Hazardous Materials Outreach & Engagement

Training Requirements for Industry

Emergency Response Guidebook (ERG)

Workshops

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Hazardous Materials Safety Assistance Team (HMSAT)

Publications

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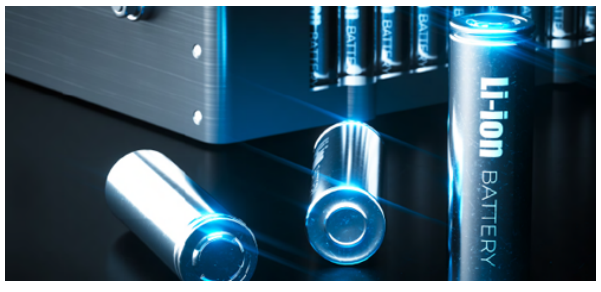
Related Documents

- How to Safely Send Batteries and Battery Powered Devices by Mail

Transporting Lithium Batteries



Lithium cells and batteries power countless items that support everyday life from portable computers, cordless tools, mobile telephones, watches, to wheelchairs and motor vehicles. Our society has come to depend on lithium cells and batteries for an increasingly mobile lifestyle. Today's lithium cells and batteries are more energy dense than ever, bringing a steadily growing number of higher-powered devices to market. With the increased energy density comes greater risk and the need to manage it. Shippers play an important role in reducing this risk and preventing incidents—including fires aboard aircraft or other transport vehicles.

Lithium batteries are regulated as a hazardous material under the U.S. Department of Transportation's (DOT) Hazardous Materials Regulations (HMR; 49 C.F.R., Parts 171-180). The HMR apply to any material DOT determines can pose an unreasonable risk to health, safety, and property when transported in commerce. Lithium batteries must conform to all applicable HMR requirements when offered for transportation or transported by air, highway, rail, or water.

Why are Lithium Batteries Regulated in Transportation?

The risks posed by lithium cells and batteries are generally a function of type, size, and chemistry. Lithium cells and batteries can present both chemical (e.g., corrosive or flammable electrolytes) and electrical hazards. Unlike standard alkaline batteries, most lithium batteries manufactured today contain a flammable electrolyte and have an incredibly high energy density. They can overheat and ignite under certain conditions, such as a short circuit or improper design or assembly. Once ignited, lithium cell and battery fires can be difficult to extinguish. Additional, although infrequent, events can result in lithium cells and batteries experiencing thermal runaway, a chain reaction leading to a violent release of stored energy and flammable gas. This thermal runaway can propagate to other batteries or conductive materials nearby, potentially resulting in large scale thermal events with severe consequences.

Resources for Shippers:

Whether shipping a single battery, a palletized load of batteries, or a battery-powered device, the safety of the package, and those who handle it along its journey, depends on compliance with the HMR. Failure to comply with the applicable regulations may result in fines or even criminal prosecution. Refer to 49 CFR 173.185 and the resources below for detailed requirements related to shipments of lithium batteries, including those contained in electronic devices.

Lithium Battery Guide for Shippers

For shipments made via the United States Postal Service (USPS), refer to the USPS website for information on postal service shipping restrictions and access to Publication 52 and International Mail Manuals (IMM). Publication 52 describes the types and quantities of hazmat that can be sent using USPS. In addition, you can view the resource below for helpful information.

USPS Delivers Shipping Hazmat Safely

Resources for Manufacturers:

Lithium cells and batteries offered for transportation must have passed the design tests found in the United Nations (UN) Manual of Tests and Criteria, Section 38.3. Effective January 21, 2022, lithium cell and battery manufacturers must make test summary documents available upon request for lithium cells and batteries manufactured after January 1, 2008. The test summary includes a standardized set of elements that provide traceability and accountability to ensure that lithium cell and battery designs offered for transport meet UN 38.3 test requirements. The UN 38.3 testing accounts for transportation impacts such as:

• Altitude	• Overcharge
• Vibration	• Thermal test
• Shock	• Impact/crush
• External short circuit	• Forced discharge

Manufacturers and subsequent distributors of lithium cells and batteries must make this information available to others in the supply chain. Check with the battery manufacturer or distributor to determine if a battery design has passed these tests, or obtain, if applicable, the test summary document. Battery manufacturers must keep copies of test results so long as the battery design is offered for transportation and for one year thereafter.

Any change or modification to a lithium battery that would lead to a failure of any of the UN 38.3 tests must be considered a new type and subjected to the required tests. See the UN Manual for the types of changes that may be considered sufficiently different from a tested type so that it might lead to a failure of a lithium battery test result.

See § 173.185(a) for all testing and test summary document requirements. For low production runs and prototype batteries, refer to §§ 173.185(d) and (e), respectively, for exceptions from the testing requirements for lithium cells or batteries shipped for disposal or recycling and for low production runs and prototype lithium cells or batteries.

For additional information, view the resource below.

New UN Requirement for Test Summaries

Resources for Airline Passengers:

If you're taking a flight, you can bring your laptop computer, cell phone, camera, tablet, or other lithium battery-powered devices! These personal electronics pose lower risk if certain conditions and limitations are followed, such as preventing inadvertent activation. Spare batteries, including baggage equipped with lithium batteries, can be packed in carry-on baggage if steps are taken to protect against short circuits.

For information on the conditions and limitations for bringing lithium batteries or any other hazardous material on your next flight, refer to the FAA's PackSafe for Passengers website before you fly.

FAA PackSafe for Passengers

In addition, the Transportation Security Administration (TSA) publishes information on additional items that they restrict on flights. Refer to TSA resources below.

TSA What Can I Bring?

Resources for Recycling Batteries:

Because of their unique safety hazards, lithium batteries must be disposed of and recycled appropriately. PHMSA regulates the transportation of these batteries in commerce. Any person involved in transporting lithium batteries for recycling or disposal must package and transport these batteries in conformance with the requirements of the HMR.

DOT Resources for Recyclers/Collection Operators/Transporters:

Lithium Battery Guide for Shippers

Sustainable Materials Management (SMM) Web Academy Webinar – Safe Transportation of Lithium Batteries: What You Need to Know in 2021

OSHA Information

The Occupational Safety and Health Administration (OSHA) maintains a website dedicated to battery disposal resources: https://www.osha.gov/green-jobs/recycling/batteries

EPA Information

The Environmental Protection Agency (EPA) maintains a website dedicated to battery disposal resources: https://www.epa.gov/recycle/used-lithium-ion-batteries. In addition, the EPA maintains frequently asked questions: https://www.epa.gov/recycle/frequent-questions-lithium-ion-batteries

Private Individuals and Households

Private individuals should dispose of household lithium batteries via appropriate recycling channels and should never place lithium batteries in the trash or general recycling due to safety concerns. Electronics recyclers or scrap/collection centers in your area can be found online. Certain grocery, home improvement, big box retail, and consumer electronics stores offer lithium battery recycling services. In addition, your local solid waste district may offer a lithium battery collection program or host regular collection events. The manufacturer of your electronic may also offer a mail-in program. Should you utilize a mail-in program, you must comply with all USPS (for USPS mail shipments) or DOT (for shipments with other carriers) requirements. The organizer of your mail-in program should provide you with the guidelines to ship in compliance with USPS and/or DOT requirements.

You can refer to the EPA's webpage dedicated to household batteries for more information and for tips on locating appropriate recycling channels in your area: https://www.epa.gov/recycle/used-household-batteries

Hazardous Materials Information Center

Have a question about transporting lithium batteries? Need clarification on the Hazardous Materials Regulations? PHMSA's Hazmat Information Center provides live, one-on-one assistance Monday through Friday from 9 a.m. - 5 p.m.

1-800-HMR-4922
1-800-467-4922
202-366-4488
infocntr@dot.gov

Last updated: Monday, October 4, 2021

U.S. DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

1200 NEW JERSEY AVENUE, SE

WASHINGTON, DC 20590

202-366-4433

HAZMAT Registration Help Desk: 202-366-4109

Hazardous Materials Information Center: 1-800-467-4922

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