

Frequently Asked Questions

Rechargeable Batteries

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Rechargeable Batteries

1. What is memory effect? ↑

This is a loss of battery capacity due to partially discharging and recharging repetitively without the benefit of a full discharge. This was a problem with early nickel cadmium (NiCd) rechargeable batteries that is not found in nickel metal hydride batteries (NiMH) currently manufactured.

2. What is the difference between nickel cadmium and nickel metal hydride batteries? ↑

Both types of batteries are rechargeable but NiMH batteries have a higher energy density (ratio of energy to volume). NiMH batteries are also considered more environmentally friendly than NiCd batteries.

3. How long will a nickel metal hydride battery hold its charge? ↑

When not in use, nickel metal hydride batteries will lose 25% to 50% of their charge within six months due to self-discharge. Several factors such as cell size and storage temperature can impact the self discharge rate. NiMH batteries that have not been used for an extended period of time should be recharged before being put into use to obtain maximum performance.

4. What is a smart charger? ↑

Smart chargers use microprocessor circuitry to monitor battery parameters such as temperature, voltage and state of charge. This information is used by the charger to determine the most opportune time to terminate the charge. When compared to timer controlled chargers, smart chargers can typically charge the batteries faster without impacting performance.

5. What is a trickle charge? ↑

This is a low rate charge used to replenish capacity lost due to self-discharge.

6. Can I use an old NiCd charger with new NiMH batteries? ↑

It is not recommended since the older NiCd chargers were not designed for the higher capacity NiMH batteries.

7. Why do batteries become warm when charging? ↑

It is normal for batteries to become warm during the charge cycle. This is caused by the energy the charger is putting into the battery. In general, the shorter the charge time, the warmer the batteries will become.

8. Can non-rechargeable Alkaline, Heavy Duty or Lithium batteries be used in an Energizer® charger? ↑

No, non rechargeable batteries should not be placed in any charger.

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9. Can Energizer® chargers be used overseas with an adapter? ↑

We do not recommend using our chargers that are designed for US power (120 volts AC at 60 Hz) in foreign countries that have a different power supply. Using overseas voltage adapters can result in permanent damage to charger or wall plug adapter circuitry.

10. Do NiMH batteries need to be charged when first used? ↑

NiMH batteries are shipped in a discharged state and need to be charged before use.

11. Should chargers be removed from household AC power when charging is complete? ↑

We recommend that the chargers be unplugged from the wall outlet and the batteries be removed after the charging sequence is complete. This allows the charger to reset prior to the next usage.

12. What happens if the batteries are inserted incorrectly in the charger? ↑

Batteries that are not loaded properly into the charger will not charge.

13. Can a NiMH battery be overcharged? ↑

Using the batteries to end of life prior to charging is recommended when a timer based charger is used. A smart charger monitors the cell condition during charge and prevents overcharging and subsequent negative impact on battery cycle life.

14. How many times can I recharge nickel metal hydride batteries? ↑

Many factors effect cycle life. Some of these factors include depth of discharge, charge and discharge current, method of charge control, storage and operating conditions and shelf life. Typically batteries with a higher mAh capacity will have a lower cycle life than lower mAh capacity batteries. In normal use, nickel metal hydride batteries should last years before cycle life substantially deteriorates.

15. Can only one battery be charged at a time? ↑

Refer to the charger instructions. Some chargers will only charge pairs of batteries at a time (2 or 4). If one or three batteries are installed in these chargers, the single battery (not in a pair) will receive no charge.

16. Can batteries of different capacities be used together? ↑

No, we recommend that batteries of different capacities not be mixed together. Mixing capacities will typically result in poor battery in-device performance.

17. How long can I store NiMH batteries? ↑

Typically up to 5 years if stored in relatively environmentally controlled conditions. To attain full capacity after extended storage may require several slow charge/discharge cycles to redistribute the electrolyte, etc.

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18. How can I test NiCd or NiMH batteries to see if they're still good? ↑

Due to their flat discharge profile and recharge ability, it is difficult to define a simple quality check for NiCd or NiMH batteries. For fully charged batteries, a battery tester which measures closed circuit voltage can be used as a general guide to determine if the battery is "good" or "defective". A voltmeter which measures open circuit voltage is not a reliable method for evaluating rechargeable batteries and is not recommended for this purpose. The most accurate way to measure the performance of rechargeable batteries is to monitor time and operating voltage during controlled discharge.

19. Why are Rechargeable Batteries 1.2Volts? ↑

Every battery chemical system has an operating voltage based on their internal active materials (fuel). For example, alkaline batteries have a voltage of approximately 1.5 volts due to the reaction between the anode and cathode materials. The reactions of the anode and cathode materials in NiMH batteries produce approximately 1.2 volts.

20. Can batteries overheat in a charger? ↑

If a battery is charged too much, or improperly, excess heat can be generated. Excessive heat generation signifies a problem. Some chargers use thermal sensors to stop or slow the charge to limit overheating of the batteries.

21. How does a charger detect different size batteries? ↑

Some charger contacts may be adjustable to accommodate different size batteries. As the contacts are moved into a different position, a small switch will change the charge rate accordingly.

22. How do chargers detect the end of the charging cycle? ↑

During charging, the battery will reach a peak voltage near the end of its charge, followed by a slight drop in voltage. Smart chargers are able to detect this voltage drop (-delta V), which will typically range from 5mV to 20mV. Smart chargers stop the charging process when they detect the drop in voltage. Many chargers simply use a timer to control the charge. However, if a fully charged battery is put back in, the timer can reset and give the battery another full charge, resulting in overcharge. Some high-end chargers have back up timers in case the -dV (-delta V) did not work.

23. How is the capacity of a rechargeable battery determined? ↑

An industry standard test procedure for determining rechargeable battery capacity is used by *Energizer*®. The [American National Standards Institute \(ANSI\)](#) procedure is as follows: Step 1 discharge new cells at 0.2 C to 1 volt. Step 2 Charge cells at 0.1 C for 16 hours. Step 3 rest cells for 1 hour. Step 4 discharge cells at 0.2 C to 1 volt. Battery capacity is determined by the hours of service to 1 volt times the discharge rate.