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## Transportation of Lithium Batteries

Lithium batteries are found in a variety of popular consumer items, including cameras, laptop computers and mobile telephones. Like other hazardous materials, lithium batteries can be transported safely, provided appropriate precautions are taken.

The Hazardous Materials Regulations (HMR) provide exceptions from the packaging and hazard communication requirements for **small** and **medium**-size lithium batteries and cells when transported by highway or rail. When the lithium content of the battery or cell does not exceed certain limits, the batteries and cells must be packaged in strong outer packaging and in a manner to protect against short circuit; however, such shipments are excepted from all other requirements in the HMR, including hazard communication requirements.

In general, the risks posed by lithium batteries are a function of the number and relative lithium content of battery cells. A cell is a single electro-chemical unit; a battery consists of one or more connected cells. Batteries and cells are divided into three categories – small, medium or large – depending upon their lithium content.

The HMR has been amended to require that **small** lithium batteries be tested in accordance with the UN Test Manual. In addition, the size standards for small lithium batteries eliminates the distinction between liquid and solid cathode lithium batteries.

**Small** lithium cells or batteries, including cells or batteries packed with or contained in equipment, are not subject to any other requirements of the HMR if they meet the certain requirements, including "PRIMARY LITHIUM BATTERIES--FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT" marking on the outside of each package.

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## Transportation of Lithium Batteries *continued* . . .

When transported by motor vehicle or rail car, **medium** lithium cells or batteries, including cells or batteries packed with or contained in equipment, are not subject to any other requirements of the HMR if they meet certain requirements including "LITHIUM BATTERIES--FORBIDDEN FOR TRANSPORT ABOARD AIRCRAFT AND VESSEL" marking on the outside of each package.

Unless contained in equipment, each package containing more than 24 lithium cells or 12 lithium batteries must be marked to indicate it contains lithium batteries and special procedures must be followed in the event that the package is damaged, it must be accompanied by a document indicating the package contains lithium batteries and special procedures must be followed in the event that the package is damaged, plus several additional requirements.

Passengers and crew may carry lithium battery-powered consumer electronic devices and associated spare lithium batteries in **carry-on baggage** only. Spare lithium batteries may only be carried in carry-on luggage and they must be individually protected against short circuits. Unprotected batteries are susceptible to short circuits when exposed to items typically carried by passengers and crew members, such as car keys and coins. Each installed or spare battery must not exceed certain limits.

Equipment is authorized aboard passenger carrying aircraft if the gross weight of the inner package of **secondary** lithium batteries or cells **packed with the equipment** do not exceed 5 kg (11 pounds). The net weight of secondary lithium batteries or cells **contained in equipment** may not exceed 5 kg (11 pounds) in packages that are authorized aboard passenger carrying aircraft.

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Transportation of Lithium Batteries *continued* . . .

The outside of each package containing a **primary** lithium battery or cell forbidden for transport aboard passenger carrying aircraft must be marked "PRIMARY LITHIUM BATTERIES--FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT" or "LITHIUM METAL BATTERIES--FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT" on a background of contrasting color, in letters at least at least 6 mm (0.25 inch) on packages having a gross mass of 30 kg (66 pounds) or less and at least 12 mm (0.5 inch) in height on packages having a gross mass of more than 30 kg (66 pounds).

For transportation by motor vehicle, rail car or vessel, lithium cells or batteries in **small-production-runs** (up to 100 lithium batteries or cells) are excepted from the testing requirements if they meet lithium content limitations, outer packaging requirements, inner packaging and cushioning material requirements.

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