The Truth About Two-Speed Pumps

Why they are fundamentally incapable of the phenomenal energy savings of new, programmable, variable-speed pumps

Although recent California legislation and manufacturer claims may make it seem that two-speed pumps are nearly equal to intelligent, variable-speed pumps in their ability to conserve energy, they aren't – not by a wide margin. The downside of not understanding the whole story is huge — often measured in thousands of dollars over the life of these vastly different products. This article by Pentair Water Pool and Spa, an impartial manufacturer of ALL TYPES of pool pumps, explains why.

It's a sad truth. Some manufacturers of two-speed pool pumps are using misleading data to convince pool owners that two-speed pumps are capable of tremendous energy savings, just like the new variable-speed pumps that allow custom programming of speed or flow to precisely meet the needs of different applications. It's simply not true; the design and performance differences between these pump types are like night and day. And with the already high and rising cost of electricity, the stakes are high. Most pool owners would be shocked to learn that their current pool pump can cost more to operate than the rest of their home appliances and utilities combined—often more than $1,000 per year.

Whether you're selecting a pump for a new pool, replacing a failed pump, or simply upgrading the energy efficiency of your pool, understanding the real differences between pumps can pay handsome dividends.

Permanent Magnet Motors vs. Induction Motors: 30% Gain in Efficiency

One critical difference between the two types is that two-speed pumps use less energy-efficient induction motors, while new pumps like IntelliFlo® and IntelliPro® variable speed pumps use permanent magnet motors (like those used in hybrid cars).

Permanent magnet motors are at least 30% more efficient than the ubiquitous induction motors installed on all two-speed pumps (and even so-called "high efficiency" single-speed and two-speed pumps).

Two Fixed Speeds Almost Never Match the Most Efficient Speeds

Two-speed pumps come factory-built with two unchangeable speeds. They can never be rewired or reprogrammed to run at any other speed. And it is virtually never true that these speeds are the most efficient for a specific pool's functions —filtering, heating, cleaning, running spa jets or other water features. In fact, a two-speed pump can actually be less efficient than a single-speed pump.

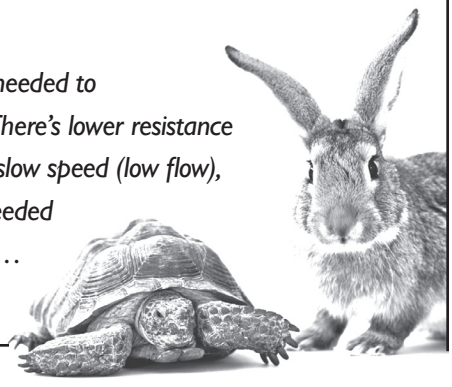
Because their fixed speeds seldom deliver the optimal flow, two-speed pumps can almost never respect the golden rule of efficient pump operation: the slowest speed required to get a job done is the most energy efficient.

Adjustable, Variable-Speed Pumps Can Cut Energy Costs by 30-90%

Fortunately, the new variable-speed pump designs allow pool owners to hit the energy efficiency bullseye dead center for any pool/equipment configuration. Here's why.

Why Slower is Better

The surprising secret to minimizing pump energy costs is to operate at the lowest speed needed to accomplish a job. That's because it takes far less energy to move water slowly than quickly. There's lower resistance in the filter, accessories, and the plumbing system. Even though a pump will work longer at slow speed (low flow), this is far more efficient. In fact, reducing pump speed by half actually reduces the power needed to an eighth of what was needed previously to get the job done. A good analogy is your car… you get far better gas mileage at 30 mph than at 90 mph.



The Truth About Two-Speed Pumps (cont.)

Digitally-controlled, variable-speed pumps can be programmed at up to 3,050 different speeds (or flow rates) to take maximum advantage of the "slower is better" rule. This ability to custom program pump performance for different pool operations, such as filtering, heating, spa jets, and water features adds savings on top of those gained by permanent magnet motors…up to 90% savings in total.

Bear in mind, these 30% to 90% savings are being realized for the simplest, as well as the most complex pool equipment systems. The example below illustrates just how significant the savings can be.

Just How Much is a "30% to 90% Savings?"

Common savings run between $621 and $1,356 per year. Savings are based on a comparison pump running between 6 and 12 hrs/day at the national average of $0.15/kwh in a 20,000 gal. pool. In areas with higher energy costs, savings can exceed $2,000/year.

The Clear Conclusion: Variable-Speed Pumps are the Superior Choice

To sum it all up, the most efficient pool pump is the one that runs smartest—at the minimum speed needed to get a job done. Enormous improvements in motor technology, including permanent magnets and adjustable digital controls, make variable-speed pumps the vastly superior choice for energy-conscious pool owners.

Added Advantages of New Technology

Beyond massive energy savings, new variable-speed pumps deliver several more benefits.

- Permanent magnet motors produce far less heat and vibration than traditional induction motors, resulting in not only less stress and wear on pump components, but on other equipment, too. You can expect dramatically longer life for an even greater return on investment.
- These are the quietest pumps ever built. Operating at optimum speeds, along with their totally enclosed fan cooled (TEFC) motor design are the primary reasons for their near-silent operation.
- Since these pumps can be adjusted for peak efficiency, there are no worries when equipment or features are changed or added. Adding a solar system, changing a filter, or adding a water feature? Just push a button to set the new, optimum speed to operate with the lowest energy use.
- These new pumps also feature built-in diagnostics that allow them to protect themselves from the most common conditions that lead to pump damage—overheating, freezing, or voltage irregularities. The totally enclosed motor provides added protection for long life.
- With the ability to adjust pump speed or water flow comes the ability to alter the effects of water features. Just dial up or dial down to add height to deck jets and fountains or flow to waterfalls.

IntelliFlo® VF

IntelliFlo® VS-3050

IntelliPro® VS-3050

Confusion in California

New legislation in California, Title 20, states that beginning in January, 2008, you'll no longer be able to buy a 1 HP or greater single-speed pump for a new pool or to replace a failed filter pump. The law will only allow two-speed pumps or variable-speed pumps. This may leave a mistaken impression that both types of pumps are equally efficient. They're not, and a number of utilities, including Pacific Gas and Electric, have conducted testing that highlights the superior energy efficiency of variable-speed pumps.

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