

# Protect Your Pumps By: Ron Stevenson

In this article I'll go through the various designs and pitfalls of old outboard water pumps.

I'm going to tap into your schooling and ask if you have heard of PASCALS LAW.?

Mr. Pascal was a French Mathematician who discovered the principle that you cannot compress a liquid (however, gases can be compressed) and in a closed system, once the pump builds up pressure, the pressure anywhere in the system is the same...this is the simplest way to describe his Law. This is commonly called the Hydraulic principle.

In any typical outboard most manufacturers have used a "Rotary Vane positive displacement" pump.

Each outboard's drive shaft has a key or drive pin to make the pump spin. In some of my really obscure outboards, the water pump is the Prop...Yes, the prop forces water into a scoop situated behind the prop and below the cavitation plate. The water goes up into the powerhead and then back down in FRONT of the prop to be vacuumed out.. This was a cheap way to cool the motor. This was called OMC's "Pressure-Vacuum" cooling. In most outboards, the vane type impeller is forced to run in an offset position in the pump housing.

This offset causes the vanes to expand in the large cavity area of the housing (causing suction) from the lake and then compress in the small cavity of the housing (causing pressure) of the water to be forced up into the powerhead hence cooling the motor.

Over many years of outboard repair and restoration, I've seen absolute carnage of water pump impellers, (see Pic's 1 & 2). Also, at loading ramps, you see boat owners that will start their outboard "out of the water". They have no idea that they are destroying the water pump impeller. Revving the motor "dry" makes the rubber vanes in the pump heat up, actually melting the vanes.

In the spring, once the motor is pre-tested for the customer, the most important item that I check is the water discharge.

Every outboard from the early 1900's up to today, has a "TELL TALE" stream of cooling water, peeing from either side of the motor, to tell the owner that "the water pump is working". A visual signal that the engine is being cooled.

Every outboard gets it's cooling water from openings inlets in the lower unit, skeg or even drilled holes in the steering trim tab below the cavitation plate. My 1961, Mercury twin 6 cylinder engines have many drilled holes in the leading edge of both trim tabs.

When the outboard is idling in neutral, the impeller is creating suction and pumping water up into the powerhead.

However, once underway in your boat, the water rushing past the lower unit, creates tremendous water pressure and the manufactures use this pressure to compensate for the pumps inability to "keep up" with the amount of water needed to cool the heat of the engine. The water pump is spinning the same RPM as the engine, but is helped with water supply by, the tremendous water pressure from the inlet openings. The list of items that destroy water pump impellers are as follows. 1) old age (rubber has dried out and deteriorated)..

2) improper installation..3) sand being sucked up by the pump from shallow water..4) oil saturation (oil from leaking seals softens the vanes) and ..5) corrosion of the aluminium pump housing from sitting for years of non-use.

The designers in the outboard industry, added drain holes in strategic areas where the water needs to be drained off the powerhead and lower unit to prevent freezing. Owners who don't drain their outboard PROPERLY before winter are asking for major damage and large repair bills.

Attached, please look at the photo of a cracked pump housing. The ice was so strong, it split the wall of the aluminum impeller housing (see Pic. 3.) Water, once it freezes, expands and breaks all sorts of motor parts. Nothing is sacred.. ice will crack lower units, cylinder heads and crankcases..

Make sure you drain your outboard properly.



**Pic. 1**



**Pic. 2**



**Pic. 3**