

# Energizer® Rechargeable Batteries and Chargers: Frequently Asked Questions



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24. How is the mAh capacity of a rechargeable battery determined?
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## 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 evident with early nickel cadmium (NiCd) rechargeable batteries and 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 20% to 50% of their charge within six months due to self-discharge. Several factors such as cell size, construction 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 when to terminate the charge.

## 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.



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

No, non rechargeable batteries cannot be placed in any charger. Charging of non-rechargeable types may cause the batteries to explode or leak.

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

Please refer to the back of the charger or the wall plug adapter. If the charger is universal voltage, the input voltage will state 100-240 volts. Energizer offers several universal voltage chargers. However, Energizer® does not recommend using 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 the charger or wall plug adapter.

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

Yes, 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 unless the charger has an on/off switch. This allows the charger to reset prior to the next usage.

**12. Can a NiMH battery be overcharged? ↑**

NiMH batteries are sensitive to continuous over charge. A smart charger monitors the cell condition during charge and prevents overcharging and subsequent negative impact on battery cycle life.

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

In normal use, NiMH batteries can be recharged hundreds of times. 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.

**14. 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.



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## 15. Can batteries of different capacities be used together? ↑

No, it is recommend that batteries of different capacities not be mixed together. Mixing batteries of different capacities can result in lower than expected performance and reduce cycle life of the lower capacity battery.

## 16. Can I use other NiMH brands in an Energizer® NiMH charger? ↑

Energizer® chargers are designed and tested for optimal performance with Energizer® batteries. Therefore, it is recommend using Energizer® NiMH batteries in Energizer® chargers.

## 17. Can I use another manufacturer's charger to charge my Energizer® NiMH Rechargeable batteries? ↑

For optimal performance, Energizer® NiMH Rechargeable batteries are designed for use with Energizer® chargers. If the charger is not properly designed, it could cause a loss of performance by the battery being overcharged, undercharging, or overheating.

## 18. How can I recycle my rechargeable batteries? ↑

Rechargeable batteries can be recycled free of charge at any Rechargeable Battery Recycling location. To learn more, visit [www.rbrc.org](http://www.rbrc.org) or call 1-800-8BATTERY.

## 19. What should I consider when choosing a NiMH battery charger? ↑

Consider the following when selecting the NiMH charger that best fits your needs. You can also review the [charger handbook](#) for additional information and performance.

Your personal needs: i.e. a charger perfect for traveling; a charger for home use only; a charger that can charge all battery sizes, AA/AAA/C/D/9V

What battery capacity (mAh) is best used for this particular charger

Special charger features: Charge time / Charge status indicators / Warranty / Dual voltage / Compact design / Fold-out plug versus external adapter cable / On-Off switch / Car adapter / Compliment of batteries charged.



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## 20. How long can I store NiMH batteries? ↑

Typically between 3 and 5 years if stored at room temperature. It is recommended that NiMH batteries stored in a charged state. To attain full capacity after extended storage may require a few charge/discharge cycles to obtain maximum performance.

## 21. 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.

## 22. Why are rechargeable batteries 1.2 Volts? ↑

Every battery chemical system has an open circuit 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.

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

During charging, the battery will reach a peak voltage near the end of a 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. Some 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) does not work.



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### **24. How is the capacity of a rechargeable battery determined? ↑**

Capacity is how much charge a battery can hold often measured in units of mAh. 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 (mA x hours = mAh).

### **25. What if I have a question about *Energizer*® Rechargeable batteries and/or chargers, but can't find the answer on your site? ↑**

Please call customer service experts at 1-800-383-7323. Or [contact Us](#) electronically, and we'll get back to you within 24 hours.



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