



***Immortal***  
*LTO Cold-Weather Batteries*





# Why Choose Immortal Cold-Weather Batteries?

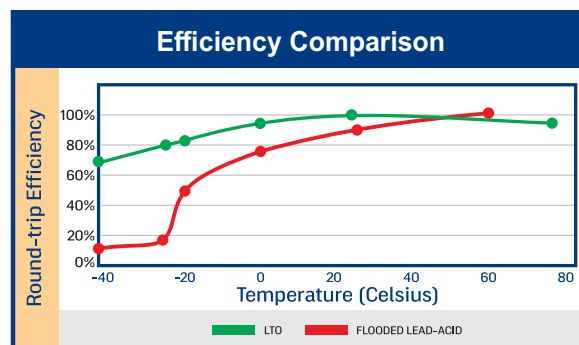
You may be skeptical about Lithium Titanate (LTO) batteries because much of what you will read below may seem too good to be true. But Lithium Titanate is a proven battery chemistry which has been around for more than 10-years. So, you may be wondering: “Why have I not heard of Lithium Titanate before? Why is no one else making LTO batteries?” It may be that other Lithium battery manufacturers are too busy making batteries for the mass-market. It may be that the Lead-Acid manufacturers are too big to switch-over. We don't know; but we do know the US military prefers LTO and has even subsidized a US manufacturing facility. We know we get calls from university research labs (and elsewhere) for custom LTO batteries (and we build them). We know because we built our own test equipment and validated their use down to -70C. And we know because there are a few other manufacturers who have incorporated LTO into their products for cold-weather applications.

We are the only Supplier of stand-alone Lithium Titanate batteries for cold weather in North America, and proud of it. Read-on, and you will see why it is time to “Get the Lead out.”

## The TITAN Immortal LTO Advantage(s)



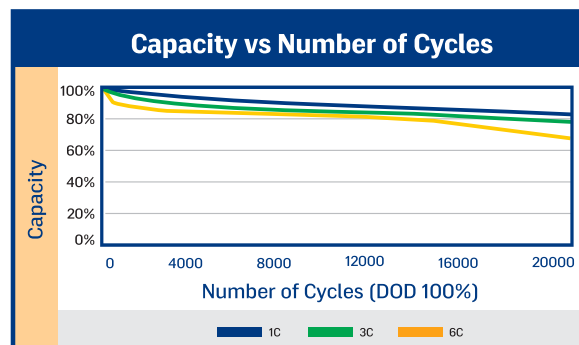
**Extreme-Cold Efficiency:** At -40°C, TITAN LTO maintains a round-trip efficiency of 65-70%. In contrast, Lead-Acid efficiency plummets to 10-15%; in some cases, becoming effectively un-chargeable. Your LTO batteries will perform reliably in extreme-cold weather when Lead-Acid systems fail, and unlike all other Lithium Chemistries, do not require external (or internal) heating to operate in even the coldest temperatures.



**Resilience and Resistance to Damage:** TITAN LTO is fundamentally more robust than Lead-Acid. While Lead-Acid batteries suffer permanent capacity loss if left below 100% SOC, TITAN Immortal batteries are not damaged by a Partial State of Charge (PSOC), and only very slightly if left fully discharged. LTO will not degrade during low-light weeks, whereas Lead-Acid suffers from life-shortening sulfation, and unlike Lead-Acid, LTO can be stored or left idle for years without self-discharging.



**Extended Lifespan:** While a well-managed Deep Cycle Lead-Acid battery operating at moderate temperatures may achieve 1,000 to 1,500 cycles, Titan LTO provides 20,000 to 30,000 cycles - lasting decades - even under 100% depth-of-discharge use.





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That's why we call them Immortal, and there is more:



**Industry-Leading LCOS for Energy Storage:** While the initial purchase price of LTO may be higher, the **Levelized Cost of Energy Storage (LCOS)**—the total cost per kWh delivered over the battery's life—is the **lowest in the industry**. TITAN LTO outlasts Lead-Acid by 10 - 20 times, and standard Lithium (LiFePO4) by 4 - 5 times. So even in temperate climates, LTO is the proven most cost-effective long-term investment.

## Exceptional Power Delivery for Cold-Weather Starting Applications



**Starter Batteries:** Along with their efficiency, longevity, and cold-weather performance, LTO is capable of extremely high charge and discharge rates. Along with all the other features of LTO, this **high-current capability opens the door for LTO to replace Lead-Acid Starter Batteries**. Specially made to be compatible with automotive charging systems, a 12V/40Ah Immortal Cold-Weather Starter Battery weighing just 9kg (21lbs) will start a truck in -40C for the life of your vehicle. From snowmobiles to automobiles to airplanes and remote diesel-generators, it is time to “**Get the Lead-Out.**”

## Enhanced Safety



**Safety Features:** Overall, TITAN LTO provides a level of safety Lead-Acid cannot match. Unlike Lead-Acid, TITAN LTO batteries include an integrated Battery Management System (BMS). This electronic "brain" monitors each cell to prevent over-voltage, under-voltage, excess current-draw (such as a short-circuit) and will allow your batteries to operate from -45C to +85C. Cell balancing ensures all cells are charged equally (“balanced”), which in the long run extends the life of your battery. Also, in the event of a failure, or external fire-event, LTO does not vent flammable gasses, and is not subject to thermal runaway.

## Improved Performance with a Drastic Reduction in Size & Weight



**Combined Benefits:** With no limitations upon depth of discharge (DOD), coupled with superior efficiency, for cold-weather applications, you can typically reduce your Lead-Acid Amp-hour (Ah) capacity to at least one-third of your previous Lead-Acid requirement. This results in a **reduction of space requirement by at least 50%**, and a **reduction in weight by 85%**.



## About TITAN LTO

TITAN IMMORTAL COLD-WEATHER BATTERIES ARE THE OUTCOME OF 5 YEARS AND COUNTLESS HOURS OF RESEARCH AND DEVELOPMENT. CONTACT US, OR VISIT [TITANLTO.CA](http://TITANLTO.CA) FOR MORE INFORMATION ON OUR GROWING SELECTION OF STAND-ALONE LTO BATTERIES. WE ALSO WORK WITH MANUFACTURERS TO PROVIDE CUSTOM-MADE LTO SOLUTIONS FOR PRODUCTION, PROTOTYPE OR SINGLE-USE APPLICATIONS.

OUR BATTERIES ARE SAFE, RESILIENT, EFFICIENT, LONG LASTING, AND COST-EFFECTIVE OVER THE WIDEST RANGE OF TEMPERATURES AND APPLICATIONS OF ANY BATTERY MADE. LITHIUM TITANATE IS NOT QUITE IMMORTAL, BUT DEFINITELY THE TITAN OF BATTERIES.



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