
# Management of Spent Dry Cell Batteries in South Africa

## What are dry cell batteries?

Dry cell batteries are batteries which contain no freestanding bodies or pools of liquid electrolyte (their electrolyte is contained by an absorbent or separator material and is mostly in aqueous, organic or inorganic salt solution) and which can operate in any orientation without spilling, making them suitable for any application including portable equipment.

Dry cell batteries include small portable batteries used daily by most people in devices such as radios, remote controllers, toys, flashlights and lanterns, games, watches, calculators, hearing aids, cameras, telephones and other communication devices (these are also known as household batteries) and also include the larger batteries used in electric motor vehicles, commercial and industrial, military and other applications.

## Categories of dry cell batteries

**Primary batteries:** are the most common household batteries which automatically convert chemical energy into electrical energy. These batteries cannot be recharged and are thrown away straight after use. They are often used in torches, toys, smoke detectors, watches, calculators, hearing aids, radios and remote controls. Some common types of primary batteries include:

- *Primary Alkaline:* they are called alkaline batteries because they use an alkaline solution (potassium/ sodium hydroxide) instead of the acidic ammonium chloride or zinc chloride electrolyte used in zinc-carbon batteries. They have become the dominant battery system in the portable battery market.

- *Carbon Zinc:* They are generically known as either zinc carbon or carbon zinc batteries, and sometimes bearing words such as “Heavy Duty” or “General Purpose” on their labels, these products were in widespread use before the development of alkaline batteries.

**Secondary batteries:** these are batteries which can be recharged electrically and can be used repeatedly. They are widely used in many applications. The most familiar are starting, lighting, and ignition (SLI) for automotive applications, industrial truck materials handling equipment, and emergency and standby power. They are basically used as storage devices for electric energy and are known also as “storage batteries” or “accumulators”. Small, secondary batteries are also being used in increasing numbers to power portable devices such as tools, toys,

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lighting, and photographic, radio, and more significantly, consumer electronic devices (computers, camcorders, cellular phones etc.). Some common types of secondary batteries include:

- *Li-ion (Lithium-ion):* Li-ion batteries are also known as "Three-C" market as they were introduced to capture over half of the sales value of the secondary consumer market, with applications such as laptop computers, cell phones and camcorders in the last decade.

- *NiCd (Nickel Cadmium):* these batteries are the most popular alkaline secondary batteries and are available in several cell designs and in a wide range of sizes. They are said to hold their charge longer than NiMH batteries when not in use and produce an initial high rate of discharge, making them a good choice for power tools. They are therefore used in heavy-duty industrial applications, such as materials-handling trucks, mining vehicles, railway signalling, emergency or standby power, and diesel engine starting. They are also recommended for outdoor solar lighting because they maintain their strength better in cold weather than NiMH batteries. They are however not recommended for digital cameras.

- *NiMH (Nickel-Metal-Hydride):* NiMH batteries are now in high volume commercial production for small portable battery applications. The key driving forces for the rapid growth of NiMH are environmental and energy advantages over NiCd and the explosive growth of portable electronic devices such as communication equipment and laptop computers. These batteries contain nickel and electrolyte, which are considered semi-toxic. They are however environmentally preferable as they avoid toxic heavy metals like cadmium. They are currently being used for large batteries, including industrial and electric vehicle applications. They are however now being replaced, in turn, by the lithium-ion battery which has an even higher specific energy and energy density.

## Why are dry cell batteries of concern?

Batteries are identified as a problem material in the waste stream and their environmental impacts are linked to their chemistry. Dry-cell batteries come in a wide range of shapes, sizes and chemistries. This makes them more complex and expensive to sort and reprocess. Some of these chemicals, such as nickel and cadmium, are extremely toxic and can cause damage to humans and the environment. In South Africa the majority of spent dry cell batteries (SDCBs) still go to landfills. When disposed in landfills, depending on their chemistries, they have a potential of causing deplorable impacts on the environment.

In poorly managed landfills, batteries have a potential to leach these toxic heavy metals into the surrounding soil, surface and groundwater. In particular, they can cause soil and water pollution and endanger wildlife. For example, cadmium can cause damage to soil micro-organisms and affect the breakdown of organic matter. It can also bio-accumulate in fish, which reduces their numbers and makes them unfit for human consumption.

From a risk management perspective it therefore makes sense to remove products containing heavy metals from the waste stream before they enter a landfill. This is particularly important given the continuing growth in demand for electronic devices and the batteries that power them. The presence of batteries in household waste also causes problems if that waste is intended for processing to recover the organic component (primarily food and garden waste) as they contaminate compostable materials.

## How are SDCBs currently managed in South Africa?

In South Africa, SDCBs are currently managed through disposal to landfills. Since these batteries are mainly generated at household level where there is often no separation of waste at source, these batteries are therefore discarded with other domestic refuse which end up being disposed of at municipal landfill sites which are often not designed to receive this type of a waste stream. This is mainly due to a lack of a functional take-back system for SDCBs as well as the lack of facilities for the recycling of this type of battery in the country.

## Are SDCBs recyclable?

The majority of primary batteries cannot be recycled while the majority of secondary batteries can be recycled. The non-recyclability of primary batteries is attributed to material recovery rates which are often said to be too small to make recycling economically viable. However, developments are said to be currently underway worldwide to establish methods and technologies for the recycling of primary batteries.

Secondary batteries on the other hand contain a range of metals, which can be reused as secondary raw materials. Methods and technologies are available worldwide for the recycling of most SDCBs containing nickel-cadmium, nickel hydride and lithium. Currently there is no collection scheme and facilities for the recycling of this type of batteries in the country however there are some companies which collect these batteries and ship them overseas for recycling.

## What must a consumer do with SDCB?

In the absence of a functional take-back system and facilities for the recycling of SDCBs in the country, consumers are left with little to no option on what to do with these batteries. As a result, consumers are currently allowed to discard these batteries with other domestic waste with impunity. However, depending on where you might be located in the country, some municipalities have established neighbourhood garden sites or waste drop-off centres where consumers are allowed to drop-off specified waste streams. So before you discard your SDCBs with other domestic waste, you can first consult with your nearest municipal offices to establish if there are any neighbourhood waste drop-off centres which can take SDCBs. Moreover, although there is currently no functional take-back system for the collection of these batteries in the country, to some extent, some companies collect these batteries through battery retailers. Consumers may therefore also check with their neighbourhood battery retailers if they are not offering this service. This service is usually offered at no cost to consumers.

## SDCBs disposal prohibitions and restrictions

The National Norms and Standards for the Disposal of Waste to Landfill (GN No. R. 636 of 23 August 2013) imposes an eight (8) year grace-period towards the coming into effect of the prohibitions and restrictions on the disposal of batteries other than lead acid batteries to landfill. This is a category where SDCBs fall. These Norms and Standards however do not apply to generators of domestic waste that is collected by a municipality.

## Compulsory take-back system

Section 59 of the Consumer Protection Act (CPA), 2008 (Act 68 of 2008) advocates for a compulsory take-back system for any goods when they reach their end-of-life. This is applicable in a case where any national legislation prohibits the disposal or deposit of any particular goods, or any components, remnants, containers or packaging of any goods into a common waste collection system.

Since the National Norms and Standards for the Disposal of Waste to Landfill impose an eight (8) year prohibitions and restrictions on the disposal of other batteries to landfill, it means that these Norms and Standards serve as a national legislation referred to in section 59 of the CPA and they therefore give effect to this section. By implication, this means that at the lapse of this eight (8) year timeframe (i.e. in 2021), consumers will be allowed to take-back their SDCBs to suppliers.

## FOR MORE INFORMATION CONTACT:

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