

Lithium Ion Battery

New PHMSA Rule Seeks Harmony in the Safe Skies

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Introduction

Safety hazards presented by the air transportation of lithium ion batteries are once again the subject of US regulatory action. The DOT's Pipeline and Hazardous Materials Safety Administration ("PHMSA") issued an Interim Final Rule ("IFR") seeking to revise the Hazardous Materials Regulations for lithium cells and batteries transported by aircraft.

Within the US, there have been over 100 reported incidents involving lithium batteries and air transport. The historic trendline is a stark reality to those tasked with transportation safety, supply chain security, and passenger safety. As more consumer products use lithium batteries, and manufacturers continue to push battery performance, the rate of incidents and alarming headline frequency can be expected to rise. In fairness, the danger of fire and explosion associated with air transportation of lithium ion batteries has been known to the air transportation community for decades. However, the present regulatory environment continues to be unique in its speed of change. This article examines the current regulatory regime as an emerging trend in hazardous materials compliance for the air transport of lithium batteries.

Summary of Regulations Governing Air Carriage of Lithium Batteries

The PHMSA is tasked with regulating the transportation of hazardous materials. The term "hazardous materials" is defined broadly as any "substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce." Lithium batteries are regulated hazardous materials due to the risk of overheating and causing a fire.

Lithium batteries are specifically regulated as Class 9 hazardous materials under the Hazardous Materials Regulations. The hazardous materials classification applies to the lithium ion batteries and cells that power consumer electrical devices as well as disposable lithium metal batteries. Under the HMR, lithium batteries are subject to complex inspection, testing, packaging, labeling, recordkeeping, and notification requirements. The practical application of these rules differs depending on the quantity of lithium and whether the batteries are contained in equipment carried aboard by passengers and crew or tendered as air cargo.

Air transportation of lithium batteries is a serious matter for all parties involved. The FAA holds authority to designate, and regulate the transportation of hazardous materials to promote safe flight of civil aircraft. Despite the risk of fire and explosion, there are limited exceptions. Lithium batteries may be carried by air crew/passengers for personal use subject to the following conditions:

- Lithium batteries installed in portable electronic devices may be in carry-on or checked baggage.
- Spare lithium batteries may be in carry-on baggage only (not checked or gate-checked baggage), provided that the spare batteries are protected from damage or short circuit by being placed in secure packaging with the terminals protected from contacting other metal.
- Whether installed in portable electronic devices or carried as a spare, lithium metal batteries may not have a lithium content of more than 2 grams per battery, and lithium ion batteries may not have a rating exceeding 100 Watt-hours—subject to limited exceptions with air operator approval.

The ability to carry lithium batteries and powered devices on aircraft is not unlimited and is subject to reasonable restrictions for potentially unsafe devices. Under the HMR, carriage of batteries or battery-powered devices is not permitted if the batteries or devices "are likely to create sparks or generate a dangerous evolution of heat, unless packaged in a manner which precludes such an occurrence." Further, lithium cells or batteries that have been "identified by the manufacturer as being defective for safety reasons and have the potential of producing a dangerous evolution of heat or fire," are prohibited from air transportation.

The broader regime governing transportation of lithium batteries as air cargo is significantly more complex. The general approach manages risk by prescribing net quantity per package guidelines based upon the lithium content of each cell or battery. Lithium batteries packed with or contained in equipment are limited to the number required to power the equipment plus two spares, provided that the total net mass

of the lithium cells or batteries in the package transported does not exceed 5kg. Id. When packages of lithium metal cells or batteries exceed 5kg, the packaging may not be transported by air carrier and must be marked with one of the following warnings: "Primary lithium batteries – Forbidden for transport aboard passenger aircraft" or "Lithium metal batteries – Forbidden for transport aboard passenger aircraft," or labeled "Cargo aircraft only."

PHMSA Interim Final Rule and a Look to Harmonization

The regulatory regime is quickly evolving based upon headlines and reported incidents. Agencies and trade associations across the globe are trending toward harmonized international rules and best practices for shipments containing lithium batteries. In 2016, the UN's International Civil Aviation Authority issued similar IFR restrictions for all member countries in an effort to prevent the risk of in-flight cargo hold fires. The US air transportation industry is in alignment with international trends. Two themes have emerged. First, the carriage of lithium batteries as cargo on passenger aircraft is quickly falling into disfavor. Second, all parties involved in the air transportation of lithium ion batteries are increasingly encouraged to adopt compliance measures tailored to their particular roles in the supply chain. Manufacturers and shippers who seek to avoid compliance with international norms will face increasing scrutiny.

To harmonize US regulation with the ICAO's Technical Instructions for the Safe Transport of Dangerous Goods by Air, PHMSA issued the IFR to address the "serious public safety hazards associated with lithium battery transportation." ICAO amended its Technical Instructions for the Safe Transportation of Dangerous Goods by Air to include the following: the prohibition of transporting lithium batteries aboard passenger aircraft unless contained in carry-on personal electronic devices; a requirement that all lithium batteries transported aboard cargo aircraft carry a charge no greater than 30% of their rated capacity; and a limitation of one package of lithium batteries per overpack. The IFR will go into effect without advance notice and opportunity for public comment.

The IFR, if finalized, will amend the HMRS to mirror the ICAO Technical Instructions amendments. The key HMRS amendments will: prohibit the transport of lithium ion cells and batteries as cargo on passenger aircraft; require all lithium ion cells and batteries to be shipped at not more than a 30% state of charge on cargo-only aircraft; and limit the use of alternative provisions for small lithium cell or battery to one package per consignment.

Despite these restrictions, it is important to bear in mind that these rules will not restrict passengers or crew members from bringing personal items or electronic devices containing lithium-ion cells or batteries, even if charged above 30%, since they will be packed with or contained in equipment. Additionally, the IFR provides a limited exception for medical devices to accommodate persons in areas potentially not serviced daily by cargo aircraft.

These rules may seem burdensome to some, but adoption is likely whether or not it is required. According to PHMSA, several large US carriers have already voluntarily complied with the ICAO amendments, thus reducing any additional regulatory hurdle they would have to satisfy.

Lithium Batteries and Hazardous Materials Compliance

The far-reaching impact of coming changes will influence consumers, manufacturers, forwarders, and carriers who employ aircraft to transport this increasingly prominent means of powering modern life. However, regulatory changes alone are insufficient to ensure air safety.

The PHMSA and FAA advisories correctly suggest that operational best practices are essential to keeping individuals safe and companies out of headlines. Compliance with this changing world of lithium transportation requires vigilant awareness, assessment, training, and process improvement.

All transportation participants must recognize that lithium compliance is not new, although certain aspects are changing in real time. Ultimately, lithium is just one hazardous material among all those regulated as part of the HMR. The FAA, correctly, does not prescribe specific guidelines. Instead it emphasizes best practices of conducting broad assessments of shippers, cargo requirements and communications, as well as safety and operating procedures, in developing effective responses to each participant's risk profile. There is no one-size-fits-all solution to hazardous materials compliance, in part because of the innumerable (and often invisible) ways in which lithium batteries are infiltrating our everyday lives. Every shipper, forwarder, or carrier must closely analyze operations and develop appropriate standard operating procedures to manage risk. It would be appropriate for corporate compliance professionals to review these standard operating procedures at least once annually due to the increasing speed of change.

Compliance with all HMR is the responsibility of every shipper, forwarder and carrier. Each is subject to investigations and inspections that carry civil and criminal penalties for HMR violations. In 2016, Civil penalties increased to \$77,114 per violation and to \$179,933 per violation in cases involving death or serious bodily injury. The civil penalty for training violations is now \$463. Criminal penalties may include imprisonment for up to 5 years and 10 years in cases involving death or bodily injury. Of course, the potential for loss of life and damage to reputation are immeasurable.

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