



Pool Pumps: Guidelines and Best Practices

VERSION 1.0

ISSUE DATE: JANUARY 2019

orfa.com



Building Community Since 1947

ONTARIO RECREATION FACILITIES ASSOCIATION INC.

1 Concorde Gate, Suite 102, Toronto, Ontario M3C 3N6, Canada

Tel: 416-426-7062 Fax: 416.426.7385

info@orfa.com www.orfa.com

COPYRIGHT © 2019 ONTARIO RECREATION FACILITIES ASSOCIATION INC.

DISCLAIMER: While the Ontario Recreation Facilities Association Inc. (ORFA) does its best to provide useful general information and guidance on matters of interest to its members, statutes, regulations and the common law continually change and evolve, vary from jurisdiction to jurisdiction, and are subject to differing interpretations and opinions. The information provided by the ORFA is not intended to replace legal or other professional advice or services. The information provided by the ORFA herein is provided “as is” and without any warranty, either express or implied, as to its fitness, quality, accuracy, applicability or timeliness. Before taking any action, consult an appropriate professional and satisfy yourself about the fitness, accuracy, applicability or timeliness of any information or opinions contained herein. The ORFA assumes no liability whatsoever for any errors or omissions associated with the information provided herein and furthermore assumes no liability for any decision or action taken in reliance on the information contained in these materials or for any damages, losses, costs or expenses in any way connected to it.

Introduction

The pool pump is an important piece of equipment needed to keep pool water clean, warm and hygienic. Pool operators must monitor pool pump condition to avoid malfunction. Any sign of wear should be immediately addressed. Manufacturers estimate the service life of a typical pool pump motor at 8-10 years.



Air Free Pump Operations

The pump is meant to operate air free, to create the necessary vacuum. After some time, you may notice air in the [pump basket](#), especially if you have a clear lid to observe such things. Air in the pump will reduce filtering efficiency, allow dangerous air to build up in filter, and can prevent your pump from catching prime (being able to move water). The problem is usually found in front of the pump, above-ground. Rarely do we have to look underground for the source of the air. The most common cause is the pump [inlet fitting](#) being loose, usually shrunken slightly from heat, or installed without thread sealant. Air in the pump basket can be caused by something as simple as the water level being too low in the pool. Also, if the [skimmer weir](#) is stuck in the up position, it will block the water and cause the skimmer to drain and take in air. Also check that the pump basket lid is secured very tightly and the O-ring is lubricated with [Teflon lube](#). Drain plugs without [Teflon tape](#), or missing an O-ring (used on some pumps) will also cause the pump to draw air.

Locating an Air Leak

Make sure the strainer lid is on tight, with a clean, lubed O-ring. Also check that all drain plugs are tight. This void will always be before the impeller. After the impeller is what we call "the pressure side". Any leak or void after the impeller will leak water out. Any leak or void prior to the impeller (in

front of the pump impeller) will draw air in when the pump is on. A pool pump will "pump" air if it can; it is the path of least resistance. So, your system needs to be almost airtight to run properly. A good trick in locating an air leak is to shut off the motor when it's under full pumping head pressure and look for water to spray back out of the void where the air was entering. You have to be quick to catch this spray-back, looking closely. If that didn't work, you can buy a Drain King at your local hardware store. This connects to a garden hose and puts the line under pressure. Push the Drain King into the skimmer, and close off other suction lines (skimmer and main drain valves). Remove the pump lid and use a plug or hold a tennis ball to plug up the pump entrance. Turn on the garden hose to allow pressure to build up in the lines before the pump basket and squirt out (or drip) at the source of the leak. You can also put the multiport valve on the Closed position, or close return side valves and pressure test the entire system in this way. If the operator finds water leaking anywhere before the pump discharge pipe, that is the source of the air. Make sure the water level in the pool is high enough, and that the skimmer weir is not stuck in the up position. Check that the incoming and outgoing valves are in the open position. If you suspect a clogged line, you can also use a Drain King to pressurize the line backwards from the skimmer towards the pump and remove leaf/debris obstructions.

Bearings

Bearings are the most vulnerable parts of the motor as these are the ones that are subject to more stress than any other part of the pump system. Bearings are vulnerable to shock, vibration, and corrosion. Once the sound of the motor experience abnormality, like a whirring sound, it's time to replace the bearings. It is recommended to replace both bearings (rear and front) at the same time. Bearings also need lubrication so as not to build up rust, especially when the pool and the pump are seldom used. There are [models of pool pumps](#) which are self-oiling and maintain the right lubricant to keep the bearings run smoothly under all conditions.



Impeller and Shafts

At times, the impeller washer, nuts and diffuser bolts have loosened or worn out and these clogged the system (in addition to large debris such as pieces of leaves, etc.). Impellers may naturally wear and require replacement. Pumps should always be run with enough water (called priming) on its suction side. Some pump models are self-priming while some are primed manually. In case the motor is run without water on the system, this may over speed the motor shaft because it has no medium that may slow down the speed. The motor should be shut-off immediately to avoid further damage to the system. This over speeding may cause the motor to overheat and burnt-out the windings if not corrected immediately. Some pumps are sealed with this type of seal placed in series with the impeller; this wears out with frequent use.

Clogged Pump Impeller

When your pressure is high, your filter is dirty, right? When your pressure is lower than normal, however, your pump basket is dirty. If the basket is clean, with pressure and flow still low or surging, there may be an air problem or the impeller may be clogged. Something prior to the filter is obstructed. A clogged impeller will still pump water, but only about half-speed. If there is a clear pump lid, the operator will notice abnormally slow swirling of the water, or the basket may not fill fully with water.

To unclog an impeller:

- Shut off power, remove motor and seal plate from pump.
- Stand motor on its end cap, remove any diffuser or impeller shroud, and using needle nose pliers or a thin screwdriver, remove the clog. Run some heavy wire through the vanes of the impeller to ream out debris, pushing it back towards the center of the impeller, where it can be picked out.
- Reassemble pump snugly and tightly. Fill pump pot with water and restart pump. Filter pressure then should rise to the normal range

Short Circuiting

A short circuit occurs when there is the presence of fluid (such as water) inside the motor's windings. This

water (possibly from worn out shaft seal, bad O-rings and defective gaskets) that may allow water to seep through.

Over or Undersized Piping

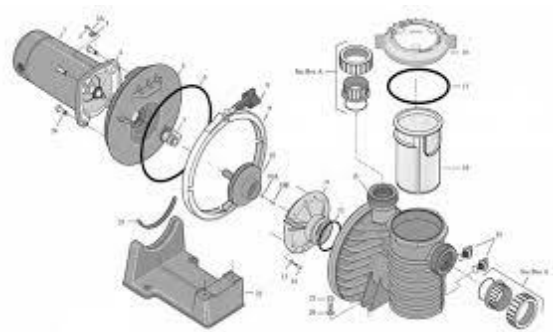
The common denominator in designing motor size in the regular pool is that the whole water in the pool should be re-circulated within 8 hours. The standard size for piping is 1 to 1-1/2 inches of pipe for suction and discharge sides for family-size above ground swimming pools. The size of plumbing system may be reduced by one size higher or lower when needed. This may not overwork the motor. This is seldom done when considering the frequency of utilization of the pool. Engineers have set this standard to compensate for the subsequent increase and decrease of users in the long run.

Overheated Pump Motors

When a motor is overloaded (such as sudden increase in ampere reading or sudden surge of grid current, over speeding due to dehydration, bad-bearings and short-circuits, etc.), the motor is more likely to burn-out. Bad bearings/s may cause the stator to rotate unbalance which overheats the windings and consequently burning the coils.

Blower Motors

If the pool has an attached spa, it may have a forced air blower motor sticking up above water level. This is connected into the spa jets (return lines) to provide turbulence and air therapy. If the blower motor is not working or is very noisy, it may need rebuilding or replacing. Check that switches on the motor are on, breakers are on, spa side or indoor remote controls and timer are on/functioning.



Unmatched Pump Assembly

The drive assembly should have the same power as its counterpart to avoid unmatched parts which may cause unbalanced operation that may overheat or

overload either part. The flanges (of the motor and pump) must also match so that gasket fit's and no leak should be observed. The bolt holes on the flanges must also match each other to avoid pressure drop that may result from the gap. The pressure drop will prolong the continuous operation of the pump giving a higher electricity bill.

Repairing or Replacing a Pump Decisions

Choosing between repair and replacement for a pump motor or the entire assembly requires investigation by the operator. First some troubleshooting should be conducted:

When a pool pump cycles on and off, it generally means something is causing it to overheat. This can be caused by:

- A jammed impeller. The impeller is the device on the front of the pump that pulls water in through the center and then sends it out through its veins.
- Wiring that is too small. This generally occurs in pumps that have just been installed.
- Bad bearings. This is typically caused by age.

There are several reasons a pump could develop a leak, including:

- Check if the seal plate O-ring is bad.
- A bolt or clamp is loose.
- The drain plugs are leaking, which means there is a faulty seal where it meets the pump.

When a pump won't turn on, there is often a faulty power source at play. Check all relevant circuit breakers or switches to make sure the pump is getting power. If that doesn't work check to see if there are any timers or automated controls connected to the pump. If the pump is on a schedule, it may not respond to manual commands. If there is still no response, the pump may have experienced a mechanical failure.

If the pump is making a vibrating sound, make sure there is nothing loose, leaning against or touching the pump.

When to Consider Repairing a Pool Pump

- When bearings are only the problem. These are usually easy to replace. Bearings cost only a fraction of the price for a whole motor unit.
- If the cost of repair is only minimal. In the case of bearing replacement, shaft seal may also be replaced if damaged or already worn out.
- When the impeller is only stock up and not deformed or broken.
- In case of total wrecked impeller due to serious clogging, this part is only the one needing replacement.

When to Consider Replacing a Pool Pump

- If the motor had passed its expected life when it encounters serious trouble.
- When you want an upgrade and current design is not appropriate anymore due to increase number of pool users and increase the frequency of maintenance.
- If same trouble occurs too often after repairs.
- When the operator is totally unsatisfied with your current pump's performance and efficiency.
- In case of a burnt motor, rewinding is also an option only if there is no damage to the motor shaft, motor housing and other essential internal parts of the motor. These damages may result from the burn-out and needed the additional cost to repair.
- If the problem is too much and the cost may likely exceed the price of a new one, like a burnt motor with deformed impeller or damage diffuser, etc.

Tips for Maintaining a Pool Pump

- Always keep the pump uncovered — even in colder weather.
- Pool pumps need unobstructed circulation air around them.
- Check the pump's lid O-ring on a regular basis to ensure it is in good condition - never use Vaseline on O-rings - use only approved O-ring lubricants.

- Water leaks from pump seals or pipe joints should be repaired to prevent failure of bearings and insulation. DO NOT splash or spray the motor. Mount the motor away from low spots and damp areas.
- When the motor is shut down for extended periods, be sure all surfaces, vents and interiors are dry to prevent rust.
- When restarting the pump and motor after an extended down time, make sure the suction is flooded so the pump seal is wet. Starting the motor with a dry pump seal can damage the seal.
- Do not store or use chemicals close to the motor. Their fumes will corrode the inside parts of the motor.
- Avoid sweeping or stirring dust near the motor while it is running.