



1921 Production Drive
Louisville, Kentucky 40299-2110
800.325.5438 502.425.5817
www.AquaticAccess.com

Why Water-Powered?

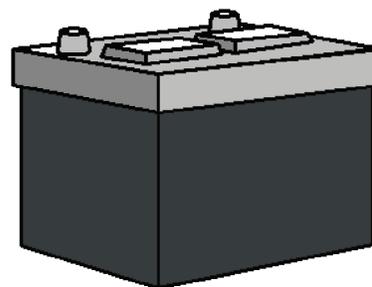
Aquatic Access is often asked why we rely exclusively on water power for our pool lifts. The answer is simple and complex. The simple answer is that there is not yet a battery on the market that we feel is reliable, safe, and economical enough to serve the needs of our very special customers. It has long been the company's belief that each pool lift we build be exactly right for the location where it is to be used and for the needs of the customers who will use that lift. To understand why we have made this decision, it is essential to understand electrical batteries and how they work. While we all are familiar with batteries – they are ingrained in our daily lives, many of us have forgotten the basic high school science that explained their functionality.

Invented by Alessandro Volta in 1800, batteries have evolved much over the years, but are still basically units with one or more electrochemical cells that convert chemical energy into electrical energy. Electrical batteries can still be divided into two categories: primary and secondary.

A primary battery is a single use battery. Its charged current is used up and the battery discarded. These are the familiar D, C, AA, and AAA batteries we use in small electronics such as radios, flashlights, etc. Also the common button batteries in hearing aids and tiny electronics are primary batteries.



A secondary battery can be recharged and used numerous times. Perhaps the most widely known secondary battery is the battery in your automobile. Automotive batteries give your automobile the power to start and power the lights, radio, and other peripheral items on board. The battery is recharged by the car's alternator as the automobile runs, and builds up enough electrical power to start the car again and again. These batteries are commonly lead-acid batteries, either sealed or unsealed. The chemicals in each battery cell do not need to be replenished in a sealed battery. An unsealed battery of this type requires occasional additions of water each cell so that all are equally full.



Another secondary battery type is the sealed nickel-cadmium (Ni-Cd) battery that is used in some cell phones, laptop computers, and other portable electronics. This type of battery is used individually or grouped into battery packs containing more than one cell. Often sold in the same sizes as primary batteries, these rechargeable batteries can substitute nicely for primary batteries even though they have a slightly lower terminal voltage and a smaller ampere-hour capacity that can sometimes affect performance. Computer users certainly are aware of the drawback of Ni-Cd batteries in their inherent tendency toward "memory". In time, these batteries "learn" to hold a charge only equal to that which has been previously used. For example, if you ran your laptop for an hour a day and then recharged the battery which was supposed to have a life of 4-6 hours,

you would quickly find that your laptop only remained charge for an hour, and needed to be “deep-discharged” (run all the way down) and recharged several times to “relearn” its ability to hold a charge for a longer period. These batteries are still widely used, but have been replaced in many cases with the lithium-ion battery.



The Lithium-ion battery or the Lithium-ion/Polymer battery is used to power most of the battery-powered pool lifts currently on the market. It is essential, therefore, to have an understanding of these batteries to make an informed decision about these lifts. The three primary functional components of a Lithium-ion battery cell are anode, cathode, and electrolyte. The anode of a conventional lithium-ion cell is made from carbon, the cathode is a metal oxide, and the electrolyte is typically a lithium salt in an organic

solvent. The lithium-ion/polymer style battery has the lithium salt in a solid polymer composite such as a polyethylene oxide or polyacrylonitrile. Because lithium reacts explosively with water, suspending the lithium salts in a polymer base and then encasing the battery in plastic to protect it from water is essential. Lithium reacts violently with water and that reaction forms lithium hydroxide and hydrogen gas, which is of course explosive as well as flammable.

These batteries are quite safe as long as that protective case is not breached. Lithium-ion batteries operate over a wider temperature range with higher energy densities and are smaller and lighter than their Ni-Cd counterparts. They are fragile, however, and require built in protective circuits to limit peak voltages. They are, as a result, more expensive to purchase and need to be replaced more frequently. Eventually these shortcomings may be overcome and a safer battery product will emerge, but that has not yet happened.

Another concern about the batteries powerful enough to operate a pool lift is the disposal of them when they no longer hold an electrical charge. All contain heavy metals and potentially dangerous materials. Not only can explosions or fires result from improper disposition, but also the pollution hazard to the environment is significant. Many states have instituted stringent regulations governing the disposal of these batteries with significant penalty for violations. Plans must be made for disposal of the batteries when replacements need to be purchased. Often the disposal is a cost that must be factored into the maintenance of the pool facility as well as the cost of periodic replacement batteries.

Water-powered lifts rely on the power of clean, flowing water and pose none of these difficulties and concerns. Water is generally available near swimming pools, and has no negative impact on the environment. While all the hazards and difficulties may be overcome as battery technology continues to evolve. Because interest in battery-driven lifts remains high in the marketplace, Aquatic Access will certainly have such a product as soon as our engineers feel that there can be a battery-powered product as safe, reliable and economical as a water-powered pool lift. However, for right now, we believe that the water-powered pool lifts have proven to be the best and most cost-effective pool lifts on the market.



This information is provided as a courtesy to our customers and is, in no way, a scientific analysis of electrical power sources.