

Rechargeable Battery Information and Care

New Batteries

A new rechargeable battery comes in a discharged condition and must be charged before use (refer to the manual for specific charging instructions). Upon initial use (or after a prolonged storage period) the battery may require three to four charge/discharge cycles before achieving maximum capacity.

It is important to condition (fully discharge and then fully charge) the battery every two to three weeks. Failure to do so can significantly shorten the battery's life. To discharge, simply run the flashlight until it completely discharges. Then recharge the battery as instructed in the user's manual.

It is normal for a battery to become warm to the touch during charging and discharging.

Battery Handling

If the battery will not be in use for a month or longer, it is recommended that it be removed from the charger and stored in a cool, dry, clean place.

A charged battery will eventually lose its charge if unused. It may therefore be necessary to recharge the battery after a storage period.

Actual battery run-time depends upon the power demands made by the equipment it powers. The total run-time of the battery is also heavily dependent upon the design of the equipment.

Here are some basic tips for battery handling:

- Do not short-circuit. A short-circuit may cause severe damage to the battery or even explosion.
- Avoid dropping or impacting rechargeable batteries. This could result in the exposure of the corrosive cell contents.
- Avoid exposing the battery to moisture or rain. Most flashlights are sealed against such exposure.
- Always battery away from fire or other sources of extreme heat. Never incinerate. Exposure of battery to extreme heat may result in an explosion.

Battery Technologies

Rechargeable batteries in portable lighting devices and two-way radios are principally made using Nickel Cadmium (NiCad), Nickel Metal Hydride (NiMH) or Lithium Ion. (Li-Ion) technologies. Rechargeable flashlight batteries are generally Nickel Cadmium.

Each type of rechargeable battery type has unique properties:

NiCad and NiMH

The main difference between the two is the fact that NiMH batteries (the newer of the two technologies) offer higher energy densities than NiCads. NiMH delivers approximately twice the capacity of its NiCad counterpart. What this translates into is increased run-time from the battery with no additional bulk to weigh down the device. NiMH also offers another major advantage: NiCad batteries tend to suffer from what is called the "memory effect". NiMH batteries are less prone to develop this affliction and thus require less maintenance and care. NiMH batteries are also more environmentally friendly than their NiCad counterparts since they do not contain heavy metals.

Li-Ion

Li-Ion has quickly become the emerging standard for portable power. Li-Ion batteries produce the same energy as NiMH batteries but weigh approximately 35% less. This is crucial in applications such as portable two-way radios or notebook computers where the battery makes up a significant portion of the device's weight. Another reason Li-Ion batteries have become so popular is that they do not suffer from the memory effect. They are also environmentally friendly because they don't contain toxic materials such as Cadmium or Mercury.

Memory Effect

NiCad batteries, and to a lesser extent NiMH batteries, are prone to what is referred to as the "memory effect". What this means is that if a battery is repeatedly only partially discharged before recharging, the battery "forgets" that it has the capacity to further discharge all the way down. To illustrate: If you, on a regular basis, fully charge your battery and then use only 50% of its capacity before the next recharge, eventually the battery will become unaware of its extra 50% capacity which has remained unused. The battery will remain functional, but only at 50% of its original capacity.

The way to avoid the "memory effect" is to fully cycle (fully charge and then fully discharge) the battery at least once every two to three months. Simply leaving the device in the ON position and letting it run can discharge batteries completely. This will help insure your battery remains healthy. Once discharged, recharge the battery completely according to the manufacturer's instructions.

Battery Upgrade

NiCad, NiMH and Li-Ion are all fundamentally different from one another and should not be substituted unless the device has been pre-configured from the factory to accept more than one type of rechargeable battery technology. The difference between them stems from the fact that each type requires a different charging pattern to be properly recharged.

Therefore, the device's internal charger must be properly configured to handle a given type of rechargeable battery. Refer to the owners manual to find out which rechargeable battery types the particular device supports.

Maximizing Battery Performance

There are several steps you can take to insure that you get maximum performance from the rechargeable battery:

Break In New Batteries

New batteries come in a discharged condition and must be fully charged before use. It is recommended that you fully charge and discharge the new battery two to four times to allow it to reach its maximum rated capacity.

Prevent the Memory Effect

Keep the battery healthy by fully charging and then fully discharging it periodically. Exceptions to the rule are Li-Ion batteries, which do not suffer from the memory effect.

Keep the Batteries Clean

It's a good idea to clean dirty battery contacts with a cotton swab and alcohol. This helps maintain a good connection between the battery and the device.

Exercise the Battery

Do not leave the battery dormant for long periods of time. We recommend using the battery at least once every two to three weeks. If a battery has not been used for a long period of time, perform the new battery break in procedure described above.

Battery Storage

If you don't plan on using the battery for a month or more, we recommend storing it in a clean, dry, cool place away from heat and metal objects. NiCad, NiMH and Li-Ion batteries will self-discharge during storage; remember to break them in before use.

Battery Ratings

There are two ratings on every battery: volts and amp-hours (AH). The AH rating may also be given as milliamp-hours (mAH), which are one-thousandth of an amp-hour (for example, 1AH is 1000mAH). The voltage of the new battery should always match the voltage of your original.

Battery Lifetime

The life of a rechargeable battery operating under normal conditions is generally between 500 to 800 charge-discharge cycles. This translates into about three years of battery life for the average user. As the rechargeable battery begins to die, the user will notice a decline in the running time of the battery. When a battery that originally operated the flashlight for a whole shift is only supplying the user with an hour's worth of use, it's time for a new one.

Rechargeable vs. Non-Rechargeable

NiCad batteries are rechargeable, whereas Lithium and alkaline batteries are not rechargeable. Therefore, Lithium and alkaline batteries must be replaced by equivalent batteries of the same type. Attempting to replace these non-rechargeable batteries with a NiCad will result in a nonfunctional battery because the device lacks the proper charging circuitry to charge the NiCad battery.

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