está funcionando apropiadamente. Las fallas prematuras de las bombas pueden ocurrir debido a problemas eléctricos. Por ejemplo, las bombas conectadas a las extensiones pueden causar problemas potenciales. A veces si usa una extensión puede funcionar para examinar la bomba pronto después de que se construya el estanque, pero no se recomienda para las instalaciones permanentes, y puede hacer que la bomba falle. Usando una extensión, especialmente una mas de 25 pies de largo, puede reducir la cantidad de potencia eléctrica. El voltaje y el amperaje que mantiene la bomba se pueden afectar, causando problemas de funcionamiento con la bomba, y posiblemente reduciendo la duración de vida de la bomba. Insista siempre que el dueño de una casa contrate un electricista profesional instale el sistema eléctrico a el estanque.*

- Check the electric box to see if the safety breaker on the ground fault circuit interrupter (GFCI) has tripped. The proper electrical setup for the pond should include a GFCI outlet. The GFCI's responsibility is to shut the power down if it senses an electrical problem. The GFCI is a safety device installed to protect people from receiving a shock in case of an electrical malfunction. GFCI's are very sensitive and can sometimes trip during a thunderstorm or a power surge. Reset the breaker if it has tripped.

*esp Chequee la caja eléctrica para ver si el interruptor de seguridad en el circuito a tierra (GFCI) ha sido activado. El arreglo eléctrico correcto para el estanque debe incluir una salida de GFCI. El GFCI es responsable para apagar la electricidad cuando presente un problema eléctrico. El GFCI es un artefacto de seguridad instalado para proteger a la gente de un choque electrónico en caso de una falla electrónica. El GFCI es muy sensible; es posible que sea activado durante una tormenta o una variación repentina de la corriente. Si ha sido activado devuélvelo a su posición normal.*







- Unplug the pump and disconnect the union fitting found at the top of the check valve. The water will back-flush from the BIOFALLS® filter back into the skimmer. This will help flush out any possible clogs along the length of the pipe.

*esp* Desconecte la bomba y desconecte el ajuste de la unión que se encuentra encima de la válvula de chequeo. El agua regresará para atrás limpia del BIOFALLS® entrando al skimmer. El chorro de agua ayudará sacar posibles obstrucciones a la largura del tubo.

- Pull the pump out of the skimmer and inspect the intake of the pump for any lodged debris. Aquascape pumps are capable of handling solids and debris up to a reasonable size, typically  $\frac{5}{8}$ ". On some occasions, debris may become lodged in the impeller (housing) of the pump. This could possibly seize up the impeller or restrict the flow, causing the pump to stop operating properly. Thoroughly check the pump intake, including the area above the impeller where small debris, such as gravel, may be trapped.
- Plug in the pump after inspecting it for debris, and see if the impeller spins.

*esp* Saque la bomba del skimmer e inspeccione la toma de la bomba para posibles escombros. Las bombas de Aquascape pueden procesar sólidos y escombros hasta un tamaño razonable, típicamente  $\frac{5}{8}$ ". En algunas ocasiones, los escombros pueden fijarse en el "volute" de la bomba. Esto posiblemente podría agarrar el succionador hidráulico o restringir el flujo causando una operación incorrecta de la bomba. Chequee completamente la toma de bomba, incluyendo el área arriba del succionador hidráulico donde escombros pequeños, como grava, pueden estar atrapados.

- Conecte la bomba después de buscar los escombros y ve si el succionador hidráulico giro.





- If the impeller does not spin, unplug the pump and try to assist it by using a screwdriver or similar tool to give it a little kick start. On some occasions, the impeller may seize up and not spin. This sometimes happens after the pump has been out of operation for a period of time (such as over the winter). Hopefully, the pump will then begin to operate after it is plugged back in. Once it starts back up on its own, you'll want to unplug the pump again, wait a few seconds, and plug it back in. The impeller should begin to spin without assistance this time.

*esp Si el impeller no gira, desenchufe la bomba y trate de darle vueltas usando un destornillador o una herramienta similar para ayudarlo arrancar. En algunas ocasiones, el impeller puede atorarse y no girar. Esto sucede a veces después de que la bomba no se ha usado por un tiempo (por ejemplo sobre el invierno). Posiblemente, la bomba comience a funcionar después de que se vuelva a enchufar. En cuanto comience a funcionar sola, usted debe desenchufar la bomba otra vez, esperar algunos segundos, y vuelva a enchufarla. Esta vez el impeller debe comenzar a girar sin ayuda.*

- If you still have no luck, bring the pump over to a different electrical receptacle on the property, specifically one that contains a GFCI breaker, and see if the pump operates. This will tell us if the pond's electrical supply is bad, or if there is something internally wrong with the pump. If the pump trips this GFCI, then there is definitely something wrong with the pump, and it should be replaced. However, you'll want to have a qualified electrician come out and check the pond's electrical setup if the pump runs without a problem on another outlet.

*esp Si aún no tiene suerte, lleve la bomba a un enchufe eléctrico diferente de la propiedad, específicamente uno que tenga un GFCI, y ve si la bomba funciona. Esto nos dirá si el suministro eléctrico del estanque está mal, o si hay una falla interna en la bomba. Si la bomba activa el GFCI, entonces definitivamente hay una falla con la bomba, y se debe reemplazar. Sin embargo, Ud. querrá conseguir un electricista calificado para chequear el arreglo eléctrico del estanque para ver si la bomba funciona sin problema en otro enchufe.*



Hopefully, through these steps, you have found the source of the problem and corrected it. You will most likely have to replace the pump if you are still having problems getting proper performance.

*esp Esperamos por medio de estos pasos, Ud. habrá encontrado la raíz del problema y haberlo corregido. Probablemente Ud. tendrá que reemplazar la bomba si aún tiene problemás obteniendo el funcionamiento correcto.*



### Warranted Pumps

All of Aquascape's pumps are covered under warranty (length of warranty depends on the pump model). This warranty covers any mechanical failure within the pump that causes it to perform improperly. Please keep in mind that this warranty does not cover damage or defects due to mishandling, improper installation, improper electrical setup, or debris damaging the pump or impeller.

Aquascape pumps generally provide service for approximately three or more years.

There are typically two reasons that most submersible-style pumps fail.

- The first is due to the seals on the pump failing. This allows moisture to enter into the pump. The GFCI will sense this moisture and will trip the breaker, cutting off the electrical supply to the pump.
- The second reason may be due to bearing failure, which would explain the problems with the impeller failing to spin when the pump is plugged in.

Aquascape continues to work with our engineers and pump manufacturers to reduce our return rates and further increase the lifespan of our pumps. Our ultimate goal is to furnish a pump that will provide years of trouble free service!



### The Pump Is Broken, Should I Get It Fixed?

Our recommendation, which is strictly based on cost, is to replace the used pump with a brand new one. The pumps we recommend and sell are not extremely expensive. By the time you take the pump to a repair shop, pay for the initial inspection, and pay for the cost of parts and labor, you'll



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have a bill for at least half of the cost of a new pump, if not more. When the pump finally fails, simply replace it with a new pump. Most honest pump repair shops will tell you the same.

### Multiple Pump Failures on the Same Installation

From time to time, Aquascape's Technical Department will get a call from a customer who has repeated problems with a particular pump on the same job. "This is the second pump we've installed and they just won't last more than a year." Odds are that something unique to this pond's application is causing these pumps to fail. Have a qualified electrician check to make sure the electrical supply to the pump is sufficient. More often than not, improper and insufficient electrical supply is the cause of such repeated failures.

If you've purchased a "special order" pump (larger pumps that are not listed in our catalog), you'll want to double check to make sure that the pump is suited for the application. Certain special order pumps are designed to operate at higher workloads with longer pipe runs and high elevation changes.

We do see pump failures caused by placing large pumps on ponds that have little, if any, workload. The pump simply doesn't have the resistance it needs to work properly, and it burns out prematurely. We also see failures

caused by the opposite, too much of a workload. This can be avoided by specifying the right pump in the first place. We recommend calling the Aquascape Technical Support line for assistance if you have applications requiring special order pumps.

### Do the Pumps Require Maintenance?

No, the pumps do not require any specific maintenance. You may however, want to remove the pump from the skimmer if you live in a cold climate and shut the pond down in the winter. The pump should be stored in a bucket of water in a garage or basement

until it's needed the following spring. The water will help keep the seals lubricated.

Test the pump to ensure that it is working properly after being out of use for an extended period of time. You may need to assist the impeller with a screwdriver or similar tool on the initial start-up.



## Typical Parts of a Pump

