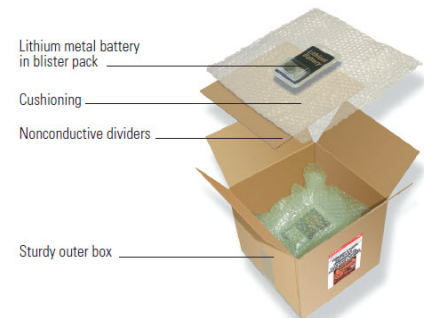


Lithium Battery Shipping Overview (also see 49CFR173.185)

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 can be difficult to put out and produce toxic and irritating fumes.

Identify the presence of lithium batteries inside of a package. 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/fake 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. **A lithium battery test summary (TS) document should be requested before any battery is shipped.**

Overview & Training

Regulations differ when shipping by air (this 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/USPS requirements. FedEx Ground offers an economical lithium battery shipping [on-line course](#) to help you meet this requirement for ground shipping. Please contact the Dangerous Goods hotline at 800-GOFEDEX, Option 81 for more information on this course. Please consult the most recent version of the Department of Transportation (DOT) regulations for shipping lithium batteries found in 49CFR173.185 for the most updated information.

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). This will be indicated in the test summary document requested from your supplier.
 - 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 48 contiguous states by highway or rail if stricter packaging and marking requirements are met (please see flowcharts at the end of the document).
- 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 grams and



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Lithium Battery Shipping Overview

<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
 - Damaged, defective or recalled batteries
 - Batteries for disposal or recycling
- Batteries that have not passed safety testing, Low-production and prototype batteries have specific requirements for shipping which are detailed in the 49CFR173.185 section of the regulations.
- 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 handling mark for lithium batteries installed in or packed with equipment is displayed below.



UN Identification Numbers Applicable to Lithium Battery Shipments

- UN3480:** Loose lithium ion batteries
- UN3481:** Lithium-ion batteries “packed with” or “contained in” equipment
- UN3090:** Loose Lithium metal batteries:
- UN3091:** Lithium metal batteries “packed with” or “contained in” equipment

- 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 the 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 Class 9 Miscellaneous label that was developed specifically for lithium battery shipments.



Lithium Battery Shipping Overview

- Prohibiting passenger aircraft marking for loose lithium batteries:
- This marking must be placed on UN3480 packages containing only lithium ion cells <20 watt hours and batteries <100 watt hours: "LITHIUM ION BATTERIES - FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT". The orange Cargo Aircraft Only label can be used as an alternative to this text statement in the 48 contiguous states.

UN3090 packages containing only metal cells with no more than 1 gram of lithium content or 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. The orange Cargo Aircraft Only label can be used as an alternative to this text statement in the 48 contiguous states.

The orange Cargo Aircraft Only (CAO) label shown below has been approved as an alternative to the passenger restriction 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 by FedEx Ground service.*



**LITHIUM ION
BATTERIES -
FORBIDDEN FOR
TRANSPORT ABOARD
PASSENGER AIRCRAFT**

**LITHIUM METAL BATTERIES -
FORBIDDEN FOR TRANSPORT
ABOARD PASSENGER AIRCRAFT**

NOTE: Please see the most current Department of Transportation regulations in 49CFR 73.185 and/or USPS Publication 52 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 must display a battery handling mark to qualify for this exception.** The packages are likely to be marked similar to this example when shipped by ground. Note that there are no OP-900 tags on this package.

Important: Packages shipped in this manner may be delayed and/or returned to the shipper.



Example of a Lithium Battery Test Summary (TS) Document

UN 38.3 Lithium Battery Test Summary

Cell, Battery or Product Model Number	
Item Number:	
Item Name:	

Cell, battery, or product manufacturer's contact information			
Name:			
Address:			
City:	State:	ZIP:	Country:
Telephone:	E-mail:	Website:	

Test Laboratory			
Name:			
Address:			
City:	State:	ZIP:	Country:
Telephone:	E-mail:	Website:	

Cell or Battery Description			
Cell or Battery:		Physical Description (dimensions, appearance):	
Cell or Battery Type:			
Watt-hour rating or Lithium Content:			
Completed Cell or Battery Weight:			
Unique Test Report ID Number:		Date of test report:	
List of Tests Completed:			
Yes	No	Pass	Fail

Signature with name and title of signatory as an indication of the validity of information provided: _____ Date: _____

Small and Medium Lithium Ion Batteries: US 48 Contiguous State FedEx Ground Shipping Only (April 2019)



Battery handling mark



All Cells and Batteries must pass UN Safety Tests

Passed Tests?

No

Obtain a Lithium Battery Test Summary (TS) Document from your supplier to assist with the proper classification

DOT Approval needed to transport. Contact Fedex Ground Safety.

Yes

Do you have cell/battery Watt-Hours (Wh)?

No

This information may be marked on the battery. If not, contact cell/battery manufacturer for a Lithium Battery Test Summary (TS) Document or calculate by multiplying a cell's or battery's rated capacity, in ampere-hours, by its nominal operating voltage.

Yes

Is Cell >60 Wh or battery >300 Wh

No

Yes

Battery is a fully regulated Class 9 hazardous material. Shipper must be pre-approved.

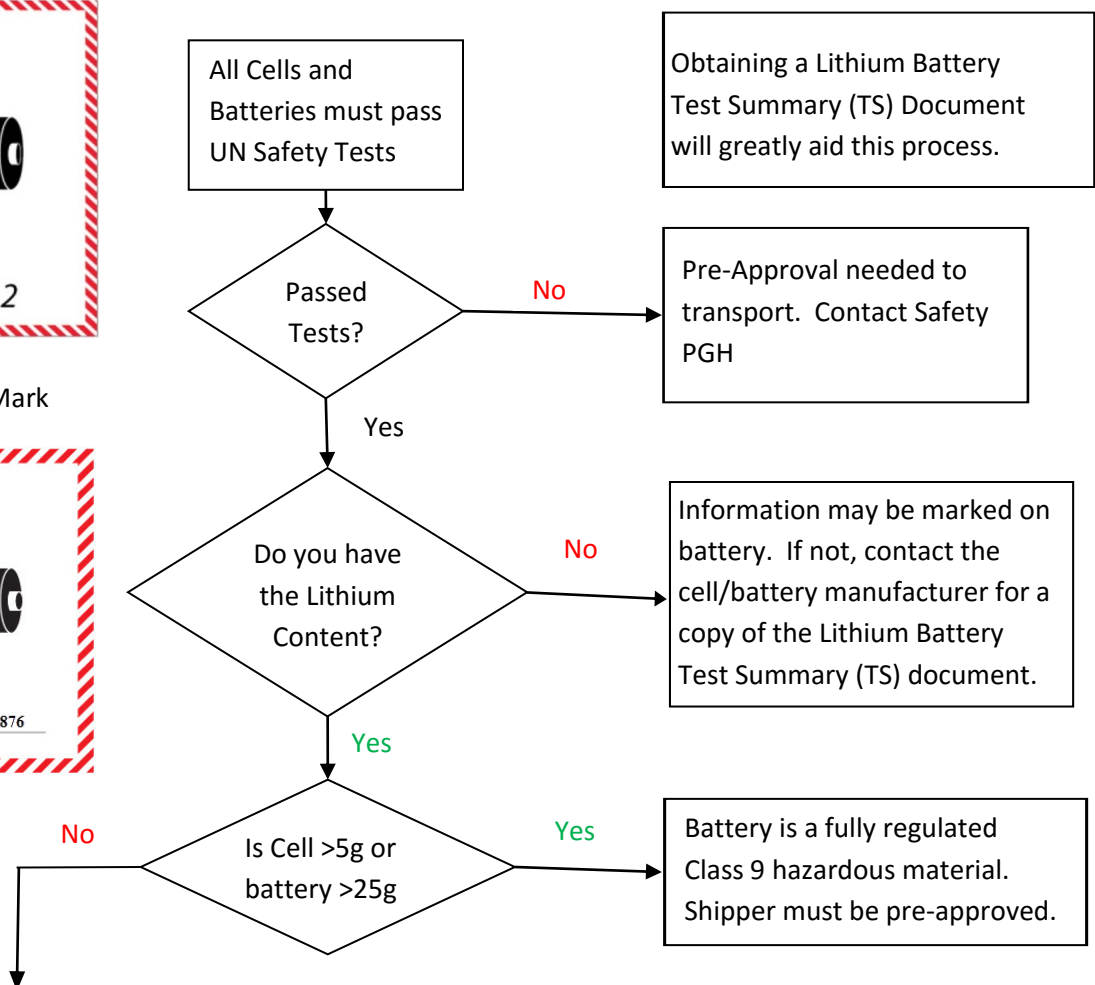
Battery can be shipped with reduced regulatory requirements:

- 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 (Obtain a Lithium Battery Test Summary (TS) Document from the battery 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 or fewer cells or 2 or fewer batteries if they are contained/installed 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."
- The following statement (marking) must be placed on UN3480 packages containing only lithium ion cells (<20Wh) and batteries (<100 Wh) that do not exceed the quantity limits (per package) shown in the U.S. regulations: "LITHIUM ION BATTERIES - FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT". The orange Cargo Aircraft Only label can be used as an alternative to this statement in the 48 contiguous states.

Small and Medium Lithium Metal Batteries: 48 Contiguous State FedEx Ground Shipping Only (April 2019)



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 must be designed to prevent short circuits (non-conductive materials) and damage to the batteries. The device must have positive method to prevent accidental activation in transport.
- Package must not exceed 66lbs. (30Kg) unless packaged 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 (contact your supplier for a copy of the lithium battery test summary document). 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 or less cells or 2 or fewer batteries when they are contained in equipment. Button cell batteries contained in equipment also do not require the mark.
- If a lithium metal cell is >1 gram and <5 grams or a 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 in the 48 contiguous states.

This information is being provided as a courtesy only, please consult the current hazardous materials regulations