



## Packaging Guidelines for Battery Shipments

Follow these instructions to help ensure safe transportation of your battery shipments and your shipments with items containing batteries within the FedEx Express® network.



## Preparing Charged Batteries for Shipment

At FedEx Express, we understand the importance of ensuring the safe transport of your shipments. Charged battery shipments or shipments with items that contain charged batteries may overheat and ignite in certain conditions and, once ignited, may be difficult to extinguish or may expend corrosive substances.

By following these guidelines and complying with all applicable local, state and federal laws governing packing, marking and labeling, you can do your part to help ensure your shipments arrive safely and on time to their final destinations. FedEx Express strictly adheres to International Air Transport Association (IATA) and International Civil Aviation Organization (ICAO) regulations.

## Shipping Wet Batteries

Wet batteries or wet cell batteries are typically filled with corrosive acid or alkali and are regulated battery shipments (Class 8 — Corrosive). Wet batteries are common in vehicles, utility systems, un-interruptible power systems and industrial machinery. These commodities must be correctly identified, classified, packaged, marked and labeled. Additionally, the package must have the Shipper's Declaration for Dangerous Goods completed and signed by a trained shipper.

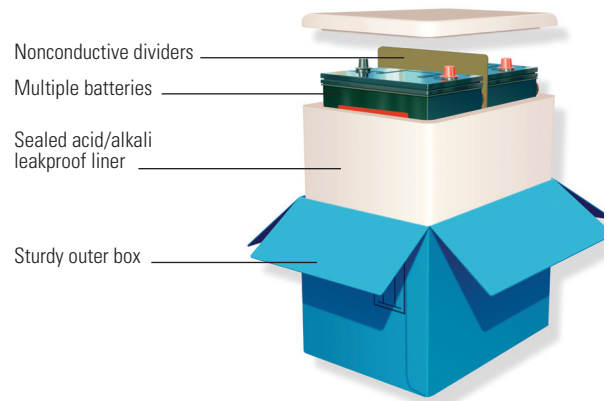
### UN Numbers and Proper Shipping Names for Wet Batteries

- UN 2794, Batteries, wet, filled with acid (electric storage)
- UN 2800, Batteries, wet (electric storage)
- UN 2795, Batteries, wet, filled with alkali (electric storage)
- UN 2800, Batteries, wet, nonspillable

### General Wet-Battery Packaging Guidelines

- Package wet cell batteries in containers, including metal containers, with acid/alkali leakproof liner — sealed to prevent leakage.
- Fasten batteries securely with fill openings and vents facing up to prevent short-circuiting or overheating.

- Position multiple batteries side by side, separated by nonconductive dividers.
- Place contents in a sturdy outer container.



## Shipping Nonspillable Wet Batteries

In accordance with 49CFR§173.159 and USG-11, an IATA (USG-11) nonspillable wet electric storage battery may be regarded as not subject to the regulations if the battery and its outer packaging are plainly and durably marked "NONSPILLABLE" or "NONSPILLABLE BATTERY." The battery must also meet the conditions for being regarded as not subject to the regulations as prescribed in Special Provision A67, meaning that no shipper's declaration is required.



## Shipping Dry Batteries

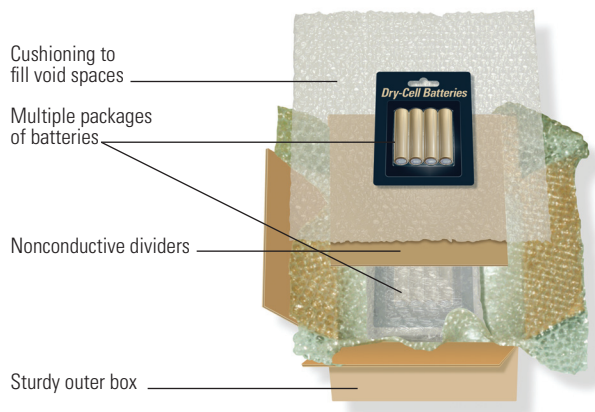
Dry batteries are sealed, nonvented batteries used in flashlights or small appliances. They contain zinc salts and other solids or may be packed in combination with other metals. These batteries include non-rechargeable alkaline batteries and rechargeable batteries made with nickel metal hydride and nickel cadmium. Some dry batteries are regulated battery shipments (Class 4 — Dangerous When Wet or Class 8 — Corrosive) and must be correctly identified, classified, packaged, marked and labeled.

## UN Numbers and Proper Shipping Names for Dry Batteries

- UN 3028, Batteries, dry, containing potassium hydroxide, solid
- UN 3292, Batteries, containing sodium

## General Dry Battery Packaging Guidelines

- Position multiple batteries or packages of batteries side by side, separated by dividers.
- Make sure batteries contained in an electronic device remain inside the device when shipping.
- Pack securely and fill void spaces to prevent shifting or movement in transit.
- Place contents in a sturdy outer container.



## Shipping Lithium Batteries

Lithium batteries are commonly used in devices like mobile phones, laptops, PDAs, watches, cameras and even children's toys. Lithium battery shipments or shipments with items that contain charged batteries may overheat and ignite in certain conditions and, once ignited, may be difficult to extinguish. The two main types of lithium batteries are lithium metal (primary non-rechargeable) and lithium ion (rechargeable).

## UN Numbers and Proper Shipping Names for Lithium Batteries

- UN 3480, Lithium ion batteries
- UN 3481, Lithium ion batteries packed with equipment

- UN 3481, Lithium ion batteries contained in equipment
- UN 3090, Lithium metal batteries
- UN 3091, Lithium metal batteries packed with equipment
- UN 3091, Lithium metal batteries contained in equipment

All packages containing lithium batteries are classified as Class 9 — Miscellaneous Dangerous Goods. However, packages containing small amounts of lithium may be exempted from most of the IATA and ICAO requirements if they comply with the requirements in Section II IATA (which matches Section II ICAO) Packing Instructions (PI) 965, 966 and 967 for lithium ion batteries and 968, 969 and 970 for lithium metal batteries as appropriate.

Lithium metal batteries (primary non-rechargeable), UN 3090 prepared in accordance with Section II IATA and packing instruction 968 require approval prior to shipping by FedEx Express (operator variation FX-10). Go to [fedex.com](https://www.fedex.com) and enter "lithium batteries" in the search field to learn about the approval process.

## Section II IATA Lithium Battery Shipments

Shipments of lithium metal batteries, lithium metal batteries packed with equipment and lithium metal batteries contained in equipment may be packaged in accordance with Section II IATA (Section II ICAO) packaging requirements when the package contains 2g or less lithium per battery or 1g or less lithium per cell.

Shipments of lithium ion batteries, lithium ion batteries packed with equipment and lithium ion batteries contained in equipment may be packaged in accordance with Section II IATA (Section II ICAO) packaging requirements when the package contains 100Wh or less lithium per battery or 20Wh or less lithium per cell.

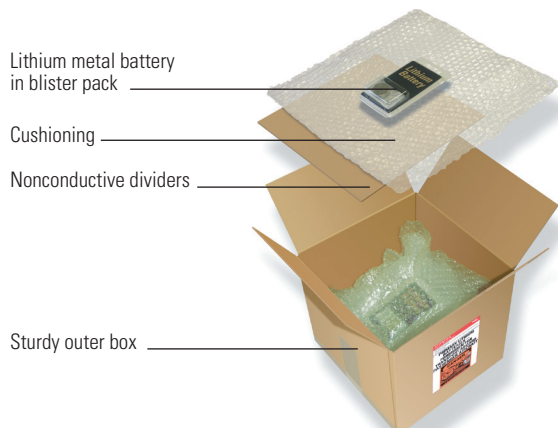
Each of the six proper shipping names defined in Section II IATA may have additional requirements related to types of approved outer packaging, weight limits and package drop tests of 1.2m.

Fully regulated lithium battery outer packaging must meet Packing Group II performance standards. (See Packaging Requirements as outlined in IATA Dangerous Goods Regulation).

## Section II Lithium Battery Packaging Guidelines

To comply with Section II IATA shipping requirements, shipments containing lithium batteries and cells must comply with specific packaging guidelines.

- Ensure that lithium batteries are individually packaged in fully enclosed inner packaging such as a plastic blister wrap or pasteboard to provide protection for each battery.
- Shield and protect lithium batteries to prevent short circuits or contact with conductive materials within the packaging that could cause short circuits.
- Ensure that packaging is proven (i.e., tested) to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, Sub-Section 38.3.
- Make sure that lithium batteries are completely enclosed (such as in equipment or surrounded by plastic with void space filled to prevent movement), except when the proper shipping names end with "contained in equipment."
- Place contents in a sturdy outer container.
- Provide correct labeling and documentation.



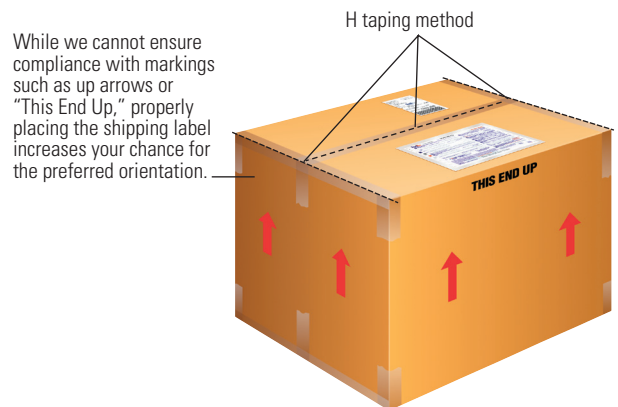
## Section I IATA Lithium Battery Shipments

Lithium batteries, both lithium ion and lithium metal, are fully regulated dangerous goods when prepared under Section I IATA regulations. These commodities must be correctly identified, classified, packaged, marked and labeled. Additionally, the package must have the Shipper's Declaration for Dangerous Goods completed and signed by a trained shipper.

## Sealing and Labeling Instructions

Although these instructions are not regulatory requirements, they represent FedEx best practices when shipping with corrugated boxes.

- Using the H taping method, apply at least three strips of pressure-sensitive adhesive plastic tape that is at least 2" wide to both the top and bottom of the carton.
- Tape all seams or flaps.
- Place the shipping label on the top of the largest side.
- Ensure that all required outer markings, labelings and documentation appear.



## Battery Shipment Restrictions and Regulations

FedEx Express will not accept or ship:

- Recalled or defective batteries, either as a stand-alone unit or contained with equipment.
- Recalled or defective lithium batteries contained in electronic equipment, such as a laptop.

(See IATA Special Provision A154 for additional details on these restrictions.)

FedEx Office Print & Ship Centers<sup>SM</sup> and FedEx World Service Center<sup>®</sup> locations do not accept regulated battery shipments, with the exception of lithium battery shipments meeting Section II IATA regulations.

While the law does not prohibit primary lithium batteries on cargo aircraft, FedEx Express has implemented additional packaging requirements for all primary lithium batteries and cells as outlined below.

- Lithium batteries and cells shipped fully marked, labeled and certified in accordance with the IATA dangerous goods regulations.
- Lithium batteries and cells shipped under "Competent Authority" granted by any national authority.
- Lithium batteries and cells previously excepted from other regulatory requirements in the IATA dangerous goods regulations Section II of Packing Instruction 968.

## FedEx Packaging Services

FedEx Packaging Services offers package development consultation services. The FedEx Packaging Services lab does not test packaging containing items classified as dangerous goods.

## Contacts and Resources

- *How to Pack* guidelines at [fedex.com/packaging](https://www.fedex.com/packaging).
- FedEx Dangerous Goods/Hazardous Materials Hotline, 1.800.GoFedEx 1.800.463.3339; press "81" or say "dangerous goods."
- FedEx Dangerous Goods training seminars and job aid at [fedex.com/us/services/options/dangerousgoods/](https://www.fedex.com/us/services/options/dangerousgoods/).

**NOTICE: FedEx Express will refuse to accept packages that do not meet FedEx Express, government or IATA and ICAO requirements.**

This brochure is in no way intended to replace requirements mandated by 49CFR and IATA. This is for informational purposes only. This packaging brochure is provided to FedEx customers to help reduce loss or damage due to improper packaging. It is NOT intended to be a comprehensive guide for packaging items we accept for transit. We make no warranties, expressed or implied, regarding this information. Proper packaging is the sole responsibility of the shipper. For more information and comprehensive guidelines, contact the FedEx Dangerous Goods/Hazardous Materials Hotline at 1.800.GoFedEx 1.800.463.3339; press "81" or say "dangerous goods." (Outside the U.S., request to speak to a dangerous goods representative.) Refer to the current FedEx Service Guide for terms, conditions and limitations applicable to FedEx® delivery services.