

What is a worst-case scenario for a lithium-ion battery?

The worst-case scenario is a thermal runaway event. A defect inside the cell can result in an internal short circuit. The severity of this event can be limited if the chain is interrupted. Physical damage to a lithium-ion, poor manufacturing quality, water and dust ingress, defective isolation and hot spots can cause a short-circuit. RAMFAN has an effective QMS, registered by UL to ISO 9001 standards since 2004. With twelve consecutive audits successfully completed since, our team has evolved into a well-tuned machine where continuous product and process improvement, throughout all of our global locations, are embedded in our operational culture.

What is the useful life of a RAMFAN battery pack?

Similar to a mechanical device that wears out faster with heavy use, the depth of discharge (DoD) determines the cycle count of the battery. The smaller the discharge (low DoD), the longer the battery will last. Two battery packs with an average runtime of 20 minutes (50% DoD) or less will last significantly longer than two battery packs with an average runtime of 40 minutes (100% DoD).

How quickly can I receive a new RAMFAN lithium-ion battery?

Our lithium-ion batteries ship next-day air cargo to most countries worldwide. Euramco Group has a valued network of international distributors and dealers who carry inventory of our products and can provide you with recommendations on the right choice of fan and ventilation accessories for a variety of applications.

Who manufactures the RAMFAN lithium-ion battery?

RAMFAN battery packs are made and meticulously designed by Euramco's team of skilled engineers with a focus on durability and longevity. We can guarantee this high-quality product because we are the manufacturer of our own innovative product designs and maintain complete control over design, quality, and lead-time.



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LITHIUM-ION TECHNOLOGY
FREQUENTLY ASKED QUESTIONS
AND ANSWERS

RAMFAN is the world's leading brand of portable ventilation equipment for the world's most difficult workplaces. RAMFAN is also the world leader in Battery Powered PPV technology, offering the best solutions for ventilation including battery-powered portable fan for firefighting and other industrial applications.

A choice you can trust: **RAMFAN**.

Euramco Group is a multi-sectoral company that leverages its global, industrial and public safety defense. For over 30 years, RAMFAN has been at the forefront of designing safe fire equipment and enhancing its capabilities to last. Our quality management covers the entire supply chain. Our customer service support and engineers are available to assist you with any configuration, operation, or application queries during our hours of operation. Our logistics and after-sales service help ensure the safety and satisfaction of firefighters.

Frequently Asked Questions and Answers

What is the main differential of RAMFAN?

We make it "firefighter proof". RAMFAN waterproof battery powered PPV fan provides protection for wet applications making it more protective for water drops. The product features hot-swappable battery pack, allowing users to safely replace battery pack without interrupt the operation, minimizing downtime. RAMFAN has been the champion of lightweight PPV design, providing also high reliability. Our high performance PPV fans are just what the fire industry is looking for.

Where are lithium-ion batteries commonly used?

Rechargeable lithium-ion batteries now power everything from tablet computers to power tools to electric cars. They are now also found in emergency rescue equipment such as breathing apparatus, extrication and cordless power tools.

Why use lithium-ion batteries in firefighting and rescue applications?

Lithium-ion is used for applications that require rechargeable capability and high energy density. Lithium-ion cells store three times more energy per kilogram and offer longer life, faster recharge, more voltage, no memory effects, and are manufactured consistently and reliably. This revolutionary technology replaced 37% of the conventional batteries in the world. The market share of the lithium-ion battery can exceed \$60 billion by 2024. Lithium-ion batteries have a high-energy density, with

unmatched quality while delivering savings in volume and weight compared to traditional cell batteries of lead acid. Overall, you get better performance at reduced weight. This makes them the best option for electric, which will soon dominate the technology landscape. Companies like Holmatro and Hurst are routinely the top companies mentioned when talking about the Rechargeable Lithium-ion Battery.

Why lithium-ion technology is superior to lead-acid and nickel-cadmium technology?

- 1. Efficiency:** Lithium-ion batteries are nearly 100% efficient in both charge and discharge, allowing the same hours of amplification both inside and out.
- 2. Environmental Impact:** Lead-acid batteries often require more raw material than lithium-ion batteries to achieve the same energy storage, causing a much greater impact on the environment during the mining process.
- 3. Superior Capacity "Usage":** Unlike lead-acid batteries, it is considered practical to regularly use 85% or more of the nominal capacity of a lithium-ion battery bank and occasionally more. Consider a 100-amp battery - if it was acid-lead, it would be wise to only use 30 to 50 amperes of juice, but with lithium-ion you could use 85 amperes or more.
- 4. Extended life:** Recent measurements show that a lithium-ion battery will still provide more than 75% of its capacity after 500-1,000 cycles, depending of the depth of discharge.
- 5. Fast and Efficient Loading:** Lithium-ion batteries can be charged "fast" up to 100% capacity. If your charger is powerful enough, lithium-ion batteries can also be charged incredibly fast.
- 6. Very little wasted energy:** Lithium-ion batteries cover almost 100% efficiency, compared to the 85% efficiency of most other batteries.
- 7. Fewer positioning problems:** Lithium-ion batteries do not need to be stored upright or in a ventilated battery compartment. They can also be easily mounted in strange shapes - an advantage if you are trying to squeeze as much energy as possible into a small compartment.
- 8. Few Maintenance Requirements:** Lithium-ion batteries are virtually maintenance-free. A "balancing" process to ensure that all cells in a battery bank are loaded equally is automatically achieved by the most good quality BMS (Battery Management System).
- 9. Safety:** Lithium-ion batteries are safe, and heat related failures are rare. The battery manufacturers achieve this high reliability by adding multiple layers of protection.

Why do lithium-ion cells have more power and less weight?

Because the lithium-ion batteries produce more pound-per-pound power than others, less materials are needed. The result is a lighter battery.

Why do you recommend lithium-ion batteries for technological applications?

Lithium-ion cells have almost three times the energy density per kilogram when compared to other battery types. The result is a significantly lighter and smaller battery system because they are capable to deliver more power with less volume-a perfect match for applications that require high-quality portable applications.

Which manufacturers utilize lithium-ion technology?

RAMFAN, Hurst/Lukas, Holmatro, MSA, FLIR, Nitecore, Petzl and Jetson Surf Technology

What products for rescue applications can I find the lithium-ion technology?

- RAMFAN EX50Li and EX150Li Battery PPV Fan
- Hurst Jaws of Life / Lukas eDraulic
- Holmatro Greenline EVO
- MSA G1 SCBA Breathing Apparatus
- FLIR Thermal Imaging Camera
- Petzl ATEX/Hazloc high-performance headlamp
- Jetson Surf Technology Electric Powered Rescue Paddle Board

Are RAMFAN PPV lithium-ion batteries different than the Tesla battery?

Many would argue that one of the best decisions Tesla ever made was going with the standard production cylindrical 18650 cells in the Model S (and later, Model X). Thanks in part to good power management and thermal planning, they have proven reliable and relatively resistant to degradation. The main difference is that of the size of battery and number of cells involved. RAMFAN lithium-ion battery packs use cylindrical cells 18650.

Does RAMFAN PPV lithium-ion battery packs have the same BMS (Battery Management System) as Tesla's?

In Tesla cars, the typical battery ratings are 85-90 kWh. To build such a battery a complex network of around 11,200 18650 lithium-ion cells with ratings 3.6 V, 2.6 Ah. The BMS for so many cells needs to be extremely accurate and reliable. The functioning of BMS decides the level of safety, life of battery, and optimal conditions like temperature, current, and voltage. RAMFAN has a full featured lithium-ion battery management system that is specifically designed to meet the tough requirements of protecting and managing battery packs for PPV fans.