



# Battery Power

Products and technologies powering our future

Note from the Editor

How Battery Shippers Benefit from a Compliance Assessment

What You Must Do Before Shipping Batteries to India

IATA Dangerous Goods Regulations Updated to Reflect 2017-2018 ICAO Technical Instructions

One Business, Two Regulatory Worlds: Handling DOT and GHS Regulations

How Retailers Can Cope with New Regulations On Shipping Lithium Batteries

The Brave, New World for Shipping Lithium Ion Batteries by Air



## The Ins & Outs of Shipping Batteries



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In 1971, responding to the growing need for timely information during chemical and hazardous materials incidents, the chemical industry created CHEMTREC®, a public service hotline for emergency responders. Today, CHEMTREC is the world's premier emergency response call center for shipping lithium batteries and other hazardous materials.

CHEMTREC streamlines the process of shipping and transporting lithium batteries, giving you peace of mind with professional support. We establish a critical link between shippers, carriers, emergency response and medical personnel, chemical specialists and law enforcement agencies during incidents relating to lithium battery shipments.

Our emergency call center is available 24/7 to offer immediate access to our fully-trained and experienced emergency service specialists (ESS). Our ESS have diverse backgrounds, having worked as EMTs and first responders and are required to complete extensive incident response training and obtain hazardous materials certification.

When you register with CHEMTREC, you'll receive an emergency response phone number to place on your shipping documents, lithium battery mark labels, packaging and other hazard communication documents, helping you comply with U.S. DOT and international hazmat shipping regulations. You'll also gain access to an extensive array of services including access to medical professionals, language interpretation services, in-country phone numbers for international compliance and more.

CHEMTREC can help reduce risk and internal burdens so your organization can succeed and grow. Helping companies safely ship lithium batteries is more than just our business—it's our passion.

Learn more about CHEMTREC at [www.chemtrec.com/batterypower](http://www.chemtrec.com/batterypower).

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# Are you looking for a way to meet DOT and international compliance standards for shipping lithium batteries?

CHEMTREC®, the world's leading emergency response information provider, can help you keep your battery shipments moving smoothly. By registering with CHEMTREC, shippers of lithium batteries and other hazardous materials have access to our 24/7 emergency phone number, highly trained emergency service specialists, toxicology and medical specialists, language interpretation services and in-country phone numbers for international compliance. You will also be able to place the CHEMTREC emergency phone number on Safety Data Sheets and hazard communication labels.

**Working together with first responders, CHEMTREC helps with incidents involving your battery shipments and maintains communication during critical phases.**

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Shannon Given

“**Ignorance isn’t bliss when it comes to complying with changing regulations for shipping batteries.**”

## The Ins & Outs of Shipping Batteries

Lithium batteries are an integral part of everyday life; powering cell phones to electric vehicles. Despite their popularity, lithium batteries are considered dangerous goods and must comply with ever-changing shipping regulations. How can standalone cells ship versus battery packs or batteries integrated into a product? If shipping by air, what is the acceptable state-of-charge (SOC) for a cells and batteries? Labelmaster provides onsite audits, similar to a DOT inspection, to educate and enable manufacturers, covering everything from paperwork and shipping labels. They can also assist retailers in avoiding product delays and recall concerns. SGS explores the intricacies of shipping batteries internationally and how to avoid costly delays with regulations effective August 2017 for shipments to India. Ignorance isn’t bliss when it comes to complying with changing regulations for shipping batteries. Education, training and audits are all tools available to help companies navigate regulations and avoid penalties, delay of product, or loss of consumer confidence.



Shannon Given  
Editor, Battery Power

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# How Battery Shippers **Benefit** from a Compliance Assessment

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**APR 24, 2017 8:10 PM**

**BY MIKE PAGEL, SENIOR CONSULTANT, LABELMASTER**

Anyone who ships lithium batteries or battery-powered products knows that compliant battery shipping is a constant challenge. Yet, shippers who undertake the efforts to improve their compliance often discover improvements in other areas as well. In our role to counsel companies on hazardous materials transport and product regulatory support, we recently conducted a compliance assessment for a global robotics company when the firm took its shipping operations in-house. The goal: Enhance the company's dangerous good compliance procedures. In the process, we helped optimize the company's overall supply chain process. In fact, such a consulting process can benefit any manufacturer that ships large lithium batteries,

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## The assessment covers every step in your operation, from receiving to stocking to outbound shipping, to highlight compliance gaps that might be vulnerable to enforcement actions.

including those involved in heavy-duty power tools, large toys such as cars and hoverboards, drones, medical equipment, electric vehicles, energy storage, general industrial machinery, and other segments.

### ONE DAY, COUNTLESS INSIGHTS

The one-day compliance assessment is similar to a US Department of Transportation (DOT) inspection, but without the fear you will get slapped with a civil penalty at the end of the day. The assessment covers every step in your operation, from receiving to stocking to outbound shipping, to highlight compliance gaps that might be vulnerable to enforcement actions. Such an audit goes well beyond just navigating regulations and requirements. It includes the sharing of industry best practices that showcase how other companies find efficiencies, which can help streamline your operation. During the day, documentation like SOPs, training records and shipper papers are reviewed. Discussions are held with employees to iden-

tify their roles. At the end of the day, a debriefing meeting outlines immediate needs and a long-term roadmap toward achieving a compliant and efficient outbound shipping process. A follow-up written report is provided within a week. Recommendations pinpoint both compliance issues to address and methods to enhance efficiencies. For example, attaching dangerous goods information to product numbers doesn't just ensure compliant packaging and labeling; it also removes a level of complexity to streamline processes for your outbound people.

### DANGEROUS GOODS TRAINING OFTEN A DEFICIENCY

One common deficiency often found during a compliance assessment is a lack of appropriate training. It's the first item a DOT inspector will ask and most shippers don't realize the extent to which it's needed. And it's not just compliance that training should address. Proper dangerous good training ensures employees understand the reasons

behind the regulations and the consequences of non-compliance. It helps them become more familiar with their functions – why they're doing what they do, which pays off in higher productivity and fewer errors throughout your supply chain. It's important to select a training company that can customize the program based on your compliance assessment. Training tailored to your company's specific needs will provide exactly what employees need to know. It also gets them more engaged and leads to a lot of relevant questions and a productive dialog.

### ALL THE GORY DETAILS

As mentioned, every compliance assessment includes a written report citing compliance gaps and making recommendations for dangerous goods program improvements. Companies tell us they want to read all of the details, even those that may be gory or alarming. However, these executives note that it's the report's executive summary that helps them in a significant way to highlight their concerns for their C-suite. Without buy-in from upper management, it's difficult to make meaningful supply chain improvements. ⚡

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# What You **Must Do** Before Shipping Batteries To India

**FEB 2, 2017 7:53 PM**  
**BY JODY LEBER, GLOBAL BATTERY  
MANAGER,SGS**

The Bureau of Indian Standards (BIS) recently gave smartphone manufacturers who want to ship batteries to India a little more breathing room. But just a little. In June 2016, the BIS released new norms that for the first time requires handset vendors to test smartphone batteries separately. In September, the BIS pushed the original deadline out to August 2017. Despite the extension, the timeframe remains tight. Let's examine what manufacturers of smartphones, and any other battery-powered devices, can do today to avoid creating costly go-to-market delays.

The new requirements and deadline for smartphone manufacturers are just the latest wrinkles to the BIS's original 2014 decision to add portable batteries to the list of mandatory goods that fall under the Compulsory Registration Scheme (CRS). The CRS demands that every new smartphone model launched in India must have its battery, the cells inside the battery, the adapter and the mobile handset tested and registered separately.





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For now, BIS allows two battery certification norms to run simultaneously, one that was issued in 2012, and the other from 2015. But after August 31, 2017:

*“Manufacturers who have models as per 2012 and 2015 versions fail to changeover completely to the revised version by August 31, 2017, existing models as per 2012 version shall be processed for deletion (will not be allowed to use in phones).” (Source: [BGR](#))*

August 2017 is months away, but there are a few factors that should create a sense of urgency for handset manufacturers. First, all testing must be done at approved laboratories in India. But there are fewer than 15 approved facilities in-country. Combine that fact with the sheer volume of products, and significant delays are inevitable. The Indian Cellular Association reports there are approximately 850 models launched in India every year, and this number is estimated to grow. But the country has only 12 to 13 BIS-certified laboratories, which are inadequate to meet the growing demand for testing in a time bound manner. (Source: [The Economic Times](#))

Timing is not the only challenge. The BIS is forcing manufacturers to transition away from the common practice of assembling phones locally and importing batteries as a separate component. By August 2017, both the device and battery will require separate

**By August 2017, both the device and battery will require separate certifications; they cannot be tested and certified as one complete unit.**

certifications; they cannot be tested and certified as one complete unit. The consequences to the unprepared manufacturer are production delays that will result in loss of go-to-market lead time, a critical tool in a very competitive market. That’s why the best advice is to begin the testing process now to avoid those delays.

## TESTING PROCESSES AND TIMETABLE

The applicable test standard is IS 16046. It’s based on IEC 62133, which calls for simulating the conditions a portable battery may be exposed to during intended use and reasonably foreseeable misuse. Cells must be approved or tested concurrent with the battery, and vary depending on its composition.

### The testing requirements for nickel batteries are:

- **Continuous Low-Charging:** Requires that a continuous low-rate charge shall not cause fire or explosion. The test is

subjecting fully charged cells to a charge as specified by the manufacturer for 28 days to prove it will not catch fire or explode.

- **Vibration:** Requires that vibrations encountered during transportation shall not cause leakage, fire or explosion. Fully charged cells or batteries are vibration-tested under the following test conditions. A simple harmonic motion is applied to the cells or batteries with an amplitude of 0,76 mm, and a total maximum excursion of 1,52 mm. The frequency is varied at the rate of 1 Hz/min between the limits of 10 Hz and 55 Hz. The entire range of frequencies (10 Hz to 55 Hz) and return (55 Hz to 10 Hz) is traversed in 90 min ± 5 min for each mounting position (direction of vibration). The vibration is applied in each of three mutually perpendicular directions.
- **Molded Case Stress at High Ambient Temperature:** Demands that internal components of batteries are not exposed during use at high temperature. Fully charged batteries are exposed to a moderately high temperature to evalu-

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ate case integrity. The battery is placed in an air circulating oven at a temperature of  $70^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . The batteries remain in the oven for 7 hours, after which they are removed and allowed to return to room temperature.

- **Temperature Cycling:** Designed to ensure that the battery will not catch fire or explode because of repeated exposure to high and low temperatures. Fully charged cells or batteries are subjected to temperature cycling ( $-20^{\circ}\text{C}$ ,  $75^{\circ}\text{C}$ ), in forced draught chambers, per the following procedure:
  1. Place the cells or batteries in an ambient temperature of  $75^{\circ}\text{C} \pm 2^{\circ}\text{C}$  for 4 hours.
  2. Change the ambient temperature to  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$  within 30 minutes and maintain at this temperature for a minimum of 2 hours.
  3. Change the ambient temperature to  $-20^{\circ}\text{C} \pm 2^{\circ}\text{C}$  within 30 minutes and maintain at this temperature for 4 hours.
  4. Change the ambient temperature to  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$  within 30 minutes and maintain at this temperature for a minimum of 2 hours.
  5. Repeat steps 1 to 4 for a further four cycles.
  6. After the fifth cycle, store the cells or batteries and check after a rest period of at least 24 hours.
- **Incorrect Installation:** Fully charged cells are evaluated under conditions in which one of the cells is incorrectly installed. Four fully charged single cells of the same brand, type, size and age are connected in series with one of the four cells reversed. The resultant assembly is connected across a resistor of  $1\ \Omega$  until the vent opens or until the temperature of the reversed cell returns to ambient temperature. Alternatively, a stabilized d.c. power supply can be used to simulate the conditions imposed on the reversed cell.
- **External Short Circuit:** Two sets of fully charged cells or batteries are stored in an ambient temperature of  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and  $+55^{\circ}\text{C} \pm 5^{\circ}\text{C}$  respectively. Each cell or battery is then short-circuited by connecting the positive and negative terminals with a total external resistance of  $80\ \text{m}\Omega \pm 20\ \text{m}\Omega$ . The cells or batteries remain on test for 24 hours or until the case temperature declines by 20 percent of the maximum temperature rise, whichever is the sooner.
- **Free Fall:** Demonstrate that dropping a cell or battery (for example, from a bench top) shall not cause fire or explosion. Each fully charged cell or battery is dropped three times from a height of 1,0 m onto a concrete floor. The cells or batteries are dropped so as to obtain impacts in random orientations. After the test, the sample shall be put on rest for a minimum of one hour and then a visual inspection shall be performed.
- **Mechanical Shock:** The fully charged cell or battery is secured to the testing machine by means of a rigid mount which will support all mounting surfaces of the cell or battery. The cell or battery is subjected to a total of three shocks of equal magnitude. The shocks are applied in each of three mutually perpendicular directions. At least one of them shall be perpendicular to a flat face. For each shock the cell or battery is accelerated in such a manner that during the initial 3 ms the minimum average acceleration is 75 gn. The peak acceleration shall be between 125 gn and 175 gn. Cells or batteries are tested in an ambient temperature of  $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ . After the test, the sample shall be put on rest for a minimum of one hour and then a visual inspection shall be performed.
- **Thermal Abuse:** Each fully charged cell, stabilized at room temperature, is placed in a gravity or circulating air-convection oven. The oven temperature is raised at a rate of  $5^{\circ}\text{C}/\text{min} \pm 2^{\circ}\text{C}/\text{min}$  to a temperature of  $130^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . The cell remains at this temperature for 10 minutes before the test is discontinued.
- **Crushing of Cells:** Each fully charged cell is crushed between two flat surfaces. The force



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for the crushing is applied by a hydraulic ram exerting a force of  $13 \text{ kN} \pm 1 \text{ kN}$ . The crushing is performed in a manner that will cause the most adverse result. Once the maximum force has been applied, or an abrupt voltage drop of one-third of the original voltage has been obtained, the force is released. A cylindrical or prismatic cell is crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus. To test both wide and narrow sides of prismatic cells, a second set of cells is tested, rotated  $90^\circ$  around their longitudinal axes compared to the first set.

- **Low Pressure:** For example, during transportation in an aircraft cargo hold, shall not cause fire or explosion. Each fully charged cell is placed in a vacuum chamber, in an ambient temperature of  $20^\circ\text{C} \pm 5^\circ\text{C}$ . Once the chamber has been sealed, its internal pressure is gradually

reduced to a pressure equal to or less than  $11,6 \text{ kPa}$  (this simulates an altitude of  $15\,240 \text{ m}$ ) held at that value for 6 hours.

- **Overcharge:** Examines whether charging for longer periods and at a higher rate than specified by the manufacturer shall not cause fire or explosion. A discharged cell or battery is subjected to a high-rate charge of 2,5 times the recommended charging current for a time that produces a 250 percent charge input (250 percent of rated capacity).
- **Forced Discharge:** Requires that a cell in a multi-cell application shall withstand polarity reversal. A discharged cell is subjected to a reverse charge at  $1 \text{ It A}$  for 90 minutes.

The tests for lithium batteries are similar, with the exception that when it comes to testing continuous charging, lithium batteries

are charged at constant voltage for seven days to a charge as specified by the manufacturer.

## RECOMMENDATIONS

For most manufacturers, this is not a DIY project because they lack the in-house expertise and equipment to conduct this multitude of tests. Even if they do have the necessary resources and personnel, chances are their laboratories are not based in India. That's where partnering with an independent laboratory with facilities in India that can immediately begin helping the manufacturer incorporate BIS testing requirements in the product design process. Whatever you do, don't wait until after the assembly lines start up to begin testing! ⚡

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# IATA Dangerous Goods Regulations **Updated** to Reflect 2017-2018 ICAO Technical Instructions

JAN 10, 2017 9:16 AM | BY NEIL MCCULLOCH, SENIOR MANAGER, INTERNATIONAL PRODUCT DEVELOPMENT, LABELMASTER

Businesses need and want predictability, particularly when it comes to government regulations. So the fact that the International Civil Aviation Organization (ICAO) updates its Technical Instructions for the Safe Transport of Dangerous Goods every two years is both a blessing and a curse. A blessing because industry knows the changes that are coming and a curse because there are changes coming.

However, these are important safety requirements covering everything that's transported by air from cargo in the hold of the airplane to the cell phones carried by passengers. With the recent concerns over certain types of phones and tablets, the 2017 update to the regulations has a direct impact on almost every business everywhere.

No one is more focused on airplane safety than the airlines themselves and their record on that score is amazing with millions of people flying daily in complete confidence. Through their global trade association IATA, the airlines develop their own procedures based on government regulations to ensure that aircraft are as safe as possible.



So it's not surprising that 2017 will see the 58th edition the IATA Dangerous Goods Regulations (DGR) published.

Based on the 2017 ICAO Technical Instructions, the IATA DGR manual gives detailed instructions on how airlines, passengers and cargo shippers should comply with the national and international regulations on dangerous goods in air transport. These are far more common than people think.

Every day about \$18.6 billion worth of goods are transported by air. We take our laptop computers, cell phones, hair spray and even our duty free liquor for granted. But each of those has significant

hazards if mishandled, poorly manufactured or simply in the wrong place at the wrong time. Consequently, ICAO, the airlines and the government have identified them as "dangerous goods" and places a number of restrictions on their carriage by air.

## So, what has changed for 2017? And how will it affect your business?

Well, if you ship any kind of lithium battery powered device, these changes will affect you and your shipping operations. If you conduct any kind of dangerous goods training, ICAO is giving advance warning of changes to how training will be evaluated in the future and you would be advised to study these changes. If you ship aerosols, the so-called packing instructions for these have been changed. If you ship any type of machinery, the way these are described on the shipping papers is changed. And many other changes will affect such products as stabilized materials and even uranium hexafluoride.

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In short, the 58th edition of the IATA DGR manual is a comprehensive update on the regulatory requirements for the carriage of many substances and articles and should be considered required reading by anyone responsible for transport compliance in your organization.

## Here are some highlights of major changes:

- Specific airline requirements – users of both FedEx and UPS services should note these companies have extensively revised their airline “variations” and check with their service representative for full details of any changes, particularly with respect to lithium battery powered products. These are major changes and should not be underestimated.
- A new lithium battery handling label (more properly called a mark) has been adopted by all modes of transport to facilitate multi-modal operations. Designed for multi-language, multi-modal use, the label contains no wording.
- A new lithium battery hazard label has been adopted. Again a multi-modal initiate designed to make the transport chain more efficient, this label clearly identifies the miscellaneous hazard of lithium batteries by adding a pictogram to the existing class 9 label. It’s probably worth reiterating at this point that class 9 dangerous goods should and indeed must be considered just as hazardous as any other class, it’s simply that their hazards don’t fall neatly into the hazards 1 – 8, such is the case with lithium batteries.
- An interim change to the regulations prohibited lithium batteries from being carried as cargo on passenger aircraft. This is now fully reflected in all sections of the regulations. Some airlines even have further restrictions and have amended their “operator variations.” While the DGR contains the latest list of these variations, they can change at any time. Shippers are well advised to contact their airline for any addition requirements which might have been imposed.
- The DGR requirement for the shipping paper, known as the Shippers Declaration of Dangerous Goods or “DGD,” must be signed and the title and place of signing included with that signature. The requirement for Title and Place has been deleted.

## Year after year, no transport mode sees more Dangerous Goods regulatory changes than air transport.

- Some new special provision numbers must now be shown on the DGD indicating to the airline that the shipper is aware of these and that those provisions have been correctly applied.
- The classification for UF6 has changed, reflecting the toxic nature of that substance.

Note, a number of these provisions are grand-fathered, meaning that that the prior requirements are still permissible.

Year after year, no transport mode sees more Dangerous Goods regulatory changes than air transport. That’s why it’s essential to have a complete grasp of each year’s changes as soon as possible.⚡

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# One Business, Two Regulatory Worlds: Handling **DOT** and **GHS** Regulations

MAY 10, 2016 8:27 PM | BY BRIAN BEETZ, REGULATORY SPECIALIST, LABELMASTER

The Globally Harmonized System of Classification and Labeling of Chemicals (GHS) deadlines that went into effect on June 1 and December 1, 2015, respectively, have had a significant impact on US chemical manufacturers and distributors.

By now, all chemicals being shipped by manufacturers and distributors should meet the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (HCS) GHS requirements, as well as the packaging, marking and labeling requirements for hazardous materials transported in commerce (e.g., 49 CFR Parts 171-180, IATA, IMO, etc.).

The transport regulations help protect against accidents while hazardous materials are in transit – short-term, high-level hazards, and generally come from US 49 CFR Parts 100-185, based on the United Nations' Model Regulations. These are not affected by the new GHS-based HCS regulations.

The HCS is defined by OSHA in US 29 CFR 1910.1200 and adapted from the



United Nation's GHS. It applies primarily to containers used in the workplace by employees, although packages shipped in commerce may require treatment depending on their consignee. These regulations set more stringent criteria and allow fewer exceptions, since they help protect people who work with

hazardous materials (often stored in large quantities) day in and day out.

Mastering both GHS and transportation requirements for hazardous materials, and ensuring that one doesn't incorrectly impact the other, has proven to be no small task for the industry in

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general. Thus, in addition to complying with completely different sets of regulations for workplace HCS and dangerous goods (DG) transport, shippers also have to understand where one ends and the other begins.

## RETRACTIONS COMPLICATE THE CHALLENGE

As if mastering the regulations isn't complicated enough, there have been examples of agency retractions that have not yet made their way into final amended rules that can currently only be found in official letters of interpretation (LOI).

For example, in 29 CFR 1910.1200, Appendix C.2.3.3, OSHA states "[w] here a pictogram required by the Department of Transportation under Title 49 of the Code of Federal Regulations appears on a shipped container, the pictogram specified in C.4 for the same hazard shall not appear."

OSHA later became aware that the Department of Transportation (DOT) does not view the GHS pictograms as a conflict with DOT's requirements, and that in some international trade situations both transportation and GHS labeling may be required on the exterior of shipped containers. A December 20, 2012 LOI issued by OSHA clarifies this discrepancy and acknowledges that they intend to revise C.2.3.3; however, more than three years later no revision to the regulation has been completed.

**To continue shipping products legally, use the same set of rules that you've always followed. However, the containers within those shipments may require labeling under the new GHS standards.**

## OTHER GHS, DOT DIFFERENCES

To further complicate things, there are instances where a shipped container is the primary chemical container and is required to display GHS hazard pictograms and associated hazard statement(s), precautionary statement(s), etc. However, such shipments may not require hazardous material transportation labeling in accordance with DOT 49 CFR regulations.

These types of shipments have the potential to incur delays while in transit if someone identifies GHS labeling and questions whether or not the shipment may be missing any required transportation labeling/markings.

Since the implementation of OSHA GHS requirements on chemical shipments, real world applications have continued to produce scenarios and questions that are not explicitly covered in the regulations. Manufacturers and distributors will continue to be burdened with regulatory chang-

es as the regulators struggle to get caught up and finalize amendments to address needed clarifications. The bigger picture, though, is continued progress toward global public safety.

To continue shipping products legally, use the same set of rules that you've always followed. However, the containers within those shipments may require labeling under the new GHS standards.

If packages serve as both the shipping package and the final-use container, they'll probably require both proper transport labels and the new HCS hazard communication labels.

Keeping teams on top of two sets of regulations is not an easy task. Staying informed about current regulations will go a long way in ensuring shipments are compliant, efficient and safe. ⚡

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# How **Retailers** Can Cope with New Regulations On Shipping Lithium Batteries

APR 16, 2016 1:29 PM | BY MIKE PAGEL, SENIOR CONSULTANT, LABELMASTER

Devices powered by lithium batteries grow more popular every year, which means industries of all of kinds are shipping such products to a wide range of locations. But retailers face the greatest frequency and variety of shipping challenges, particularly if planning to transport the batteries and products by air. The latest regulations don't make it any easier.

For illustration, just this past February, the International Civil Aviation Organization (ICAO), the United Nations agency that regulates the transport of dangerous good aboard aircraft, enacted a ban on transporting standalone lithium ion batteries as cargo on passenger aircraft. The ban became effective April 1, 2016. In addition, the ICAO has mandated that, also effective April 1, 2016, standalone lithium ion batteries can only be shipped by air at a state of charge not exceeding 30 percent of the battery's rated capacity.

These are just of a number of recent rules and restrictions on battery shipments established by regulatory agencies and air cargo carriers in their quest to protect the public. Compliance with such mandates is not easy. For example, downstream distributors often don't have the means to test the state of charge of batteries they ship. Until now, there's never been such a limit.

**How can retailers avoid these headaches when the next holiday blockbuster battery-powered device arrives?**





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The reality is air shipping will simply become less viable. You just can't train thousands of employees to know the infinite permutations of batteries, configurations, and labels "X, Y and Z." Our retailer clients are telling us they will not ship batteries or battery-containing products that are fully regulated by air, it's just too complex.

## STICK TO THE GROUND GAME

Retailers should address this challenge foremost by streamlining their shipping processes through automation and training. A successful shipping strategy also should:

- **Build in more lead time.** If you are shipping one package to one customer, you'll still be okay shipping by air. But if you are shipping dozens of packages a day to the same customer or retail partner, ground probably makes more sense. In such cases, retailers should be prepared to plan inventory months ahead of time as they push shipments to ground or ocean transport.

- **Minimize risks of reverse logistics and customer returns.** Here retailers should stick to the ground game. You don't know what happened to that battery or that device from the time it got to the customer to the time he or she returns it. If it is damaged, then it's even a greater risk. And, there's no need to receive it overnight, so there's no reason to have an untrained person package a battery for air shipment. It just doesn't pay.

## PROTECT AGAINST NEXT HOLIDAY GIFT FIASCO

Hoverboards were the big gift this past holiday season, beloved by teens, tweens and orthopedic surgeons alike. But then came the online videos with the battery-powered hoverboards exploding into flames. Retailers quickly found themselves grappling with the challenge of shipping thousands of returns under a bewildering tangle of regulations and changing carrier restrictions. How can retailers avoid these headaches when the next holiday blockbuster battery-powered device arrives?

It all starts with the quality of the product itself. When an item gets popular, manufacturers will try to make it at the lowest cost. Some of these hoverboards used poor-quality batteries that did not meet the required testing criteria. The best advice is to buy from reputable manufacturers and ask for the test reports. It also is beneficial to obtain input from a dangerous goods transport advisor when making such purchasing decisions. The evidence is clear: In just one year, the landscape for shipping lithium batteries by air has grown exponentially more complex. However, as outlined here, retailers do have options to overcome the obstacles and continue to provide top-notch service to their customers. For additional information on lithium battery regulations, visit the Labelmaster lithium battery shipping services page at <http://www.labelmaster.com/lithium-battery-shipping/>. ⚡

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# The Brave, New World

## For Shipping **Lithium Ion Batteries** by Air

MAR 17, 2016 7:39 AM

BY BOB RICHARD, VICE PRESIDENT, REGULATORY  
COMPLIANCE, LABELMASTER

Has your company seen all the headlines about shipping lithium ion batteries by air? How are you supposed to keep up with what's compliant and what is not? Here's a concise overview on the lithium ion battery air transport regulations that will be effective this April 1, 2016, along with a preview of what might be expected later in 2016.

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## Can you still ship lithium batteries by air? A qualified yes.

### THE BAN ON PASSENGER AIRCRAFT

In February 2016, the International Civil Aviation Organization (ICAO) – the United Nations agency that regulates the transport of dangerous goods aboard aircraft – enacted a ban on transporting standalone lithium ion batteries (UN 3480) as cargo on passenger aircraft. The ban goes into effect April 1, 2016.

Because lithium metal batteries (UN 3090) already were prohibited, the new regulation means no standalone lithium batteries, in any quantity or packaging, may be shipped as cargo on passenger aircraft.

Can you still ship lithium batteries by air? A qualified yes.

Batteries packed with or contained in equipment (UN 3019 and 3481) may still be shipped compliantly, subject to the air transport regulations. Passengers, too, may still transport their battery powered devices and spare batteries on their person and in their carry-on bags – for now. And all lithium batteries may still be transported on cargo-only aircraft, subject to the regulations that are addressed below.

However, you need to be aware that airlines may have variations in place even though the regulations don't prohibit them on cargo aircraft. Based on the latest addendum to the IATA Dangerous Goods Regulations (Addendum II), the airline variations applicable to lithium batteries have increased significantly. You also need to be aware that airlines may have restrictions that are not published or reflected in the published variations, so it's important to check with the airlines prior to transport.

### NEW STATE OF CHARGE LIMITATIONS, OTHER RESTRICTIONS

ICAO also has mandated that, effective April 1, 2016, standalone lithium ion batteries (UN 3480) can only be shipped by air at a state of charge (SoC) not exceeding 30% of the battery's rated capacity. The 30 percent SoC limit applies to Section 1A, 1B, and II of Packing Instruction 965.

In addition, shippers will not be authorized to transport more than one package of standalone lithium batteries prepared in accordance with packing instruction 965 or 968 Section II per consignment.

A consignment is defined as "one or more packages of dangerous goods accepted by an operator from one shipper at one time and at one address, receipted for in

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one lot and moving to one consignee at one destination address.”

You should be aware that there is significant confusion amongst shippers and airlines relative to the definition of a consignment. Some airlines will interpret this more liberally than others because any package can be handled by airline personnel and documented according to one air waybill as a single consignment.

In addition, no more than one Section II lithium battery package may be placed into an overpack. Section II packages may not be offered in a unit load device and must be offered separately from other non-dangerous cargo. This allows the airlines to load lithium batteries more strategically with appropriate risk mitigation (e.g., specially designed ULDs, fire blankets, in holds with fire suppression, away from flammable cargoes, etc.)

## What’s the bottom line on this?

- Ship lithium batteries by cargo aircraft only (if the airline hasn’t filed a variation or implemented an embargo). You will need a Cargo Aircraft Only label for all standalone batteries.
- Ensure they are at a state of charge no more than 30% of capacity of the rated capacity.
- Pack them separately from everything else.

This also means developing a process to verify the state of charge in the prepackaged batteries, and a procedure to manage the more restrictive packing rules.

## IMPACT ON SUPPLY CHAINS

The prohibition related to passenger aircraft will have significant impacts to supply chains because cargo aircraft and routes are limited and some destinations are only serviced by passenger aircraft. This will be an issue particularly when batteries are needed for critical lifesaving medical devices that must be shipped for use by patients, doctors, nurses and hospitals in remote areas.

Even so, these recent developments prompt the question: Will all air shipment of lithium batteries eventually be banned? Well, let’s hope not. The new restrictions will be devastating enough to supply chains and the societal impacts remain to be fully realized.

From the battery industry’s perspective, they’re between a rock and hard place. No matter how restrictive and complicated the regulations get, the real issue isn’t the rules, but compliance. Without an aggressive internationally coordinated enforcement strategy, the chance of another catastrophic incident is greatly increased. What is most troubling is that those who have exerted great efforts to politicize the issue, invoke restrictions without fully evaluating the consequences, conducted tests without

verifying that the batteries tested were compliant in the first place have done little to nothing to address the real crux of the matter – there are unscrupulous shippers that continue to put us all at risk by shipping poorly designed, manufactured and improperly tested batteries. In many instances these are shipped illegally as undeclared shipments. When will this be addressed? Until these individuals are held accountable the problem will not be resolved.

One can expect that each airline will be conducting independent risk assessments based on guidance published in an FAA Safety Alert for Operators (SAFO). Some airlines may never accept lithium batteries, but only time will tell. Certainly, they may be more selective with respect to the shippers from which they will accept such packages. At best, it will be difficult to transport lithium batteries by air.

The Society of Aeronautical Engineers has started work on a performance standard and it is hoped that once it is completed the lithium battery restrictions and passenger aircraft ban will be revisited by ICAO and the airlines.

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