



Leading the charge for recycling.™



LI-ION BATTERIES IN THE MARKETPLACE: BALANCING RECYCLING AND SAFETY

FLORIDA NAHMMA WORKSHOP , MAY 2018

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Call2Recycle Assists Local Governments in battery collections and recycling



For your residents:

- No cost rechargeable battery recycling-boxes or bulk
- Fee Based: Flat rate all battery boxes for primary batteries or bulk shipping of sorted batteries (flat rate plus freight)
- **GreenVantage Plus Program:** Larger communities/Districts: Offset pricing/rebate for rechargeable batteries shipped in bulk when bundled with primary batteries



www.Call2Recycle.org/start-recycling

What Are Our Responsibilities?

Program Management Services

1. **Reverse Logistics Management.** Manage collection, pick-up, transport, sorting and processing.
2. **Education & Promotion.** Beyond educating consumers, collection sites and businesses on why and how to recycle, we convince opinion leaders that we do things right.
3. **Administration & Performance Reporting.** Regulatory submittals, voluntary reporting, certifications, downstream verification, etc.
4. **Customer Service.** Inbound and outbound call center that manages 10,000 inquiries per month.



Call2Recycle 2017 Results

- **14 million lbs.** of batteries collected and recycled in US and Canada, including 8 million lbs. in the United States
- Increased primary battery collections by 24% in our first year of a national new program initiative to 1.7M lbs.
- **YOY, Lithium ion collections grew nearly 15% to 2.2 M lbs.**
- VT- primary battery EPR law state- grew collections to 81,000 lbs., from 59,000 lbs. the first year of the state program (administered by Call2Recycle)



Batteries: What's changing? Why?

- Landslide move by consumers to products that are mobile/cordless
- Americans love affair with smart phones, iPads, tablets etc. for instant access to information and communication
- Larger, more powerful Li-Ion batteries are becoming more common (40V- 60V) with higher watt hour ratings
- Batteries for these devices are lighter, smaller, contain more energy/power, charge faster and hold longer charges



- **Changing Battery Chemistries = Changing Impacts**

- Decline of **NiCad** : Lessening of Toxicity Impacts
- Popularity of **Li-Ion**: Less Environmental, more Safety impacts
- 5.6 billion Li-Ion cells sold globally in 2016
- Battery fires are in the news and becoming a recognized issue for some consumer products (CPSC recalls)
- Battery safety and fire issues are increasing for waste transport, processing and disposal and even battery recycling



Our Lithium Battery Experience

- We have handled approximately 5 million boxes of consumers batteries since inception and untold numbers of drums & gaylords.
- In these containers, we've collected over 144 million lbs. of consumer batteries; over 35 million lbs. have been lithium-based.
- We've collected, transported, sorted and processed lithium-based batteries from over 14,000 active collection sites across North America.
- Lithium Ion Processors are global; there are currently no US processors of lithium batteries (although there are US sites that will accept, shred or treat them).
- **Until recently, safety/fire incidents have been very isolated.**



How Can You Identify a Lithium-Based PRIMARY Battery?

Lithium Metal (Primary) Single Use

- How they are sold in the consumer marketplace:
9v, AA, AAA, C, D, Coin/Button cell
- They **MAY** be marked: 'Lithium' or 'Lithium cells';
marked as (CR###)



How Can You Identify a Lithium-Based RECHARGEABLE Battery?

Rechargeable (Lithium Ion)

- It **MAY** be Marked “Rechargeable”
- It **MAY** Have a Battery Chemistry Name (Lithium Ion) or Abbreviation (LI-ION, Li-ion, LiPo (lithium polymer))
- It **MAY** Just Have Battery Seal, other or no Marking



Battery Terminals Must Be Protected

Here's Why



Many batteries hold a residual charge even when they appear dead. When this battery comes into contact with other batteries or metal, a spark or excessive heat can occur.

Unprotected battery terminals are dangerous.

Heat from Short-Circuited Lithium-Based Batteries Can Cause Fires



Why Are Safety Incidents Increasing?

1. As more mobile products using batteries (e.g. toys, tools, electronics) are sold, batteries are **flooding the market**.
2. Battery chemistries can be **hard to identify** making it difficult to know which are hazardous and require special handling.
3. As the **power** of batteries increases and sizes shrink (energy density), damaged or defective batteries release more energy.
4. Sales of **counterfeit batteries**, which are more likely to cause safety incidents, are increasing.
5. The **design of products**, affixing a more powerful battery into a smaller product, creates a premium on design and, in some cases, increases risks.
6. Batteries are being damaged in processing of waste streams

Recycling Lithium-Based Batteries

Four Important Lessons

1. **A Spent Battery Isn't.** Used lithium batteries can often maintain 80%+ of their original charge.
2. **Don't Remove Non-Removable Batteries.** Lithium polymer batteries, without hard cases, are susceptible to damage.
3. **Tape or Bag.** The positive terminal must be protected either by tape or place in a clear and sealable bag.
4. **Curbside Collection Is Seldom Wise.** While some municipal governments have effective programs to mitigate safety issues, most do not. Find a dedicated collection container / site.





Watch for Lithium-Based Batteries that Show Signs of Damage Such as Swelling, Smoking, Leaking or Overheating.



Do NOT place damaged lithium-based batteries in a collection box or drum for recycling with other batteries. Immediately put them in an absorbent, non-flammable material (sand or cat litter) in a cool, dry area.

The U.S. DOT requires special packaging for shipping defective, damaged or recalled (DDR) lithium-based batteries.

DDR Solution for compromised Li-Ion Batteries

	Small Kit	Large Kit
Kit		
Kit Contents	<ul style="list-style-type: none">• Overpack box• Metal can with return shipping label• Metal lid and locking ring• Vermiculite• Tape• Plastic bags• Permit and caution labels• Return shipping label• Instructions• Recycling of all batteries	<ul style="list-style-type: none">• Overpack box• Metal bucket with return shipping label• Metal lid and locking ring• Inner box• Vermiculite• Tape• Plastic bags• Permit and caution labels• Return shipping label• Instructions• Recycling of all batteries
Note	<p>US & Canadian Special Permit allows for no more than 4.4 lbs. (2kgs) of lithium cells and batteries to be contained in a single package. However, a single cell or battery may be shipped within one package provided the cell or battery has a mass of 5 kg or less.</p>	

Call2Recycle's **CHARGE UP SAFETY** Campaign

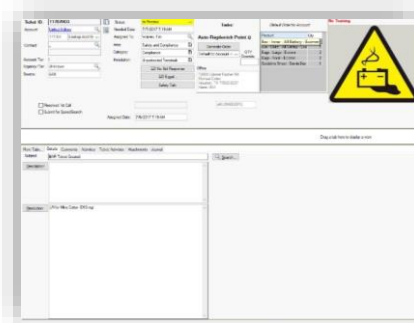
Four Main Objectives

1. **Foster Employee Leadership.** Improve our knowledge, culture and commitment to safety to enable us to serve as leaders and influencers with customers.
 2. **Improve Collection Site & Sorter Performance.** Increase visibility, accountability and behaviors surrounding safe handling, storage and transport of batteries.
 3. **Drive Awareness thru Education.** Improving the visibility and knowledge of safe practices. Safety training on website for customers by Dec 2017
 4. **Engage Stakeholders.** Build relationships with other like-minded organizations to influence public and government debate on relevant safety issues.
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Charge Up Safety™: Operational Changes

- Flame Retardant Box.
- Terminal Protection Guidelines.
- Box Anomaly Reports (BAR).



Minimum Terminal Protection Guidelines SHIPPING IN CALL2RECYCLE BOXES

Below are the minimum requirements for preparing household batteries for shipment. When in doubt, all of the battery type, Call2Recycle® recommends the battery be individually bagged or taped.

BATTERY TYPE / CHEMISTRY	TERMINAL PROTECTION REQUIRED?
Rechargeable Nickel Cadmium (Ni-Cd) Nickel Metal Hydride (Ni-MH) Nickel Zinc (Ni-Zn)	9V or Less = NO (drop in the box) Greater than 9V = YES — Terminal protection REQUIRED
Primary (Select sites only) Alkaline & Carbon Zinc	12V or Less = NO (drop in the box) Greater than 12V = YES — Terminal protection REQUIRED
Rechargeable Small Sealed Lead Acid (SSLA/Pb) Lithium Ion (Li-Ion)	ALL = YES — Terminal protection REQUIRED
Primary (Select sites only) Lithium Button/Coin Cell	ALL = YES — Terminal protection REQUIRED

Charge Up Safety!
call2recycle.org/policy

Avoid the sparks!

Batteries that don't have metal caps or other features can create an arcing fire or explosion.

**Protect terminals before shipping:
Bag or Tape Each Battery!**

Place each battery into a clear plastic bag and follow the steps below:

- Double bag
- Seal with tape
- Label each bag

➡ Drop bags only

If you bag your batteries, tape the outside of the bag with a non-conductive tape.

- No metal tape
- No electrical tape
- No duct tape
- No packing tape
- No shrink wrap
- No staples

(drop in the box)

call2recycle

REMARKS: Call2Recycle is not a complete battery shipping or Call2Recycle policy. It is a guide only. Please refer to the Call2Recycle website for more information.

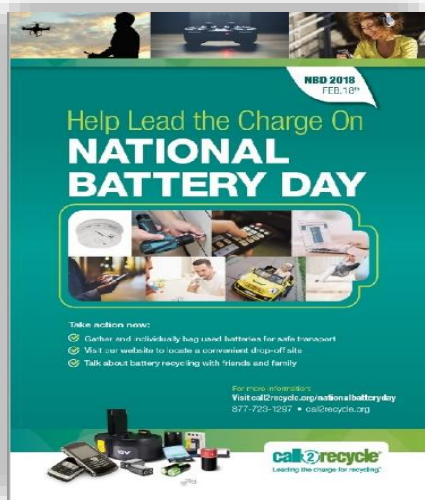
Call2Recycle Operational Safety Policies

1. **Individually bag or tape all batteries!**
2. Collection sites that ship batteries with positive terminals that are not protected according to U.S. DOT requirements may face suspension/termination.
3. Batteries considered to be damaged, defective or recalled must be shipped separately in U.S. DOT-approved packaging.
4. Call2Recycle only accepts Call2Recycle boxes or other containers we have pre-approved. (UN 4 GV rated boxes)
5. Boxes should be shipped when they are full (up to 66 lbs./30 kgs) or within one year of the first battery being collected.



Charge Up Safety™: Consumer Education

- Safety Video.
- Safety Portal.
- Consumer Outreach Events.



Steps you can take in your program:

- Expect to receive lithium batteries and have a plan in place to manage at your MRF, transfer station, etc.
- **Train staff: Access our safety training PP at www.call2recycle.org/safety-training**
- Isolation kit advisable for compromised/damaged lithium ion batteries (DDR Kit or equivalent)
- Develop consumer education messaging to inform residents **not** disposing of Lithium based batteries in the trash; rather promote drop off sites for their safe recycling
- Promote our Collection Site Locator (<http://www.call2recycle.org/locator/>) to your residents

Resources

Visit the new Call2Recycle Safety Portal:

www.Call2Recycle.org/safety



- Safety presentation for training your staff
- Downloadable Safety training video
- YouTube battery safety 101 video
- FAQs
- Other links/technical assistance resources



Leading the charge for recycling.™

thank you!

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