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## Pump Leaks

### SEAL FAILURE

PROBABLE INDICATORS:

**Water leaking from pump volute or housing**

PROBABLE CAUSES:

**Debris, overheating, or other damage to seal**

Many **seal failures** can be traced to construction debris which prevented a proper seal from forming because the debris was not flushed out prior to startup in a new installation. Most pumps have a two-piece pump seal or pump seal assembly that prevents water from reaching the motor. One portion of the seal is mostly carbon and the other is ceramic. As one surface rotates against the other, a watertight seal is formed. Then, as long as the seal stays well lubricated and cooled with water, the pump will retain the seal for a good long life. However, if the pump operates with insufficient water, impeller friction will heat up and boil away any water left in the pump housing. As that water boils, it evaporates as steam instead of cooling the pump. As a result, heat builds up even more, weakening the seal, which eventually fails. Prolonged exposure to this condition could eventually: A. melt the pump basket (beyond recognition in severe cases), and B. melt threaded fittings, causing water leaks to develop at the discharge port. When **seal failure** is detected, both pieces of the seal must be replaced. On Hayward (and most other) pumps, the ceramic part is closest to the motor and the carbon is closest to the impeller. Prior to reassembly, it is important to clean each surface with a clean cloth so that they are free of dirt and grease.

### VACUUM LEAK

PROBABLE INDICATORS:

**Air bubbles in pump basket (pump loses prime)**

PROBABLE CAUSES:

**Strainer lid o-ring (gasket) failure... or suction-side plumbing leak**

As long as the skimmer and other points along the suction line are free from debris and the pump and plumbing are sized correctly, the pump basket should be filled completely with water. If air bubbles are observed in the basket, there may be a suction-side **vacuum leak**. The most common cause is a bad strainer lid gasket (o-ring). This o-ring seals the top of the pump strainer and aids in creating a vacuum so the pump can draw water. If this seal is compromised, air is drawn into the basket and makes a full prime almost impossible. If not corrected, this condition can lead to seal failure. If the o-ring looks to be in good condition and has not lost its elasticity, applying some lubricant (we recommend Magic Lube) may fix the problem. Another possible cause could be a slight break (**vacuum leak**) in the suction-side plumbing. ***A great service trick for locating a suction leak above ground is to run water from the garden hose over each section of exposed suction-side plumbing. Once water hits the leak, the pump should start priming (a decrease in the pitch of the motor will likely be audible as well).*** **NOTE: Be careful not to accidentally spray water onto the motor!** There are many places for air to enter the suction side. These are the most likely conditions: 1. Water level in the pool is too low – causing the skimmer to suck air. 2. The o-ring (gasket) for the pump strainer lid (pump pot) is bad. (In this scenario, the gasket needs to be lubricated or may need to be replaced and lubricated.) 3. Stem or cover leak on suction valve. 4. Suction-side plumbing fitting is loose or warped from heat. 5. Cracked pipe. 6. A leaky condition with any item attached within the suction-side plumbing. Once the location is determined, perform necessary repairs. (Continued on back)

## ***MOTOR BEARING FAILURE***

### *PROBABLE INDICATORS:*

#### **Loud, grinding or clanking noise**

– though this could also indicate the cooling fan is loose, OR water is leaking into the motor

### *PROBABLE CAUSES:*

#### **Seal leak ... or normal wear on bearings**

With pools becoming more automated and owners not visiting the pool pad on a regular basis, seal leaks can go unnoticed for quite a while. If audible telltales go undetected, problems are often left unattended, causing pump motors to eventually seize. Therefore, technicians should encourage owners to occasionally visit the pad and listen for any unusual sounds – sounds that may prompt proactive maintenance measures to prevent damage (or further damage) to the motor and subsequently the entire pump. Loud noises, particularly grinding, usually indicate the **motor bearings** are failing. However, since it is impossible to know if a bearing replacement alone is enough to fix the problem, the more practical step financially is to simply replace the pump motor – an action that will prevent the worst case scenario, a motor failure that is catastrophic to the entire pump.

## ***DEAD MOTOR OR INCONSISTENT MOTOR***

### *PROBABLE INDICATORS:*

#### **Dead or humming motor**

### *PROBABLE CAUSES:*

#### **Incorrect voltage or starting capacitor failure**

A humming motor could indicate a bad starting capacitor or incorrect voltage. Using a multimeter, first verify that the incoming voltage to the motor is correct. Then, with the power off, try to turn the motor shaft from the back of the motor. If the shaft **will not** turn, the bearings may be seized, which means the motor probably needs replacement. If the shaft **easily turns**, the most likely culprit is the starting capacitor (if there is one). If a new starting capacitor does not resolve the issue, then the motor windings are most likely bad, which means the motor needs to be replaced.

## ***INTERMITTENT***

## ***MOTOR OPERATION***

### *PROBABLE INDICATORS:*

#### **Pump shuts off intermittently**

### *PROBABLE CAUSES:*

#### **Improper voltage, worn bearings or oversized pump (too large for system)** (All three can lead to excessive amp draw.)

First verify that the pump is not too large for the system. Then, using a multimeter, verify that the incoming voltage to the motor is correct. If the voltage is OK, consider that most motors have an internal thermal overload that will turn the pump off if it gets too hot. This can be caused by improper voltage, bearing failure, or restricted ventilation. Many times the motor will shut off and start back up after cooling down. Improper voltage and hard-turning (worn) bearings will cause excessive amp draw, thus causing the excessive heat. If left unchecked, these conditions can lead to motor failure.