TASER INTERNATIONAL®
7860 E. McClain Drive, Suite 2 * Scottsdale, AZ 85260 USA * 480-991-0797 * Fax 480-991-0791 * www.TASER.com

FAQ about AA Batteries and Battery Chargers

Is battery selection really important? Yes. The ADVANCED TASER® is a powerful device requiring high drain batteries. Batteries are run at their maximum capacity by the ADVANCED TASER and are critical to the success of the stopping power. After extensive testing, we recommend Energizer ACCU®, GP®, & TASER® brand Nickel Metal Hydride (NiMH) rechargeable batteries as the single most powerful types of batteries available. Alkaline batteries are the second recommended types of battery. Duracell Ultra® and Energizer Titanium E²® are the approved alkaline batteries for our products and each has expiration dates. If non-approved alkaline or NiMH batteries are used, problems could arise. Some NiMH batteries don't have complete exposure of their positive end including some Energizer, Rayovac and Panasonic NiMH to name a few. It is critical to look at the top positive end and make sure there is no cardboard on the base of the top positive end. The battery springs may not completely contact and could result in malfunction.

Shouldn't Heavy-Duty or Super Heavy-Duty batteries work? No. Unfortunately many terms used by the battery industry can be very misleading. “Heavy Duty” batteries are often the least powerful batteries you can buy and are a step down in quality. The term used to refer to zinc chloride batteries that had 50% more capacity than traditional carbon zinc batteries -- but that was 50 years ago! Calling zinc chloride batteries heavy duty became misleading once alkaline batteries with 300% more capacity than zinc chloride batteries became available. Stick with factory recommended batteries.

Will installing the batteries wrong do any damage to the ADVANCED TASER? Yes. If all batteries are installed in reverse you can actually reverse polarity of the unit and short it out. Even if only one battery is installed incorrectly you will experience weapon failure and rapidly drain the power of these batteries. Instruction diagrams are on the inside of each battery tray. It is very important to follow those instructions. Insert the batteries using the "V-shape" technique as noted in the manual.

How many AA batteries do I need? 8 AA alkaline or NiMH rechargeable batteries are required to operate. It is also recommended that you keep a spare set of Duracell Ultra® or Energizer Titanium E²® available.

What is the real world difference between alkaline and NiMH batteries in the ADVANCED TASER? Fresh Duracell Ultra® or Energizer Titanium E²® batteries will provide a rate of 12-15 electrical pulses per second. Fully charged NiMH batteries provide a rate of 15-20 pulses per second. NiMH batteries give the strongest output, and perform much better in cold weather. However, undercharged batteries will cause weapon failure. Battery failures with rechargeable batteries in older TASERs have resulted in escalation of force because officers had to move up the use of force continuum. The recommended alkaline batteries have a stronger shelf life (4-6 years). Again, the selection of the battery is very important. The trade off is better pulse rate versus maintaining a fully charged set of NiMH batteries.

Alkaline batteries are 1.5 Volts and the NiMH batteries are rated at 1.2 Volts, why the difference? NiMH batteries are ideal substitutes for most high drain electronics. There is no need to worry about the apparent voltage differences. Even though alkaline batteries are rated at nominal 1.5 Volts, they only deliver 1.5 Volts when they are fresh. In fact, over the course of their discharge, alkaline batteries actually average about 1.2 Volts. The main difference is that an alkaline battery starts at 1.5 Volts and gradually drops to less than 1.0 Volts. NiMH batteries stay at about 1.2 Volts for most of their discharge cycle.

Should I be concerned about the mAh (milli Amp hours) rating? Yes, but only when considering NiMH batteries. Alkaline batteries typically have a capacity rating of over 2,500 mAh and NiMH have rated capacities of only 1,200 to 1,800 mAh. But, when actually powering an electronic device like the ADVANCED TASER, the NiMH batteries will run the device for two to three times longer. Alkaline batteries were not designed to meet the very high power demands of today's electronic devices. Alkaline batteries have a high rated capacity, but they can only deliver their full capacity if the power is used slowly. With NiMH batteries, the higher the mAh number, the longer the charge will last. Also, the higher the mAh number, the higher the price! A rating of 1200 mAh is more than sufficient and ratings of 1400, 1600 and 1800 just increase the length of the recharge.

What is the self-discharge rate of alkaline and NiMH batteries? Alkaline batteries stored at "room temperature" (70 degrees F) self-discharge at a rate of less than two percent per year. However, if they are stored at 85 degrees F they lose about 5% per year, but at 100 degrees F they lose 25% per year. NiMH batteries self-discharge at a much faster rate than alkaline batteries. In fact, at "room temperature" NiMH batteries will self-discharge approximately one percent per day. This is the primary reason behind our recommended two-week check and charge schedule.
Because the voltage of an alkaline battery drops at a very predictable rate it's possible to estimate the amount of capacity left in an alkaline battery based solely on its voltage. (1.5 Volts - fully charged, 1.25 Volts - 50% charged, 1.0 Volts - almost fully discharged). But a NiMH battery stays at about 1.2 Volts until it is nearly completely discharged.

This makes it almost impossible to know the amount of capacity left based on its voltage alone. It also leaves you very little warning when it's time to change your batteries! Moreover, the NiMH will provide little audible warning when they are near their end of capacity. Alkaline batteries will begin to slowly fade out causing the pulse rate to diminish. The NiMH's will provide a rapid pulse and then rapidly plummet in pulse rate.

What is "memory effect" and should I be concerned? "Memory effect" is a term used when rechargeable batteries experience voltage depletion (reduced capacity) over their life. In other words, the battery is not able to hold the same capacity as it did the first time it was charged. This is true with all rechargeable batteries, but some have a very high rate loss. NiMH batteries are virtually memory free and do not need to be fully discharged before recharging. Keep in mind that this is the amount of charge the batteries will hold not the quality. NiMH batteries can be damaged from heat by overcharging, but is easily avoided by using a high quality, microprocessor controlled battery charger such as our factory recommended battery brands.

How many times can rechargeable batteries be recharged? The quick and easy answer is hundreds of times. The reason we can't be more precise is because this is a more complex question to answer than it might seem. The number of times a battery can be recharged depends on how the battery was used. Every time a rechargeable battery goes through a charge and discharge cycle it loses a tiny bit of capacity. Not to mention if you accidentally overcharge the batteries or if you repeatedly completely discharge them. Therefore, it would be impossible to give you an exact number. Today's NiMH will generally last 300 -1,000 charge / discharge cycles.

Does rapid charging reduce the life of batteries? No. So long as it is done using properly designed, "smart" chargers, most NiMH batteries can be recharged in about an hour without any damage or reduction in their life. However, NiMH batteries must be rapid charged with a charger specifically designed for charging NiMH batteries. Chargers designed to charge only Nickel cadmium (NiCad) batteries can overcharge NiMH batteries. Even a standard or slow NiCad charger can damage NiMH batteries. Many inexpensive NiMH battery chargers are simply NiCad chargers that have been modified slightly. We do not recommend this type of charger. While it is less expensive to manufacture than a smart charger, it can lead to overcharging and battery damage. Most NiMH "smart" chargers have actually been designed to detect when a NiMH battery is fully charged and then shut off or go into a trickle charge mode. Because of the more complex circuitry, this type of charger costs more to manufacture, but should lead to greater battery life.

Do I have to purchase a brand specific charger for my NiMH batteries? Any good NiMH charger should be able to recharge any good quality NiMH battery without any problem. Just keep in mind that a "smart" charger is better than a "dumb" charger. The TASER NiMH "smart" charger charges through the use of the dataport plug. This feature allows you to charge the NiMH batteries without having to remove both the battery tray and each battery out. In addition, there is also a place for a battery tray to charge in the base of the charger.

Can a battery charger damage a battery? Yes. The most common cause of premature battery failure is overcharging. The chargers most likely to cause overcharging are the 5, 8, or 15-hour chargers. The problem with these chargers is that they really don't have a charge control mechanism. Most of them are simple designs that charge at their full charge rate for a fixed period of time through a timer, and then shut off or switch to a trickle charge rate. Each time the unit is either unplugged or batteries are removed, the timer begins at zero and recharges the batteries for another lengthy recharge.

If improperly used they can shorten a battery's useful life. Suppose that fully charged or partially charged batteries are put into the charger. The charger has no way to sense this, so it will give the batteries a full charge it was designed to deliver. Do this enough times with one of those battery chargers and the capacity of the battery will start to drop.

Why does my indicator light on the AVANCED TASER have a steady light when I use NiMH batteries? The battery indicator light is calibrated for alkaline batteries (1.5 Volts per battery) and will not function properly with rechargeables. Rechargeable NiMH batteries (1.2 Volts per battery) will always indicate 'low" even when full charged. The battery indicator cannot distinguish between the 1.5 Volts and the 1.2 Volts. Since the unit was designed originally with off-the-shelf batteries, the indicator measures for 12 Volts (8 X 1.5 = 12 Volts) as the maximum and indicates low battery based upon a decrease from the 12 Volts. Freshly charged NiMH batteries start at 9.6 Volts (8 X 1.2 = 9.6 Volts) and immediately register as low on the battery indicator, even though they are not low. **To check the NiMH battery strength, remove the Air Cartridge and check for a fast spark rate of 15-20 pulses per second. On alkaline batteries, if the LED light is blinking, the batteries are good. If the LED is solid red, the batteries are low and should be changed. The red light stops blinking when the charge drops below 70%. If there is no light at all or is barely visible, the batteries are dead or have been installed improperly. Recheck that the batteries are installed properly.**

About how many 5-second cycles can I get out of each type of battery (alkaline vs. NiMH)? Testing indicates approximately 15-20 cycles out of a fresh set of approved alkaline batteries before a dramatic drop in battery performance. The batteries may still fire the unit beyond that number, but at a reduced pulse rate. A fully charged set of NiMH batteries provides approximately 100 cycles. But, it is important to keep in mind that you will not be given the same type of pulse decline warning given by alkaline batteries. Number 101 could give you absolutely nothing!