

# THE BATTERY DIFFERENCE:

## A SOLUTION TO REDUCING SOLDIER LOAD AND INCREASING EFFECTIVENESS ON THE BATTLEFIELD

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One of the greatest contributors to expendable Soldier load is spare batteries. Recent efforts by the Maneuver Center of Excellence (MCoE) and Project Managers (PMs) such as PM Soldier Sensors and Lasers (PM SSL) have standardized the majority of dismantled electronic equipment into a few common battery types. Commercially available 1.5v AA batteries have replaced numerous unique equipment-specific battery types in night vision devices, target locators, and weapon sights. While these efforts drastically reduced the myriad types of batteries required, they did not necessarily reduce the overall Soldier load.

Recent commercial developments have brought the lithium non-rechargeable battery into the supply system as a means to carry more power in significantly fewer batteries. Lithium L91 AA 1.5v batteries (NSN 6135-01-333-6101 pkg. 12) provide three to five times the system battery life as conventional alkaline AAs. While the initial cost is higher, their increased lifetime results in similar overall operational costs at drastically reduced Soldier load.

High drain devices such as the AN/PSQ-20, 20A, 20B Enhanced Night Vision Goggle (ENVG), AN/PAS-13 Thermal Weapon Sight (TWS) and the AN/PED-5 Laser Target Locator Module (LTLM), benefit most from lithium non-rechargeable batteries. The current requirements for these devices deplete conventional alkaline batteries at such a rate that operational use time is severely limited. Many of PM SSL's current sensors, lasers, and precision targeting devices were designed for the lithium battery with its far superior output capabilities and voltage curve. As expected, the number one issue Soldiers expressed with these systems in post-combat surveys is poor battery life when using regular alkaline batteries.

### Power Struggle

While alkaline AA battery initial costs are significantly less than their L91 AA lithium counterparts, Soldiers need to carry and expend a considerable number of batteries in order to match the operational time of far fewer L91s. This increases Soldier load. L91 AA lithium batteries increased performance time offers the user less frequent battery changes, equating to reduced Soldier load and system down time.

### Operating Temperature: Designed With Every Climate in Mind

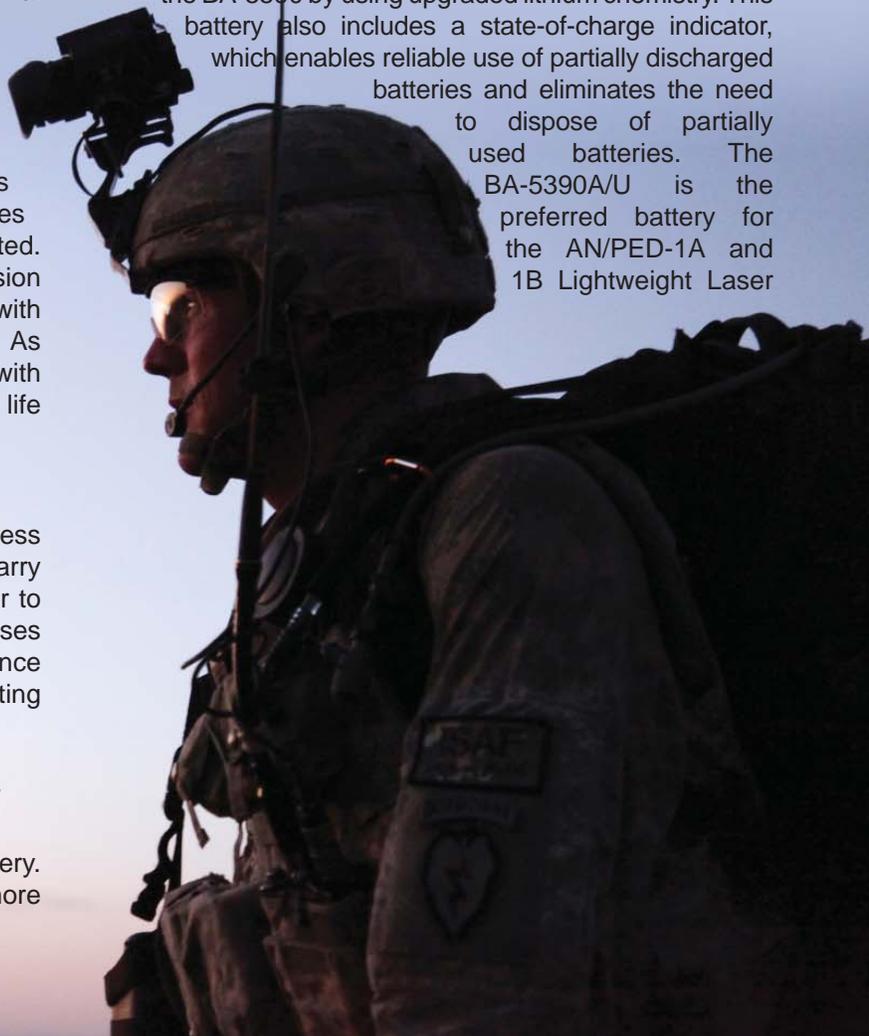
Cold temperatures diminish the capability of any battery. However, the lithium battery's chemistry is much more

resistant to these losses. Lithium is the only AA battery that will effectively power most equipment in arctic conditions. At -20° Celsius, the L91 lithium AA battery has more than 10 times the lifespan of its alkaline counterpart.

### Weight Matters

The L91 lithium battery is also lighter than an alkaline battery, resulting in an approximately six-fold reduction in overall mission battery load when combined with its extended battery life. With equipment weight reduction and Soldier load among the top priorities of materiel developers, this represents a significant advance over previous battery technology. The L91 lithium AA battery itself is 37 percent lighter than its alkaline counterpart, so Soldiers not only carry fewer batteries but also the batteries they carry are lighter.

In addition to AA batteries, the venerable BA-5590 has a more powerful replacement in the BA-5390A/U (NSN 6135-01-517-6060). It packs 50 to 100 percent more runtime than the BA-5590 by using upgraded lithium chemistry. This battery also includes a state-of-charge indicator, which enables reliable use of partially discharged batteries and eliminates the need to dispose of partially used batteries. The BA-5390A/U is the preferred battery for the AN/PED-1A and 1B Lightweight Laser



Designator Rangefinder (LLDR 2 and 2H) because its high power demands will quickly deplete the BA-5590. Use of the upgraded battery can cut in half the number of mission-required batteries compared to the BA-5590. This is another opportunity to reduce individual Soldier load.

### Check Your TM

Equipment technical manuals (TMs) clearly state the acceptable battery types for their respective equipment. Always follow the TM recommendations to ensure the equipment is not damaged and operational needs are met. Many batteries look the same, yet are not interchangeable with those designed uniquely for other equipment. Never mix batteries of different brands — alkaline and lithium variants — or those with different states of charge. This can cause uneven current draw, which can result in battery overheating and rupture. Rechargeable batteries offer yet more weight and cost-savings opportunities when the mission or training conditions permit their effective use. Rechargeable batteries are usually used in maintenance situations.

Ultimately, commercial battery technology advances have enabled developers to maximize capability by producing backwards compatible power systems. This provides significantly longer operational life at a lower weight penalty. While these newer components are initially more expensive, they lower operational costs, Soldier loads, and logistical burdens due to the reduced numbers required.

### Using L91 lithium batteries...

- Extends operational life by 300-500 percent,
- Saves mission weight by approximately 600 percent and
- Saves logistical costs by 300 to 500 percent.

### Remember:

- Do not mix batteries of different types or brands. They will discharge unevenly and can ultimately rupture and fail.
- Using the wrong battery type affects the accuracy of your battery indicators or alarms. Developers designed night vision devices, thermal sights and target locators to use L91 lithium AA batteries. Alkaline batteries will not accurately indicate, or alarm, their state of charge, but lithium batteries will.

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# LITHIUM

VS.

# ALKALINE

## Battery Performance in Your Sensors, Lasers, and Precision Targeting Devices

### LITHIUM BATTERIES

- 30% Lighter = significant decrease in Soldier load
- Much longer lasting
- Best in high-drain devices, **Enhanced Night Vision Goggles, Thermal Weapon Sights, and Laser Target Locators**
- Performs in extreme temperatures
- Longer shelf life

### ALKALINE BATTERIES

- Increased Soldier load
- Limited performance in extreme temperatures
- Shorter shelf life
- Limits opportunity to carry additional kit

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