

SANYO

We aim to bequeath a beautiful Earth for our future generations.

What can we do as a leading company for energy and environment? We can start from what we have; our unique technology and innovative creativity to deliver global solutions.

Ideas were gathered and a brand new innovative battery, "eneloop" was born.

"Disposable to Reusable"

Shifting the life style based on our brand vision.

All for the Earth. All for life.
That is eneloop.

eneloop
Ready to use Rechargeable Battery



eneloop
Handbook

Change the future of our environment by changing your battery

How many battery are we using and throwing away every year....

What can we do to save our environment....

What is the idealistic Eco-friendly battery for the future...

This is SANYO 's answer

eneloop
Ready to use Rechargeable Battery

Represent a new life style.



index



eneloop is not only rechargeable but it is also recyclable.
This makes eneloop an excellent choice from both
environmental and economic point of view.

■ [What is eneloop?](#) [P3](#)

■ [Economic Benefits of eneloop](#) [P4](#)

■ [Low Self-Discharge Battery](#) [P5](#)

■ [eneloop versus Dry-Cell Batteries](#) [P6](#)

■ [High-Power Battery](#) [P7](#)

■ [High Performance in
Low-Temperature Conditions](#) [P8](#)

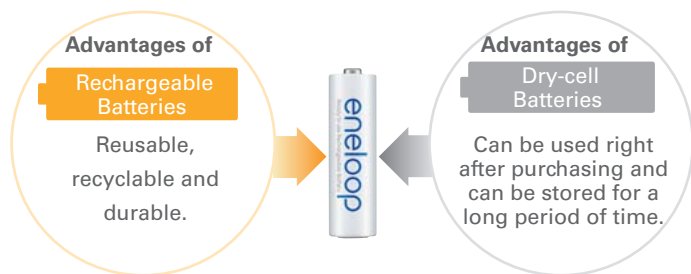
■ [Wide Range of Applications](#) [P9](#)

eneloop Q&A [P11~P18](#)



What is eneloop?

It is a new battery that can be used as easily as a dry-cell battery, and reused simply by recharging it. eneloop is the new battery that might just change your lifestyle.

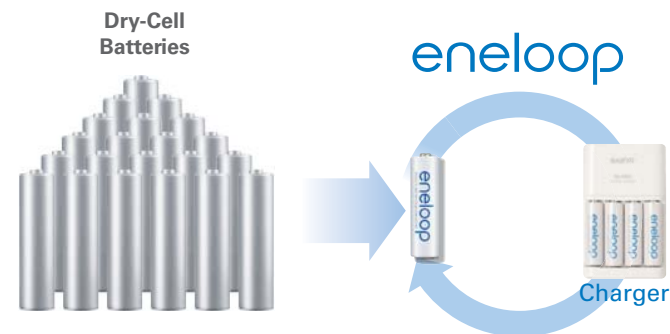


The advantages of the rechargeable battery and the dry-cell battery are combined into one



Economic benefits of eneloop

Because you can recharge eneloop up to 1,500 times*1. In terms of cost effectiveness, though the initial cost is more expensive, eneloop batteries help you to save more money eventually.



eneloop can be recharged 1,500 times, which represents a huge economic advantage

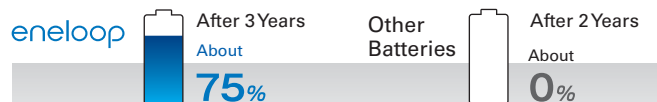
*1: A guide-line for battery life based on IEC61951-2 : 2003 (7.4.1.1)



Low Self-Discharge Battery

SANYO eneloop batteries represent a solution to the problem of excessive self-discharge.

How much energy still remains after 3 years? ^{*1}



Because of its low self-discharge characteristic, you can use eneloop right after purchased.

(all batteries have been charged before shipping)

- appliances such as radio, clock, torch light, remote control, etc...can also be used.
- eneloop is an ideal battery for both high-current and low-current applications.
- eneloop comes in handy in the case of emergencies.^{*2}

eneloop is ready-to-use even
after 3 years^{*1} of storage

^{*1}: Result of a test made by leaving the battery at an ambient temperature of 20°C (self discharging condition: 740mA (E.V.=1.0V). A comparison made with our nickel metal hydride battery (Min.2500mAh).

^{*2}: Avoid leaving the battery in high temperature areas or areas which are excessively humid. We also recommend that your eneloop batteries be charged every year.



eneloop versus Dry-Cell Batteries

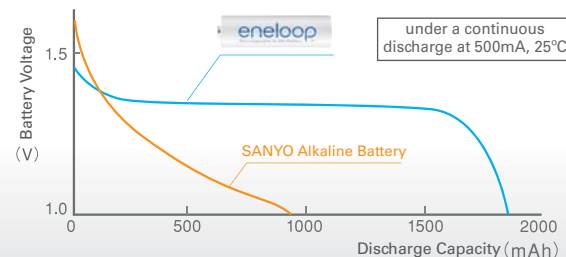
Advantage of eneloop

eneloop supplies constant voltage from beginning to end.

Things that must be taken into account

Unlike dry-cell batteries, the initial voltage of eneloop is low. eneloop may not function in equipment that requires batteries with higher voltage. Also, eneloop may function when used in flashlights but may provide only a dim light, in contrast to a higher voltage battery.

Change in voltage compared with dry-cell batteries (under a continuous discharge at 500mA, 25°C)



eneloop can be used for a long time
at a constant voltage

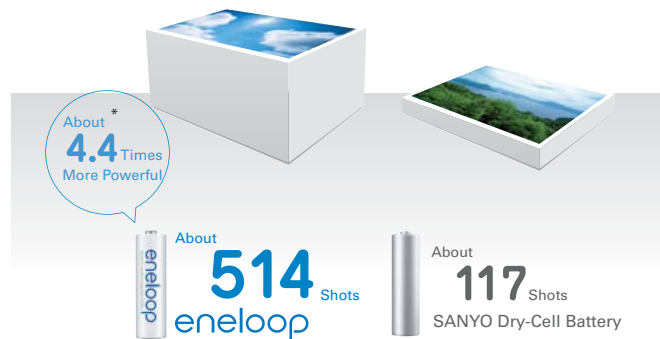


High Power Battery

A digital camera using eneloop
can take approximately 4.4 times more shots.



Comparison of Digital Camera shots using
eneloop battery & dry-cell battery



eneloop can take about 514 shots

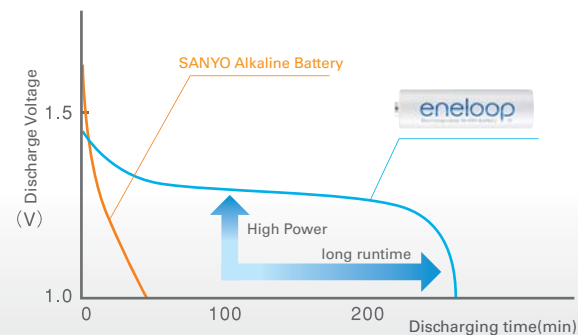
*Testing Condition at HR-3UTGA. When used SANYO digital camera DSC-S4. One picture taken every 20 seconds with LCD on and flash used every third shot. This may change depending on the equipment and other conditions and number of shots made. This is a comparison made with SANYO eneloop battery and SANYO Alkaline dry cell battery(LR6)



High Performance in Low-Temperature Conditions

eneloop has superior performance at 0°C and can even be used at temperature as low as -20°C°.

Discharging Characteristics at 0°C
(at 500mA continuous discharge)



Superior discharge at low temperature!

Great performance even in outdoor use such as skiing etc.


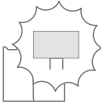



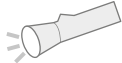

*Operation time will be shorter than that of room temperature. This condition is not subjected to the gadget










Wide Range of Applications (eneloop can be used in various applications)

The table below compares the duration of an eneloop rechargeable battery and a dry-cell battery.

High Current Medium Current Low Current

	*1 Digital Camera	Flash Light	Electric Shaver	Electric Toothbrush	4-Wheel Drive Car	*2 Torch Light	*3 Stereo Radio Cassette Recorder
							
	Continuous Shoot Time	Continuous Flash Time	Continuous Use Time	Continuous Use Time	Continuous Run Time	Continuous Use Time	Continuous Play Time
eneloop	About 2 to 3 hours	About 1.5 to 2 hours	About 3 to 4 hours	About 3 to 4 hours	About 2 to 3 hours	About 3 to 5 hours	About 5 to 6 hours
Dry-cell Battery	About 0.5 to 1 hour	About 1 to 2 hours	About 1.5 to 2.5 hours	About 1.5 to 2.5 hours	About 1 to 2 hours	About 3 to 4 hours	About 4 to 5 hours

	MP3 Player	IC Recorder	Portable Game	CD Player	Radio Tranceiver (special small power type)	Clock	Remote Controller
							
	Continuous Play Time	Continuous ON Time	Continuous ON Time	Continuous Play Time	Continuous ON Time*4	Battery ON Time	ON Time
eneloop	About 6 to 7 hours	About 10 to 12 hours	About 18 to 20 hours	About 20 to 30 hours	About 40 to 60 hours	About 1 to 2 years	About 1 to 3 years
Dry-cell Battery	About 5 to 6 hours	About 10 to 12 hours	About 18 to 20 hours	About 20 to 30 hours	About 40 to 60 hours	About 1 to 5 years*5	About 1 to 5 years*5

• The above specifications are based on the theoretical capacity of the battery and the consumption power rate of the equipment. It may vary greatly depending on the conditions of use, models used, ambient temperature and the condition of the equipment used. • For eneloop, runtime is measured beginning from a fully charged state. Performance time may be shorter if the battery has been left unused for a period of time after being fully charged. • The data in the table are approximations, and runtime specifications may be different when eneloop is used with applications not included in the table. • Dry-cell battery: AA Alkaline/Manganese dry-cell battery used. eneloop: AA Nickel Metal Hydrogen battery used. For MP3 player and IC recorder, AAA batteries were used.

*1: For digital camera, SANYO's DSC-S4 was used. One shot was taken every 20 seconds (flash ON every third time)

*2: For torch light, two AA batteries were used.

*3: For stereo radio-cassette recorder, 4 AA batteries were used.

*4: For transmission, reception, and waiting times, a ratio of 1 transmission, 1 reception, to 8 waiting time was used.

*5: As Manganese batteries are recommended for use in some remote controls and clocks, both test results of Manganese and Alkaline batteries are shown.

More about eneloop

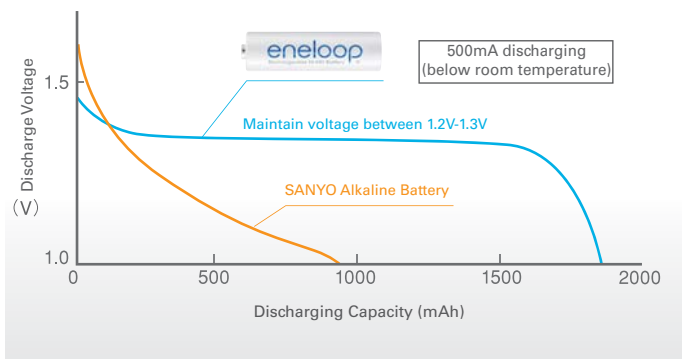
Can eneloop be charged up to 1,500 times?

This is an estimation based on test results for battery life according to IEC standards (number of times after charging/discharging). The number may vary, however, depending on how the batteries were used. The battery life gets shorter as the number of recharging times increase.

What's the difference between 1.5V and 1.2V?

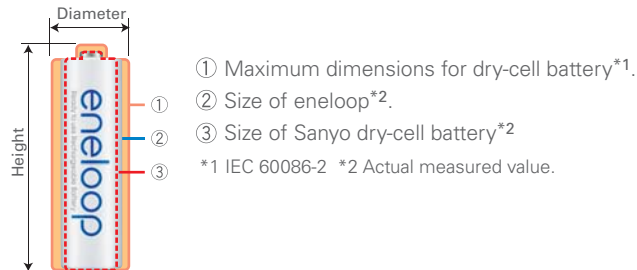
1.5V is the nominal voltage for dry-cell batteries and Nickel Metal Hydride batteries has nominal voltage of 1.2V. Dry-cell batteries have slightly higher voltage than actual working voltage required in the equipment.

Though the Nickel Metal Hydride battery is 1.2V, Nickel Metal Hydride batteries are able to provide similar performance as standard dry-cell batteries. Basically application which using dry-cell battery can also use Ni-MH battery. Please be aware of exceptional case where only dry-cell battery can be used.



Size difference with Dry-cell batteries

eneloop's size is based on IEC (International Electrotechnical Commission) standards. When you are trying to insert eneloop into such equipment, you may find the casing tight, or sometimes you may not be able to fit them at all. Do not force the battery as you may damage eneloop's battery label and cause overheating. In such cases, never use eneloop batteries. Nevertheless eneloop is suitable for all equipments which meets IEC standard.



What is the difference between "Best Before Date" and the "Manufacturing Date" ?

"Best Before Date" printed on dry-cell battery refers to the optimal performances guaranteed if you use the battery within this period. This limitation does not apply to eneloop, because Nickel Metal Hydride batteries such as eneloop can be used at anytime if they are electrically charged. For reference the "Manufacturing Date" is printed on the package. (Due to the unique low self discharge characteristic, if it is within three years from "Manufacturing Date", you can still use them directly after purchased without charging.)

What is Memory Effect?

If Ni-Cd batteries and Nickel Metal Hydride batteries are repeatedly charged before the stored energy is used up, the battery “memorizes” its altered, decreased lifecycle. When you use it the next time, the voltage decreases immediately. Sometimes this causes the equipment to shut down. This is called the “memory effect.”

The voltage of eneloop is higher than that of conventional Nickel Metal Hydride batteries and even if the battery is charged excessively, sufficient voltage is maintained, no memory effect occurs and you can recharge the battery according to your needs.

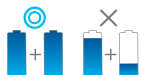


What is Refresh Function?

This function is to remove “Memory Effect”. This is achieved by discharging the batteries first and then recharging the batteries to its full charged. However, eneloop battery does not experience the effects of “memory effect”, so eneloop does not need to use the ‘Refresh Function’.

What about connecting two or more batteries?

Do not use newer eneloop batteries with batteries of different capacities or different manufacturers. Connecting eneloop with older eneloop batteries is not a problem unless they are virtually dead. (We recommend that eneloop be fully charged before use.) To ensure satisfactory performance, we recommend using batteries with the same capacities.



My equipment does not work. Why?

It may be due to the following reasons:

Cause 1: Batteries are not charged

eneloop is a rechargeable battery, it is pre-charged when you purchase, but once you used, it need to be charged in order to use it again. In the event, if your charged battery cannot be used, possible causes are; batteries are not charged properly or batteries have self-discharged because you kept your batteries in the applications for too long. Please try to charge it again.

Cause 2: The terminals may not be clean.

Touching the battery with your fingers may leave dust or dirt on the surface of positive and negative terminals. This causes the electrical resistance on the surface of the electrode to increase, which affects battery performance. If this happens, clean the terminals with a dry cloth.



Cause 3: Over-discharged.

Applications without over-discharge preventing device can cause batteries to over-discharge. For example, use low current draw LED light until battery runs out, it cause over-discharge and later cannot charge the battery correctly. Recharging battery 2-3 times solves this problem but if the problem still persists, It is considered battery’s life span has ended and please stop using. Continuous over-discharging causes damage to the batteries. We recommend to recharge the battery, once luminous energy become low or battery energy become low during using LED light



Can eneloop be used in underwater light?

Please do not use eneloop and SANYO Ni-MH batteries on underwater light and sealed application. SANYO Ni-MH batteries contain a gas release vent, which allows releasing hydrogen, when the battery is misused. For normal usage, gas will not be released but hyper-electric discharge or short circuit can cause inside of the batteries gas pressure to rise and gas will automatically be released. This gas contains Hydrogen and sealed devices cannot diffuse the gas. So if there is any firing source like sparks, it might cause bursting or fire.



My battery gets hot. Is it ok?

Nickel Metal Hydride batteries like eneloop sometimes get as hot as 50°C (hot when touched), but it is not abnormal. Our eneloop charger has a temperature protective circuit in case of a temperature rise. After charging is completed, wait until the battery cools off before using it. If the battery gets abnormally hot, it may be because it is a dysfunctional battery.

Where is the best place to store my eneloop batteries?

Do not store them in humid or sunlit areas. Do not expose them to high temperatures. It is recommended to store them at room temperature. If stored fully charged, it is possible to use them within approximately three years. Depending on how they are stored, to ensure that they can be used for a long time, it is recommended that they should be charged at least once every year.

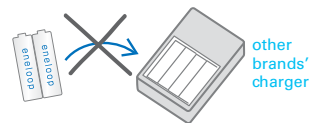
How to carry eneloop batteries around?

When carrying or storing batteries, avoid direct contact with metallic objects such as key-holders, necklaces, coins and mobile phones. Also please do not store them in metallic carrier, it might cause short circuit. For carrying the batteries, please use resin made case to carry.



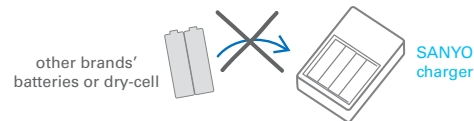
Can I use other brands' charger to charge eneloop batteries?

It is strongly recommended to charge eneloop on SANYO Ni-MH battery chargers. SANYO chargers are designed to suits SANYO batteries and designed to bring out the best performance. We will not take any responsibility for batteries problem charged with other brands' charger. It is also recommended not to charge other brand' batteries with Sanyo charger.



Can I use SANYO charger to charge other brands' batteries or Dry Cell batteries?

It is not recommended to charge other brands' batteries and do not charge dry-cell batteries as dry-cell batteries cannot be recharged.





eneloop Q&A

What should I consider when selecting a charger?

Items such as those listed below should be considered:

- What is the size of my battery and how many of them can be charged at the same time?
- Charging speed.
- Does the charging indicator show that charging is complete?
- Is it compact?
- Can it be used in overseas?

Is it possible to use eneloop worldwide?

Yes, if your charger has a function called Auto Voltage which is applicable to any voltage between 100 and 240V. You will likely need a plug adapter for your charger in these countries.

Tips for using eneloop

- eneloop lasts longer if stored in low temperatures and in dry conditions. But, one must prevent it from getting wet.
- Leaving eneloop in an application may result in the battery discharging. If an application is not in use for a long period of time, remove the battery from the equipment.



What is an Adapter?

An adapter is a piece of equipment that enables smaller size batteries to power applications that normally require size C and D batteries. In this way, eneloop size AA batteries can power an application that requires much larger batteries. Adapter has no relation to the battery's capacity. Adapter can be used with most applications. However, in some applications adapter do not reach the contact point of the battery holder. In such cases, do not use the adapter, and use size C and D eneloop batteries instead. The adapter is designed for emergency use. It is not intended as an equivalent alternative for C and D size cells. Finally, we also have another lineup of Nickel Metal Hydride batteries besides eneloop that can be used in this adapter.



Just plug the eneloop into the adapter and you can use it in your equipment. Of course the adapters only adapt the mechanical dimensions of the eneloop.

The capacity remains as original eneloop AA (TyP. 200mAh Min. 1900mAh)