

A Thorough Guide to Battery Types,
Recycling Processes &
Downstream Applications

FAQ'S

ABOUT
BATTERY RECYCLING



RETROFIT
ENVIRONMENTAL

Battery Recycling

Batteries are composed of various metals, alloys and composites, all of which are limited natural resources. The demand for these materials is quickly outpacing the planet's resources. Retrofit Environmental is committed to providing cost effective recycling solutions, partnering with down-stream recycling vendors who employ only the most advanced recycling technologies. By recycling instead of landfilling, even alkaline batteries can make a difference in the circular economy.



Alkaline & Carbon-Zinc

These are the most common variety of batteries generally encountered. They are small dry-cell batteries, sealed and non-rechargeable. Carbon-Zinc batteries are labeled general purpose or heavy duty. Processing capabilities vary by battery chemistry.

FORMATS

AAA, AA, C, D, 9-Volt,
Button cells

USES

Flashlights, Radios, TV remotes,
lower end consumer products,
watches, hearing aids



RECYCLING PROCESS

Manual Separation or High Temp Metal Reclamation (HTMR). Zinc manganese concentrate (ZMC) used as a micronutrient in fertilizer, paper production, plastic and brass manufacturing. Carbon is used to strengthen concrete in road construction. Steel shells and component parts are reclaimed and used in the manufacturing of new steel-based products.

Battery Recycling FAQ cont'd



Lead Acid

These batteries are very common and are typically recognized by their weight due to the high quantity of lead contained within the housing.

FORMATS

Large format, gel cell, Automotive group sizes

USES

Automotive, Forklift, Golf cart, Alarm panels, Emergency lighting, Computer backups (UPS)



RECYCLING PROCESS

Manual Separation followed by Lead Smelting. Both the internal components and plastic housing are recycled. Reclaimed commodities are primarily used in the manufacture of new automotive batteries. Acids are captured and neutralized.



Lithium-Ion / Polymer

These are small dry-cell batteries that are sealed and rechargeable.

FORMATS

18650 cells, AAA, AA, C, D, custom sizes

USES

Cell phones, Power tools. Laptops. Handheld Electronics, Medical devices, E-bikes



RECYCLING PROCESS

Disassembled, crushed under liquid to prevent fugitive emission and reduce reactions, Metal separation (copper, aluminum, and cobalt) and metal-enriched liquid solidified using filtering and finally sent off site for further metal purification.

Battery Recycling FAQ cont'd

Lithium Primary



These are small dry-cell batteries that are sealed and non-rechargeable. Found often as coin sized cells (CR2032)

FORMATS

AAA, AA, C, D, 9-volt, button cells, custom sizes

USES

Watches, Cameras, Handheld Electronics, Tire-Pressure Sensors, Alarms, Computer Memory Backup, Pacemakers, Remote Car Lock fobs, Smoke Detectors



RECYCLING PROCESS

Crushing after cryogenic process in liquid solution which reduces reactions. Lithium enriched solution is processed into Lithium Carbonate, a raw material that can be reused in numerous industrial applications.

Nickel-Metal Hydride



These are small dry-cell batteries that are sealed and rechargeable. They are most often found in older power tool packs and as rechargeable AA, AAA and C consumer batteries.

FORMATS

AAA, AA, C, D, 9-Volt, old power tool packs

USES

Popular rechargeable used in most applications that Alkaline batteries are used



RECYCLING PROCESS

Thermal treatment under vacuum is used to selectively recover the cadmium. A Ni-Fe alloy and plastics are also recovered.

Battery Recycling FAQ cont'd



Dry Cell Nickel-Cadmium

Small dry-cell batteries, sealed and rechargeable. Commonly found in older power tool packs and as rechargeable AA, AAA, and C consumer batteries

FORMATS

AAA, AA, C, D, 9-Volt, old power tool packs

USES

Older popular rechargeable used in most applications that Alkaline batteries are used



RECYCLING PROCESS

Thermal treatment under vacuum is used to selectively recover the cadmium. A Ni-Fe alloy and plastics are also recovered.

Wet Nickel-Cadmium



Small to large, flooded cell batteries, vented, rechargeable, pocket-plate and sinter-plate types. Liquid electrolyte is corrosive.

FORMATS

Hard case, tall rectangular

USES

Emergency power, telephone systems, railroad switching applications, solar storage



RECYCLING PROCESS

Thermal treatment under vacuum is used to selectively recover the cadmium. A Ni-Fe alloy and plastics are also recovered.

Battery Recycling FAQ cont'd



Zinc-Air

Fairly uncommon, small, dry-cell batteries, sealed and non-rechargeable.

FORMATS

Button cells

USES

Watches, hearing aids



RECYCLING PROCESS

Zinc-air batteries are recycled in the same way as alkaline batteries or by the high temperature metal reclamation (HTMR) method.



Mercury

Outdated type of small dry-cell batteries, sealed, non-rechargeable. Outlawed for public use by The Battery Act of 1996.

FORMATS

Button cells, 9-Volt, 12.3V

USES

Watches, hearing aids, cameras, and industrial/Military applications



RECYCLING PROCESS

Mercury Retort - high temperature distillation within a vacuum chamber.