

Rechargeable Battery Storage Life Test

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The Rechargeable Battery Storage Life Test

The Rechargeable Battery Storage Life Test for rechargeable NiMH and Ni-Cd batteries is a simple test of the capacity of the battery after it has been stored for a fixed period of time.

Why a Rechargeable Battery Self Discharge or Storage Life Test?

The Rechargeable Battery or Self Discharge or Storage Life Test

Looking at the Rechargeable Battery Self Discharge Results

Interpreting and Using the Rechargeable Battery Self Discharge Results

All rechargeable batteries lose their stored capacity or charge over time, even when they are not used. Some technologies are better than others (they lose less over time). We suspect that some brands, within the same technology, are better or worse than others.

Some manufacturers are claiming their newer technology NiMH batteries will not lose more than 1 - 2% of their energy per month (instead of 1 - 2 % per day). See the AA LSD (Low Self Discharge) Battery Tests Results.

Check out the Rechargeable Battery FAQs for more information on each technology's storage capabilities or self discharge rates.

Why a Rechargeable Battery Storage Life Test? We consider this an important test. There are many cases when you will charge a battery for a device that is not used constantly. You'll install the battery, say your LED flashlight or torch, and then put it away. We expect the batteries and the flashlight to be useful after 1 month of not being used.

Well, wouldn't you rather have a battery that maintains a reasonable charge after a few weeks or 1 month. Theoretically, after 1 month, a reasonably good NiMH rechargeable battery should still have at least approximately 60% of its charge. ($100\% - 30 \text{ days} \times 1.5\%$).

Here are some examples where you would want your batteries to maintain a reasonable charge during storage.

- A low use device such as a flashlight
- A very low power device - A very low power device may still run out of power due to self discharge. A good example of this is timer based products. I use a timer to turn on an electric pump to water a garden. This device uses very little power and only turns the pump on 3 times a week. It will likely lose more energy from self discharge than real use.
- Kids toys that are not used everyday - Some toys are used a little and then put away for days and weeks before being re-used.
- Going away on a trip for an extended period - You might bring your charger, but you shouldn't need to worry about charging your stored batteries if it's a two week trip. When you pull those rechargeable batteries out of your travel bag after two weeks, they should work, right!
- Camping or Hunting - Your devices are ready to go, and you may be out for a week or two, or longer. There's no electricity, so whether you have extra rechargeable batteries in your pack or the device is not being used regularly, you have a right to expect them to work when you need them.

The Self Discharge or Storage Life Test

We have decided on a simple test of 1, 2 and 4 weeks. We believe that these are reasonable periods of non-use between charges. Once the battery is ready for testing, we use the fixed load test.

Before a rechargeable battery is put into storage, it is fully charged.

- All rechargeable batteries are charged using the same charger.
- All rechargeable batteries are charged at the same rate.

- All rechargeable batteries are stored at room temperature.
- Room temperature is 25 degrees Celsius.
- Room temperature may vary plus or minus 2 degrees throughout the year.
- AA, AAA rechargeable batteries are tested using a fixed load of 10 Ohms.

Looking at the Rechargeable Battery Self Discharge Results

When the rechargeable battery storage or self discharge test is done, three samples are charged and stored for 7 days, 14 days and 28 days. When the results are produced, there may be some cases where the capacity after storage, for example, is higher after 28 days than 14 days.

The reason for this is that different cells were used in the different length of the storage tests. All the rechargeable batteries are processed and treated the same. The rechargeable battery tested at the longer storage period may have a higher residual capacity (what appears to be a lower self discharge).

- No two rechargeable batteries are identical or behave exactly the same in whatever the identical circumstances are.
- The rechargeable battery may have a higher initial capacity.
- Rechargeable battery capacity varies from cell to cell. This is normal.
- Even with the best rechargeable batteries, as noted by the manufacturer, rechargeable battery capacity can vary more than 5%.
- Some rechargeable battery data sheets from reputable manufacturers list a minimum capacity which can be up to 10% lower than the labeled or stated capacity (see Sanyo_HR-3U-2500.pdf).
- Not only can each rechargeable battery have a different initial capacity, but you can also expect there to be some differences in each rechargeable battery's behaviour, including self discharge.
- Although room temperature may vary by a few degrees, we do not expect that this small variation is a measurable factor.

In ideal circumstances Rechargeable Battery Review would have:

- A great deal more samples to test and thus produce a good average.
- More samples would produce more results in less time.

- More samples requires more equipment to perform the tests when they are completed.
- More human resources to manage the greater number of tests, tabulate the results and manage the information (including publishing).
- A great deal more financial resources to accomplish all of the above.

Interpreting and Using the Rechargeable Battery Self Discharge Results

The information published here at Rechargeable Battery Review should be considered as a reasonable reference and not as an absolute value for the entire product line. When reviewing the information presented, please consider:

- The information presented in the previous paragraphs.
- The variation in performance that exists in all rechargeable batteries provided by all manufacturers.
- The rechargeable battery manufacturers data sheet when it is available.
- All the samples are processed and treated equally.
- Trends that may appear from products from the same manufacturer.