



New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Solid Waste Reduction & Recycling

How To Set-Up A Battery Recycling Program

The following information is included in this
packet:



What to do with:
Alkaline Batteries
Zinc-Carbon Batteries
Lithium Batteries
Nickel - Cadmium Batteries
Small Lead-Acid Batteries
Button Batteries

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PLEASE NOTE!

This does not include a complete list of potential vendors. Inclusion of a facility in this booklet does not constitute approval or endorsement of that facility or provide any assurances with regard to quality of services provided or the facility's environmental compliance history.

GENERAL INFORMATION

So your business is considering a battery recycling program to compliment your existing recycling program. That's great! It's not as hard as you may think. This booklet provides the general information you need to get started.

Check our website -

www.dec.ny.gov/chemical/8819.html

for more general information on non-hazardous and hazardous batteries. Please remember, anytime you're not sure or have any questions, call the Bureau of Solid Waste Reduction & Recycling (BWRR) at (518) 402-8705.

Battery collection and processing, like the management of other recyclables and building trash, is an operational function that requires commitment of appropriate resources. This should be viewed as an extension of the disposal requirements for your business.

In the past, the main problem with collection and transportation of recyclable batteries was their classification as a hazardous waste which necessitated compliance with State and Federal hazardous waste regulations. This problem has been eliminated since the United States Environmental Protection Agency's (USEPA) Universal Waste Rule (Hazardous Waste Management System; Modification of the Hazardous Waste Recycling Regulatory Program) was promulgated on May 11, 1995. The new streamlined hazardous waste management regulations govern the collection and management of certain widely generated wastes. It greatly simplifies the requirements for the collection and transportation of recyclable batteries as well as other materials.

BASIC STEPS

The basic steps to setting up a battery recycling program are:

1. Appoint a responsible employee(s) to run the program.
2. Research recycling/disposal options.
3. Decide which types of batteries you will collect.
4. Decide on a collection location point(s).
5. Trouble shooting and record keeping.

1. Responsible Staff

You need to have an employee responsible for the operation of the battery recycling program. This is very important. This person (probably you) will be responsible for:

- √ Researching recycling/disposal options.
- √ Determine the types of batteries to recycle.
- √ Decide on the collection point(s).
- √ Submit a report to the appropriate management official for final approval to proceed.

This person(s) will also be responsible for:

- √ Developing educational information for the employees on the program.
- √ Dealing with the paperwork (reporting numbers for Executive Order 4).
- √ Answering employee questions.

2. Battery Types & Their Disposal/Recycling Options

Many types of batteries are manufactured ranging from alkaline to zinc-air batteries. Those batteries are commonly available in many sizes including AAA, AA, C, D, 9-volt, and button. Principal consumer uses include flashlights, radios, toys, computers, hearing aids, cameras, pocket calculators, watches, cordless tools and cordless appliances.

Non-Hazardous Batteries

Alkaline (Manganese) Batteries

Alkaline batteries, the most commonly used consumer batteries, represent about 63 percent of domestic consumer battery sales. These batteries are commonly manufactured in D, C, AA, AAA, 9-volt and button sizes. Known for their high performance and good shelf life, these batteries serve a wide variety of consumer uses including toys, radios, cassette recorders, camera flash units, flashlights, and cordless appliances.

Historically, alkaline batteries were manufactured with a thin coating of mercury added to the surface of the zinc anode to control corrosion which would create hydrogen gas. If created, this gas could result in increased internal pressure, possibly reduce battery life and present a potential leakage concern. The presence of mercury increases both shelf life and battery performance. Mercury levels of 1 percent of the battery weight were typical in the early to mid-1980s, but decreased to an average of 0.5 percent of battery weight by 1989. Thus, battery manufacturers have now redesigned these batteries and reduced the mercury content voluntarily. These batteries now meet the New York State legislated (Chapter 304, laws of 1991) standard of 0.025 percent (250 ppm) mercury by

weight for (non-button or coin) batteries and 25 mg total mercury for button or coin batteries manufactured after January 1, 1992. Also, the four major U.S. battery manufacturers produce a "no-mercury-added" alkaline battery.

In addition to the disposable alkaline batteries, consumers can purchase rechargeable alkaline batteries. The rechargeable alkaline batteries are a "no-mercury-added" alkaline battery.

Zinc-Carbon Batteries

Zinc-carbon batteries are commonly manufactured in D, C, AA, AAA, and 9-volt sizes. They are used for the same general purposes as alkaline batteries. General purpose zinc-carbon batteries are the least expensive and the least powerful batteries available and have a much shorter service life than alkaline batteries. This is because the alkaline solutions used as electrolytes in alkaline batteries are better ionic conductors than the electrolyte solutions used in zinc-carbon cells.

These batteries, like alkaline batteries, have historically contained a small amount of mercury to control the reaction of zinc with other battery components which could create hydrogen gas. Battery manufacturers are reducing the mercury content. These batteries must meet a maximum mercury content of 1 ppm for all batteries sold in New York State after January 1, 1993. Also, the use of mercury has been phased out, and all zinc-carbon batteries being manufactured by the major manufacturers are now made with no-mercury added.

Disposal Option - Regular Garbage

Alkaline, rechargeable alkaline and carbon-zinc batteries can go directly into the garbage with no special handling requirements.

Lithium Batteries

Lithium battery usage is expected to grow in the next decade due to their outstanding performance characteristics and concurrent reduction in cost. The principal consumer usage is for powering cameras or as memory back-up in computers and other electronic equipment.

Since lithium is very reactive in the presence of water, such exposure must be avoided to prevent a vigorous reaction and generation of hydrogen gas. Battery

manufacturers have designed consumer lithium batteries with an excess of cathodic material to assure that all the lithium (the hazardous component) is completely expended when the battery is spent.

Disposal Procedure - Special Condition

In order to dispose of lithium batteries in your regular garbage you will need to assure the battery is completely discharged.

Hazardous Batteries

Nickel-Cadmium Batteries, Small Sealed Lead-Acid Batteries and Button Batteries are the major ones of concern due to their toxic components. Each type will have its own means for being recycled.

First contact your **local Recycling Coordinator** to see if there is a program in your community and that it will take commercial generated batteries. Check our website for a list of Recycling Coordinators www.dec.ny.gov/chemical/8511.html Ask about what they are collecting; and find out how to get into their program, this is the easiest scenario. However, some communities will not accept batteries from commercial or institutional facilities. and you will be need to keep reading this helpful guide to find out what to do next.

Nickel-Cadmium Batteries

Nickel-cadmium batteries are the principal rechargeable consumer batteries being used today. Up to 20 percent of the battery weight is cadmium. Nickel-cadmium batteries are available in traditional consumer D, C, AA, AAA, and 9-volt sizes, as well as a wide variety of specialized sizes and shapes designed for specific applications needed by institutional and industrial uses. Consumer nickel-cadmium batteries are commonly used to power portable tools, video cameras, cellular telephones, remote control toys, portable computers, hand-held vacuum cleaners and portable medical devices.

Small Sealed Lead-Acid Batteries

This type of battery is permanently sealed because the electrolyte never needs to be serviced. These batteries are actually considered to be dry cells because the

electrolyte is absorbed into the separators and plates. Since these batteries have similar performance to nickel-cadmium batteries, they are finding use in similar applications; however, nickel-cadmium batteries are more cost effective for lower power requirements while sealed lead-acid batteries are more cost effective for higher power requirements.

Recycling Options: The Rechargeable Battery Recycling Corporation (RBRC) is a non-profit service organization that was established to make recycling of rechargeable batteries convenient and inexpensive. RBRC administers the "Charge Up To Recycle!" program. RBRC recycles the following battery chemistries: Nickel Cadmium (Ni-Cd), Nickel Metal Hydride (Ni-MH), Lithium Ion (Li-ion) and Small Sealed Lead (Pb). The batteries collected under this program are managed in compliance with the U.S. EPA's Universal Waste Rule and will be recycled. RBRC website is www.rbrc.org

There are other companies that will take these types of batteries, do a web search for more options.

For the consumer, Lowes, Home Depot, Target, Walmart and Radio Shack will take back these batteries for recycling. Call first to make sure your local store has a collection program.

Button Batteries

Silver Oxide Batteries

Silver oxide batteries are manufactured with a silver oxide cathode, a zinc anode, and an alkaline solution, usually potassium hydroxide or sodium hydroxide, as the electrolyte. The batteries most commonly used by consumers are manufactured as button cells (over 30 sizes) and contain approximately 1 percent (10,000 ppm) of mercury by weight. The principal uses of silver oxide batteries include calculators, watches, cameras and hearing aids. Silver oxide batteries are designed to yield a constant voltage output, as opposed to the declining voltage output of the alkaline and zinc-carbon batteries.

Zinc-Air Batteries

Zinc-air batteries are manufactured with oxygen as the cathode, zinc as the anode,

and an alkaline solution such as potassium hydroxide as the electrolyte. Oxygen for the cathode is provided by atmospheric air allowed into the battery through holes in the casing. These batteries are manufactured as button cells and contain about one percent mercury by weight. Primary consumer use of these batteries is for hearing aids and pagers. Over 50 percent of hearing aids use zinc-air batteries.

Zinc-air batteries can provide the longest life of the three common types of button batteries (silver-oxide, mercuric-oxide and zinc-air). Although this battery has a long shelf life, once the air passage is open, the battery will continue to discharge until the anode is fully depleted. Use of outside air can cause battery performance to vary, depending on air humidity and other varying air quality factors.

Your business will need to make decisions. If you have cameras, calculators, etc. you will probably generate button batteries. It will cost your business to ship and have them recycled. You should note that these costs should be viewed as solid waste management costs.

3. Collection Point(s)

When you are deciding where to locate your battery collection point, consider the following:

- ✓ Convenience to employees.
- ✓ Common work areas.
- ✓ Ability to monitor collection.

The location needs to be convenient or employee may not be willing to bring the batteries. It is also a good idea to have it near the person(s) in charge of the program. This will prevent unwanted batteries from turning up. If your policy is "No batteries from home", a location near you or the employee in charge of the program, will help prevent them from entering your program.

4. Educational Program, Troubleshooting & Record Keeping

Once the initial planning is completed, the next step is to devise an educational program that will fit your needs and the needs of your employees. The success of your program will depend on how well informed (and motivated) your employees are to the hows and whys of the battery recycling program. A vigorous educational program will assure a successful recycling program.

Educational Program

An educational program has to be well thought out and informative, but not necessarily serious. A program that is entertaining and fun will have a lasting impression and will not seem as tedious. An ongoing educational program is required to assure your program's continuing success. The elements to consider when you are developing an educational program for your employees are discussed below:

The Kick-Off Memo - The most common approach is a kick-off memo from as high up in the business as possible. If everyone knows that upper management is behind your recycling program, you'll have better participation - **"If the boss can do it, I can do it."** Include reasons for implementing this program as well as environmental and economic benefits. Describe the procedures and keep them simple. A complicated program will not benefit anyone. Indicate which batteries are accepted and explain why. Especially important, and often overlooked, is to include the contact person's name and telephone number in case anyone has questions.

Initial Promotion - When you first kick off the battery recycling program, reminders should be prominently posted throughout the building.

Slogans & Logos - You may want to develop a slogan or business logo for your recycling program. Your employees will be able to identify with it and interest will be stimulated.

Educational Pamphlets - In addition to the kick off memo, you may want to develop an educational pamphlet. Given to all employees, it can be a useful reminder.

Publicity - Your expanded recycling program may be of interest to your community. Contact local TV, radio stations and newspapers. They may like an opportunity to report on your recycling efforts.

Status Reports - Status reports on your overall recycling program and your expanded battery recycling program should be done on a regular basis to your employees. Everyone likes feedback on how they are doing. Follow up on your educational program with memos on the status of your program. Let employees know how many batteries has been recycled and the environmental and economic benefits. An business newsletter is a good forum for program updates.

Troubleshooting

Troubleshooting problems at the beginning of your recycling program can mean the difference between success and failure. Typical problems include:

Poor participation - Problems can be minimized through an effective educational program. Ask several employees if the educational program is effective. If not, you may need to distribute new information.

Change in collection - Alert employees to any changes in the collection program and issue frequent reminders. (E-mail is great for that.)

Contamination - If you are finding the wrong types of batteries are being left for recycling, make sure your educational efforts are clear and direct.

Record Keeping

Record Keeping is helpful for the following reasons:

- ✍ Let's you see how well your program is running.
- ✍ Let's the Big Boss see how well you are running the program.

5. Costs

The cost to recycle your batteries will depend on which program you implement.

SUMMARY

In conclusion, you will need to:

- ☺ Assign a responsible employee.
- ☺ Decide what you are going to collect and where you will collect them.
- ☺ Contact the recycling facility.
- ☺ Educate the employees.
- ☺ Keep records!

Good Luck! Remember, batteries are everywhere! And we are responsible to make sure they are properly recycled or disposed. If you have any questions, call (518) 402-8705.