

# Rechargeable alkaline battery

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A **rechargeable alkaline battery** (also known as alkaline rechargeable or rechargeable alkaline manganese (RAM)) is a type of alkaline battery that is capable of recharging for repeated use. The first-generation rechargeable alkaline technology was developed by Battery Technologies Inc in Canada and licensed to Pure Energy, EnviroCell, Rayovac, and Grandcell. Subsequent patent and advancements in technology have been introduced. The formats include AAA, AA, C, D, and snap-on 9-volt batteries. Rechargeable alkaline batteries are manufactured fully charged and have the ability to hold their charge for years, longer than NiCd and NiMH batteries, which self-discharge.<sup>[1]</sup> Rechargeable alkaline batteries can have a high recharging efficiency and have less environmental impact than disposable cells.



Rechargeable Alkaline AA battery

## Contents

- 1 Proper use and durability
- 2 Comparison to other rechargeable batteries
- 3 Environmental issues
  - 3.1 Chemical composition
- 4 See also
- 5 References
- 6 External links

## Proper use and durability

Although these batteries can be used in any device that supports a standard size (AA, AAA, C, D, etc.), they are formulated to last longest in periodical use items. This type of battery is better suited for use in low-drain devices such as remote controls or for devices that are used periodically such as flashlights, television remote control handsets, portable radios, etc. If they are discharged by less than 25%, they can be recharged for hundreds of cycles to about 1.42 V. If they are discharged by less than 50%, they can be almost fully recharged for a few dozen cycles, to about 1.32 V. After a deep discharge, they can be brought to their original high-capacity charge only after a few charge-discharge cycles.

## Comparison to other rechargeable batteries

The rechargeable alkaline battery is cheaper than other rechargeable types. Cells can be manufactured in the fully charged state and retain capacity well. Their capacity is about 2/3 that of primary cells. They are of dry-cell construction, completely sealed and not requiring maintenance. Cells have a limited cycle

life, which is affected by deep discharge; the first cycle gives the greatest capacity, and if deeply discharged a cell may only provide 20 cycles. The available energy on each cycle decreases. Like primary alkaline cells, they have a relatively high internal resistance, making them unsuitable for high discharge current (for example, discharging their full capacity in one hour).<sup>[1]</sup>

## Environmental issues

### Chemical composition

Rechargeable alkaline batteries are developed from primary alkaline batteries, designed to resist leakage that a recharge could cause, so they can be safely recharged many times.

Some other types of rechargeable cells contain mercury or cadmium and thus can be an environmental hazard unless disposed of properly. As of August 2007, a number of companies make batteries that are free from these heavy metals. According to the websites of EnviroCell<sup>[2]</sup> and PureEnergy and according to old Rayovac packaging, these manufacturers' rechargeable alkaline batteries have no mercury or cadmium.

### See also

- List of battery types
- List of battery sizes
- Comparison of battery types
- Battery recycling
- Recharging alkaline batteries (of types not designed to be recharged)

## References

1. David Linden, Thomas Reddy (ed.), "Handbook of Batteries Third Edition", McGraw Hill, 2002 ISBN 0-07-135978-8 chapter 36 *Rechargeable zinc/alkaline/manganese dioxide batteries*
2. "EnviroCell Alkaline Rechargeable Batteries". Envirocell.com. Retrieved 2010-10-15.

## External links

- Alkaline battery charging (<http://www.allaboutbatteries.com/Alkaline-charging.html>)

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