

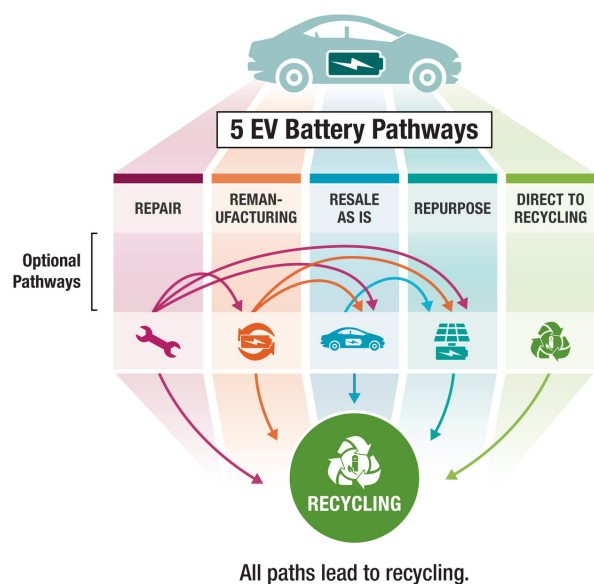


EV BATTERY GUIDELINES

IDENTIFICATION, COLLECTION, AND TRANSPORTATION

The information herein is provided as a resource; it is not a directive. It is the responsibility of the shipper (employed by the company holding the battery) to have knowledge of the regulations, identify the EV battery, decide on its disposition, and sign the bill of lading. Call2Recycle is not responsible for errors in judgment on behalf of the shipper as a result of reading this document.

EV BATTERY PATHWAYS



Source: Call2Recycle®

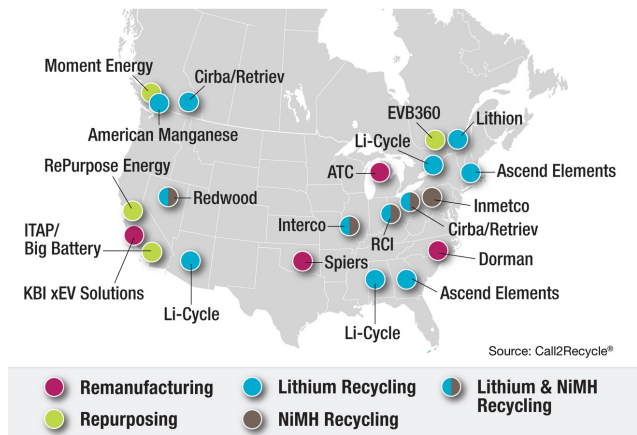
- 1 Repair** is done at the dealership and is not an option for auto dismantlers, recyclers, and shredders.
- 2 Remanufacturing** of end-of-vehicle life EV battery by a known company for reuse in similar vehicle from which it came.
- 3 Resale** of end-of-vehicle life EV battery in an 'as is' state to a 3rd party.
- 4 Repurposing** of end-of-vehicle life EV battery by a known company for an alternative use other than what the batteries was original intended for.
- 5 Recycling** of end-of-life and damaged-defective batteries by a professional battery recycling company

EV BATTERY DESTINATIONS

Companies performing various EV battery services

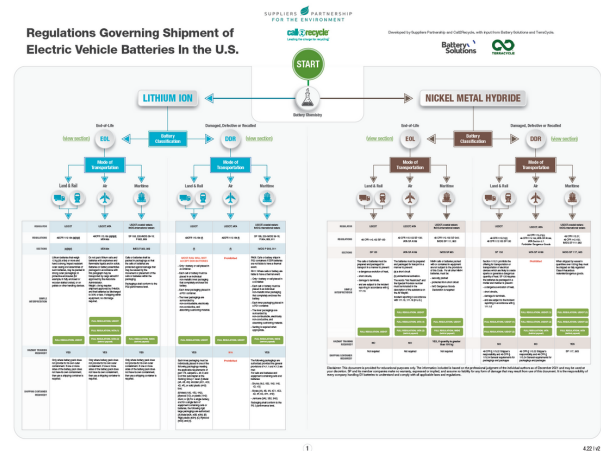


North American EVB Management Sites



REGULATORY REQUIREMENTS

Please see the [guidance document prepared by Suppliers Partnership & Call2Recycle](#) that explains regulations pertaining to shipping EV batteries by mode of transportation.



EV BATTERY IDENTIFICATION

- **Look for the battery label and identify the:**
 - chemistry
 - vehicle make, model, year
 - battery serial number or similar identifying number
- Measure the battery width, length, height and the battery weight (if possible)

This information is important for two reasons:

1. Identifying chemistry and vehicle helps decide which remanufacturer, repurposer, or recycler to ship to
2. Battery size and weight play a factor in shipping container size (if needed) and transportation costs

EV BATTERY DISPOSITION: END-OF-LIFE VS. DAMAGED-DEFECTIVE

The U.S. Department of Transportation (USDOT) requires the shipper to identify if the battery is end-of-life (EOL) or damaged-defective (DD). The shipper is the individual employed by the company shipping the battery who is required by law to make the final decision if the battery is end-of-life or damaged-defective, and is also the person required by law to sign the bill of lading.

Damaged characteristics:

- Dents, punctures, cracks in battery out shell
- Water damage including water coming out from within the battery pack*
- Corrosion on the terminals
- Broken terminals
- Loose wiring from inside the battery pack
- Signs of tampering

* If the electric vehicle and/or battery pack has been damaged due to flooding from a hurricane (salt water or fresh water) do not attempt to charge or drive the vehicle/battery. Call first responders as the battery pack may now be at risk of a thermal event.

Defective characteristic:

- The battery management system is giving a readout code

Thermal event batteries are classified as damaged-defective, however, have different characteristics:

- Swelling
- Melted plastic
- Hot to touch
- White/grey smoke
- Sweet bubble gum type of smell
- Crackling sound
- Flames

End-of-life battery definition:

- A used EV battery that has come to the natural end of its in-vehicle life. This battery has no signs of thermal events, damage, or defects.

Regulatory requirements pertaining to lithium cells and batteries:

- [49 CFR § 173.185 - Lithium cells and batteries](#)
- [PART 173 - SHIPPERS - GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS](#)

Please scroll to section 173.185 Lithium cells and batteries

Pertinent Excerpts:

- (b), (5) Lithium batteries that weigh 12 kg (26.5 pounds) or more and have a strong, impact-resistant outer casing and assemblies of such batteries, may be packed in strong outer packagings; in protective enclosures (for example, in fully enclosed or wooden slatted crates); or on pallets or other handling devices, instead of packages meeting the UN performance packaging requirements in paragraphs (b)(3)(ii) and (b)(3)(iii) of this section. Batteries or battery assemblies must be secured to prevent inadvertent shifting, and the terminals may not support the weight of other superimposed elements. Batteries or battery assemblies packaged in accordance with this paragraph may be transported by cargo aircraft if approved by the Associate Administrator.
- (b), (6) End-of-life batteries are packed in a Packing Group 2 level shipping container if not on a pallet
- (f), (1), (2), (3), (4) Damaged-defective batteries are packed in a Packing Group 1 level shipping container all of the time.

Examples:



Pallet for optional use when the end-of-life EV battery has a hard out shell on all sides.



Unrated one-time use container for use only with end-of-life EV battery with a hard outer shell. Not for use with damaged-defective EV batteries.



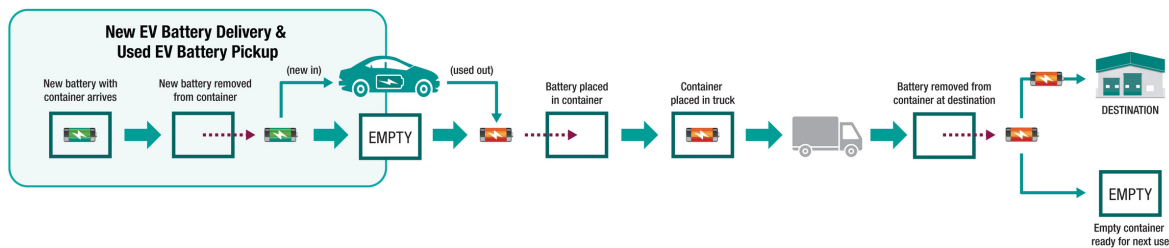
Packing group 1 multiple reuse steel container lined with fire retardant material for damaged-defective EV batteries.

Transportation requirements pertaining to lithium cells and batteries:

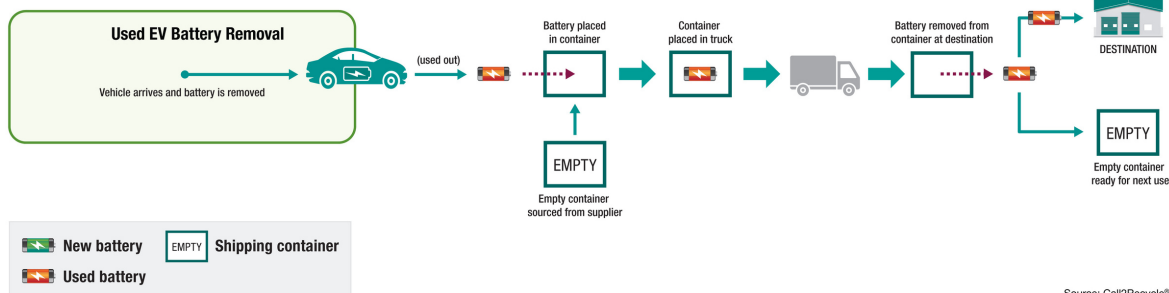
- The batteries must ship with a carrier approved for transporting dangerous goods
- The driver of the vehicle must be a trained Hazmat Employee as required by the US DOT.
- Shipping containers need to be arranged for and managed in a manner similar to that depicted in this next graphic, all in alignment with 49 CFR 173.185 US DOT regulations. Management of shipping containers will play a significant role in minimizing costs associated with handling end-of-life EV batteries.

The Logistics of EV Battery Shipping Containers

Scenario A: Battery Exchange (e.g. Dealership)



Scenario B: Battery Removal (e.g. auto dismantler & recycler)



Source: Call2Recycle®

Signing Bill of Lading

Bills of lading (BOL) contain a section called a Shipper's Certification. The US DOT requires that this Certification be signed for shipments of hazmats including end-of-life (EOL) and damaged-defective (DD) EV batteries. The individual who signs this section of the BOL is referred to as the "hazmat employee" by the US DOT. Hazmat Employees are required to be trained before they are authorized to sign BOLs. Training content and documentation have specific requirements.

ABOUT CALL2RECYCLE

Call2Recycle is the leading North American battery recycling network for industry, committed to the safe and responsible collection, transportation, sorting, and recycling of batteries and related devices, whether at end-of-life, damaged or defective, or brought out of the market due to a recall.

A non-profit organization in both United States and Canada, the company has safely and responsibly recycled more than 209M pounds / 94M kilograms of batteries across multiple chemistries since 1994.

The business works with roughly 400 clients from the household battery, hearing aid, power tool, cell phone, laptop, outdoor power equipment, electric bicycle, and electric vehicle industries. Clients choose to work with Call2Recycle for the company's effective cost management, safety-focused approach, and regulatory compliance.

Call2Recycle, Inc. is headquartered in Atlanta, Georgia, while Call2Recycle Canada, Inc. is headquartered in Toronto, Ontario.

For more information:

- Call2Recycle US: www.call2recycle.org
- Call2Recycle Canada: www.call2recycle.ca