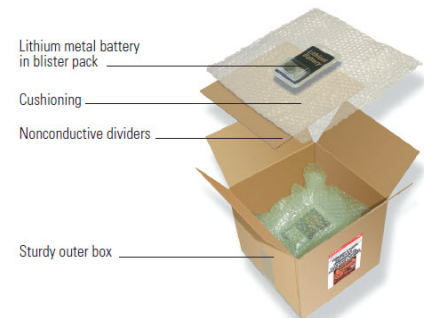


Lithium Battery Shipping Overview

Lithium batteries are used in many electronic devices such as cameras, cell phones, laptop computers, medical equipment and power tools.

When shipping or importing lithium batteries, including those contained in or packed with devices and equipment, packaging requirements must be met and package contents must be declared to transportation companies and the U.S. Postal Service/SmartPost.



Cause for Concern

While most lithium batteries are safe, some have overheated and caught fire. Once ignited, they can cause any nearby batteries to overheat and catch fire. These fires are difficult to put out and produce toxic and irritating fumes.

When shipping lithium batteries, it is not always clear which mode of transport will be used. Shipments may end up on an aircraft and an aircraft's fire suppression system may not be able to extinguish all types of lithium battery fires.

Counterfeit and no-brand lithium batteries are also of concern because they may not have been safety-tested. These lithium batteries may be poorly designed, have little protection, and/or contain manufacturing flaws. It is important to verify the batteries planned for shipment have been safety-tested.

Overview

Regulations differ when shipping by air (includes FedEx Ground shipments to Alaska and Hawaii), water or USPS/SmartPost service. FedEx Ground strongly recommends that anyone shipping lithium batteries take a specific lithium battery shipping class in order to better understand these complex regulations and meet DOT/ICAO/IATA/IMDG requirements. FedEx Ground offers an economical lithium battery shipping [on-line course](#) to help you meet this requirement. Please contact the Dangerous Goods hotline at 800-GOFEDEX, Option 81 for more information on this course.

Basic transport requirements

- **Critical:** Passing of safety tests for lithium batteries and cells (Refer to the UN Manual of Tests and Criteria - UN/DOT 38.3)
 - There are recordkeeping requirements for this testing which can be found in 49CFR173.185.
- Use of separate proper shipping names for lithium ion batteries and lithium metal batteries:
 - Lithium-ion batteries: UN3480
 - Lithium-ion batteries "packed with" or "contained in" equipment: UN3481
 - Lithium metal batteries: UN3090
 - Lithium metal batteries "packed with" or "contained in" equipment: UN3091
- Only allow small and medium-sized lithium cells (<60 watt-hours for ion or <5 grams for metal) and batteries (<300 watt-hours for ion or <25 grams for metal) to be shipped as partially regulated in the domestic U.S. by highway or rail if the stricter packaging and marking requirements are met
- In addition to the markings listed in the 'marking requirements' section on page three, packages of medium-sized lithium batteries (Lithium Ion: >100 watt hours and <300 Watt hours OR Lithium Metal: >2

Lithium Battery Shipping Overview

grams and <25 grams) must be additionally marked with the following statement: "LITHIUM BATTERIES FORBIDDEN FOR TRANSPORT ABOARD AIRCRAFT AND VESSEL."

- Certain types of battery shipments are prohibited or may require special arrangements in the FedEx Ground network. Contact the PGH Safety Department if someone wants to ship any of the following:
 - Batteries that have not passed the UN safety testing
 - Damaged, defective or recalled batteries
 - Batteries for disposal or recycling
 - Low-production and prototype lithium batteries
- Lithium batteries are regulated based on the rated watt-hours for lithium ion batteries or the weight of the lithium contained in the batteries for lithium metal batteries. This information is usually marked on the battery or documented on a Safety Data Sheet (M/SDS) which can be obtained from your supplier or the battery manufacturer.



Small and medium sized lithium ion battery exceptions

- This section applies to the transport of small lithium ion (<20 watt hours for cells/<100 watt hours for batteries) and small lithium metal (<1 grams for lithium metal cells/<2 grams for lithium metal batteries) and medium lithium cells and batteries (60-300 watt-hours for lithium ion and >2 grams and <25 grams for lithium metal). This also covers cells and batteries packed with, or contained in, equipment.
 - Cells and batteries must be packaged in accordance with the requirements listed in 49 CFR 173.24, 173.24a and 173.185. UN specification packaging (POP) is encouraged but not required.
 - The batteries must be placed in inner packaging designed to prevent damage, short circuits and movement within the outer package. The battery terminals are of a particular concern. They should not be able to contact other batteries and/or any other conductive contents or packaging.
 - The batteries must be placed in rigid outer packaging. If the shipper chooses to use soft outer packaging, such as a padded envelope with the rigid packaging inside, the outer packaging must be marked as an "OVERPACK". If the battery is contained (installed) in a device, the rigid packaging may not be necessary provided that the device will offer at least the same protection as rigid packaging
 - If the battery is contained in a device, there needs to be a positive means to prevent activation of the device during transportation. This may be accomplished by measures such as disconnecting the battery or placing tape over a switch
 - The package must not exceed 30 kg (66 lbs.) gross weight. This weight limit does not apply to lithium cells or batteries packed with or contained in equipment

Lithium Battery Shipping Overview

- **Marking Requirements:** Except for a package containing button cell batteries installed in equipment (including circuit boards), or no more than four lithium cells or two lithium batteries installed in a device, the outer package must display a lithium battery handling mark. The the handling mark for lithium batteries installed in or packed with equipment is displayed below.



- The new version of the handling mark must include the appropriate UN Identification number (see Basic Transport requirements above) as well as a phone number for additional information about the shipment. This number does not need to be an emergency response phone number, nor does it need to be a U.S. phone number.. The packages must be of a sufficient size that the marking will completely fit on one package surface, when packages are required to bear this marking.

Drop Test: Except when cells or batteries are contained in equipment, each package must be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained in the package, without shifting of the contents that would allow short-circuiting, and without release of package contents.

- Shipments prepared in accordance with international regulations, such as the IATA/ICAO Dangerous Good Regulations and the IMDG Code are acceptable for ground transport within the US provided that a portion of the trip is by air or water. *Note: Please see Class 9 Miscellaneous Label exception at the end of this document for more information on imported battery shipments.*

Shipping of lithium ion cells >60 WH and batteries >300 WH and lithium metal cells >5 grams lithium per cell and >25 grams per battery as fully regulated Class 9 hazardous materials.

- This includes Class 9 batteries that are “packed with” and “contained in” equipment. There is no general relief for larger batteries.
- There is a new version of the Class 9 Miscellaneous label that was developed for lithium battery shipments. The new label is displayed below on the left and includes the same battery graphic as the battery handling label. The current Class 9 label can still be used for these shipments until December 2018.

Lithium Battery Shipping Overview

New



Current (acceptable until 12/31/2018)



- Prohibiting passenger aircraft marking for primary metal lithium batteries:
- The following marking below, in red, must be placed on packages containing only primary lithium (metal) cells with no more than 1 gram of lithium content and batteries with an aggregate lithium content of no more than 2 grams, that do not exceed the quantity limits (per package) shown in the U.S. regulations: “LITHIUM METAL BATTERIES - FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT” or “PRIMARY LITHIUM BATTERIES - FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT.” The marking must be on a background of contrasting color in letters at least 6 mm (0.25 inch) on packages having a gross mass of 30 kg (66 lbs.) or less, except that smaller font may be used as necessary to fit package dimensions.

PRIMARY LITHIUM BATTERIES - FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT

The Cargo Aircraft Only (CAO) label shown below has been approved as an alternative to this text marking requirement. *NOTE: Packages displaying the orange CAO label and/or a “Lithium Batteries – Forbidden for transport by Aircraft and Vessel” marking are prohibited for transport to/from/within Alaska and Hawaii.*



LITHIUM BATTERIES - FORBIDDEN FOR TRANSPORT ABOARD AIRCRAFT AND VESSEL

L415 LABELMASTER® (800) 621-5808 www.labelmaster.com

NOTE: Please see 49 CFR 173.185 for additional important information on shipping small and medium sized lithium batteries.

Lithium Battery Shipping Overview

Class 9 Miscellaneous Label exception for lithium battery packages imported into the domestic US.

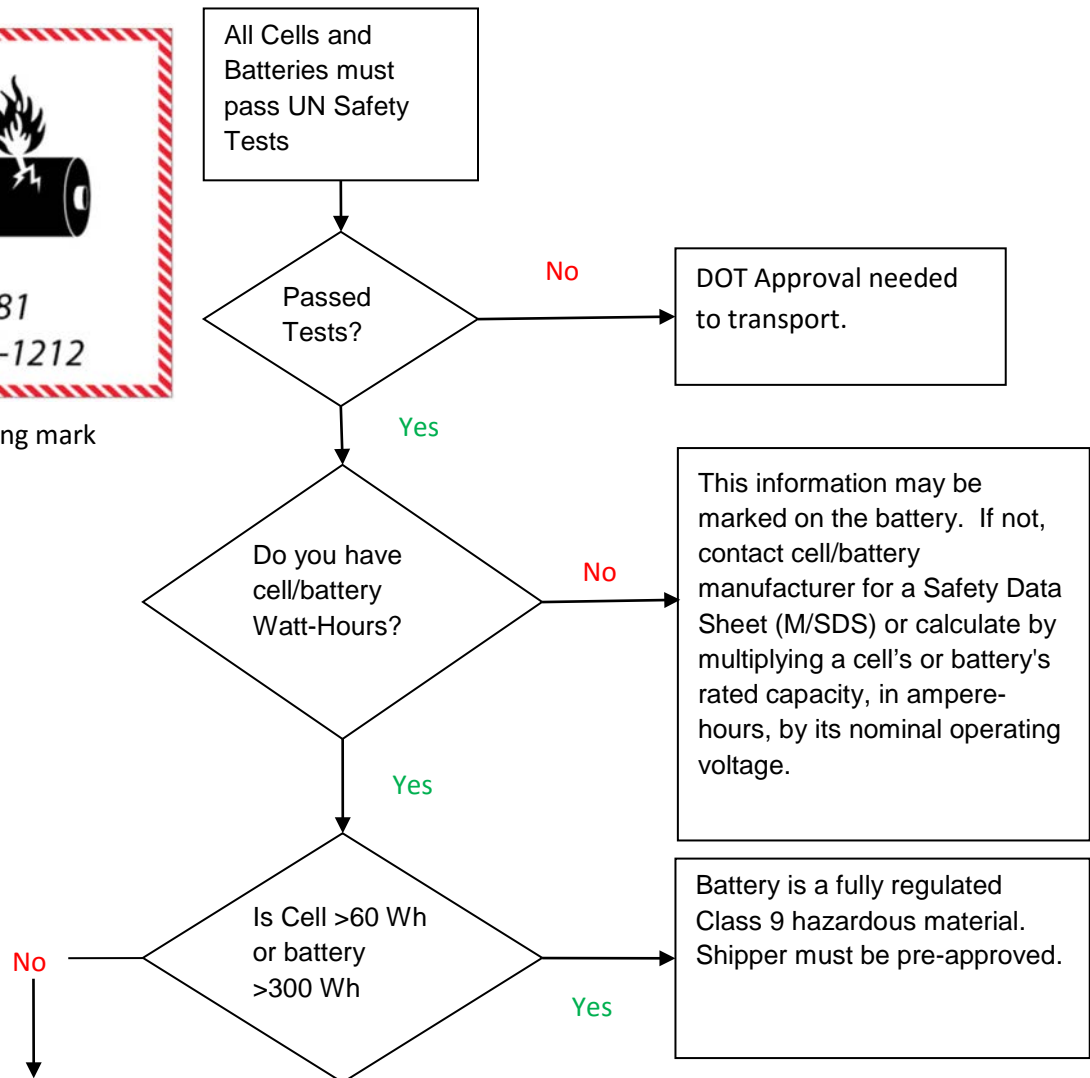
The DOT has issued an interpretation letter that permits shippers of lithium batteries to leave the Class 9 miscellaneous label still affixed to the package and still take advantage of the exceptions offered for domestic ground shipping in the 48 contiguous states. This means that the shipper does not need to remove or cover the Class 9 label on the package in order to ship as a partially regulated package (similar to an ORM-D). Therefore, these packages do not need shipping papers, such as a Hazmat Certification [OP-950] or OP-900 Hazmat tags. These packages will not need to be packaged in UN POP (performance oriented packaging), nor are they subject to the hazmat surcharge. The packages are likely to be marked similar to this example when shipped by ground. Note there are no OP-900 tags on this package.



Small and Medium Lithium Ion Batteries: 48 Contiguous State FedEx Ground Shipping Only (April 2017)



Battery handling mark



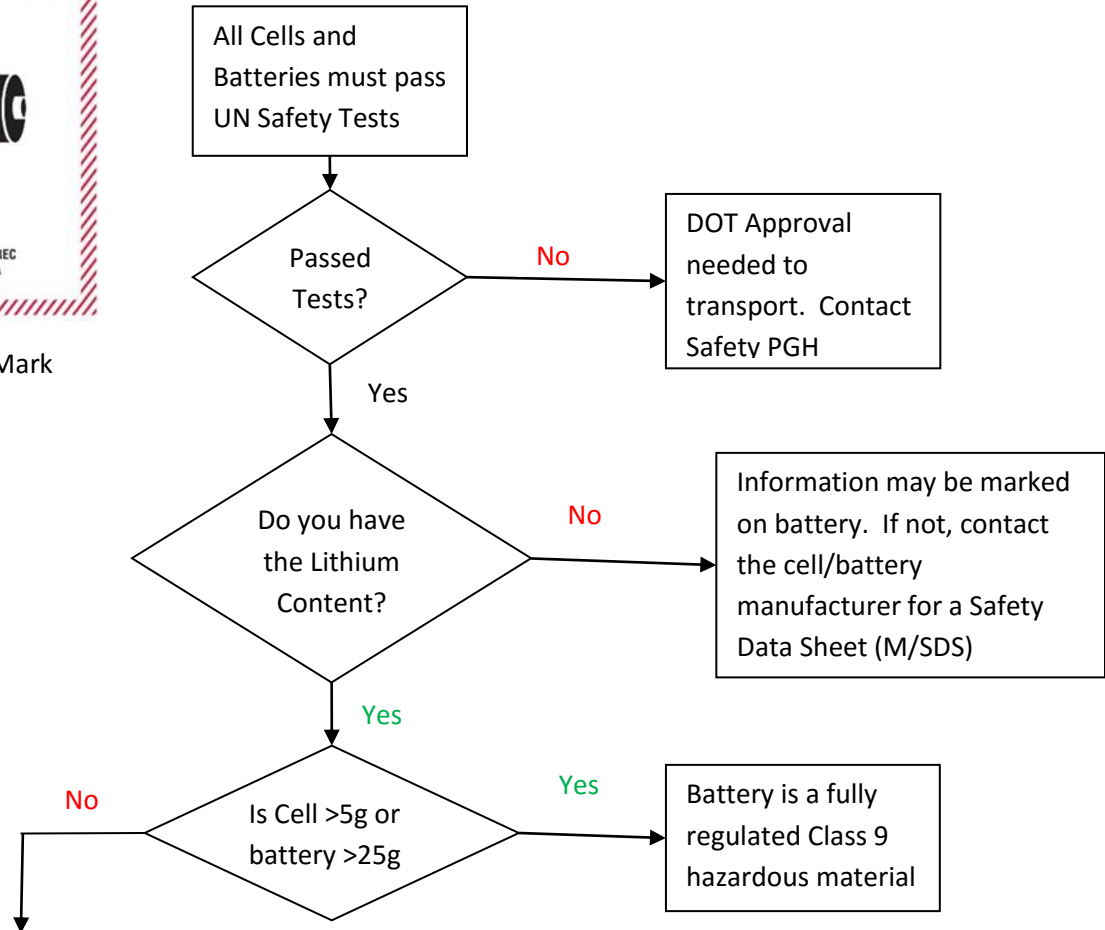
Battery can be shipped with reduced regulatory requirements:

- Batteries must be placed in rigid outer packaging (unless contained in equipment) and inner packaging designed to prevent damage to the batteries and short circuits (non-conductive materials)
- Package must not exceed 66lbs. (30Kg) unless packed with or contained in equipment.
- The battery handling mark pictured above must be applied to the package. The shipper must add the appropriate UN Identification Number (See the Safety Data Sheet [M/SDS] and/or contact their supplier for this information). A phone number must be listed for information about the package. The number does not necessarily need to be an emergency response number and does not need to be a US domestic phone number. The mark must be fully on one package surface. The mark is not required to be applied when there are < 4 cells or <2 batteries if they are contained in equipment.
- If the cell is >20 Wh or the battery is >100 Wh the package must be marked "LITHIUM BATTERIES – FORBIDDEN ABOARD AIRCRAFT AND VESSEL."

Small and Medium Lithium Metal Batteries: 48 Contiguous State FedEx Ground Shipping Only (April 2017)



Battery Handling Mark



Battery can be shipped with reduced regulatory requirements:

- Batteries must be placed in rigid outer packaging (unless contained in equipment) and inner packaging designed to prevent damage to the batteries and short circuits (non-conductive materials)
- Package must not exceed 66lbs. (30Kg) unless packaged with or in equipment.
- The battery handling mark pictured above must be applied to the package. The shipper must add the appropriate UN Identification Number (See the Safety Data Sheet [M/SDS] and/or contact their supplier for this information). A phone number must be listed for information about the package. The number does not necessarily need to be an emergency response number and does not need to be a US domestic phone number. The mark must be fully on one package surface. The mark is not required to be applied when there are < 4 cells or <2 batteries when they are contained in equipment. Button cell batteries installed in equipment also do not require the mark.
- If the lithium metal cell is >1 gram and <5 grams or the lithium metal battery is >2 grams and <25 grams, the package must be marked "LITHIUM BATTERIES – FORBIDDEN ABOARD AIRCRAFT AND VESSEL."
- The following statement (marking) must be placed on packages containing only primary lithium (metal) cells with no more than 1 gram of lithium content and batteries with an aggregate lithium content of no more than 2 grams, that do not exceed the quantity limits (per package) shown in the U.S. regulations: "LITHIUM METAL BATTERIES - FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT". The orange Cargo Aircraft Only label can be used as an alternative (unless package is destined for Alaska or Hawaii).