

◆ **Electrical System**

A vehicle's electrical system may have a number of hazardous materials of various types including primary and auxiliary batteries, speakers and battery disconnects. Batteries store electrical energy which may provide motive or auxiliary power to the vehicle or its systems.

◆ **Batteries**

There are many different types of batteries installed in a vehicle that may be regulated for transportation including, but not limited to: wet acid or alkaline batteries, lithium batteries, nickel metal hydride, sealed non-spillable acid or alkaline batteries, or non-spillable glass-mat or gel batteries.



In some cases, dry batteries are shipped with a separate electrolyte pack.

Batteries may be described in one of the following ways:

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Wet Acid Batteries

UN2794, BATTERIES, WET, FILLED WITH ACID, 8



Wet Alkaline Batteries

UN2795, BATTERIES, WET, FILLED WITH ALKALI, 8

Lead acid and alkaline batteries may be packed in strong outer, non-specification fiberboard boxes, wooden boxes or crates, or secured to a pallet or skid.

Nickel Metal Hydride Batteries

UN2800, BATTERIES, WET, NON-SPILLABLE, 8

Sealed Non-Spillable Acid or Alkaline Batteries

UN2800, BATTERIES, WET, NON-SPILLABLE, 8



Glass Mat or Gel Batteries

UN2800, BATTERIES, WET, NON-SPILLABLE, 8



In order to qualify as a non-spillable battery, the battery must be subjected to, and pass without failure or leakage, a vibration test and a pressure differential test, and conform to all of the applicable provisions of 49 CFR § 173.159(d).

◆ **Non-Spillable Batteries**

Non-spillable batteries may be packed in strong outer, non-specification packagings, in protective enclosures (e.g., in fully enclosed wooden slatted crates) or on pallets.

Non-spillable batteries must be secured to prevent inadvertent movement, prevented from short circuiting and the terminals may not support the weight of other superimposed freight.



Non-spillable batteries themselves and the strong outer packagings must be legibly and durably marked as “NON-SPILLABLE” or “NON-SPILLABLE BATTERY.”

◆ **Lithium Batteries**

Lithium Metal Batteries may be described in one of the following ways:

Lithium Metal Batteries

UN3090, LITHIUM METAL BATTERY, 9

Lithium Metal Batteries contained in equipment

UN3091, LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT, 9

Lithium Metal Batteries packed with equipment

UN3091, LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT, 9

Lithium Ion Batteries may be described in one of the following ways:

Lithium Ion Batteries

UN3480, LITHIUM ION BATTERIES, 9

Lithium Ion Batteries Contained in Equipment

UN3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT, 9

Lithium Ion Batteries Packed with Equipment

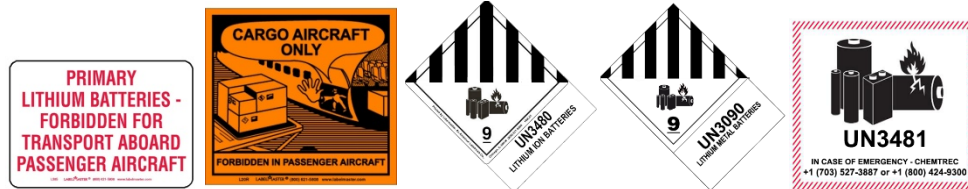
UN3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT, 9



Lithium metal batteries and lithium ion batteries are strictly regulated because of the inherent risk of fire if damaged, especially when transported by air.

Below are the markings that may be required on packages containing lithium metal or lithium ion batteries.

Lithium metal and lithium ion batteries must be classified in accordance with 49 CFR § 173.185.



Lithium metal and lithium ion batteries may be packed in strong outer, non-specification packagings, in protective enclosures (e.g., in fully enclosed wooden slatted crates) or on pallets.

In all cases, the batteries must be secured to prevent inadvertent movement and the terminals may not support the weight of other superimposed elements.



Lithium batteries are not permitted for transportation by passenger aircraft and only on cargo aircraft under special permission from PHMSA. Some carriers (e.g., UPS) do not accept batteries for transport under any circumstances.

◆ **Magnetized Materials**

Speakers and other vehicle parts and components that contain magnetized material are generally not regulated for transport as hazardous materials by all modes of transport; however, if transported by air in significant quantities (e.g., pallet loads), the magnetic field created may affect the aircraft’s navigational instruments.

In these cases, the unit loads or overpacks must be marked and labeled as magnetized material and appropriately declared for carriage aboard the aircraft.



Regulated magnetized material must be described as:

UN2807, MAGNETIZED MATERIAL, 9

◆ **Battery Disconnects**

Battery disconnects are explosive cable cutters that use a small explosive charge to sever the vehicle's battery cables to prevent a source of ignition following an accident.

Although relatively new, these devices are usually classified and described in one of the following ways:

UN0431, ARTICLES, PYROTECHNIC, 1.4G
UN0432, ARTICLES, PYROTECHNIC, 1.4S
UN0323, CARTRIDGES, POWER DEVICE, 1.4S

