



## Packaging 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.



## Unique Risks Associated With Shipping Batteries

Batteries provide the power source for personal computers, phones, automobiles, and life-saving appliances. However, batteries are classified as dangerous goods, because by definition they produce electricity from a chemical reaction. When improperly handled, packaged, or stored, batteries pose a risk for corrosive chemical and electrical fires. Emphasis must be placed on safety when packaging and transporting them. Following is an overview of the requirements for acceptance and transport of batteries with the FedEx Express system.

## 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.

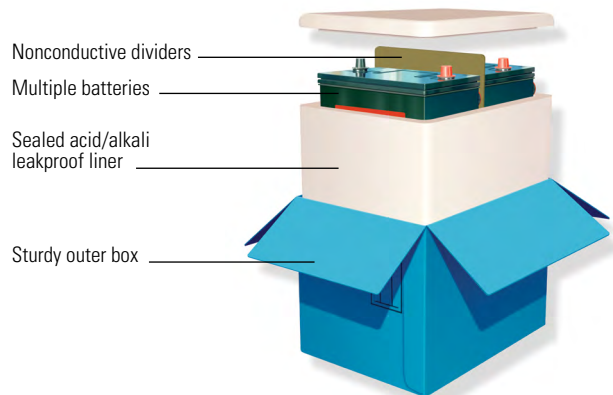
## UN Numbers and Proper Shipping Names for Wet Batteries

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

## 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 Non-Spillable Wet Batteries



In accordance with 49CFR 173.159 and USG-11, an IATA (USG-11) non-spillable 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 "NON-SPILLABLE" or "NON-SPILLABLE 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

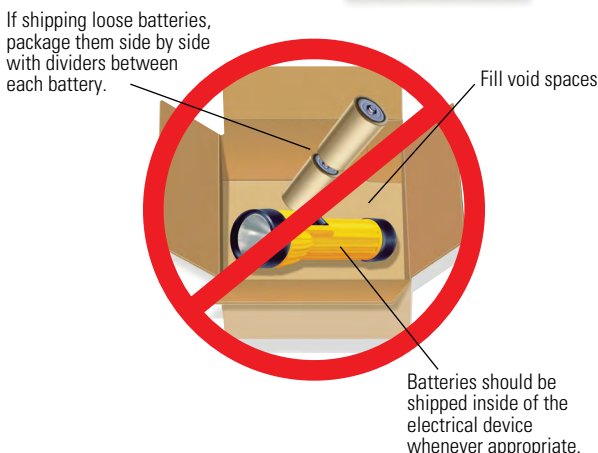
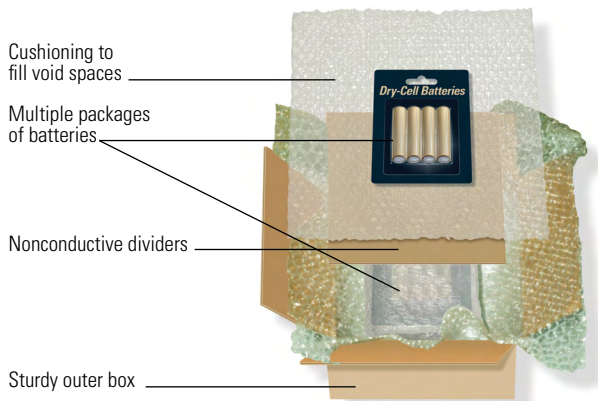
Dry batteries are sealed, nonvented batteries used in flashlights or small appliances. They contain zinc salts and other solids or may be packed in combination with other metals. These batteries include non-rechargeable alkaline batteries and rechargeable batteries made with nickel metal hydride and 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 (electric storage)
- 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 contained in equipment
- UN 3481, Lithium ion batteries packed with equipment
- UN 3090, Lithium metal batteries
- UN 3091, Lithium metal batteries contained in equipment
- UN 3091, Lithium metal batteries packed with equipment

**The Class 9 Lithium Battery label (IATA Figure 7.3.X) is required on all Section I, IA, and IB shipments. Note: No text is allowed on the bottom half of the label outside of the number "9."**

Lithium-powered vehicles (such as Airwheel®, Solowheel®, Hoverboard®, Segway® mini, and balance wheels) cannot be classified as UN 3481. IATA offers a Small Vehicles Powered by Lithium Batteries – Cargo Provisions document that concludes the correct classification for these small vehicles is UN 3171, Battery Powered Vehicles. There is no exception for vehicles that contain lithium ion batteries that do not exceed 100 Wh.

### FedEx Express Operator Variations

Some of the FedEx Express operator variations published in the current IATA regulations are specific to lithium batteries: FX-04 (f) and FX-05 (a)–(d).

- FX-04 (f) – Hoverboards or similar self-balancing vehicles will only be accepted from companies in new, original, unopened packaging. Used, refurbished balancing vehicles shipments from individuals, resellers, or third party shipments will not be accepted.
- FX-05 (a) – FedEx Express will not accept UN 3090 or UN 3480 offered as Section II.

- FX-05 (b) – UN 3090 lithium metal batteries under Packing Instruction 968 (Section IA, IB) require pre-approval. See [fedex.com/dangerousgoods](https://www.fedex.com/dangerousgoods); select Get Started, then Lithium Batteries.
- FX-05 (c) – All lithium batteries (Section I, IA, IB and II) in all packing instructions must not be shipped in the same package as the following dangerous goods classes/divisions: 1.4, 2.1, 3, 4.1, 4.2, 4.3, 5.1, 5.2, and 8 and 2.2 with a Cargo Aircraft Only label. This includes All Packed in One, Overpacks, and combination All Packed in One/Overpacks. Exception: If the only lithium batteries are those contained in temperature-control devices and the lithium batteries are Section II. The package must also not require the Lithium Battery Mark, and ELB (FedEx Express DG handling code for Section II lithium batteries) must not be selected in the FedEx automation device.
- FX-05 (d) – Shippers sending any data loggers, which remain active in flight (other than SenseAware®), must be pre-approved.

Contact the FedEx Dangerous Goods/Hazardous Materials hotline at 1.901.375.6806 or email [dghotline@fedex.com](mailto:dghotline@fedex.com) to begin the approval process.

## Section II IATA Lithium Battery Shipments

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 Packing Instructions (PI) 966 and 967 for lithium ion batteries and 969 and 970 for lithium metal batteries as appropriate.

Shipments of lithium metal batteries packed with equipment and lithium metal batteries contained in equipment accepted by FedEx Express may be packaged in accordance with Section II IATA packaging requirements provided that the metal or alloy cell content does not exceed more than 1g, and aggregate lithium content does not exceed 2g per battery.

Shipments of lithium ion batteries packed with equipment and lithium ion batteries contained in equipment accepted at FedEx Express must meet the general requirements of the packaging instruction. For lithium ion or polymer cells, the watt-hour rating is not more than 20Wh and 100Wh per battery.

For proper shipping names ending in “Packed with Equipment,” Packing Instructions 966 and 969 indicate that the number of cells or batteries in each package must not exceed the number required for the equipment’s operations plus two spare sets. A “set” of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment. Each of the 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 1.2 m.

When the Lithium Battery Mark (IATA Figure 7.1.C) is required and used for Section IB and permitted Section II lithium battery shipments, the UN number(s) must be added to the mark. The UN number indicated on the mark should be at least 12 mm high. Note: The Lithium Battery Mark cannot be folded or wrapped around multiple sides of the package.

UN 3480, Lithium Ion Batteries Sections IA and IB have a state of charge (SoC) maximum of 30% without competent authority approval from both the state of origin and the state of the operator. Per IATA Special Provision A213, lithium batteries conforming with IATA 3.9.2.6.1 (f) containing both primary lithium metal cells and rechargeable lithium ion cells must be assigned to UN 3090 or UN 3091 as appropriate. When offered as Section II, the content of all the lithium metal cells contained in the battery must not exceed 1.5 g, and the total capacity of all lithium ion cells contained in the battery must not exceed 10Wh.

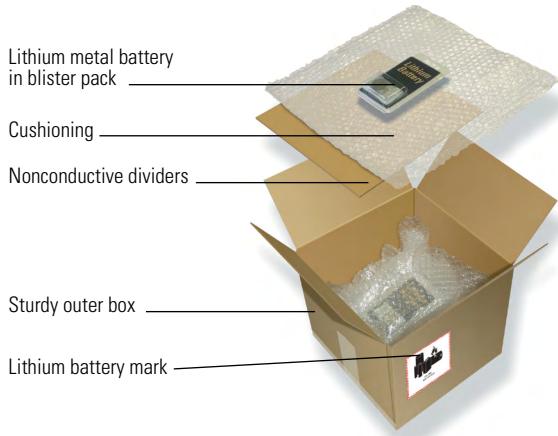
## Section II Lithium Battery Packaging Guidelines

To comply with Section II IATA shipping requirements for lithium batteries, accepted by FedEx Express, shipments 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 electrically 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.

Certain fully regulated Section IA and Section I Packing Instructions require UN specification packaging that meets Packing Group II performance standards. Refer to the specific IATA Packing Instruction for complete packaging requirements.



Refer to the FedEx Express lithium battery flow chart for additional assistance: [http://images.fedex.com/us/services/pdf/LithiumBattery\\_Overview.pdf](http://images.fedex.com/us/services/pdf/LithiumBattery_Overview.pdf). When shipping UN 3480, Lithium Ion Batteries or UN 3090, Lithium Metal Batteries internationally, additional carrier and country limitations apply. Refer to this job aid for country limitations: [http://images.fedex.com/us/services/pdf/LithiumBatteries\\_Limitations.pdf](http://images.fedex.com/us/services/pdf/LithiumBatteries_Limitations.pdf). Questions may be directed to the FedEx Dangerous Goods/Hazardous Materials hotline at 1.800.GoFedEx; press "81" or say "dangerous goods" and press "4" for the next available dangerous goods agent.

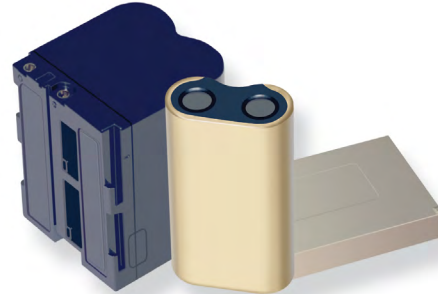
### Section IA IATA Lithium Battery Shipments

Lithium batteries, both lithium ion and lithium metal, are fully regulated dangerous goods when prepared under Section IA 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.

### Section IB IATA Stand-Alone Lithium Battery Shipments

Section IB requirements apply to lithium metal cells with a lithium metal content not exceeding 1g and lithium metal batteries with a lithium metal content not exceeding 2g packed per Table 968-IB. Section IB requirements apply to lithium ion cells with a 20Wh and batteries of 100Wh or less per Table 965-IB. "IB"

is required on the shipper's declaration after Packing Instruction. See the applicable Packing Instruction for complete details. All IB shipments are required to have a Shipper's Declaration for Dangerous Goods completed and signed by a trained shipper, and "IB" must be indicated after Packing Instruction, either in the Packing Instruction section or in Authorization.



When the Lithium Battery Mark (IATA Figure 7.1.C) is required and used for Section IB and permitted Section II lithium battery shipments, the UN number(s) must be added to the mark. The UN number indicated on the mark should be at least 12 mm high.

Note: The Lithium Battery Mark cannot be folded or wrapped around multiple sides of the package.

### 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.
- Waste batteries or batteries being shipped for recycling or disposal. (See IATA Special Provisions A154 and A183 as well as FX-04 (e) for additional details on these restrictions.) FedEx Authorized ShipCenter<sup>®</sup> locations, FedEx OnSite locations, and FedEx ShipSite<sup>®</sup> locations do not accept dangerous goods.

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

## 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” and press “4” for the next available dangerous goods agent.
- FedEx International hotline, 1.800.Go.FedEx; say “international” to confirm commodity acceptability to a specific destination for a FedEx international service.

### NOTICE:

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

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