VERMONT
AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation

Environmental Fact Sheet

Waste Management & Prevention Division
802-828-1138

Hybrid and Electric Vehicle Batteries

What types of batteries are found in Electric Vehicle and Hybrid Vehicles and why are they of concern?

Lithium Ion and Nickel Metal Hydride Rechargeable batteries are currently used in both Hybrid and Electric Vehicles and have high-voltage electrical systems that typically range from 100 to 600 volts.
Nickel metal hydride battery packs can contain up to approximately 250 individual battery cells and lithium ion battery packs can contain up to approximately 95 individual battery cells.

Lithium Ion batteries may present a fire and explosion hazard when damaged and can also be reactive if not fully discharged. Lithium Ion batteries are increasing in use and can also be found in motorcycles, scooters, RV equipment and many other products.

Nickel Metal Hydride batteries are not reactive but contain valuable metals that can be recycled.

How are Lithium Ion and Nickel Metal Hydride batteries from businesses regulated?

Lithium Ion Battery Management

Spent lithium ion batteries that are generated by businesses can be managed by either of the following standards:

1) As **Universal Waste** by following the standards outlined in Subchapter 9 of the Vermont Hazardous Waste Management Rules (VHWMR) and Part 273 of the Code of Federal Regulations Title 40 (refer to the "Universal Waste" fact sheet for more information about this option).

Or

2) As reactive **Hazardous Waste**, following the management standards provided in Subchapter 3 of the VHWMR.

Nickel Metal Hydride Battery Management

Spent nickel metal hydride batteries that are generated by businesses are not regulated as hazardous waste, but most businesses in VT choose to recycle nickel metal hydride batteries.

Best Management Practices

- ✓ Avoid stockpiling spent batteries.
- ✓ Contact the automotive manufacturer/retailer for the type of vehicle the battery has been removed from to see if they will accept for recycling.
- ✓ If an automotive manufacturer/retailer will not accept the battery for recycling, Schedule pickups with a recycling contractor at least once a year or more if needed.
- ✓ Check batteries for swelling and damage prior to storing.
- ✓ Place swollen or damaged batteries in a closed, watertight, storage container such as a five-gallon plastic (polyethylene) pail or bin. Add Sand, kitty litter, vermiculite or another fire containment material such as CellBlockEx to aid in safe storage.

- ✓ Store batteries upright on an impervious surface and separate by battery type.
- ✓ Store under cover and consider storage in a separate containment area or building to prevent property loss in the event of a reaction or fire.
- ✓ When handling batteries, always wear safety equipment (e.g., gloves, apron, and eye protection).
- ✓ Keep an ABC Fire Extinguisher next to battery storage area. Class D is also recommended for extra safety with lithium ion or any lithium-based batteries.
- ✓ For shipping purposes, remember that any damaged lithium ion battery or a lithium ion battery that is over 300 watt hours is a hazardous material per Department of Transportation Code and considered highly dangerous.

How are Lithium Ion and Nickel Metal Hydride batteries from households regulated?

Although household wastes are exempt from the VT Hazardous Waste Management Regulations, all spent nickel metal hydride and lithium ion batteries, including those generated by households, should be recycled through one of the following: an automotive manufacturer/retailer, battery recycling contractor, or solid waste management entity. Contact information for solid waste management entities in VT.

For information on the recycling of other small consumer batteries such as those used in lap tops, phones, drills, toys, flashlights, etc. please see Call2RecycleVT

Resources:

Battery Recycling Contractors

Battery Solutions

Complete Recycling Solutions

Veolia

ENPRO

Clean Harbors

Call2Recycle

Solid Waste Management Entities- https://dec.vermont.gov/waste-management/solid/local-districts

Maintenance and Safety of Hybrid and Plug-In Electric Vehicles-Battery Maintenance

https://afdc.energy.gov/vehicles/electric_maintenance.html

Alternative Fuel Vehicles Safety Training

Training, tools, and information for emergency responders to safely handle emergencies involving alternative fuel vehicles

https://www.nfpa.org/Training-and-Events/By-topic/Alternative-Fuel-Vehicle-Safety-Training

Hybrid Cars.Com- https://www.hybridcars.com/hybrid-car-battery/

Rechargeable Battery Association

https://www.prba.org/wp-content/uploads/Overview-of-Battery-Transport-Regulations.pdf