

## About Batteries

### 1) What is the difference between various battery types and which one will save me more money?

Rechargeable batteries are made either using one of the chemistry – Ni-Cad, Ni-MH or Li-ion. These three types of technologies have different characteristics.

**a) Ni-Cad** - Ni-Cd batteries have a cycle life of up to 1500 charge/discharge cycles. The down side of Ni-Cad is it suffers from "[memory effect](#)", resulting from repeated charging and infrequent discharging. Ni-Cd batteries deliver less capacity compared to Ni-MH batteries.

**b) Ni-MH** - Unlike Ni-Cad, Ni-MH batteries are less likely to contain "memory effect". Another advantage is Ni-MH batteries deliver 30% more capacity than Ni-Cad batteries without extra mass. Thus you have longer run time for your applications. They have a cycle life between 500-1000 cycles.

**c) Li-ion** – Li-ion is a newer technology compared to the other two batteries. Li-ion batteries do not suffer from "[memory effect](#)" and deliver the same energy as Ni-MH. They are the lightest rechargeable batteries available today. Hence, they are commonly found in laptop computers, digital cameras and wireless phones. These batteries are generally more expensive.

Depending on application, Li-ion and Li-polymer batteries are best for use in digital camera, laptops, PDA, cellular phones, and latest digital gadgets. Ni-Cad cells are generally cheaper and rechargeable up to 2 to 3 years with a good battery charger like IC-6006. Ni-MH cells provide larger capacity and they are generally good for digital camera batteries and other high drain devices, and cost cheaper in comparison with Li-ion, Li-polymer batteries. Alkaline batteries are great because of their availability. They can save users a lot trouble when there is no power source to recharge your battery or the rechargeable battery went bad.

### 2) How long does it take to charge Ni-MH batteries for the first time?

Normally it takes around 12 hours to charge new Ni-MH batteries. You may need to cycle (fully charged and then fully discharged) the battery for a few times before it reaches full capacity. If the battery charger stops charging a new battery before it is fully charged, just remove the battery and then re-insert it. This will restart the charge cycle again.

### 3) What does 'memory effect' mean?

Ni-Cad batteries tend to suffer from 'memory effect'. It is a condition where battery is repeatedly recharged before discharging, which eventually reduce its ability to run at full capacity. If you only use 60% capacity before the next recharge, the battery will forget the remaining 40% unused energy. The battery will function but only use 40% of the remaining capacity. This gradual loss of battery runtime is known as memory effect.

To avoid 'memory effect', fully discharge the battery by running it on an application until the battery stops functioning. Then fully recharge the battery.



#### **4) How are batteries rated?**

Batteries are rated in capacity. The measuring unit for capacity is Amp Hours (Ah) or Milliamp Hours (mAh), 1Ah = 1000mAh. The higher capacity / Ah, the longer run time of the battery.

#### **5) How long can the batteries last?**

Ni-Cad batteries have a cycle life of up to 1500 charge/discharge cycles. Ni-MH batteries have shorter cycle life, 500-1000 cycles. This means an average user can have a battery life of one and a half to three years.

#### **6) Battery Care / How to maximize battery performance?**

- a) Cycle new batteries for a few times to reach maximum capacity.
- b) Keep the batteries in a cool and dry place.
- c) Avoid 'memory effect' by fully discharged the batteries by running them on an application until the batteries stop functioning. Then fully recharge the batteries.
- d) Ni-Cad, Ni-MH and Li-ion batteries will self-discharge if they have not been used for a long period of time. To reuse them, just cycle (fully charge and discharge) the batteries again.
- e) Please keep new or charged battery cells in a battery case, and put them in storage room or place where no direct sunlight and low in humidity. Avoid contact with metals.

#### **7) How do you pick the right rechargeable batteries for your application?**

Ni-Cad batteries have longer life cycle and suitable for industrial and general applications.

Ni-MH batteries have larger capacity, thus it is best for highly drain device such as digital camera.

Alkaline cells are best for small electronic devices such as remote controls, alarms. Lithium cells are found in watch, calculators, and motherboards. They are best for application using very little currents.

Li-ion cells are design for use in highly drain electronic devices- laptops, cellular phones, digital camera and camcorder. They provide best performance and last longer per charge. Expected life cycle is less than 1 ½ year.

#### **8) Why rechargeable batteries are better than alkaline batteries?**

- a) Cost saving – Alkaline battery is non rechargeable. Once the battery is dead, you need to replace it with a new battery. On the other hand, Ni-Cad and Ni-MH batteries are rechargeable. When the batteries are fully discharged, you just need to recharge it to reach maximum capacity. You do not need to buy additional batteries.
- b) Environment friendly – By using rechargeable batteries, you reduce trash. But Ni-Cad and Ni-MH batteries contain hazardous components. Please be environmentally conscious by recycling them.

**9) How much can you save with rechargeable Ni-MH batteries?**

Independent study shows hi quality brand name alkaline AA batteries can last as long as 2000mAh AA batteries. So when choosing batteries make sure to buy 2100mAh or higher capacity cells, plus it can be recharge up to 500 times or more. For example, you use a CD walkman for 3 months, and switch from Alkaline to Rechargeable Ni-MH batteries. You can save up to \$94.00 dollars in purchase with alkaline batteries. However, if you use digital camera for 3 months, switching from Alkaline to Ni-MH saves hundreds, plus reducing approximately 500 Alkaline cells in our waste system.

**10) Can I mix batteries in my camera?**

No, you may not mix alkaline batteries with Ni-MH batteries because they have different voltages. In addition, it's not recommended to mix old batteries with new batteries because different voltage and capacity can cause older battery cells to leak, or even burst.

**11) How to dispose batteries?**

Ni-Cad and Ni-MH batteries contain hazardous components. Please be environmentally conscious by recycling them.