

NICAD BATTERY INFORMATION

Ni-Cd batteries are composed of nickel and cadmium. These materials are deposited on metal plates, cut into strips and rolled up inside the cell.

Ni-Cd batteries can be recharged many times, even up to 1000 times or more, as long as they are not damaged by exceeding their operating bounds.

There are many types of Ni-Cd cells on the market. Some, such as SCR cells are optimized for maximum voltage. Others are designed to give high capacity and long run time, while others are designed for low cost. Your dealer can help you choose the right type of battery for your application.

Like all batteries, Ni-Cd, or Nicad, cells have a positive (or plus, +, red) terminal and a negative (or minus, -, black) terminal. These two terminals must be hooked up correctly to the circuit (charger, car, speed control, or motor) or damage can result to the battery or any devices connected to them.

Nicad cells are rated for 1.2 volts each nominal. The precise voltage will depend on how charged the cell is and the characteristics and type of the cell itself. Cells are usually assembled into battery packs. A battery pack with 6 cells inside it would put out 7.2 volts nominal.

In R/C car use, going to a battery with more cells in it, such as a 7 cell 8.4 volt battery instead of a 6 cell 7.2 volt battery, will cause the car's motor to go faster, because of the higher voltage. The higher voltage will also cause higher current flow, and the car will not run as long on a charge, unless you reduce the gearing some. (Put a pinion gear on the motor with fewer teeth.)

The capacity rating of the cell tells how long the cell will deliver sufficient voltage to power the load. The nominal capacity rating is usually expressed as milli-amp/hours, and mostly ranges from 50 Mah to 4000 Mah. Some common capacity ratings are 1200, 1400, and 1700 AND 2000. Cells with more capacity will power the load or run the car for a longer period of time before they must be recharged.

Usually you never want to charge a battery at more than 3 times it's rated capacity. If the cell is rated at 2000 Mah you would charge it at 6000 milli-amps (6.0 amps) maximum. This is the maximum safe charge rate. Not all cells can withstand being charged at 3 times their rated capacity, and may become damaged or explode.

Nicads must be charged before being used. Once charged they will hold their charge for several weeks, after which time they may need to be recharged before using.

Nicad cells can deliver large amounts of amperage to the load, much more than an ordinary dry cell flashlight battery, for example. If you accidentally short circuit a Nicad battery there will be a very large flow of current. The wires will probably glow red hot and melt or burn. The cell will be permanently damaged, and could possibly leak chemicals. Be very careful to NEVER, EVER, SHORT CIRCUIT A NICAD BATTERY.

When it is time to recharge a discharged battery pack there are several ways of doing it. Aslow or trickle charger takes about 10 or more hours. A rapid charger is best for R/C car use. The least expensive type of rapid charger is the timer charger. This turns off the charge after a certain amount of time. This type of charger requires extreme caution. You must always set the timer a little on the low side. If you time charge a battery for too long, or charge a battery that is already charged, you will overcharge the battery. Over charging will cause the battery pack to become warm, then get hot, leak fluid and gas through the pressure safety vent at the top of the cell. At this point the cell is ruined, and you will need to buy a new one. Be careful to NEVER OVERCHARGE A NICAD BATTERY.

A Tekin peak detecting charger is designed to prevent overcharging a Nicad, while also delivering a full optimum charge. This type of charger will monitor the voltage of the battery pack while it is charging. A good quality peak-detection charger will keep charging as long as the voltage is still going up, but will shut off the charge when the battery voltage starts to level off or drop. This way you always get a full charge without overcharging. This also gives you the most power and longest run time from the battery pack.

Not all cells with the same nominal capacity rating will have exactly the same capacity. This is due to manufacturing tolerances. After the manufacturing process is complete it is possible to go back and test each individual cell to determine more accurately the actual capacity. This is done with a device like the Tekin DIS-350. After testing a sticker or number is placed on the cell, indicating the actual capacity. If each cell is tested and the battery pack is assembled with cells that all test at the same capacity the battery pack is said to be *matched*. A matched battery pack is good to use when using a rapid charger. This is because all the cells in the battery will reach full charge at the same time, since they all have the same capacity. This reduces the chance of overcharging some cells in the battery while not fully charging others.

After a few or several charges in one day a battery can become fatigued, and develop an undesirable "memory" effect. Some types of cells are more sensitive to this than other types. It is a temporary condition. The degraded performance can be mostly reversed by allowing the cell to rest for a few days after a lot of use, especially if a small discharge resistor is placed across the pack. You can also reduce or prevent and even reverse the performance loss by using a negative pulse "flex" type charger, such as Tekin's BC112. This will extend the life of the cell, especially under extreme conditions.

After a Nicad battery is used many times it will begin to lose power and capacity. When the battery no longer takes a full charge it is time to replace it. The best way to dispose of a Nicad cell is to take it to a dealer to send it in to be reprocessed. This reduces cadmium build up in the environment. Do not ever put a battery in a fire to dispose of it. It may explode and release toxic fumes.

TYPICAL NICAD CHARGE CURVE

