







Search...
 Go

Find Your Battery

Select category

Select manufacturer

Select model

[Other search options](#)

Batteries And Accessories
Alarm
Alkaline
ATV
Barcode-Scanner
Camcorder
Cellular
Coin Cell
Cordless
Digital Camera
DVD Player
Emergency Exit
Flashlight
Generator
Laptops
Lithium
Medical
Motorcycle
Pager
PDA
Personal Watercraft
PLC
Power Tool
Professional Alkaline
Rechargeable
Scooter
Sealed Lead Acid
Single Cell
Snowmobile
Tennis Ball Machine
Test Equipment
Thermal Imaging
Two-Way-Radio
UPS
Utility Vehicle
Wheelchair

Whats the difference between Nickel Cadmium (Nicad), Nickel-metal hydride (NiMH), and Lithium Ion (Li-Ion)?

The three most popular battery chemistries have very special qualities each. I'll start with the oldest first.

#### Nickel Cadmium

Nicad batteries are very robust. They are good for working in extreme environments, such as cold or hot weather. They also have a longer life cycle than NiMH or Li-ion, with about 700-1000 life cycles. They are very robust for high output deep discharge applications. On the downside, they have a charging problem called the "memory effect". That is, if they don't get completely charged after each use, they will potentially only charge up to the last highest charge. This can shorten the lifespan of the battery. They can be reconditioned but at the cost of at least 3 life cycles.

The benefits of using a Nicad battery are extreme temperature tolerance, deep discharge capabilities,

Nicad cell availability. Since Panasonic has bought Sanyo, the availability of quality cells has gone down. Panasonic has discontinued manufacturing several sizes of Nicad batteries. As a result, the sizes that have been discontinued are now only available by Chinese manufacturers. This is an inferior battery.

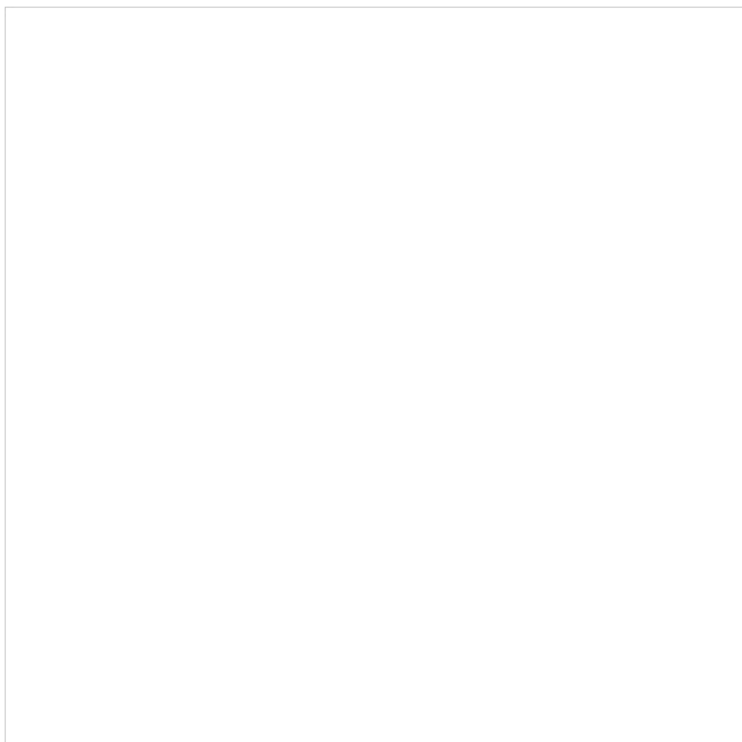
#### Nickel Metal Hydride

NiMH batteries offer a higher capacity than Nicad batteries, and less capacity than Li-Ion. They are nearly twice as heavy as Nicad batteries. They also don't have a memory effect. They are a good medium temperature battery. You can operate with them usually in -5 to 95 degrees fahrenheit with no adverse problems. They have good deep-discharge qualities and can store nearly twice the capacity of nicad cells. Their life-cycle is generally lower than nicad, at 500-800 life cycles. They are very similar to nicad when it comes to charge and discharge characteristics, and are safer than Lithium ion with thermal runaway.

NiMH batteries have more of a tendency to have weak-cell syndrome. That is, when you charge a battery pack all the way, then you go to use, it it dies right away. When you test it, it will say that its fully charged. This is because some or all of the cells can no longer hold power. NiMH batteries have a tendency to do this more than any other battery type.

NiMH cells are better protected from thermal runaway than Lithium Ion, however not as good as nicad. They have similar safety characteristics as nicad and are better for the environment than nicad.

The availability of NiMH cells is very good. Several manufacturers produce them in many countries.



## Lithium Ion (Li-Ion)

Lithium Ion battery cells are known for their enormous energy density. They are able to store more energy per pound than any of the traditional battery packs. That makes them very popular for portable electronics, vehicles, etc. They don't have the memory effect that nicad does, and they perform the best at deep discharge applications compared to nicad or nimh. Environmentally they are safer to dispose than nicad as they don't taint water supplies, and from a mining point of view, there is no benefit or negative aspect either way.

Li-Ion is not a good battery chemistry for extreme temperatures. According to Nasa, the maximum capacity of lithium ion cells at -40 degrees C is 12% of its room temperature capacity. We've had customers who have had li-ion radio batteries stop working at -5 degrees fahrenheit.

Safety is another issue with lithium Ion. All lithium ion batteries have to be controlled with an integrated circuit to control input and output voltage. If the circuit is not present, the cell could have thermal runaway. I'm sure you've all heard of laptop batteries catching fire. That is an instance of thermal runaway. Another safety issue is water. In the presence of H2O, li-ion will oxidize extremely rapidly (hint explode).

The life cycle of li-ion is approximately 400 to 750. This is ever changing with the testing of different lithium salts but as of November 2012, when you purchase batteries for your consumer electronics, this will be the approximate range.

The charge and discharge curve of li-ion is extraordinary. It can handle heavy input and output voltage, making it ideal for use in power tools, electric vehicles, mobility devices, and the like.

The availability of lithium Ion is very good. There are several areas of the world that mine it, and pricing should be stable for the foreseeable future. Efforts from Wall Street to commoditize it would have negative effects on its price and availability.

### Customer Testimonials



**Anonymous**

25 Sep 2018

easy



**Jeffrey H** - AK, ...

24 Sep 2018

Good service!



**Milton S**

21 Sep 2018

just what i was  
looking for

CLICK HERE FOR  
MORE REVIEWS



### Specials

Bullard T3, T3MAX  
Battery



\$54.95

BT-023436-001 Radio  
Battery



\$83.95

Motorola APX 4000  
Battery



\$79.95

## Contact Us

Toll Free: 800-995-9750

Local: 208-347-2744

Fax: 208-347-3898

Email Us

Contact Us



## Customer Care

My Account

Track Order

Specials

## Information

Battery Blog

About Battery Universe

FAQ

Battery Care

Battery Glossary

Radio Battery Chemistry

Friends

## Store Policy

Shipping

Privacy

Terms of Use

Disclaimer



© Copyright 2018 Battery Universe All Rights Reserved. Battery Universe and the Battery Universe Name and Company logo are trademarks of Battery Universe and/or its affiliates in the U.S. and other countries where applicable. All other trademarks mentioned throughout this web site and logos displayed are the property of their respective owners.