FEDERAL REGISTER

Vol. 79 Wednesday,
No. 151 August 6, 2014

Part IV

Department of Transportation

Pipeline and Hazardous Materials Safety Administration

49 CFR Parts 171, 172, 173, et al.
Hazardous Materials: Transportation of Lithium Batteries; Final Rule

DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

49 CFR Parts 171, 172, 173, 175

[Docket No. PHMSA–2009–0095 (HM–224F)]

RIN 2137–AE44

Hazardous Materials: Transportation of Lithium Batteries

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), DOT.

ACTION: Final rule.

SUMMARY: PHMSA, in consultation with the Federal Aviation Administration (FAA), is modifying the requirements governing the transportation of lithium cells and batteries. This final rule revises hazard communication and packaging provisions for lithium batteries and harmonizes the Hazardous Materials Regulations (HMR) with applicable provisions of the United Nations (UN) Model Regulations, the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions) and the International Maritime Dangerous Goods (IMDG) Code.

DATES: *Effective Date:* August 6, 2014.

Voluntary Compliance Date: Voluntary compliance with all amendments is authorized August 6, 2014.

Delayed Compliance Date: Unless otherwise specified, compliance with the amendments adopted in this final rule is February 6, 2015.

The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of August 6, 2014.

FOR FURTHER INFORMATION CONTACT: Charles E. Betts or Kevin A. Leary Standards and Rulemaking Division, Pipeline and Hazardous Materials Safety Administration, telephone (202) 366–8553, or Janet McLaughlin, Office of Hazardous Materials Safety, Federal Aviation Administration, telephone 202–385–4897.

SUPPLEMENTARY INFORMATION:

Contents

I. Executive Summary

In this final rule, PHMSA is revising requirements in the HMR applicable to the transport of lithium cells and batteries consistent with the UN Model Regulations, the ICAO Technical Instructions and the IMDG Code. The final rule:

(1) Replaces equivalent lithium content with Watt-hours for lithium ion cells and batteries;

(2) adopts separate shipping descriptions for lithium metal batteries and lithium ion batteries;

(3) revises provisions for the transport of small and medium lithium cells and batteries including cells and batteries packed with, or contained in, equipment;

(4) revises the requirements for the transport of lithium batteries for disposal or recycling;

(5) harmonizes the provisions for the transport of low production and prototype lithium cells and batteries with the ICAO Technical Instructions and the IMDG Code; and

(6) adopts new provisions for the transport of damaged, defective, and recalled lithium batteries.

PHMSA is not adopting proposals to: (1) Modify provisions for what constitutes a change to a battery design in the UN Manual of Tests and Criteria; (2) require lithium cells and batteries to be marked with an indication that the cell or battery design passed each of the appropriate tests outlined in the UN Manual of Tests and Criteria; or (3) limit the locations on board aircraft where shipments of lithium cells and batteries could be stowed.

The provisions of this final rule are consistent with Section 828 of the ''FAA Modernization and Reform Act of 2012'' (Pub. L 112–98, 126 Stat.133 (Feb. 14, 2012)), which prohibits DOT from issuing or enforcing any regulation or other requirement regarding the air transportation of lithium cells or batteries if the requirement is more stringent than the requirements of the ICAO Technical Instructions.

PHMSA estimates that the costs of this rule would total $12.1 million over the next 10 years when applying a 3 percent discount rate, and $10.8 million when applying a 7 percent rate. PHMSA also developed high and low cost estimates to incorporate uncertainty in quantifying costs—at a 7 percent discount rate the low estimate of costs is $7.4 million and the high estimate is $15.0 million. These figures acknowledge that the HMR already authorize the use of the ICAO Technical Instructions and the IMDG Code for most lithium battery shipments. Further, shipments of lithium batteries transported to or from the U.S. must conform to either the ICAO Technical Instructions by air or the IMDG code by vessel. Domestic air and vessel transport of lithium batteries is the final remaining segment likely to be impacted by the amendments in this final rule. Commenters representing air carriers indicated that international operators and most U.S. operators conform to the provisions of the ICAO Technical Instructions because of the desire to have a single set of operational practices and training standards. PHMSA anticipates cost savings resulting from harmonization of certain requirements, including those related to proper shipping names and Watt-hour ratings. Separate entries for lithium metal and lithium ion batteries have appeared in the ICAO Technical Instructions and the IMDG code since 2009. PHMSA did not adopt those entries at that time but noted that the then new entries could be used both domestically and internationally, and for transportation by motor vehicle and rail immediately before or after being transported by aircraft. [74 FR 2207]. While the HMR permit the use of these shipping descriptions because these entries do not appear in the Hazardous Materials Table (HMT; § 172.101) use of these descriptions continues to frustrate shipments. Similarly, the ICAO Technical Instructions and the IMDG code use the term ''Watt-hours'' to measure the size of lithium ion batteries, while the HMR use the term ''equivalent lithium content.'' While both of these provide an indication of the size of a lithium ion battery, they are not interchangeable units and this difference frustrates shippers attempting to determine the appropriate shipping requirements. PHMSA anticipates some safety benefits resulting from risk reduction through a combination of: Reliable packaging; hazard communication; inspection and

acceptance checks prior to loading cargo aboard aircraft; pilot notification; and employee training, many of which have already been adopted into current practice.

II. Background

PHMSA published a notice of proposed rulemaking (NPRM) in this docket (75 FR 1302, Jan. 11, 2010) to enhance the transport of lithium cells and batteries through elimination of regulatory exceptions, increased battery design testing requirements, air cargo stowage requirements, and clarification of certain other provisions. In that NPRM, PHMSA discussed: (1) National Transportation Safety Board (NTSB) Recommendations resulting from the February 7, 2006, cargo aircraft accident at Philadelphia International Airport suspected to have been caused by lithium batteries; (2) numerous minor incidents of smoke or fire involving lithium cells and batteries in air transportation, which may be ''precursors'' to a catastrophic accident; and (3) research conducted by FAA William J. Hughes Technical Center (Technical Center), which examined the characteristics of fires involving packages of lithium batteries, the effectiveness of conventional fire suppression systems at mitigating the impacts of these fires, and the ability of packages to contain a fire involving lithium batteries. 75 FR at 1303–07. Specifically, in the NPRM, PHMSA proposed to:

- Adopt or revise various definitions of: ''Lithium cell or battery''; ''lithium content''; ''lithium ion cell or battery''; ''lithium metal cell or battery''; ''short circuit''; and ''Watt-hour.''
- Adopt Watt-hour, in place of ''equivalent lithium content'', as the measure of power (or size) of a lithium ion cell or battery.
- Require a shipper, carrier, package owner, or person reporting an incident provide reasonable assistance in an investigation including access to the damaged package or article.
- Replace the single proper shipping name and UN identification number for ''lithium batteries'' with separate proper shipping names and UN identification numbers for lithium metal batteries and lithium ion batteries and also adopt separate proper shipping names and UN identification numbers for lithium metal and lithium ion batteries packed with, or contained in, equipment.
- Consolidate requirements for shipping lithium cells and batteries, and exceptions into § 173.185, by:
  - Requiring cells and batteries to be tested in accordance with the latest revisions to the UN Manual of Tests and Criteria, and require manufacturers to retain evidence of successful completion of UN testing. PHMSA also indicated it was considering requiring the presence of a ''quality mark'' to indicate successful testing.
  - Eliminating the exceptions for small cells and batteries in air transportation, except with respect to extremely small cells packed with or contained in equipment.
  - Providing certain relaxed requirements for (1) the shipment of low production runs and prototype batteries, and (2) batteries being shipped for recycling or disposal.
- Require lithium cells and batteries, when transported by aircraft, to be stowed in a location accessible by a crew member or a location equipped with an FAA-approved detection and fire suppression system.

PHMSA proposed an effective date for a final rule 75 days after publication in the **Federal Register** and invited comments concerning the additional costs that would result from such a compliance schedule, practical difficulties associated with quickly coming into compliance with the provisions of the January 11, 2010, NPRM, and any other issues that PHMSA should consider in making a decision on the compliance schedule. PHMSA also invited commenters to address the feasibility and practicability of a phased compliance schedule, under which certain provisions of the final rule would become effective on a faster schedule than other provisions, for which immediate compliance would be more difficult.

A total of 125 persons submitted comments on the proposals in the January 11, 2010, NPRM. Commenters included battery and electrical device manufacturers, airlines, airline pilots, retailers, battery recyclers, members of the U.S. House of Representatives, the U.S. Small Business Administration (SBA), the U.S. Chamber of Commerce, and foreign governments. PHMSA also received comments from industry trade associations and other advocates representing the above named groups.

Commenters expressed support for the overall goal of improving the safe transport of lithium batteries by all modes, especially air. The commenters also stressed the need for consistency between the HMR and the ICAO Technical Instructions. Several commenters suggested that even small deviations from the ICAO Technical Instructions in the transport of lithium batteries would cause significant disruptions. These commenters stated that differences between U.S. and international requirements for lithium batteries detract from safety by creating confusion and excessively complicating the detailed set of regulations that already apply to lithium battery shipments. SBA recommended that PHMSA consider the public comments to the proposed rule, assess the impact of the proposed rule on small businesses, and consider feasible alternatives that would meet the agency's safety objectives while minimizing the economic impact on small business.

The majority of commenters focused on the proposals for: (1) Eliminating provisions for small lithium batteries currently found in § 172.102, special provision 188; (2) modifying the criteria under which a lithium battery would be considered to be a new type; and (3) prescribing aircraft stowage requirements. To review the NPRM, draft regulatory evaluation, environmental assessment, comments, letters, and other materials considered in this regulatory action go to *http://www.regulations.gov,* docket number PHMSA–2009–0095. To locate a specific commenter by name simply use the search function provided by regulations.gov.

Since publication of the January 11, 2010 NPRM:

- PHMSA hosted a public meeting attended by 100 individuals (outside of PHMSA and FAA) representing a total of 73 companies, organizations and other entities, 16 of whom made presentations. A transcript of this meeting is in the docket (at PHMSA–2009–0095–0189).[1]
- The FAA Technical Center continued to study the risks presented by lithium batteries in air transportation and ways to address those risks and published reports on ''Fire Protection for the Shipment of Lithium Batteries in Aircraft Cargo Compartments'' (November 2010) and, in conjunction with Transport Canada, on a ''Freighter Airplane Cargo Fire Risk Model'' (September 2011). Copies of these reports are in the docket (at PHMSA–2009–0095–0235 and –0240, respectively).
- PHMSA evaluated transportation incidents involving lithium batteries and one cargo aircraft accident in which an aircraft transporting lithium batteries

[1] In addition, representatives of the Cargo Airline Association met with officials of the FAA on September 8, 2010, to present additional concerns with proposals in the NPRM, and a member of the Airline Pilots Association provided information to PHMSA on aircraft fire suppression systems, the notice to the pilot in command, and current training of airline personnel in a telephone conference on April 20, 2011. Memoranda of these contacts are in the docket (at PHMSA–2009–0095–0220 and –0234, respectively).

was destroyed and both pilots were killed.[2]

• The ICAO Dangerous Goods Panel adopted revisions into the 2013–2014 ICAO Technical Instructions that narrow exceptions for lithium metal and lithium ion cells and batteries not packed with, or contained in, equipment when transported by aircraft. PHMSA incorporated the 2013–2014 ICAO Technical Instructions by reference into the HMR in docket number PHMSA2012–0027 (HM–215L), 78 FR 988 (January 7, 2013).[3]

• In February 2012, Congress passed and the president signed the ''FAA Modernization and Reform Act of 2012'' that specifically prohibits DOT agencies from issuing or enforcing regulations regarding the air transport of lithium cells or batteries, whether transported separately or packed with, or contained in, equipment, if the requirement is more stringent than the requirements of the ICAO Technical Instructions.[4]

• In April 2012 and January 2013, PHMSA stated that it was considering harmonizing requirements in the HMR on the transportation of lithium batteries with changes adopted in the 2013–2014 ICAO Technical Instructions and requested additional comments on (1) the effect of those changes, (2) whether to require compliance with the ICAO Technical Instructions for all shipments by air, both domestic and international, and (3) the impacts if PHMSA failed to adopt specific provisions in the ICAO Technical Instructions into the HMR. 77 FR 21714 (Apr. 11, 2012), 78 FR 1119 (Jan. 7, 2013).

The changes adopted in the ICAO Technical Instructions require additional shipper training, markings, labels, and pilot notification for packages containing more than 8 lithium cells or 2 lithium batteries, which were previously not subject these requirements. Commenters to the April 11, 2012 and the January 7, 2013 notices unanimously supported harmonization of the HMR with the 2013–2014 ICAO Technical Instructions while acknowledging that the changes adopted by the ICAO would result in increased costs in training, package markings and revised procedures. Commenters also noted that, if PHMSA failed to harmonize the HMR with the current ICAO Technical Instructions, shippers and carriers would continue to struggle with the differences between the two sets of regulations. Commenters further stated that PHMSA should not adopt proposals in the NPRM that would be more restrictive than the ICAO Technical Instructions because this would place U.S. shippers and carriers at a disadvantage relative to their international counterparts and be in violation of the FAA Modernization and Reform Act of 2012. Commenters also opposed specifically maintaining an option to use the current HMR, instead of the ICAO Technical Instructions, and noted that permitting shippers and carriers to choose compliance with alternative standards in domestic and international commerce would undermine safety because the ICAO provisions are more stringent than the current HMR.

Several air carriers indicated that because the 2013–2014 ICAO Technical Instructions would become effective January 1, 2013 they would be in compliance with those standards by that date regardless of whether (or when) PHMSA issued a final rule. Other commenters requested a transition period between 6 and 18 months to permit companies to conduct training and adjust their operations to adapt to these changes. Outside of a delayed compliance date, commenters did not suggest any other ways to reduce the compliance burden. The National Association of Manufacturers (NAM) indicated that supply chains will have to adapt to a final rule that adopts the provisions of the 2013–2014 ICAO Technical Instructions, but the costs of implementing these provisions would vary from one manufacturer to another. The Cargo Airline Association (CAA) suggested that the revisions in the 2013–2014 ICAO Technical Instructions might result in a shift in transport from the air mode to other modes (such as ground) but did not attempt to quantify this as shipping decisions would vary from company to company.

Air carriers and international shippers stressed the desire for a single system to eliminate errors and streamline training. Further, the commenters asserted that any benefits associated with maintaining an option would be minor, accrued by a small number of entities and that these benefits would be more than offset by increased confusion experienced by shippers and air carriers. Additionally, commenters suggested that a failure by PHMSA to mandate the use of the ICAO Technical Instructions would create an environment where the U.S. permits a lesser standard than the rest of the world, placing air carriers and pilots at increased risk and hampering enforcement of the ICAO Technical Instructions.

Based on all the comments received, and our analysis of the recent changes to the ICAO Technical Instructions, we are adopting into the HMR requirements consistent with 2013–2014 ICAO Technical Instructions, the 17th revised edition of the UN Model Regulations, the 5th Revised Edition of the UN Manual of Tests and Criteria Amendment 1, and Amendment 36–12 of the IMDG Code. In the section-by-section review, each of the proposals, with corresponding comments, and subsequent revisions is discussed in more detail. For convenience, a list of commenters is provided below:

3M Company
Airlines for America (A4A), formerly Air Transport Association (ATA)
ACCO Brands (ACCO)
Advanced Medical Technology Association (AdvaMed)
Airforwarders Association (Afa)
The Airline Pilots Association, International (ALPA)
Airtec GmbH & Co. KG (Airtec)
Alaska Airlines
The American Trucking Associations (Trucking)
Association of Hazmat Shippers, Inc. (AHS)
Association of International Automobile Manufacturers, Inc. (AIAM)
Asurion Corporation
AT&T Services Inc.
Batteries Plus LLC
Battery Association of Japan (BAJ)
Bayer HealthCare Diabetes Care
Berlin Heart Inc.
Best Buy Corporation
Biomet Incorporated
Black & Decker
Boat U.S. Foundation
Boston Power
Boston Scientific Corporation
Camera and Imaging Products Association (CIPA)
Cargo Airline Association (CAA)
Casio America (Casio)
Clean Harbors Environmental Services
Coalition of Airline Pilots Associations (CAPA)
Communications and Information Network Association of Japan (CIAJ)
CompuCom Systems, Inc.
Consumer Electronics Association (CEA)

[2] On September 3, 2010, in Dubai, United Arab Emirates, a 747–400 cargo aircraft crashed while attempting to land at the Dubai airport after a fire was discovered. Both pilots were killed, and the aircraft and its cargo, which included lithium batteries, were destroyed. The UAE preliminary report of the accident is in the docket (at PHMSA–2009–0095–0238).

[3] This means that, for purposes of the HMR, a shipment of lithium batteries to, from, or within the United States could be offered and transported in accordance with the current edition of the ICAO Technical Instructions even before PHMSA issued a final rule in this proceeding.

[4] The legislation allows the continued prohibition on the transport of lithium metal cells and batteries aboard passenger aircraft. It also authorizes the issuance of more stringent regulation based on credible reports that lithium batteries substantially contributed to the initiation or propagation of a fire aboard an aircraft, as long as the regulations address solely the deficiencies referenced in the report(s) and are the least disruptive and least expensive variation from existing requirements while adequately addressing identified deficiencies.

Consumer Electronics Retail Coalition (CERC)
Control Technology Inc.
Corporate Radiation Safety and Dangerous Goods Transport (Siemens)
Council on Safe Transport of Hazardous Articles (COSTHA)
Covidien
CTIA—The Wireless Association
Dangerous Goods Advisory Council (DGAC)
Dangerous Goods Trainers Association (DGTA)
Delphi Automotive (Delphi)
Delta Airlines (Delta)
Deutsche Post DHL (DHL)
DGM USA
Digital Europe
Embassy of Israel
Embassy of the Republic of Korea
Energizer Battery Manufacturing, Inc. (Energizer)
EnteroMedics, Inc.
Environmental Technology Council
European Portable Battery Association (EPBA)
European Union
Express Association of America (EAA)
Fedco Electronics, Inc. (FedCo)
FedEX Express (FedEx)
Garmin International, Inc. (Garmin)
GE Corporation (GE)
GRC Wireless Recycling (GRC)
Greatbatch, Inc.
Hephner TV & Electronics
Hitachi Maxell, Ltd.
Horizon Air
International Air Transport Association (IATA)
Infinite Power Solutions, Inc.
Information Technology Industry Council (ITI)
Infotrac
International Federation of Airline Pilots Associations (IFALPA)
The Japan Electrical Manufacturer's Association (JEMA)
Japan Electronics & Information Technology Industries Association (JEITA)
Japan Machinery Center for Trade and Investment (JMC)
Johnson Controls
Korea International Trade Association (KITA), the Korea Electronics Association (KEA), and the Battery R&D Association of Korea (KORBA)
Learjet Inc.
Leroy Bennet
Lifescan, Inc. and Animas Corporation
Lithium Battery Industry Coalition
Medical Device Manufacturers Association (MDMA)
Medtronic, Inc.
Mercedes-Benz USA, LLC
MicroSun Technologies LLC
Motorola, Inc.
National Association of Manufacturers (NAM)
National Fire Protection Association (NFPA)
National Funeral Directors Association (NFDA)
The National Industrial Transportation League (NITL)
National Retail Federation (NRF)
National Transportation Safety Board (NTSB)
National Electrical Manufacturers Association (NEMA)
NetApp, Inc.
Nexergy
National Institute of Standards and Technology/US Department of Commerce (on behalf of Japan and on behalf of Korea)
Nokia Inc.
The North American Automotive Hazmat Action Committee (NAAHAC)
Northern Air Cargo (NAC)
Olympus Corporation of the Americas (Olympus)
Organ Recovery Systems, Inc.
Palladium Energy
Panasonic Corporation of America (Panasonic)
Photo Marketing Association
Quallion LLC (Quallion)
RadioShack Corporation
Recharge
The Rechargeable Battery Association (PRBA)
Rechargeable Battery Recycling Corporation (RBRC)
Rep. Don Young
Rep. John Mica
Rep. Robert E. Latta
Retail Industry Leaders Association (RILA)
Rockwell Automation
Rose Electronics Distributing Company
Saft
Small Business Administration Office of Advocacy (SBA)
Security Industry Association
Southwest Airlines, Co. (Southwest)
Sprint Nextel Corporation (Sprint)
SRICI Testing Center
St. Jude Medical, Inc.
SureFire LLC
Techtronic Industries (TTi)
The International Air Cargo Association (TIACA)
TNR Technical, Inc.
Transportation Intermediaries Association (TIA)
Transportation Trades Department AFL–CIO (TDD)
Troy Rank
Tyco Electronics
Tyco International
United Parcel Service (UPS)
United Technologies Corporation (UTC)
URS Corporation (URS)
US Chamber of Commerce

III. Section-by-Section Review

A. Part 171

Section 171.8 Definitions

In the NPRM, PHMSA proposed to remove, add and amend a number of definitions applicable to lithium batteries, as follows:

1. Remove the definition for ''equivalent lithium content'' and replace that term with ''Watt-hour'' consistent with the UN Manual of Tests and Criteria. Commenters supported the proposed addition of the term ''Watt-hour'' in place of ''equivalent lithium content'' as a method to measure the size of lithium ion cells and batteries.

3. Provide separate definitions for ''lithium metal cell or battery'' and ''lithium ion cell or battery'' in order to differentiate between the different lithium battery chemistries, and a definition of ''Short circuit'' consistent with the 5th revised edition of the UN Manual of Tests and Criteria, Amendment 1 and revise the definitions of ''Aggregate lithium content'' and ''Lithium content'' also consistent with the 5th revised edition of the UN Manual of Tests and Criteria, Amendment 1. PHMSA did not receive any negative comments regarding these proposed changes.

In this final rule, we are adding definitions for ''Lithium ion cell or battery,'' ''Lithium metal cell or battery,'' ''Short circuit'' and ''Watt-hour'' as proposed. We are removing the present definitions of ''aggregate lithium content,'' ''equivalent lithium content,'' and ''lithium content.'' The explanation of the size or energy of a cell or battery is being incorporated into the definition of lithium metal cell or battery and lithium ion cell or battery. The term ''Aggregate lithium content'' is not used in the HMR.

Section 171.21 Assistance in Investigations

In § 171.21, PHMSA requires a shipper, carrier, package owner, package manufacturer or certifier, repair facility, or person reporting a hazardous materials transportation incident to provide assistance to authorized representatives of the Department of Transportation investigating the incident. In the NPRM, PHMSA proposed to specifically require such persons to provide reasonable access to a damaged package or article involved in a transportation incident. PHMSA proposed these revisions in response to NTSB Recommendation A–07–107 that recommends retaining failed lithium batteries or devices for further analysis. After an incident, often the only evidence provided to PHMSA and the FAA is a written incident report, and in some instances, pictures of the involved package or article. In some cases, analysis of the damaged article may reveal the cause of the incident.

NEMA supported this proposal and suggested that, if this requirement had been in place earlier, PHMSA and the FAA would possess more information regarding the causes of many of the lithium battery incidents cited in the NPRM. UPS and URS request clarification on the phrases ''reasonable access'' and ''if available,'' noting that the term ''reasonable'' is not defined. NAC raised environmental and safety concerns associated with the storage of hazardous materials in the workplace. NTSB stated that PHMSA could significantly improve the NPRM if

retention and analysis of failed batteries and equipment were required.

After reading the comments and reexamining the proposal, we concluded that the regulations as currently written already meet the intent of recommendation A–07–107. Specifically §§ 109.3 and 109.9 permit a designated agent of the U.S. DOT to gather information in support of an investigation and direct a package to be transported to a facility for examination to evaluate whether the package conforms to the appropriate requirements. Based on the particular circumstances involved in an incident investigation PHMSA may decide to examine failed batteries or devices. In the case of lithium batteries, the decision about whether PHMSA will retain and examine the remains of a lithium battery incident depend on the condition of the package or article involved in the incident (e.g., where did the incident occur, did the incident involve other packages, are there sufficient remains to examine, can the cause be determined based on other evidence?) PHMSA uses this information to conduct follow-up investigations as necessary.

Sections 171.12, 171.22, 171.23, 171.24, 171.25 Use of International Standards and Regulations

The HMR, ICAO Technical Instructions, IMDG Code, and the Transport Canada TDG Regulations are based on the UN Recommendations, which are model regulations issued by the UN Committee of Experts on the Transport of Dangerous Goods. The HMR, with certain conditions and limitations, permit both domestic and international shipments of hazardous materials to be offered for transportation and transported under provisions of, the ICAO Technical Instructions, the IMDG Code and the TDG Regulations as appropriate. In most cases where we allow compliance with an alternative standard such as the ICAO Technical Instructions or the IMDG Code, the level of safety is at least equal to the HMR. However, in a limited number of situations additional conditions or limitations are necessary consistent with the public interest or are required to comply with other federal law. Examples of these condition or limitations include but are not limited to: Approval of Class 1 (explosive) materials; identification of hazardous substances and hazardous wastes; and the prohibition on the transport of lithium metal batteries by passenger aircraft.

In the NPRM, PHMSA proposed more stringent requirements than the ICAO Technical Instructions and the IMDG Code that were effective at the time the NPRM was published. Most commenters strongly recommended that we adopt the standards set forth in the ICAO Technical Instructions and the IMDG code, rather than the more stringent requirements proposed in the NPRM. These commenters contended that the proposed amendments would create confusion, decrease compliance, and negatively impact safety throughout the supply chain. Since the NPRM was published, the ICAO Technical Instructions have been revised several times and provide additional protections not found in the current HMR including a reduction in the number of batteries permitted in a package, employee training and explicit hazard communication. Accordingly, we would be continuing to allow a lower level of safety for the domestic transportation of lithium cells and batteries if we do not harmonize the HMR with the 2013–2014 ICAO Technical Instructions.

DGAC noted the provisions in the proposed § 171.12(a)(6)(i) would effectively impose less stringent requirements for shipments originating in Canada than PHMSA proposed for domestic shipments by rail or highway. PHMSA intends all lithium batteries offered for transport to, from, or through the United States in accordance with the Canadian TDG regulations to also comply with the appropriate requirements of the HMR.

Based on those comments received, and our analysis of the requirements of the 2013–2014 ICAO Technical Instructions, we are adopting into the HMR requirements consistent with 2013–2014 ICAO Technical Instructions, the 17th revised edition of the UN Model Regulations, the 5th Revised Edition of the UN Manual of Tests and Criteria Amendment 1, and Amendment 36–12 of the IMDG Code. In this final rule, we are amending §§ 171.12, 171.24 and 171.25 to reflect the revised proper shipping names for lithium metal batteries, already found in the ICAO Technical Instructions and the IMDG Code and we will maintain the current prohibition on the transport of lithium metal batteries aboard passenger aircraft.

B. Part 172

Section 172.101 Hazardous Materials Table

At present, the Hazardous Materials Table (HMT) in § 172.101 contains three entries for lithium batteries. (1) Lithium battery (UN3090), (2) Lithium batteries, contained in equipment (UN3091), and (3) Lithium batteries packed with equipment (UN3091). In the NPRM we proposed to adopt separate entries for lithium metal and lithium ion batteries (including lithium metal and lithium ion batteries packed with, or contained in, equipment) to be consistent with the UN Model Regulations, the ICAO Technical Instructions and the IMDG Code. Commenters to the NPRM supported the clarification brought by the separate shipping descriptions. In this final rule, PHMSA is adopting the new HMT entries shown in the chart below:

Lithium ion batteries *including lithium ion polymer batteries*	UN3480, 9, II
Lithium ion batteries contained in equipment *including lithium ion polymer batteries*	UN3481, 9, II
Lithium ion batteries packed with equipment *including lithium ion polymer batteries*	UN3481, 9, II
Lithium metal batteries *including lithium alloy batteries*	UN3090, 9, II
Lithium metal batteries contained in equipment *including lithium alloy batteries*	UN3091, 9, II
Lithium metal batteries packed with equipment *including lithium alloy batteries*	UN3091, 9, II

DGAC and IATA asked PHMSA to clarify the quantity limits for lithium batteries packed with, or contained in, equipment. DGAC recommended that PHMSA clarify that the mass limit applies to the mass of batteries in or with equipment, excluding the weight of the accompanying equipment and packaging. IATA requested that PHMSA align the quantity limits shown in column 9 of the hazardous materials table with respect to batteries contained in equipment with the ICAO Technical Instructions. The aircraft quantity limits for lithium batteries including lithium batteries packed with, or contained in, equipment in this final rule are aligned with package limits described in the 2013–2014 ICAO Technical Instructions.

Section 172.102 Special Provisions

Section 172.102 contains special provisions applicable to the transportation of specific hazardous materials. In this final rule, PHMSA is

removing and revising several special provisions as follows:

Special Provision 29

Special provision 29 outlines provisions for the transport of low production runs of lithium batteries. As proposed in the NPRM, PHMSA is deleting special provision 29 and combining the transport provisions for low production runs with the transport provisions for prototype lithium batteries into § 173.185(e). See the detailed discussion of the revisions to § 173.185 below.

Special Provision 134

Special provision 134 applies to vehicles powered by wet batteries, sodium batteries, or lithium batteries and equipment powered by wet batteries or sodium batteries that are transported with these batteries installed. In this final rule, PHMSA is revising special provision 134 to reflect the adoption of separate shipping descriptions for lithium ion batteries and lithium metal batteries.

Special Provisions 188, 189

Special provisions 188 and 189 contain transport provisions for ''small'' and ''medium'' lithium cells and batteries. These provisions are being revised and moved to § 173.185(c). Consequently, in this final rule, PHMSA is deleting special provisions 188 and 189. See the detailed discussion of the revisions to § 173.185 below.

Special Provision 190

Special provision 190 contains transitional provisions enacted in a previous rulemaking pertaining to lithium batteries published August 9, 2007 (72 FR 44930). The transition period shown in special provision 190 has expired and is it no longer effective. In this final rule, PHMSA is deleting special provision 190.

Special Provision 328

Special provision 328 applies to fuel cell systems that also contain lithium batteries. In this final rule, PHMSA is revising this special provision to reflect the adoption of separate shipping descriptions for lithium ion batteries and lithium metal batteries.

Special Provision A51

Special provision A51 applies to the air transport of aircraft batteries, including lithium ion batteries. In this final rule, PHMSA is revising this special provision to reflect the adoption of separate shipping descriptions for lithium ion batteries and lithium metal batteries.

Special Provision A54

Special provision A54 requires a competent authority approval if the mass of a lithium battery exceeds the quantity limit specified in Column 9B for the HMT. In this final rule, PHMSA is revising this provision slightly to maintain consistency with the ICAO Technical Instructions.

Special Provision A55

Special provision A55 outlines conditions for the air transport of prototype lithium batteries. PHMSA is deleting special provision A55 and combining the transport provisions for low production runs with the transport provisions for prototype lithium batteries into § 173.185(e). See the detailed discussion of the revisions to § 173.185, below.

Special Provision A100

Special provision A100 prohibits the transport of lithium metal batteries aboard passenger carrying aircraft and permits the transport of up to 5kg of lithium ion batteries aboard passenger aircraft. In this final rule, PHMSA is adopting separate HMT entries for lithium metal batteries and lithium ion batteries. With the adoption of separate HMT entries for lithium metal and lithium ion batteries, this special provision is no longer necessary and is deleted.

Special Provision A101

Special provision A101 outlines the conditions and limitations on the air transport of lithium metal and lithium ion batteries packed with or contained in equipment. In this final rule, PHMSA is revising this special provision consistent with comparable provisions in the ICAO Technical Instructions applicable to lithium metal batteries packed with or contained in equipment.

Special Provision A103 And A104

Special provisions A103 and A104 prescribe quantity limits for lithium ion batteries packed with or contained in equipment. In this final rule, PHMSA is adopting separate HMT entries for lithium metal batteries and lithium ion batteries. With the adoption of separate HMT entries for lithium metal and lithium ion batteries, these special provisions are no longer necessary and are deleted.

C. Part 173

Section 173.185 Lithium Cells and Batteries

In § 173.185, PHMSA sets forth packaging requirements and certain conditional exceptions for the transport of lithium batteries. As discussed above, other conditions and exceptions are located in special provisions in § 172.102. In the NPRM, PHMSA proposed to consolidate into a single section provisions for the packaging of lithium batteries primarily by relocating relevant requirements currently located in special provisions to § 173.185. Unless otherwise specified in this section, the hazard communication and training requirements located in part 172 of this subchapter will continue to apply to the transport of lithium cells and batteries.

Most commenters, including AHS, BAJ, COSTHA, UPS, and NAC supported the consolidation of lithium battery requirements into one section. Other commenters, including Delphi and NEMA supported the efforts to consolidate the lithium battery provisions into a single, easily referenced section, but suggested that this can only work if PHMSA harmonizes the HMR with international regulatory approaches.

In this final rule, PHMSA is consolidating into § 173.185 the general requirements for lithium batteries including UN design testing requirements, packaging requirements, and other transport conditions. Based on the provisions outlined in the ICAO Technical Instructions, the UN Model Regulation, and the IMDG Code, we are reorganizing this section by:

- Keeping the design testing and general safety requirements in paragraph (a) and adding a requirement to create and retain records of successful testing.
- Consolidating in paragraph (b) the packaging requirements for lithium cells and batteries, including cells or batteries packaged with, or contained in, equipment, when these items are shipped as Class 9 materials, including the provision in current paragraph (h) for shipping larger batteries (exceeding 12 kg (26.5 lbs in weight)).
- Placing exceptions for smaller lithium cells and batteries in paragraph (c).
- Revising paragraph (d), covering cells and batteries shipped for disposal or recycling, and consolidating in paragraph (e) provisions covering shipments of both low production runs and prototype cells or batteries.
- Adding provisions for shipping damaged, defective, or recalled batteries in paragraph (f).
- Moving to paragraph (g) the provision in current paragraph (f) for approval of transportation of a lithium cell or battery that does not comply with requirements in the HMR.

(a) Classification

In § 173.185(a), the HMR describe the requirements for transporting cells and batteries as a Class 9 material. These requirements include UN battery design testing, general battery design safety requirements, and packaging requirements. In the NPRM, we proposed to incorporate by reference the 5th revised edition of the UN Manual of Tests and Criteria and add (1) specific criteria for when testing of a ''different design'' would be required, and (2) a requirement for a manufacturer to maintain evidence of successful completion of required tests. We also sought comments on the benefits of requiring a quality mark, which would signify compliance with the UN battery design tests, to appear on the outside of the battery case.

• Test requirements and exemption for existing designs.

PHMSA adopted the fifth revised edition of the UN Manual of Tests and Criteria in the January 19, 2011 final rule (HM–215K) and Amendment 1 thereto in the January 7, 2013 final rule (HM–215L). Commenters including Saft and UPS supported adopting the updated testing standards in the 5th revised edition, but expressed concern that absent any exemption provision addressing cells and batteries qualified under prior versions of the UN tests, it would appear that all cell and battery designs would need to be retested.

PHMSA agrees with Saft's recommendation to allow the continued transport of lithium cells and batteries tested under the prior versions of the UN tests. In this final rule, we are adding a reference to the 5th revised edition Amendment 1 of the UN Manual of Tests and Criteria and permit the continued transportation, without retesting, of lithium cell and battery designs that were tested in accordance with the version of the UN Manual of Tests and Criteria effective when the cell/battery was first transported.

In the 5th revised edition of the UN Manual of Tests and Criteria, Amendment 1, the criteria for batteries different from a tested type were revised to provide a non-exhaustive list of changes to a lithium battery or cell design that could be expected to ''materially affect the test results'' and require further testing. In the NPRM, PHMSA had proposed a separate list of changes that might lead to a failure of any of the tests would have constituted a design change requiring a manufacturer to subject a lithium battery design to the appropriate tests. The proposed changes would have been more conservative than those provisions adopted in the 5th Revised edition of the UN Manual of Tests and Criteria and would have included: any change to (1) the anode, cathode, or electrolyte material; (2) protective devices including hardware or software; (3) the safety design of the cells, such as the safety vent; (4) the number of component cells; or (5) the connecting mode of the component cells.

PHMSA received mixed responses from commenters on this proposal. Some commenters supported the proposed changes, suggesting the examples provide useful clarification. Several comments from lithium battery and equipment manufacturers and other groups representing the battery industry and small business interests questioned the basis for proposed modifications to the design change criteria and the benefit of the specific criteria. They stated that changes that could influence safety vary and are not limited to the provided examples; conversely, certain changes on the proposed list may not always materially affect the test results. These commenters asked PHMSA to retain the design change requirements outlined in the UN Manual of Tests and Criteria.

In this final rule, we are not adopting the text proposed in the NPRM. The provisions outlined in the 5th Revised Amendment 1 of UN Manual of Tests and Criteria provide sufficient guidance to make testing determinations; PHMSA will continue to study this matter and stresses the importance of testing after any material modifications in the design or manufacturing.

• Test record requirements.

The UN Model Regulations and the ICAO Technical Instructions require lithium cells and batteries (including lithium cells and batteries packed with, or contained in, equipment) offered for transport to be manufactured under a quality management program (QMP) that includes: (1) A description of the organizational structure and responsibilities of personnel with regard to design and product quality; (2) the relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used; (3) process controls that should include relevant activities to prevent and detect internal short circuit failure during manufacture of cells; (4) quality records, such as inspection reports, test data, calibration data, and certificates. Test data must be kept and made available to the appropriate national authority upon request; (5) management reviews to ensure the effective operation of the quality management program; (6) a process for control of documents and their revision; (7) a means for control of cells or batteries that are not conforming to the type tested; (8) training programs and qualification procedures for relevant personnel; and (9) procedures to ensure there is no damage to the final product.

We are not adopting the requirement for lithium batteries to be manufactured in accordance with a quality management program in this final rule. We have not fully assessed the impact of requiring each cell and battery manufacturer to create and maintain such a program. However, since quality control in manufacturing is an important prerequisite to ensuring the safe transport of lithium batteries, we intend to initiate a separate rulemaking project to consider adopting additional portions of the QMP. Meanwhile, we encourage manufacturers to use good practices for ensuring consistency in manufacturing such as those found in the UN Model Regulations and the ICAO Technical Instructions.

At this time, we are adopting, as proposed and consistent with good quality management practices, a requirement for manufacturers to retain evidence of a successful completion of the UN design tests, for as long as they offer that battery design for transportation, and for one year thereafter. Manufacturers would be required to maintain this evidence in a readily accessible location at the principal place of business, for as long as the lithium batteries are offered for transportation in commerce, and for one year thereafter. Each person required to maintain this evidence must make it available at reasonable times and locations. This requirement would apply to all new cells and batteries manufactured after the effective date of this final rule. Commenters were generally supportive of this change.

UPS stated that a person could construe the proposed record-retention requirement as conditioning the length of the record-retention period upon the manufacturer's offering of the lithium cell or battery for transportation, or such a transportation offering by any other person. Accordingly, we are adopting the suggestion of UPS to provide in § 173.185(a)(2) that ''Each person who manufactures lithium cells or batteries must create a record of satisfactory completion of the testing prior to offering the lithium cell or battery for transport and must: (1) maintain this record for as long as that design is offered for transportation and for one year thereafter, and (2) make this record available to an authorized representative of the Federal, state or local government upon request.

NEMA and PRBA questioned PHMSA's assumptions and analysis on information collection costs for the creation of battery design testing records. NEMA stated that a design drawing for a simple battery pack adequate for use in any reasonable quality system takes 8–16 hours of a skilled draftsman, along with a few hours of engineering support, and both types of employees earn more than $25 per hour. The commenter further stated that even the smallest assembler has more than 10 designs and major companies have hundreds of designs. However, this final rule does not require a lithium battery manufacturer to generate engineering drawings or extensive documentation. While the commenter notes that a battery assembler may have various designs, the commenter did not elaborate on whether each of these designs would require separate testing and documentation in accordance with the requirements for the UN Manual of Tests and Criteria.

This final rule requires manufacturers to retain evidence of successful completion of the required tests, for as long as they manufacture that battery design and for one year thereafter. This evidence must also be made available to an authorized representative of the federal, State or local government, upon request. PHMSA is adjusting its information collection burdens for the creation and retention of records of completion of design testing requirements. PHMSA estimates the burden of generating and retaining documentation that certifies compliance with the UN Manual of Tests and Criteria based upon an assumption that there are 110 active lithium battery manufacturers, which produce an average of 10 designs each, and that each design requires approximately 30 minutes of design records to be generated and documented. This produces an industry total of 550 hours.

• General safety requirements.

The HMR require lithium batteries to be equipped with certain safety features such as safety venting devices and diodes or fuses if a battery contains cells or series of cells that are connected in parallel. These provisions (currently in § 173.185(a)(2) and (a)(3)) are being combined into a single sub-paragraph (a)(3).

• Marking of Watt-hour rating on lithium ion batteries.

We are adding a requirement in paragraph (c)(1)(i) that each small lithium ion battery manufactured after December 31, 2015, to be marked with the Watt-hour rating on the outside case. This action is consistent with requirements found in the UN Model Regulations, the ICAO Technical Instructions and the IMDG Code since 2009. Incorporating this provision into the HMR ensures greater consistency between the HMR and the international regulatory standards. As previously mentioned, this requirement has been in effect in the UN Model Regulations, the ICAO Technical Instructions and the IMDG code for several years, we do not anticipate substantial impact in complying with this requirement.

• Marking cells and batteries to indicate successful testing.

In the NPRM, PHMSA stated that it was considering requiring the presence of a visible quality mark on the outside case of each cell or battery to signify successful completion of the required lithium battery design tests in a readily recognizable manner. The proposal was intended to promote knowledge of the UN tests throughout the world and provide downstream shippers with a straightforward means of identifying lithium batteries that meet applicable UN testing standards.

PHMSA received supportive comments from ALPA, TDD, and air carriers stating this would provide useful information for shippers to determine if cells and batteries were properly tested prior to offering them into transport. Most commenters questioned the benefit of an additional mark on batteries already marked in compliance with other bodies such as Underwriters Laboratory. Several other commenters stated that the presence of an additional symbol in no way affects the likelihood that a particular battery complies with the UN testing provisions, and posed problems since the mark could be counterfeited. Several air carriers commented that carriers should not be expected to look inside packages or devices to see if a mark is present. Until a universally recognized quality mark is established, and the obstacles to implementing such a system are overcome, PHMSA will not propose to require such a mark.

• Liquid cathode cells.

PHMSA also proposed to retain the longstanding prohibition in current § 173.185(a)(6) forbidding the transport of certain liquid cathode cells when discharged to less than 2 volts or 2/3 the voltage of the fully charged cell, except when transported for disposal or recycling. Saft states that this prohibition does not exist in the UN Model Regulations or the IMDG Code. It states the ICAO Dangerous Goods Panel (DGP) removed this provision from the ICAO Technical Instructions effective January 1, 2011 based on improvements to lithium battery manufacturing and the addition of a forced discharge test to the UN design testing requirements that eliminate the need for this now outdated provision. We agree that there is no longer any need for this provision, and it is being removed.

(b) Packaging of Class 9 Materials

The HMR currently require lithium cells and batteries to be packed in inner packagings in such a manner as to prevent short circuits, including movement which could lead to short circuits. These inner packaging must be placed in an outer package conforming to the requirements of part 178, subparts L and M, at the Packing Group II performance level. The HMR also require that lithium cells or batteries packed with equipment and lithium cells or batteries contained in equipment must be: (1) Of a design that meets the UN tests; (2) packed to prevent short circuits; and (3) packed in UN-performance packagings and the equipment and the packaged cells or batteries contained in a strong outer package.

In the NPRM, PHMSA proposed to continue these requirements but consolidate in paragraph (b) all the packaging requirements for lithium cells and batteries shipped as a Class 9 material, including cells and batteries packed with, or contained in, equipment. Three commenters, DGAC, IATA, and COSTHA, appear to have interpreted the proposals in the NPRM to except lithium batteries packed with equipment from the specification packaging requirements not covered by an exception. This was not our intent. Lithium batteries packed with equipment that otherwise do not meet the criteria for an exception must be placed into a suitable UN standard packaging that meets the Packing Group II performance level consistent with the UN Model Regulations, the IMDG Code, and ICAO Technical Instructions.

The HMR also currently require lithium battery powered equipment to be placed into a strong outer packaging that is waterproof or is made waterproof by nature of its construction. NAM and Delphi suggested removing this requirement. They state that waterproof packaging requirements for equipment containing lithium ion or lithium metal batteries regardless of mode of transportation (air, rail, highway, and water) are onerous and inconsistent with the UN Model Regulations, the ICAO Technical Instructions, and the IMDG Code. Covidien requests clarification of the word ''waterproof'' and requests that PHMSA acknowledge in its review that the concept of ''waterproof'' should be a risk-based

determination tied to international approaches, rather than an absolute concept. Since this requirement does not appear in the UN Model Regulations, the ICAO Technical Instructions or the IMDG Code, and there is no clear basis for this requirement in the HMR, PHMSA is removing this requirement.

Saft states the requirement that lithium batteries be packed in combination packages that meet the packing group II performance standards appears inconsistent with the provision in current § 173.185(g) allowing batteries that exceed 12 kg gross weight and are equipped with a strong, impact-resistant, outer casing currently to be packaged in a strong outer packaging in a protective enclosure. For clarity, PHMSA is moving this separate packaging provision to paragraph (b)(5) under the Class 9 packaging requirements.

In this final rule, PHMSA is harmonizing the packaging requirements applicable to lithium batteries packed with equipment and lithium batteries contained in equipment with the UN Model Regulations, the ICAO Technical Instructions and the IMDG Code. When packed with equipment, the lithium battery must be placed into an authorized package that meets the Packing Group II performance level, or the battery must be placed into a suitable inner packaging then placed with the equipment into a suitable outer package that meets the Packing Group II performance level. The packaging requirements for lithium cells and batteries, including lithium cells and batteries packed with, or contained in, equipment, are contained in a single paragraph (b). Paragraph (b)(1) includes a reference to the general packaging requirements in §§ 173.24 and 173.24a applicable to all hazardous materials, and a definition of the term ''equipment,'' as it is used in this section. Paragraph (b)(2) includes provisions specific to lithium batteries such as packaging to prevent short circuits, sparks, or the generation of a dangerous amount of heat movement within the package. Paragraph (b)(3) sets forth packaging requirements for lithium cells and batteries not contained in equipment (i.e., packages of batteries, and batteries packed with equipment). These are specific requirements applicable to only these configurations including a requirement that inner packaging completely enclose the cell or battery and the authorized UN outer packagings. Paragraph (b)(4) includes the unique additional requirements applicable to lithium batteries contained in equipment, including a requirement that equipment be protected from accidental activation and providing an exception from UN packaging. Paragraph (b)(5) includes a provision for packaging lithium batteries and assemblies of batteries with a gross weight greater than 12 kg (26.5 lbs) that employ a strong impact resistant outer casing which was formerly located in § 173.185(g).

(c) Exceptions

As discussed above, special provisions 188 and 189 currently provide provisions for ''small'' and (for rail or highway only) ''medium'' lithium metal and lithium ion cells and batteries, respectively, provided they meet the design tests outlined in the UN Manual of Tests and Criteria, and are packed in a strong outer package in a manner that prevents short circuits and damage.[5] Each package containing more than 24 lithium cells or 12 lithium batteries must: (1) Be marked to indicate that it contains lithium batteries and that special procedures are to be followed if the package is known to be damaged; (2) be accompanied by a document indicating that the package contains lithium batteries and that special procedures are to be followed if the package is known to be damaged; (3) weigh no more than 30 kilograms; and (4) be capable of withstanding a 1.2 meter drop test, in any orientation, without shifting of the contents that would allow short-circuiting or release of package contents.

In the NPRM, PHMSA proposed to:

- Create a new exception for extremely small batteries with very low energy (i.e. 0.3 grams lithium content for lithium metal or 3.7 Wh for lithium ion) when packed with or contained in equipment. We additionally requested comment on an exception for lithium batteries shipped at a reduced state of charge. PHMSA based the 0.3 gram or 3.7 Wh thresholds on the energy levels found in common coin or button cells.
- Eliminate the current exceptions for the air transport of small lithium cells and batteries, including small cells and batteries packed with or contained in equipment. Thus when transported by air, all lithium cells and batteries would be regulated in the same manner regardless of their size;
- Restrict exceptions for surface transport consistent with the UN Model Regulations and the IMDG Code.
  - Highway, rail and vessel shipments of ''small'' cells/batteries would be excepted from shipping paper, marking and labeling requirements;
  - Shipments of ''medium'' cells/batteries would be restricted to highway and rail only;
  - Packages containing more than 8 lithium cells or 2 lithium batteries would be subject to package marks indicating presence of lithium batteries and special procedures to follow if package damaged, an accompanying shipping document, a 1.2 meter drop test and 30 kg per package weight limit;

Recent revisions to the ICAO Technical Instructions include provisions for extremely small lithium metal cells and batteries containing less than 0.3 grams of lithium metal, lithium ion cells and batteries less than 2.7 Wh, and an exception from button cells installed in equipment, such as circuit boards. We also expect that implantable medical devices would be covered under this exception. PHMSA is revising the HMR consistent with these exceptions.

Other changes that became effective in the 2013–2014 ICAO Technical Instructions concerned small lithium cells and batteries that by virtue of their size, were previously afforded exceptions from most requirements. The revisions now effective in the ICAO Technical Instructions require: (1) Each package that contains more than 8 small lithium cells or two small lithium batteries display a Class 9 hazard warning label in addition to the lithium battery handling label; (2) shipping papers accompany the shipment, unless the shipper provides alternative written documentation describing the shipment; (3) formalized employee training and testing; (4) carrier acceptance checks; and (5) pilot notification.

ACCO, PRBA, and BAJ stated that the very low threshold for excepting batteries (0.3 g or 3.7 Wh) would provide little to no assistance to shippers utilizing single cell batteries such as cellular phones and other consumer electronic devices that generally fall in the range of 4–6 Wh. Alaska Airlines, A4A, NAC and NEMA questioned the basis for the proposed battery size limits and raised concern regarding the effects of proposing additional requirements not contained in the ICAO Technical Instructions. Other commenters stated that the exception is unnecessarily restrictive. Garmin considers devices containing lithium batteries such as cellular phones and MP3 players as posing no danger of

[5] A ''small'' lithium cell or battery may not contain more than 1 gram per lithium metal per cell, 2 grams lithium metal battery or 1.5 grams ELC per lithium ion cell, 8 grams ELC per lithium ion battery. A ''medium'' lithium cell or battery may only metal lithium 1 gram and 5 grams per cell and between 5 grams and 25 grams per battery or, for a lithium ion cell or battery, ELC between 1.5 grams and 5 grams per lithium ion cell and ELC between 8 grams and 25 grams.

accidental external short circuiting. The commenter stated that the physical structure of these devices, the custom packaging for spare batteries, and the recessed nature of battery terminals all effectively mitigate short circuit hazards in transport. Digital Europe requests PHMSA align with the ICAO Technical Instructions that except lithium button cells installed in equipment from certain marking requirements.

IFALPA, ALPA, NFPA, and NTSB supported PHMSA's original proposal to otherwise eliminate regulatory exceptions for lithium batteries in air transportation, including the introduction of requirements for hazard labeling, packaging, training, and the inclusion of lithium battery shipments on the notice to the pilot in command. These commenters support subjecting all lithium batteries to the same requirements, regardless of size. They stated that this will improve hazard communication, reduce battery incidents through enhanced training, and provide pilots with knowledge of the size, location, and the quantity of lithium battery shipments that will assist flight crew decision making during an in-flight emergency. NFPA stated that the proposed measures included in the NPRM provide more complete information, in a more consistent manner, for access by the transporter as well as the emergency responders, when necessary. In their comments to the NPRM, the NTSB stated that cargo shipments of small lithium batteries should be subject to the same packaging and identification requirements that apply to medium and large lithium batteries to alert package handlers to exercise greater care when loading and unloading packages containing them. ALPA stated that hazardous materials have been safely transported for decades under the HMR, and bringing lithium batteries fully into this regulatory scheme would provide significant safety benefits. ALPA goes on to say that by eliminating the regulatory exception for lithium battery shipments, handlers will separate packages containing lithium batteries from general freight, reducing the possibility of inadvertent damage. These shipments would also be subject to an acceptance check by airline personnel prior to placement in air transportation, including inspection of the package to detect damaged or improperly prepared packages.

Most other commenters opposed PHMSA's proposal to eliminate the regulatory exceptions for the air transport of lithium batteries. AIAM, COSTHA, DGM, EPBA, and IATA cited confusion and increased complexity that would result from different requirements. ATA, Alaska Airlines, CEA, Horizon Air, Korea, Panasonic, PRBA, and Saft did not accept PHMSA's incident analysis as support for eliminating the regulatory exceptions for lithium batteries. These commenters stated they are not aware of any safety incidents involving the air transport of properly packaged batteries, or batteries in compliance with existing regulations. CIPA and Fedco added that new regulations will not enhance compliance if shippers ignore them. TIACA stated that the incidents cited for reasons of non-compliance raises calls for better enforcement, rather than sweeping new regulations. The SBA recommended that PHMSA conduct further outreach to the regulated community to enhance dialogue, promote safety, and ensure harmonization.

Saft, Southwest, and others stated that PHMSA's decision to propose different requirements for lithium batteries and lithium batteries packed with, or contained in, equipment than those applied internationally would actually detract from safety, because these differences would create confusion and excessively complicate an already complex set of regulations that apply to lithium battery shipments. SBA and PRBA stated that the proposed rules would create conflicting standards and require significant supply chain redesigns. Lifescan, NAM, UPS, and others cite multimodal difficulties when the U.S. HMR conflict with the other published regulations. They stated that the provisions in the NPRM will cause such packages and devices to be non-compliant upon entering the United States.

Other commenters stated that the imposition of more restrictive U.S. requirements compared to the ICAO Technical Instructions would have far-reaching adverse economic consequences. These commenters stated that the elimination of the current exceptions would result in burdensome administrative procedures, higher transportation costs, and longer transportation time due to import and export barriers, disruptions to air freight, and increased costs of packaging, transport, and storage.

Some commenters cited the impacts of this proposal on their industry sectors medical equipment and information technology. At the March 5, 2010, public meeting, as well as in written comments, they suggested that various aspects of the NPRM would inappropriately subject medical devices to the HMR and requested that PHMSA except finished medical devices from the HMR. The commenters stated that the NPRM requirements would create severe disruptions to current shipping practices and could threaten patient access to life-saving and life-enhancing medical devices. These commenters further stressed the difference between implantable medical devices regulated by the U.S. Food and Drug Administration (FDA) and typical consumer products. They stated that medical devices are already subject to additional controls including registration of the manufacturing facilities, quality system requirements, and post market surveillance and reporting. Devices that pose a higher risk to a patient such as implantable medical devices undergo an extensive FDA pre-market approval process to establish reasonable assurance of safety and effectiveness of the device.

NAM stated that the NPRM is inconsistent with other national policy goals because the rule would make the transport of large, advanced batteries used for electric and hybrid vehicles and domestic energy exploration more difficult and expensive. AT&T suggested that, if PHMSA adopts the proposed rules, the wireless business would have to make a dramatic shift to surface transport, which would not only delay the delivery of products and services to enterprise business customers, government agencies, and consumers, but also, more fundamentally, slow the velocity of competition and innovation. Moreover, customer demands would be met not only more slowly, but also unevenly. NetApp asserted that PHMSA did not adequately assess the effects of the NPRM on U.S. companies that manufacture and ship large equipment containing lithium ion batteries. NetApp stated that the proposed regulation would significantly impede their ability to meet customers' expedited delivery requirements and place them at a disadvantage relative to foreign manufacturers.

NEMA strongly recommended that PHMSA and its regulatory partners take sufficient time to recognize the additional protection from short circuit or other malfunction that equipment and additional packaging provide to lithium batteries. NEMA suggested that PHMSA should except equipment and devices containing or packed with lithium batteries from full regulation under Class 9. RBRC stated that the limit on the number of batteries that can be shipped in a single package with a piece of equipment powered by lithium ion batteries (proposed subsections 173.185 (b) and (c))—would preclude the collection of used cellular phones in

the same boxes with used lithium ion batteries.

In the NPRM, PHMSA proposed specific requirements for extremely small batteries with very low energy (i.e. 0.3 grams lithium content for lithium metal or 3.7 Wh for lithium ion) when packed with or contained in equipment.

Trucking, Saft, Energizer, and the RBRC strongly opposed the proposed elimination of the exception from the requirements of subpart H (''Training'') of part 172 of the HMR for both ''small'' and ''medium'' batteries, regardless of the mode of transport. The commenters state that removal of these exceptions will result in a very significant increase in the costs associated with the supply of lithium cells and batteries for many important applications—including medical, military, security equipment, personal phones, computers, and other electronic devices. GE Corporation (GE) requested that, if PHMSA does impose training requirements on hazmat employees transporting small lithium cells and batteries by ground, they be similar to those outlined in the ICAO Technical Instructions for batteries since, in most instances, lithium batteries will be the only type of hazardous material shipped by the employees subject to these requirements. In this final rule, PHMSA is not imposing specific training requirements on shippers offering lithium batteries and battery powered devices for surface transport that meet all of the applicable conditions of § 173.185(c).

In this final rule, PHMSA will not eliminate provisions for the air transport of small cells and batteries as originally proposed. Instead, we will adopt the provisions outlined in the UN Model Regulations, the ICAO Technical Instructions and the IMDG Code that permit the transport of a up to 8 lithium cells or 2 small lithium batteries (less than 1 gram per lithium metal cell or 2 grams per lithium metal battery and 20 Wh per lithium ion cell or 100 Wh per lithium ion battery) including small lithium batteries packed with, or contained in, equipment. We are maintaining the current prohibition from transporting lithium metal cells or batteries aboard passenger carrying aircraft (regardless of size) when the cells and batteries are not packed with or contained in equipment.

We will also continue to provide exceptions from the shipping paper, marking, labeling, emergency response information, and training requirements for the transport of small and medium sized batteries by highway and rail only. Packages containing lithium cells and batteries that meet the conditions of this exception must be marked ''LITHIUM BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD AIRCRAFT AND VESSEL.'' UPS suggests text markings on packages are variable and provide limited effectiveness. The commenter suggests a clear graphic marking will assist in overcoming any English-language barriers that may be faced by personnel loading aircraft or aircraft containers, especially when the shipments involved are known to move very commonly in international commerce. KITA, KEA, KORBA suggested that the proposed mark would create confusion and further suggested that PHMSA permit the air transport of lithium batteries consistent with the ICAO Technical Instructions. NEMA stated that the existing international labeling requirements, combined with those being proposed, would cause confusion in multi-modal transport as well as cross-border ground transport. The commenter further states that since these products are transported several times, by several different modes, and cross international borders during their journey, consistent international regulatory approaches ensure compatibility and that transportation risks are properly managed.

PHMSA does not expect the text mark required on packages as a condition of this exception will cause confusion in multimodal or international transport because this marking would apply only in limited circumstances. The HMR would only require the additional text marking for medium-sized lithium cells and batteries transported under the exceptions permitted for highway and rail transport.

In the preamble to the NPRM, PHMSA noted that the ICAO Technical Instructions require certain packages to display a lithium battery handling label.[6] This label conveys certain information including: The presence of lithium batteries; the fact that a flammability hazard exists if damaged; instructions to package handlers in case a package is damaged; and a telephone number for additional information. In the NPRM, PHMSA noted that the ICAO lithium battery handling label conveys this information, and, while the HMR currently do not require the use of the lithium battery handling label we permit its display because it conveys the information required to appear on packages containing lithium batteries. PRBA states that PHMSA's permission for shippers to utilize the lithium battery handling label is misguided and would cause greater confusion. PRBA states the lithium battery handling label was adopted by ICAO to distinguish between shipments of fully-regulated lithium batteries and shipments of lithium batteries offered under the exceptions found in Packing Instructions 965–970 of the ICAO Technical Instructions. PRBA contends that if PHMSA includes a provision in the HMR that ''authorizes'' the use of the lithium battery handling label, it would only further confuse shippers of these products and result in greater non-compliance.

The HMR require certain information to appear on packages containing lithium batteries offered for transportation under the various exceptions. This required information includes an indication of the presence of lithium batteries and the special procedures that should be followed if the package is damaged. PHMSA requires the display of the lithium battery handling label for shipments transported by aircraft, but still permits voluntary use of this label by all modes on the basis that this label conveys the information required by the HMR.

We note that the ICAO Technical Instructions and the IMDG code differ in the quantity limits for small lithium batteries. Specifically, the ICAO Technical Instructions limits a package to 8 small lithium cells or 2 small lithium batteries, but does not impose a package mass limit. Conversely, the UN Model Regulations and the IMDG code do not limit the number of cells or batteries that can be contained in the package, but limits each package to 30 kg gross weight. We do not expect this difference between in quantity limits will pose significant difficulties because the cell and battery size and quantity limit in the ICAO Technical Instructions effectively limit the package weight in line with the surface modes (i.e. a package of lithium cells or batteries properly packaged in accordance with the packing instruction 965 or 968 of the ICAO Technical Instructions will also meet the provisions of the IMDG Code special provision 188 including the 30 kg gross weight limit).

In the NPRM, PHMSA requested comment on whether it should adopt an exception for batteries shipped at a reduced state of charge. ALPA recognizes that the energy in a lithium ion battery and the intensity of a fire involving that battery directly relates to its state of charge and a lower state of charge reduces the risk posed by a battery in transportation. However, ALPA expressed concern that incorporating state of charge

[6] The 2013–2014 ICAO Technical Instructions refer to a ''lithium battery handling label.'' In this final rule, we use the phrase ''lithium battery handling marking'' to distinguish it from hazard warning labels described in Part 172, Subpart E.

requirements in the HMR will be nearly impossible to verify or enforce. CERC stated that an exception for a reduced state of charge could not feasibly work for retailers and the millions of annual shipments of products to and from service centers. Additional commenters stated that it would be impossible for used battery collection programs to know the state of charge of each battery placed in collection boxes used at schools, libraries, and federal and state buildings throughout the U.S. Conversely, Quallion supported a limitation on state of charge for some lithium ion cells and batteries shipped by air stating that shipping at a lower state of charge further reduces the already-low risk of a fire in the event of significant damage to properly packaged products. PRBA states that such a limitation should not apply to batteries and batteries packed with, or contained in, equipment shipped for military or medical applications or batteries collected and shipped for recycling. When batteries are packed with, or contained in equipment, the limited additional benefit of mandatory reduced charge is overcome by the need for these products to work immediately when they reach their final destination. Due to its limited applicability and difficulty to verify, PHMSA will not adopt an exception based on a limited state of charge. However, when practical, PHMSA encourages shippers and manufacturers to utilize all appropriate methods, including shipping batteries at a reduced state of charge to help mitigate the hazards associated with transporting lithium batteries.

PHMSA received several comments requesting exceptions from the HMR based on battery chemistry or end use. For example, SureFire recommended that PHMSA include exceptions for purposes of military, first responder, medical, and other critical applications. Control Technology Inc. stated that certain chemistries such as lithium iron phosphate (LiFePO4) are much safer than competing technologies, which pose far greater fire risks. Energizer requested that PHMSA except lithium iron disulfide ($LiFeS_2$) batteries from the HMR when the batteries meet the existing requirements. This commenter cites a lack of incidents and recognition of overall safety and quality. Panasonic suggested that PHMSA except lithium manganese dioxide CR cells and lithium carbon monofluoride BR cells from the Class 9 shipping requirements when the cells contain less than 1 gram lithium metal and are proven to have satisfactorily completed the UN tests and are properly packaged. The commenter added that these batteries are produced on automated lines in the U.S., Japan, and Indonesia and incorporate numerous safety features to ensure they are safe under abuse conditions. The same commenter further stated that these batteries are used in hundreds of applications ranging from acting as the primary power source to providing power for memory back-up. While PHMSA appreciates the extensive work already completed to create safer batteries, the fact remains that lithium batteries still pose chemical and electrical hazards. While certain chemistries may possess a greater resistance to abuse, we do not agree that it is appropriate to create exceptions based on specific chemistries or applications.

(d) Lithium Cells and Batteries Shipped for Disposal or Recycling

In the NPRM PHMSA proposed to continue the exception currently in § 173.185(d) from the UN design testing requirements and the UN specification packaging requirements when lithium cells or batteries are transported by motor vehicle for disposal or recycling. Shipments of lithium batteries would continue to be subject to all other applicable provisions of the HMR.

GRC expressed concern that the proposed revisions do not exclude the responsibility for hazardous materials training for their suppliers. GRC stated that training in accordance with part 172, subpart H would be virtually impossible, given the nature of their participating organizations and the number of collection sites that include non-profits, schools, retailers, community groups, and businesses. CEA contended that the proposals in the NPRM will ultimately act as a disincentive for consumers to recycle responsibly. RBRC stated that, for this rule to be successful there must be a specific provision dealing with collection for recycling programs that recognizes the simple fact that most used batteries collected are, by their very nature, in a low state of charge.

PHMSA agrees with the commenters that the nature of the battery recycling and disposal process very often make compliance with all HMR requirements, including hazmat employee training, difficult and, in many cases, unnecessary. However, PHMSA remains concerned that uneven compliance with basic safety requirements, such as short circuit and damage protection of lithium batteries, can lead to transportation incidents as an increasing number of lithium and other high energy batteries enter the waste and recycling stream. At the same time, PHMSA recognizes the role that battery recycling and disposal industries play in environmental stewardship.

In this final rule, PHMSA continues to provide exceptions from the UN design testing requirements and the UN packaging requirements when lithium cells and batteries (including lithium cells or batteries contained in equipment) are transported by motor vehicle for disposal or recycling. Further, we are excepting offerors and carriers from the requirements for part 172, subparts C through H (shipping papers, marking, labeling, placarding, emergency response information and training) for appropriately packaged small and medium-sized lithium batteries when such batteries are offered for transport by motor vehicle to a permitted storage facility or for the purposes of recycling.

(e) Low Production Runs and Prototypes

The HMR have separate but similar provisions for low production runs and prototype lithium batteries in § 172.102(c), special provision 29, and § 173.185(e), respectively. Both of these provisions except lithium batteries from the UN battery design testing requirements under certain conditions. As proposed in the NPRM, PHMSA is combining in § 173.185(e) the conditions for the transport of low production runs and prototype lithium batteries that have not been subjected to the appropriate UN design tests, consistent with the UN Model Regulations.

Johnson Controls and Saft supported the exceptions for transporting ''prototype'' or ''low production runs'' of lithium cells or batteries. In particular, Saft welcomed the proposed expansion of the current text—which covers only prototypes—to also address the transport of cells and batteries produced in low production runs as such action is consistent with UN special provision 310. However, Saft asked PHMSA to authorize transport by vessel consistent with the provisions of IMDG Code special provision 310. PHMSA agrees with the commenter. Special provision 310 of the IMDG code authorizes the vessel transport of low production runs consisting of not more than 100 cells or batteries, or to prototypes.

Saft also proposed adding a new paragraph to authorize non-specification packaging for batteries employing a strong, impact-resistant outer casing and exceeding a gross weight of 12 kg (26.5 pounds), and assemblies of such batteries when transported by highway and rail. It stated that many of the newer prototype or low production lithium

batteries are of such a size that use of UN standard packagings as would otherwise be required would be impractical for the same reasons that use of such packaging is impracticable for UN-tested batteries of similar size.

PHMSA agrees such a provision would facilitate the transport of large, robust lithium batteries without sacrificing safety. In this final rule, we are adding a provision to authorize non-specification packaging for low production and prototype lithium metal and lithium ion batteries employing a strong, impact-resistant outer casing and exceeding a gross weight of 12 kg (26.5 pounds), and assemblies of such batteries. In this final rule PHMSA authorizes such packaging for transport by highway, rail and vessel consistent with special provision 310 of the IMDG Code. PHMSA continues to forbid transport of lithium batteries in these non-specification packages by passenger-carrying aircraft and only permits transport by cargo air when approved by the Associate Administrator prior to transport.

(f) Damaged Defective or Recalled Batteries

Lithium batteries and devices are returned to manufacturers and retail outlets for a variety of reasons including product returns, warranty fulfillment, repair, failure during field testing, or a manufacturer recall. The HMR do not currently contain provisions for transporting batteries subject to a manufacturer's recall or that are damaged and potentially dangerous. Based on previously developed guidance material and competent authority approvals, PHMSA will require lithium batteries that have been damaged, identified as being defective, or are otherwise being returned to the manufacturer for safety reasons, to be packaged in combination packages, surrounded by non-conductive cushioning material, and transported by highway or rail only. PHMSA and the FAA would address situations requiring air transport on a case-by-case basis by Approval.

Most commenters generally supported these proposals. However, they expressed concern that the words ''damaged'' or ''defective'' may be subject to misinterpretation. For example, scratches or other cosmetic damage to a battery casing, or, for large batteries, damage to external structural features such as bolt-down lugs, would not constitute damage that affects the safety of the battery in transport. PRBA suggested clarifying language stating that damaged, defective, or recalled batteries which do not have the potential of producing a dangerous evolution of heat, fire or short circuit are not subject to the paragraph. PRBA stated that this would allow companies to ship batteries by air that simply are not working to specification, but which pose no additional safety risk in transport. PRBA states this option is necessary for many reasons, but is most important for batteries designed for use in medical and military applications. For example, if a battery is not working to specifications in such lifesaving applications as defibrillators, it is critically important for the battery to be quickly returned to the manufacturer for analysis. Special provision A154 in the ICAO Technical Instructions states that batteries are prohibited from transport by aircraft only to the extent that any damage or defect causes the battery to ''have the potential of producing a dangerous evolution of heat, fire or short circuit.''

UPS also supported PHMSA's proposal, but noted that the provision does not appear to provide a viable means of transport for residents of Alaska, Hawaii, Puerto Rico and others not accessible by the highway and rail system. Horizon Air and Rep. Don Young request exceptions for communities such as those in Alaska not accessible by surface transportation. These commenters suggested that PHMSA add a provision stating that damaged defective or recalled batteries are not permitted for transportation by passenger-carrying aircraft and may be transported by cargo aircraft only if approved by the Associate Administrator prior to transportation. NITL, NEMA and others stated that an option to transport these batteries by cargo vessel is necessary to enable returns from overseas if the air mode is not available. Several other commenters stated that failure to allow a mode that will enable returns from overseas will be counterproductive, since it will prevent battery companies from fully investigating and analyzing product defects or failures.

In response to these comments, PHMSA is authorizing the transport of damaged, defective or recalled cells or batteries by highway, rail, or vessel when the batteries are packaged in specification packagings and each battery is individually placed into inner packagings surrounded by cushioning material that is non-combustible, and non-conductive. PHMSA is adopting language consistent with the ICAO Technical Instructions that prohibit the air transport of lithium cells or batteries that are subject to a safety recall or batteries that have been damaged and have the potential of producing a dangerous amount of heat or fire. PHMSA will evaluate the need to transport such cells or batteries by aircraft on a case-by-case basis by Approval.

Section 173.219 Life-Saving Appliances

Section 173.219 requires life-saving appliances containing lithium batteries to be transported in accordance with § 173.185 of the HMR and special provisions 188, 189, A101, A103 and A104 as applicable. PHMSA did not receive comments specific to the transport of life-saving appliances. In this final rule, PHMSA is revising this section consistent with other changes in this final rule. Lithium batteries packed with, or contained in, life-saving appliances must meet the applicable requirements of § 173.185 and special provisions A54 and A101.

Section 173.220 Vehicles

Section 173.220 contains conditions and exceptions applicable to the transport of vehicles and machinery, including those powered by lithium batteries. In the NPRM, PHMSA proposed to except prototype lithium batteries from the UN design testing requirements when these vehicles are transported by highway for product testing. The batteries would be required to be securely installed in the vehicle. Commenters supported this proposal and no objections were raised. PHMSA is adopting this exception as proposed.

D. Part 175

Section 175.8 Exceptions for Operator Equipment and Items of Replacement

In § 175.8, PHMSA provides exceptions for operator equipment and items of replacement. In the NPRM, PHMSA proposed to modify § 175.8 to permit airlines to carry additional items approved by the FAA Administrator for use aboard the aircraft. This proposal was in response to the December 15, 2008, petition for rulemaking (P–1533) from A4A and the RAA. The petition requested that PHMSA amend the HMR to permit airlines to carry a limited number of small lithium batteries in the aircraft cabin in a constant state of readiness with adequate backup power for the duration of the flight. PHMSA agreed with airlines' need to maintain and use various types of equipment in the cabin, which are increasingly powered by lithium batteries.

Commenters generally supported the proposals to permit airlines to carry lithium batteries in the cabin to power devices such as electronic flight bags, onboard medical monitoring devices,

and credit card readers. Southwest supported the proposed revision of § 175.8 for operator equipment and items of replacement, but suggested that the regulation should clearly identify which branch of the FAA will act on a request for an approval (Certificate Management Office, Flight Standards, Hazmat Branch Managers, etc.), and that the approval process should provide for review and feedback in a timely and consistent manner. Three commenters requested that PHMSA clarify the wording ''Items containing hazardous material'' and suggested that this wording would preclude spare lithium batteries for required devices. On September 23, 2009, the FAA published a document *Information for Operators* (InFO) that discusses the appropriate regulations applicable to the operation of portable electronic devices aboard aircraft. This InFo is available through the FAA at the following URL: *http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety.*

In response to the commenters' PHMSA is revising the proposed § 175.8(a)(4) to read ''hazardous materials used by the operator aboard the aircraft when approved by the Administrator of the Federal Aviation Administration.'' This will permit operators to carry hazardous material used by the flight crew as appropriate, subject to approval by the Administrator of the FAA.

Section 175.10 Exceptions for Passengers

In § 175.10, the HMR provide conditions and exceptions for the transport of certain hazardous materials when carried by aircraft passengers or crewmembers in checked and carry-on baggage. In the NPRM, PHMSA proposed to require lithium batteries carried by a passenger or a crewmember in checked or carry-on baggage to be of a type proven to meet each of the appropriate tests outlined in the UN Manual of Tests and Criteria.

PRBA supported PHMSA's proposal. DGAC stated that, while it would expect cells and batteries would meet the UN testing requirements, it wonders how passengers would actually know whether their batteries were tested. In addition, it questions how such a requirement would apply to passengers arriving from outside the United States. The 2013–2014 ICAO Technical Instructions already include the requirement for the manufacturer to test lithium cells and batteries, and all lithium batteries must already be of a design that meets each test in the UN Manual of Tests and Criteria prior to being offered for transportation. Accordingly, we do not anticipate any adverse impact to harmonizing the provisions of the HMR with the provisions of the ICAO Technical Instructions at this point.

NFDA asked PHMSA to insert the words ''living or deceased'' before the word ''humans'' in § 175.10(a)(3), in order to clarify that implanted medical devices in a deceased human body being transported by an air carrier falls under the exception currently available for living humans. The provisions in § 175.10(a)(3) applicable to implanted medical devices in humans or animals does not specify the condition of the human or animal. Thus this provision already permits implanted medical devices regardless of whether the human or animal is alive or deceased.

PRBA and others note the HMR currently authorize a passenger to carry lithium ion batteries up to 300 Watt-hours, but the ICAO Technical Instructions limit a passenger to carry lithium ion batteries up to 160 Watt-hours and requires authorization of the airline if the battery is over 100 Watt-hours. The commenters state this should be changed to harmonize with the ICAO Technical Instructions. We agree and in this final rule we are revising § 175.10 to state, when approved by the air operator, up to two individually protected spare lithium ion batteries per person having a Watt-hour rating greater than 100 Wh, but not greater than 160 Wh, may be carried in (a) carry-on baggage, or (b) equipment in either checked or carry-on baggage.

PRBA and NEMA also noted that PHMSA also has included a provision that appears to prohibit spare ''dry cells and batteries'' (e.g., alkaline, nickel cadmium, nickel metal hydride) from placement in checked baggage. NEMA opposed any such prohibition and states that non-lithium dry cell batteries, even when new and deliberately shorted in large quantities cannot produce dangerous levels of heat. PRBA asked PHMSA to clarify whether we intended to prohibit dry cell batteries from checked baggage. They state this would be an impossible provision to enforce considering the millions of alkaline batteries purchased by consumers every year in the U.S. and is unnecessary in light of the battery's low voltage. PHMSA did not intend to limit the ability of passengers to carry spare non-lithium dry cell batteries to carry-on baggage. In this final rule, PHMSA is revising § 175.10(a)(18) to specify each spare lithium battery must be carried in carry-on baggage only.

Section 175.30 Inspecting Shipments

Section 175.30 establishes requirements for acceptance and carriage of hazardous materials by aircraft. We are adding a new paragraph (a)(5) to this section to specify that the air carrier must not accept a lithium battery shipment described on alternative written documentation unless it is in compliance with § 173.185(c)(4)(v)(B).

Section 175.33 Shipping Paper and Notification of the Pilot-in-Command

Section 175.33 establishes requirements for a shipping paper to accompany an air shipment of hazardous materials and for the aircraft operator to notify the pilot-in-command of the specific information about the hazardous materials to be transported on the aircraft. We are adding a new paragraph (a)(12) to this section to specify that the air carrier must notify the pilot-in-command of the UN number, the hazard class, the number of packages, and the gross mass of every package for each shipment of lithium batteries containing more than 2 small lithium batteries or 8 small lithium cells in any package that otherwise meet the requirements of § 173.185(c). We are also adding a new paragraph (c)(5) to this section to specify that when alternative written documentation is supplied by the shipper in accordance with § 173.185(c)(4)(v)(B), the operator must retain this documentation for 90 days.

Section 175.75 Quantity Limitations and Cargo Location

In § 175.75, the HMR prescribe quantity limits and stowage locations for various hazardous materials aboard an aircraft. In the NPRM, PHMSA proposed to modify § 175.75 to prohibit the stowage of lithium batteries in an inaccessible manner, unless the inaccessible cargo compartment or freight container was equipped with an FAA-approved fire suppression system or the lithium batteries were packaged in an FAA-approved fire resistant container. We also invited comments on whether limiting the number of lithium batteries in a single aircraft, compartment, or unit load device would further enhance safety.

• Stowage Location.

Our proposal to restrict locations for stowage of lithium batteries onboard an aircraft was based on NTSB recommendations A–07–104 and A–07–105 and FAA testing that demonstrated that lithium batteries are a potential fire source and can also enhance the severity of a fire from an outside source.

While the cargo compartments of passenger aircraft are required to be equipped with fire suppression systems, and some cargo-only aircraft are equipped with FAA-approved fire suppression systems, the specific number of such cargo-only aircraft remains unknown. The NTSB stated that it believes this leaves flight crews on cargo-only aircraft at risk from in-flight fires involving both primary and secondary lithium batteries.

PHMSA received many comments on these proposals from a variety of sources including passenger airlines, express air carriers, medical device manufacturers, retailers, airline pilot organizations, the NTSB, members of the U.S. House of Representatives, battery and electronic equipment manufacturers, and others who ship lithium batteries and lithium battery powered equipment. While some welcomed the proposed requirements, most commenters opposed additional loading and segregation requirements. These commenters stated that the proposed additional requirements are unnecessary, and would impose significant cost and logistical hurdles on air carriers resulting in delays, frustrated shipments, and other adverse distributional effects.

The NTSB, ALPA, TDD and IFALPA support additional controls on the stowage of lithium batteries aboard aircraft. These commenters stated that the quantity of lithium batteries in any single location, or in a single cargo compartment, must be restricted to mitigate the consequences of an incident by controlling the number of batteries in close proximity to each other. ALPA stated that it is vitally important to limit the quantity of lithium ion batteries stored in a single location as well as in a single cargo compartment. ALPA supported this statement by saying that, since a fire may be the result of an internal short circuit, defective design, or counterfeit battery, no amount of packaging or training will prevent every incident; however, the severity of an incident may be effectively managed by controlling the number of batteries in close proximity to each other.

ALPA and TDD do not support any proposal that permits the placement of lithium ion batteries in an accessible cargo position as an alternative to stowing the batteries in a Class C cargo compartment. ALPA stated that, if a Class C compartment does not exist on an aircraft, PHMSA should not permit shipments of these batteries on board the aircraft unless additional testing determines that they can be safely transported in a Class E cargo compartment. ALPA and TDD stated that, if a fire were to occur in an accessible location, it is unlikely that a crewmember would attempt to extinguish the fire using a hand-held halon fire extinguisher.

NTSB noted in its comments that halon fire suppression is ineffective on fires involving lithium metal batteries and suggested that PHMSA could improve the NPRM by explicitly requiring shipments of lithium metal batteries to be loaded in FAA-approved fire resistant containers. Several commenters, including AfA, TIA, AHS, A4A, NAC, and TIACA, questioned the proposal to permit an FAA-approved container for the purposes of transporting lithium batteries. These commenters suggest that unless PHMSA identifies a suitable container or criteria for such a container, this option does not offer any relief.

More commenters opposed additional loading and segregation requirements. These commenters stated that the proposed additional requirements are unnecessary, and would impose significant cost and logistical hurdles on air carriers resulting in delays, frustrated shipments, and other adverse distributional effects. A number of them, including airlines, express air carriers, retailers, medical and other equipment manufacturers, expressed concerns about the impact of stowage restrictions on aircraft cargo capacity. Saft and IATA stated that, unlike passenger-carrying aircraft, many existing cargo aircraft do not have, and are not required to be fitted with, Class C cargo compartments. Therefore, if the stowage requirements outlined in the NPRM were finalized, such cargo-only aircraft could only carry lithium batteries in an accessible location. FedEx and others stated that a requirement for lithium ion batteries to be accessible would place them together with other highly regulated and flammable substances, increasing the potential for igniting or increasing the severity of an onboard fire. Similarly, UPS stated that the proposed stowage requirements would have the practical effect of making crew accessible positions the most common method of handling lithium batteries and devices shipped with them. Currently, very few positions on UPS aircraft are accessible, and typically UPS reserves such positions for high-hazard materials currently subject to accessibility requirements. UPS further stated that such consolidation may present commercial issues to air carriers whose customers may, for sanitation and other reasons, seek to forbid locating their lithium battery-powered products near traditional cargo aircraft-only shipments. These commenters stated that such restrictions will likely result in aircraft operators electing to simply ban the transport of such materials or load these products on passenger-carrying aircraft rather than run the risk of non-compliance with the HMR.

Digital Europe asked PHMSA to consider that only bulk shipments of lithium batteries should potentially require additional stowage and segregation. It asserts that, by volume, lithium batteries contained in equipment will put the most demand on crew accessible stowage. Casio stated that lithium ion batteries packed with, or contained in, products constitute a small volume of the overall package and a restriction that includes batteries packed with or contained within products may have a significant impact on the availability of cargo space. NetApp illustrated this fact with their experience shipping large equipment that also contains several small lithium batteries.

CIPA and Olympus stated that if one cell or battery causes a fire within a package complying with the ICAO Technical Instructions, the fire will self-terminate without spreading to other batteries or the contents of the same package. Accordingly, there is no need for additional restrictions. Air carriers, including UPS, FedEx, Delta and Southwest, stated that the proposed restrictions would further complicate the loading process and require an overhaul of training and operational procedures. Delta and others commented that the HMR currently impose compartment limits at the hazard class or division level, but not to specific UN numbers. They stated that, since the HMR do not impose loading restrictions on Class 9 material, PHMSA must establish loading limits for lithium batteries specific to those UN numbers. Subsequently, each carrier would then be required to develop a process to ensure compliance with this regulation. These commenters stated that managing such accessibility limitations at the UN number level would impose great difficulties on air carriers.

UPS stated that its loaders would be required to scrutinize the UN number and proper shipping names marked on all Class 9 shipments in order to identify those packages subject to new accessibility requirements. In addition, UPS stated that it will need to reprogram electronic systems developed to support the loading of aircraft unit load devices (ULDs) and aircraft, as well as generate a notice to the pilot, specifically to address the lithium battery specific requirements. Alaska Airlines, Horizon Air, and NAC

proposed creating an additional hazard class for lithium batteries if loading limits are needed, thereby reducing the complications associated with segregating packages based on the UN number. While a separate hazard class for lithium batteries would assist in identification, and subsequent segregation, of such packages for transport, PHMSA does not believe creating a new hazard class for a single commodity is appropriate.

VFS stated that it is developing a ULD that has a means to alert a pilot or flight crewmember of the presence of smoke and control or extinguish a fire inside of a ULD without requiring a crewmember to enter the compartment. PHMSA and FAA applaud these efforts and welcome such innovations.

• Quantity Limits.

In response to PHMSA's invitation for comments on limiting the number of lithium batteries in a single aircraft, compartment, ULD, pallet, or similar overpack, IATA and TTi stated that the guiding principle established in the ICAO Technical Instructions is that packaging requirements and the package limits for hazardous materials reduce the hazard in air transport to an acceptable level. On that basis, there is no limit on the number of individual packages of hazardous materials that may be transported in a single aircraft, single cargo compartment, or ULD unless there is a need to separate or segregate packages containing incompatible hazardous materials.

PRBA stated that there is no reasonable basis to limit the number of lithium ion or metal battery packages in a single aircraft cargo compartment, ULD, or overpack. PRBA expanded on this by stating that the HMR already contain: (1) Strict weight restrictions on these packages; (2) quantity limits for batteries packed with, or contained in, equipment; and (3) a prohibition against shipping lithium metal batteries on passenger-carrying aircraft. These restrictions adequately address what PRBA understands to be PHMSA's justification for this proposal, i.e., to mitigate the consequences of a fire involving lithium ion and lithium metal batteries. NEMA echoed these statements by commenting that, if a package is properly packaged and labeled in compliance with the current regulations, it should be allowed to ship without any further restrictions. Delta questioned the basis upon which PHMSA and FAA would formulate a compartment limit.

PHMSA and FAA continue to study these issues and will take into consideration new suppression systems and agents as they become available in the future. We are not adopting stowage restrictions or limits on the number of for lithium batteries in a single aircraft, aircraft compartment, ULD, pallet or overpack.

E. Compliance Date

PHMSA's January 11, 2010, NPRM proposed a 75-day period for affected entities to come into compliance with the provisions of the NPRM. ALPA favored expedited compliance with the safety regulations, stating that the provisions, once enacted, would have a significant positive impact on safety and may preclude the need to prohibit the transport of lithium batteries aboard aircraft. However, nearly all other commenters opposed the 75-day period for compliance with the requirements outlined in the NPRM. These commenters stated that a 12–18 month compliance period would be required if PHMSA adopted the provisions of the NPRM. The commenters noted various barriers to immediate compliance including training hazmat employees, certifying packaging, obtaining various approvals, and modifying their logistical operations.

The provisions of this final rule harmonize the HMR with the UN Model Regulations, the ICAO Technical Instructions, and the IMDG Code, so we do not anticipate significant barriers to compliance. In the April 2012 notice, we requested comments on ways to reduce the compliance burden should PHMSA adopt in a final rule the ICAO revisions. Outside of a delayed effective date, commenters did not provide any comment on ways that PHMSA could reduce the burden or costs of implementation of a final rule. Most commenters supported a January 1, 2013, effective date since the 2013–2014 ICAO Technical Instructions also become effective on January 1, 2013. Commenters suggested that PHMSA provide a suitable grace period to allow shipments that were initiated prior to January 1st to reach their destination. Others suggest longer grace periods between one month and 18 months. The delayed effective date would permit the incorporation of new requirements into standard operating procedures and for the training of affected personnel.

In order to facilitate harmonization, and permit the acceptance of lithium battery shipments made in accordance with the 2013–2014 ICAO Technical Instructions, PHMSA permits immediate voluntary compliance with all of the provisions in this final rule. PHMSA will not require compliance with the requirements of this final rule until six months after publication in the **Federal Register**.

IV. Regulatory Analyses and Notices

A. Statutory/Legal Authority for This Rulemaking

This final rule is published under the following statutory authorities:

1. 49 U.S.C. 5103(b) authorizes the Secretary of Transportation to prescribe regulations for the safe transportation, including security, of hazardous material in intrastate, interstate, and foreign commerce.

2. 49 U.S.C. 44701 authorizes the Administrator of the Federal Aviation Administration to promote the safe flight of civil aircraft in air commerce by prescribing regulations and minimum standards for practices, methods, and procedures that the Administrator finds necessary for safety in air commerce and national security. Under 49 U.S.C. 40113, the Secretary of Transportation has the same authority to regulate the transportation of hazardous materials by air, in carrying out § 44701, that he has under 49 U.S.C. 5103.

3. 49 U.S.C. 5120(b) authorizes the Secretary of Transportation to ensure that, to the extent practicable, regulations governing the transportation of hazardous materials in commerce are consistent with standards adopted by international authorities. This rule amends the HMR to maintain alignment with international regulatory approaches by incorporating various amendments to facilitate the transport of hazardous material in international commerce. To this end, as discussed in detail above, the rule incorporates changes into the HMR found in the 5th revised edition of the UN Manual of Tests and Criteria, the seventeenth revised edition of the UN Recommendations, Amendment 36–12 to the IMDG Code, and the 2013–2014 ICAO Technical Instructions, which became effective January 1, 2013.

4. Section 828 ''FAA Modernization and Reform Act'' (Pub. L 112–95; 126 Stat. 133 (Feb 14, 2012)) prohibits DOT agencies from issuing or enforcing regulations regarding the air transport of lithium cells or batteries, whether transported separately or packed with, or contained in, equipment, if the requirement is more stringent than the requirements of the ICAO Technical Instructions. However, the legislation authorizes the continued prohibition on the transport of lithium metal cells and batteries aboard passenger aircraft and authorizes the issuance of more stringent regulation based on credible reports that lithium batteries substantially contributed to the initiation or propagation of a fire aboard an aircraft. Such regulations must address solely the deficiencies

referenced in the report and must be the least disruptive and least expensive variation from existing requirements while adequately addressing identified deficiencies.

B. Executive Order 12866, Executive Order 13563, and DOT Regulatory Policies and Procedures

This final rule is considered a significant regulatory action under Executive Order 12866 and the Regulatory Policies and Procedures of the Department of Transportation (44 FR 11034) because of significant public interest. A regulatory impact assessment is available for review in the public docket for this rulemaking.

Executive Orders 12866 and 13563 require agencies to regulate in the ''most cost-effective manner,'' to make a ''reasoned determination that the benefits of the intended regulation justify its costs,'' and to develop regulations that ''impose the least burden on society.'' In this final rule, PHMSA is amending the HMR to harmonize requirements for the transport of lithium batteries with requirements in the UN Model Regulations, 2013–2014 ICAO Technical Instructions, and the IMDG Code by: (1) Adopting separate shipping names for (i) lithium metal batteries, lithium metal batteries contained in equipment, and lithium metal batteries packed with equipment; and (ii) lithium ion batteries, lithium ion batteries contained in equipment, and lithium ion batteries packed with equipment; (2) adopting ''Watt-hours'' as the measure of the size of a lithium ion battery to replace the current use of ''equivalent lithium content;'' (3) revising various definitions consistent with the UN Model Regulations; (4) adopting into the HMR the ICAO exception for packages containing up to 2 small lithium batteries or 8 small lithium cells; (5) for lithium ion batteries that meet the conditions in the exception, requiring each package to bear a lithium battery handling label; and (6) revising package weight limits applicable to different lithium battery types and configurations.[7] PHMSA is retaining its prohibition on the transport of lithium metal batteries aboard passenger aircraft. PHMSA considered three potential regulatory options.

- Option 1 is a no-action option. This would retain the current provisions applicable to lithium batteries. All costs and benefits are relative to this option.
- Option 2 would amend the HMR applicable to the transport of lithium cells and batteries consistent with the UN Model Regulations, the ICAO Technical Instructions and the IMDG Code. This option would provide an exception for shipments of a limited number of small lithium batteries and battery powered equipment, but retains the current prohibition on the transport of lithium metal batteries aboard passenger aircraft.
- Option 3 would eliminate the regulatory exceptions for small lithium batteries—including batteries packed with, or contained in, equipment—and require their shipment as fully regulated Class 9 materials. This option would additionally (1) modify the design change criteria in the UN Manual of Tests and Criteria; (2) require lithium cells and batteries to be marked with an indication that the cell or battery design that passed each of the appropriate tests outlined in the UN Manual of Tests and Criteria and (3) limit the locations on board aircraft where shipments of lithium cells and batteries could be stowed.

PHMSA has chosen the Option 2—harmonization with UN Model Regulations, the ICAO Technical Instructions and the IMDG Code. This option was constructed with the input of stakeholders representing the aviation, manufacturing, and shipping industries, as well as international governments and safety agencies. It is the result of compromise directed at producing a strong yet flexible regulation and reflects Congressional intent and stakeholders' need for a global standard.

To evaluate the impact of the rule, PHMSA used market research and information provided by commenters to the April 11, 2012, notice to project the total numbers of packages and shipments that the regulation would affect. PHMSA first quantified the number of lithium batteries transported to or from the U.S., and then estimated the number of shipments potentially affected by this rule. Trade data from 2011 were inflated assuming a constant 10% growth rate, with an expected 2.8 billion batteries, packed in nearly 1.1 million shipments, moving to or through the U.S. for the decade spanning 2014 to 2023. The following table shows the 10-year projected number of lithium battery shipments potentially affected by this rule.

2014–2023	Batteries (millions)	Shipments
Imports	2,836.1	710,626
Domestic origin	2.6	436,814
Total	2,838.8	1,147,440

Lithium batteries imported into the U.S. over the next 10 years are considered to be consolidated into shipments holding an average of 4,000 batteries each (based on historical data), whereas anecdotal evidence from commenters engaged in domestic custom battery production indicated that their shipments were mostly small runs of specialized batteries, with an average of a half dozen batteries per package.

Due to uncertainty inherent in much of the data collected for this analysis, we have used a probabilistic method observing the overall distribution of possible costs to observe the range of potential outcomes resulting from adoption of the provisions in the final rule. Figures listed here are mean (average) costs.

Costs resulting from the regulatory changes are the sum of: Hazard communication costs, including labeling, documentation, and package inspection; training and employment costs; and cost associated with the generation and retention cell/battery design testing records information. Hazard communication broadly refers to package markings, labels, documentation, and acceptance checks. The hazard communication cost increases, as a result of adopting the provisions of the new rule, would be calculated by multiplying the number of shipments required to comply with enhanced hazard communication

[7] In this document, ''configurations'' refers to the relevance of differences between batteries-only shipments, batteries packed with equipment, and batteries contained in equipment.

requirements by the increased cost per shipment. Training costs would be limited to a one-time expenditure by shippers to familiarize staff with the new regulations, while carriers would be presumed to undergo supplemental training on the revised ICAO Technical Instructions, regardless of U.S. action in a final rule. Cost associated with battery design testing would be a nominal sum resulting from the generation of battery design testing records. Using both 3% and 7% annual discounting for future costs, the total present value mean cost of the regulation from 2014 to 2023 is expected to be between $10.1 million (at 7% discount) and $11.2 million (at 3% annual discount), with a possible range of $6.9 million to $15.3 million in 2013 dollars.

Benefits for this rulemaking are based on the potential to avert consequences from catastrophic incidents that would otherwise occur without the provisions of the rule. However, due to the inherent uncertainty of potential and averted consequences, quantification of the benefits is so imprecise that PHMSA elected not to estimate them. PHMSA has instead elected to engage in a break-even analysis to determine the threshold safety benefit that would make this rule cost beneficial. This estimation still requires PHMSA to estimate the expected cost of aircraft incidents involving lithium batteries.

PHMSA weighs the relative probabilities of an incident occurring on a cargo-only aircraft and a passenger aircraft by assuming on average an 80% chance of an incident occurring onboard a cargo-only and 20% chance on a passenger flight. This roughly matches the proportion of total cargo that is carried on cargo-only aircraft and passenger aircraft. The average expected incident has costs of $354 million, which is $302 million when discounted at 3 percent, and $279 million when discounted at 7 percent.

Table 3–2–3 presents the number of incidents that would need to be prevented in order for this rule to be cost-beneficial. For instance, using the base case for costs, this rule would need to prevent more than 0.041 incidents over the next 10 years, discounted at 3 percent, for the benefits to exceed the costs.

TABLE 3–2–3—BREAK-EVEN POINTS, NUMBER OF INCIDENTS PREVENTED

	Discounted 3%	Discounted 7%
Low cost estimate	0.029	0.03
Base case cost estimate	0.041	0.043
High case cost estimate	0.056	0.061

C. Executive Order 13132

The requirements in this rule will preempt state, local, and Indian tribe requirements but do not have substantial direct effects on the States, the relationship between the national government and the States, or the distribution of power and responsibilities among the various levels of government. Therefore, the consultation and funding requirements of Executive Order 13132 do not apply.

The Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq., contains an express preemption provision (49 U.S.C. 5125(b)) preempting State, local, and Indian tribe requirements on the following subjects:

(1) The designation, description, and classification of hazardous materials;

(2) The packing, repacking, handling, labeling, marking, and placarding of hazardous materials;

(3) The preparation, execution, and use of shipping documents related to hazardous materials and requirements related to the number, contents, and placement of those documents;

(4) The written notification, recording, and reporting of the unintentional release in transportation of hazardous material; or

(5) The design, manufacture, fabrication, marking, maintenance, recondition, repair, or testing of a packaging or container represented, marked, certified, or sold as qualified for use in transporting hazardous material.

Federal hazardous materials transportation law provides at 49 U.S.C. 5125(b)(2) that, if DOT issues a regulation concerning any of these subjects, DOT must determine and publish in the **Federal Register** the effective date of Federal preemption. The effective date may not be earlier than the 90th day following the date of issuance of the final rule and not later than two years after the date of issuance.

This final rule addresses subject items (1), (2), (3), and (4) above and preempts State, local, and Indian tribe requirements not meeting the ''substantively the same'' standard. The effective date of Federal Preemption is November 4, 2014.

D. Executive Order 13175

This final rule was analyzed in accordance with the principles and criteria contained in Executive Order 13175, Consultation and Coordination with Indian Tribal Governments. Because this final rule does not have tribal implications and does not impose substantial direct compliance costs, the funding and consultation requirements of Executive Order 13175 do not apply.

E. Regulatory Flexibility Act, Executive Order 13272, and DOT Procedures and Policies

This final rule has been developed in accordance with Executive Order 13272, Proper Consideration of Small Entities in Agency Rulemaking, and DOT's procedures and policies to promote compliance with the Regulatory Flexibility Act (Pub. L. 96–354) and to ensure potential impacts of rules on small entities are properly considered. The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires an agency to review regulations to assess their impact on small entities, unless the agency determines that a rule is not expected to have a significant impact on a substantial number of small entities.

1. Need for and Objectives of the Rule

The intent of this action is to align the HMR with international transport standards and requirements to the extent practicable in accordance with Federal Hazardous Materials transportation law (see 49 U.S.C. 5120). Our goal is to harmonize, without diminishing the level of safety currently provided by the HMR, and not impose undue burdens on the regulated public. This action is necessary to incorporate changes adopted in the UN Recommendations on the Transport of Dangerous Goods—Model Regulations, the ICAO's Technical Instructions for the Safe Transport of Dangerous Goods by Air, and the IMDG Code, effective January 1, 2013.

2. Comments to the Initial Regulatory Flexibility Analysis

PHMSA received comments on the initial regulatory flexibility analysis from industry trade associations and SBA. Small businesses including Fedco and ICCNexergy added figures detailing their expected burden.

SBA and PRBA stated that the proposed rules would create conflicting standards and require significant supply chain redesigns. Further, SBA stated that the initial regulatory flexibility analysis understated the number of, and impact on, small businesses that support the retail sector, including internet shippers, manufacturers of battery packs, shipping companies, and airlines that handle lithium batteries or electronic devices containing lithium batteries. SBA recommended that PHMSA conduct further outreach to the regulated community to enhance dialogue, promote safety and ensure harmonization.

We have been attentive to the concerns of small businesses through the preparation of the rule and its supporting analyses. Data provided by several commenters suggested that a significant percentage of lithium batteries transported in the U.S. affected by this rule are packed with, or contained in, equipment and often those pieces of equipment only contain one device per package. When developing the rule, PHMSA examined alternatives for reducing the regulatory compliance burden on small entities, including providing exceptions for certain finished medical devices and extending the compliance date to permit extra time for small entities to come into compliance. In this final rule, we are maintaining existing exceptions:

- For the transport of lithium batteries by modes other than aircraft (i.e. highway, rail and vessel), including batteries packed with, or contained in, equipment; and
- for the air transport of packages containing up to 8 small lithium cells or 2 small lithium batteries and lithium batteries packed with, or contained in, equipment.

3. Description and Estimate of the Number of Small Entities to Which the Final Rule Will Apply

Two types of small businesses are likely to incur costs associated with compliance with the provisions of this rule—(1) manufacturers and distributors of lithium batteries and (2) air carriers. We employ the thresholds published by the Small Business Administration for industries subject to the HMR—generally, this includes those that have up to 500 employees. Our research has identified 130 possible entities: 60 manufacturers and sellers, and 70 air transporters.

PHMSA reviewed records of the potentially affected small manufacturing and sales businesses by NAICS codes—discussed in greater detail in the Regulatory Flexibility Analysis—and determined that of the 60 identified:

- 29 are classified as manufacturers of primary or storage batteries;
- 16 are classified as manufacturers of equipment, other devices, or components of these articles;
- 13 are classified as wholesalers of equipment or parts; and
- 2 are engaged in research and development.

Through the preparation of this analysis, there has been no evidence of retailers other than the manufacturers and wholesalers above that specialize in lithium battery sales.

PHMSA then identified air transportation businesses by NAICS code, and found that there are 642 businesses with fewer than 1,000 employees offering either scheduled air transportation (passenger or freight only) or chartered freight transportation. Of these, 572 had 100 or fewer employees and were judged to be unlikely to carry enough cargo that the impact of the revised regulation would be considered significant. Thus there are 70 air carriers potentially affected.

4. Description of the Projected Reporting, Record Keeping and Other Compliance Requirements for Small Entities

The costs accruing to small businesses are not anticipated to be significant.

- Hazard communication: The adoption of the 2013–2014 ICAO Technical Instructions for the majority of projected shipments is unlikely to generate substantial new costs. The total estimated cost for the entire industry over the next decade is between $1.5 and $2.1 million; the proportion applicable to small businesses is negligible.
- Training: PHMSA estimates that a company will spend between $300 and $400 to train an employee once, with subsequent trainings being required independent of this regulation. While this figure represents the largest individual cost under consideration in this analysis, the small businesses that commented on the Initial Regulatory Flexibility Analysis (IRFA) state that they do currently package fully regulated Class 9 shipments, indicating that these costs are at least already partly borne by such businesses.
- Records of Design Testing: The final rule requires the development and retention of battery-design testing results. The projected cost of these activities is estimated at $110,000 over the next 10 years; the proportion applicable to small businesses is negligible.

5. Steps PHMSA Has Taken To Minimize the Significant Economic Impact on Small Entities

There are no alternatives to the final rule that would accomplish the stated objectives of the rule, which are to reduce the risk posed by the transport of lithium batteries and to harmonize the domestic HMR with international rules. As discussed in IV. B. of the preamble to this final rule, PHMSA considered a number of regulatory options: (1) A do nothing option, (2) an option that would harmonize the HMR with the requirements of the UN Model Regulations, the ICAO Technical Instructions and the IMDG Code, and (3) an option consistent with eliminating regulatory exceptions for the transport of small lithium cells and batteries. PHMSA chose the second option because it was constructed with the input of stakeholders representing the aviation, manufacturing, and shipping industries, international governments, and safety agencies. It is the result of compromise directed at producing a strong yet flexible regulation and reflects congressional intent and stakeholders' need for a global standard. Harmonizing the domestic HMR with the requirements of the UN Model Regulations, the ICAO Technical Instructions and the IMDG Code provides the most flexibility while increasing safety levels. Based on this analysis, we certify that this final rule does not impose a significant economic impact on a substantial number of small entities.

F. Paperwork Reduction Act

PHMSA currently has approved information collections under Office of Management and Budget (OMB) Control Number 2137–0034, ''Hazardous Materials Shipping Papers and Emergency Response Information'' which is currently under OMB review and OMB Control Number 2137–0572, Testing Requirements for Non-Bulk Packaging,'' with an expiration date of July 31, 2015. This final rule will result in an increase in the annual burden of these information collections due to amendments being adopted in this final rule. IATA states that, based on calculations for the completion of a shipping paper for various types of shipments of lithium batteries, it takes

between 3 minutes and 10 minutes to produce a shipping paper and additional time associated with collection of data to complete the information required on the written information to the pilot-in-command (NOPIC) as required by § 175.33 of the HMR. IATA also states that PHMSA's estimate of consolidated shipments to be inaccurate. The commenter states that while there is some level of package consolidation for shipments of batteries and for equipment shipped with batteries from the point of manufacture to a distribution center, the same is not necessarily true for shipments from a distribution center.

PHMSA has re-evaluated the additional time for a transport worker to review and complete an existing shipping document; PHMSA's revised estimate accounts for the reduced regulatory burden of this final rule relative to the NPRM and the revised estimate also accounts for the additional time required by shippers of batteries and assumes lithium battery shippers often repeatedly offer the same hazardous materials and have developed the ability to automate many administrative processes. PHMSA has adjusted the paperwork burden imposed by the requirements of this final rule accordingly.

Under the Paperwork Reduction Act of 1995, no person is required to respond to a collection of information unless it is approved by OMB and displays a valid OMB control number. Section 1320.8(d), Title 5, Code of Federal Regulations requires that PHMSA provide interested members of the public and affected agencies an opportunity to comment on information collection and recordkeeping requests.

OMB Control No. 2137–0034

Hazardous Materials Shipping Papers and Emergency Response Information

Additional Annual Number of Respondents: 670.

Additional Annual Number of Responses: 143,430.

Additional Annual Burden Hours: 2,390.

Additional Annual Burden Costs: $47,800.

OMB Control No. 2137–0572.

Testing Requirements for Non-Bulk Packaging

Additional Annual Number of Respondents: 110.

Additional Annual Number of Responses: 1,100.

Additional Annual Burden Hours: 550.

Additional Annual Burden Costs: $11,000.

Requests for a copy of this information collection should be directed to: Steven Andrews or T. Glenn Foster, Office of Hazardous Materials Standards (PHH–10), Pipeline and Hazardous Materials Safety Administration, Room E24–426, 1200 New Jersey Ave. SE., Washington, DC 20590–0001, telephone (202) 366–8553.

G. Regulation Identifier Number (RIN)

A regulation identifier number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center generally publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

H. Unfunded Mandates Reform Act

This final rule does not impose unfunded mandates under the Unfunded Mandates Reform Act of 1995. It does not result in costs of $140,800,000 or more, adjusted for inflation, to either State, local or tribal governments, in the aggregate, or to the private sector in any one year, and is the least burdensome alternative that achieves the objective of the rule.

I. Environmental Assessment and Finding of No Significant Impact

The National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321–4347) requires Federal agencies to consider the environmental impacts of major Federal actions and prepare a detailed statement for actions significantly affecting the quality of the human environment. For those actions that are unlikely to have significant environmental impacts, the Council on Environmental Quality (CEQ) regulations (40 CFR parts 1500–1508) require Federal agencies to conduct an environmental assessment that includes (1) the need for the action, (2) alternatives to the action, (3) probable environmental impacts of the action and alternatives, and (4) the agencies and persons consulted during the consideration process (40 CFR 1508.9).

1. Purpose and Need

This final rule amends the requirements for the transport of lithium batteries. Most of these amendments harmonize the HMR with its international equivalents and focus on packaging, hazard communication and training. These measures serve to ensure that lithium batteries are safe for transport and the hazards associated with lithium batteries are properly communicated. Thus, most of the amendments of this final rule have no environmental impact. However, we are amending the requirements applicable to the transport of transport of lithium batteries for disposal or recycling. This section focuses on the environmental impacts of these activities under each of the alternatives considered.

Once lithium batteries reach the end of their useful life they must be recycled or properly disposed. The environmental benefits and policy need for battery recycling have been demonstrated through the enactment of battery recycling laws by more than half the states and Puerto Rico. Several states have also enacted laws specifically mandating the recycling of lithium ion batteries.[8] Appropriate transport safety regulations will ensure that lithium batteries can be safely and efficiently transported for disposal or recycling. Any provisions for the transport of lithium batteries must balance the need to facilitate transport with the need to ensure that the hazards posed by lithium batteries in transport are appropriately managed.

2. Alternatives

In developing this rule, PHMSA considered three regulatory options: (1) A do nothing option (no action alternative); (2) an option that would expand the current recycling and disposal provisions thus facilitating more movement; and (3) an option that eliminates regulatory exceptions for the transport of small lithium cells and batteries. This would require lithium batteries shipped for disposal or recycling to meet all of the requirements applicable to new batteries.

The second option is the selected alternative. PHMSA has chosen this alternative because it was constructed with the input of stakeholders representing the, manufacturing, and shipping industries, environmental concerns and battery recyclers. This option requires lithium batteries to be packaged to reduce the possibility of damage that could lead to an incident; and accompanied by hazard information that ensures appropriate and careful handling and informs transport workers and emergency response personnel of actions to be taken in an emergency.

The do nothing option does not achieve the stated objective of ensuring the safe transport of lithium batteries for disposal or recycling.

The third option was judged too costly and onerous to industry relative

[8] Source: Call2Recycle, Inc a battery product stewardship program; *http://www.call2recycle.org/recycling-law-map/.*

to potential benefits, and was thus eliminated.

3. Analysis of Environmental Impacts

Hazardous materials are substances that may pose a threat to public safety or the environment during transportation because of their physical, chemical, or nuclear properties. The hazardous material regulatory system is a risk management system that is prevention-oriented and focused on identifying a safety hazard and reducing the probability and quantity of a hazardous material release. The regulations require each shipper to classify a material in accordance with these hazard classes; the process of classifying a hazardous material is itself a form of hazard analysis. Further, the regulations require the shipper to communicate the material's hazards through use of the hazard class, and proper shipping name on the shipping paper and the use of labels on packages and placards on transport vehicles. Thus, the shipping paper, labels, and placards communicate the most significant findings of the shipper's hazard analysis. Hazardous materials are often further sub-categorized to one of three packing groups based upon its degree of hazard—from high-hazard Packing Group I to a low-hazard Packing Group III material. The quality, damage resistance, and performance standards of the packaging in each packing group are appropriate for the hazards of the material transported.

Releases of hazardous materials, whether caused by accident or deliberate sabotage, can result in explosions or fires. Radioactive, toxic, infectious, or corrosive hazardous materials can have short-term or long-term exposure effects on humans or the environment. Generally, however, the hazard class definitions are focused on the potential safety hazards associated with a given material, or type of material, rather than the environmental hazards of such materials.

Lithium is the lightest solid metal. It can be absorbed into the body by inhalation of its aerosol and by ingestion and is corrosive to the eyes, the skin, and the respiratory tract. Lithium reacts violently with strong oxidants, acids, and many compounds (hydrocarbons, halogens, halons, concrete, sand and asbestos) causing a fire and explosion hazard. In addition, lithium reacts with water, forming highly flammable hydrogen gas and corrosive fumes of lithium hydroxide. Lithium hydroxide represents a potentially significant environmental hazard, particularly to water organisms. Lithium metal batteries contain no toxic metals.

Lithium ion batteries contain an ionic form of lithium but no lithium metal. Lithium ion batteries do not pose an environmental hazard and are safe for disposal in the normal municipal waste stream. While other types of batteries include toxic metals such as cadmium, the metals in lithium ion batteries—cobalt, copper, nickel and iron are considered safe for landfills or incinerators. The primary hazard posed by lithium batteries are their ability to overheat and ignite, and once ignited, the resulting fires can be especially difficult to extinguish. The likelihood to overheat or ignite is increased if the batteries are poorly packaged, damaged or exposed to a fire or a heat source. When packaged and handled properly, lithium batteries pose no environmental hazard.

While the HMR contain provisions applicable to the transport of lithium batteries for disposal or recycling several commenters expressed concern about a do nothing option. GRC stated that the current provisions do not exclude the responsibility for hazardous materials training for their suppliers and that training in accordance with part 172, subpart H would be virtually impossible, given the nature of their participating organizations and the number of collection sites that include non-profits, schools, retailers, community groups, and businesses. CEA contended that a do nothing option will ultimately act as a disincentive for consumers to recycle responsibly. PHMSA agrees with CEA's comment that the do nothing alternative would reduce battery recycling compared with the preferred alternative.

We also considered an option that would impose additional safety requirements on the transport of lithium batteries for disposal or recycling, including a requirement that such batteries be placed in specification packages. We considered this option because lithium batteries of all sizes can be transported for disposal or recycling and the batteries are often from an uncertain origin, may be damaged and there is no guarantee that the batteries have a low energy level. Enhanced safety requirements may be appropriate in some cases. This option was ultimately rejected because this would not facilitate battery recycling and would generate only marginal additional safety benefits and potentially result in additional environmental impacts from the use of additional packaging.

RBRC stated that, for this rule to be successful there must be a specific provision dealing with collection for recycling programs that recognizes the simple fact that most used batteries collected are, by their very nature, in a low state of charge. With this in mind, we developed measures to expand the current lithium battery recycling provisions with the aim to facilitate the transport of most lithium batteries i.e. those used in consumer electronic devices consistent with current exceptions for the transport of small lithium cells and batteries. PHMSA ultimately selected this option because it was determined to pose little adverse impact to the environment, encourages responsible end of life practices for lithium batteries and provides a means to safely transport lithium batteries for their final disposition. The measures in this option reduce the risks to people and the environment posed during transportation of lithium metal and lithium ion batteries by ensuring that the batteries: Withstand conditions normally encountered in transportation, are packaged to reduce the possibility of damage that could lead to an incident, and minimize the consequences of an incident. Additionally, the provisions of this option facilitate the collection and safe transport of used lithium cells and batteries for recycling or disposal.

4. Consultation and Public Comment

PHSMA received numerous comments to the NPRM (75 FR 1302, Jan. 11, 2010) and the April 11, 2012 (77 FR 21714) **Federal Register** notice that sought further comments on the impacts of revisions to the HMR applicable to lithium batteries. The commenters who responded to the draft environmental impact statement included Black and Decker, the Environmental Technology Council, UTC, CERC, ITI, PRBA, the Lithium Battery Industry Coalition, GRC, and CEA. These commenters supported provisions for the transport of lithium batteries for recycling. They stressed the need to maintain exceptions for the transport of small (consumer type) lithium batteries. ITI stated that the initial environmental impact statement published in the NPRM lacks an analysis of the impact that classifying consumer electronic equipment as a Class 9 hazardous material would have on waste streams. The commenter stated that such classification would result in significant escalation in the cost of shipping devices containing lithium batteries for proper disposal or recycling. The provisions of this final rule maintain the current exceptions for the transport lithium batteries contained in equipment; thus this final rule will not impact consumer electronic equipment. The Environmental

Technology Council agreed that, while the performance standard may be sufficient for lithium ion batteries, such as those found in cellular phones and notebook computers, this standard may not be appropriate for reactive batteries that pose the greatest risk. The commenter recommended specific measures that should be taken to ensure the safe transport of reactive batteries, including ensuring that batteries are not connected in series, insulating all batteries from each other, and limiting the types and sizes of packagings. The HMR require that lithium batteries be protected from short circuits and damage, as well as separated from each other and other conductive materials. We encourage all shippers and carriers to implement appropriate risk reduction measures commensurate with the hazard posed by an individual shipment. These measures outlined in the HMR are intended to provide flexible, performance-oriented provisions.

5. Finding of No Significant Impact

PHMSA finds that the selected alternative will not have a significant impact on the human environment. Lithium batteries are a key part of strategies to develop greener technologies to power many different applications from automobiles to cellular phones to computers. The measures outlined in this final rule facilitate the safe and efficient transportation of lithium metal and lithium ion batteries across national boundaries from initial manufacture until their eventual disposal or recycling. This regulation is anticipated to result in slight positive impacts on the environment because the regulation provides clear and consistent regulations that reduce the likelihood of a transportation incident involving lithium batteries which would likely cause other secondary environmental impacts. The provisions of this final rule also continue to permit the operation of battery recycling programs throughout the United States.

J. Privacy Act

In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. DOT posts these comments, without edit, to *www.regulations.gov,* as described in the system of records notice (DOT/ALL–14 FDMS), which can be reviewed at *www.dot.gov/privacy.* DOT will read and respond to all substantive comments on a rulemaking. If you are filing comments on behalf of an organization or group of individuals, we encourage you to include the name of your group or organization. However, all comments, even anonymous comments filed on behalf of a group, will be considered if they are timely filed. Including your name/group along with your comment is completely optional.

K. Executive Order 13609 and International Trade Analysis

Under E.O. 13609, agencies must consider whether the impacts associated with significant variations between domestic and international regulatory approaches are unnecessary or may impair the ability of American business to export and compete internationally. In meeting shared challenges involving health, safety, labor, security, environmental, and other issues, international regulatory cooperation can identify approaches that are at least as protective as those that are, or would be, adopted in the absence of such cooperation. International regulatory cooperation can also reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

Similarly, the Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465), prohibits Federal agencies from establishing any standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. For purposes of these requirements, Federal agencies may participate in the establishment of international standards, so long as the standards have a legitimate domestic objective, such as providing for safety, and do not operate to exclude imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

The Republic of Korea Ministry of Foreign Affairs and Trade, PRBA, NEMA, NAM, Digital Europe, Japan, and the European Union stated that the January 2010 NPRM is inconsistent with the ICAO Technical Instructions. The commenters stated that the proposed elimination of the exceptions for certain lithium batteries when transported by aircraft, and the proposed revision of the design change criteria, would result in an unnecessary increase in transportation, packing, and testing costs for the manufacturers and traders of lithium batteries. These commenters further stated that technical rules and regulations should not be more trade-restrictive than necessary, as stipulated in the relevant World Trade Organization Agreements addressing Technical Barriers to Trade.

PHMSA participates in the establishment of international standards in order to protect the safety of the American public, and we have assessed the effects of this final rule to ensure that it does not cause unnecessary obstacles to foreign trade. This final rule harmonizes the domestic HMR with approaches outlined in the UN Model Regulations, the ICAO Technical Instructions and the IMDG Code. Commenters identified several benefits to adopting the international transport standards for lithium batteries into the domestic regulations, including streamlined shipping practices that reduce cost, a reduction in the potential for confusion and improved shipment safety through increased visibility of lithium battery shipments. Conversely, commenters noted several disadvantages to not adopting the international transport standards into the domestic regulations. The current ICAO Technical Instructions are at least as safety as the current HMR and many commenters stated that the current domestic regulations do not provide the level of safety as the ICAO Technical Instructions. Further, maintaining a dual system hinders consistent enforcement of the requirements and increases the likelihood of frustrated shipments.

The decision to adopt the requirements of the ICAO Technical Instructions into the domestic HMR was guided by the input of stakeholders representing the aviation, manufacturing, and shipping industries, as well as international governments and safety agencies. It is the result of considerations directed at producing a strong yet flexible regulation and reflects Congressional intent and stakeholders' need for a global standard. Accordingly, this rulemaking is consistent with E.O. 13609 and PHMSA's obligations under the Trade Agreement Act, as amended.

List of Subjects

49 CFR Part 171

Exports, Hazardous materials transportation, Hazardous waste, Imports, Incorporation by reference, Reporting and recordkeeping requirements.

49 CFR Part 172

Education, Hazardous materials transportation, Hazardous waste, Incorporation by reference, Labeling, Markings, Packaging and containers, Reporting and recordkeeping requirements.

49 CFR Part 173

Hazardous materials transportation, Incorporation by reference, Packaging and containers, Radioactive materials, Reporting and recordkeeping requirements, Uranium.

49 CFR Part 175

Air carriers, Hazardous materials transportation, Radioactive materials, Reporting and recordkeeping requirements.

In consideration of the foregoing, we amend 49 CFR Chapter I as follows:

PART 171—GENERAL INFORMATION, REGULATIONS, AND DEFINITIONS

■ 1. The authority citation for part 171 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; 49 CFR 1.81, 1.97; Pub. L. 101–410 section 4 (28 U.S.C. 2641 note); Pub. L. 104–134, section 31001.

■ 2. In § 171.8:

■ a. The definitions for ''Aggregate lithium content'' and ''Equivalent lithium content'' and ''Lithium content'' are removed.

■ b. The definitions for ''Lithium ion cell or battery'' ''Lithium metal cell or battery'', ''Short circuit'' and ''Watt-hour'' are added in alphabetical order.

The additions read as follows:

§ 171.8 Definitions and abbreviations.

* * * * *

Lithium ion cell or battery means a rechargeable electrochemical cell or battery in which the positive and negative electrodes are both lithium compounds constructed with no metallic lithium in either electrode. A lithium ion polymer cell or battery that uses lithium ion chemistries, as described herein, is regulated as a lithium ion cell or battery.

Lithium metal cell or battery means an electrochemical cell or battery utilizing lithium metal or lithium alloys as the anode. The lithium content of a lithium metal or lithium alloy cell or battery is measured when the cell or battery is in an undischarged state. The lithium content of a lithium metal or lithium alloy battery is the sum of the grams of lithium content contained in the component cells of the battery.

* * * * *

Short circuit means a direct connection between positive and negative terminals of a cell or battery that provides an abnormally low resistance path for current flow.

* * * * *

Watt-hour (Wh) means a unit of energy equivalent to one watt (1 W) of work acting for one hour (1 h) of time. The Watt-hour rating of a lithium ion cell or battery is determined by multiplying the rated capacity of a cell or battery in ampere-hours, by its nominal voltage. Therefore, Watt-hour (Wh) = ampere-hour (Ah) × volts (V).

* * * * *

■ 3. In § 171.12, paragraph (a)(6) is revised to read as follows:

§ 171.12 North American shipments.

(a) * * *

(6) *Lithium metal cells and batteries.* Lithium metal cells and batteries (UN3090) are forbidden for transport aboard passenger-carrying aircraft. The outside of each package that contains lithium cells or batteries meeting the conditions for exception in § 173.185(c) of this subchapter and transported in accordance with the Transport Canada TDG Regulations must be marked in accordance with § 173.185(c)(1)(iii) or (c)(1)(iv) as appropriate.

* * * * *

■ 4. In § 171.24, paragraphs (d)(1)(ii) and (d)(1)(iii) are revised to read as follows:

§ 171.24 Additional requirements for the use of the ICAO Technical Instructions.

* * * * *

(d) * * *

(1) * * *

(ii) *Lithium metal cells and batteries.* Lithium metal cells and batteries (UN3090) are forbidden for transport aboard passenger-carrying aircraft. The outside of each package that contains lithium metal cells or lithium metal batteries (UN3090) transported in accordance with Packing Instruction 968, Section II of the ICAO Technical Instructions must be marked ''PRIMARY LITHIUM BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT'' or ''LITHIUM METAL BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT.''

(iii) *Low production runs or prototypes lithium cells or batteries.* Production runs consisting of not more than 100 lithium cells or batteries per year, or prototype lithium cells or batteries (including cells or batteries packed with, or contained in, equipment or motor vehicles) not of a type proven to meet the requirements of section 38.3 of the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter), must be approved by the Associate Administrator prior to transportation aboard aircraft.

* * * * *

■ 5. In § 171.25, paragraph (b)(3) is revised to read as follows:

§ 171.25 Additional requirements for the use of the IMDG Code.

* * * * *

(b) * * *

(3) The outside of each package containing lithium metal cells or batteries (UN3090) transported in accordance with special provision 188 of the IMDG Code must be marked ''PRIMARY LITHIUM BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT'' or ''LITHIUM METAL BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT.'' This marking is not required on packages that contain 5 kg (11 pounds) net weight or less of lithium metal cells or batteries that are packed with, or contained in, equipment.

* * * * *

PART 172—HAZARDOUS MATERIALS TABLE, SPECIAL PROVISIONS, HAZARDOUS MATERIALS COMMUNICATIONS, EMERGENCY RESPONSE INFORMATION, TRAINING REQUIREMENTS, AND SECURITY PLANS

■ 6. The authority citation for part 172 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; 49 CFR 1.81, 1.97.

■ 7. In § 172.101, the Hazardous Materials Table is amended by removing and adding entries in alphabetical order, to read as follows:

§ 172.101 Purpose and use of hazardous materials table.

* * * * *

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or division	Identification Nos.	PG	Label codes	Special provisions	(8) Paging (§ 173.***)			(9) Quantity limitations (see §§ 173.27 and 175.75)		(10) Vessel stowage	
							Exceptions	Non-bulk	Bulk	Passenger aircraft/rail	Cargo aircraft only	Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	[REMOVE]												
	*		*		*	*	*		*	*			
	Lithium batteries, contained in equipment.	9	UN3091	II	9	29, 188, 189, 190, A54, A55, A101, A104.	185	185	None	See A101, A104	35 kg	A	
	Lithium batteries packed with equipment.	9	UN3091	II	9	29, 188, 189, 190, A54, A55, A101, A103.	185	185	None	See A101, A103.	35 kg gross	A	
	Lithium battery	9	UN3090	II	9	29, 188, 189,190, A51, A54, A55, A100.	185	185	None	See A100	35 kg gross	A	
	*		*		*	*	*		*	*			
	[ADD]												
	*		*		*	*	*		*	*			
	Lithium ion batteries *including lithium ion polymer batteries*.	9	UN3480	II	9	A51, A54 ..	185	185	185	5 kg	35 kg	A	
	Lithium ion batteries contained in equipment *including lithium ion polymer batteries*.	9	UN3481	II	9	A54	185	185	185	5 kg	35 kg	A	
	Lithium ion batteries packed with equipment *including lithium ion polymer batteries*.	9	UN3481	II	9	A54	185	185	185	5 kg	35 kg	A	
	Lithium metal batteries *including lithium alloy batteries*.	9	UN3090	II	9	A54	185	185	185	Forbidden	35 kg	A	
	Lithium metal batteries contained in equipment *including lithium alloy batteries*.	9	UN3091	II	9	A54, A101	185	185	185	5 kg	35 kg	A	
	Lithium metal batteries packed with equipment *including lithium alloy batteries*.	9	UN3091	II	9	A54	185	185	185	5 kg	35 kg	A	
	*		*		*	*	*		*	*			

■ 8. In § 172.102 amend paragraphs (c)(1) and (c)(2) as follows:
■ a. In paragraph (c)(1), special provisions 134 and 328 are revised and special provisions 29, 188, 189, and 190 are removed;
■ b. In paragraph (c)(2), special provisions A51, A54 and A101 are revised; and special provisions A55, A100, A103, and A104 are removed.

The revisions read as follows:

§ 172.102 Special provisions.

* * * * *

(c) * * *

(1) * * *

134 This entry only applies to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries and equipment powered by wet batteries or sodium batteries that are transported with these batteries installed. For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are electrically-powered cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, battery-assisted bicycles, lawn tractors, boats, aircraft, wheelchairs and other mobility aids. Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries must be consigned under the entries ''Lithium metal batteries contained in equipment'' or ''Lithium metal batteries packed with equipment'' or ''Lithium ion batteries contained in equipment'' or ''Lithium ion batteries packed with equipment'' as appropriate. Self-propelled vehicles or equipment that also contain an internal combustion engine must be consigned under the entries ''Engine, internal combustion, flammable gas powered'' or ''Engine, internal combustion, flammable liquid powered'' or ''Vehicle, flammable gas powered'' or ''Vehicle, flammable liquid powered,'' as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and batteries. Additionally, self-propelled vehicles or equipment that contain a fuel cell engine must be consigned under the entries ''Engine, fuel cell, flammable gas powered'' or ''Engine, fuel cell, flammable liquid powered'' or ''Vehicle, fuel cell, flammable gas powered'' or ''Vehicle, fuel cell, flammable liquid powered,'' as appropriate. These entries include hybrid electric vehicles powered by a fuel cell engine, an internal combustion engine, and batteries.

* * * * *

328 When lithium metal or lithium ion batteries are contained in the fuel cell system, the item must be described under this entry and the appropriate entries for ''Lithium metal batteries contained in equipment'' or ''Lithium ion batteries contained in equipment''.

(c) * * *

(2) * * *

Code/Special Provisions

* * * * *

A51 Irrespective of the quantity limitations specified in Column (9A) of the § 172.101 Table or § 175.75(c), the following aircraft batteries may be transported on passenger aircraft as cargo:

a. Wet cell batteries, UN 2794 or UN 2795, up to a limit of 100kg net mass per package;

b. Lithium ion batteries, UN 3480, packages containing a single aircraft battery with a net mass not exceeding 35kg; and

c. Transport in accordance with this special provision must be noted on the shipping paper.

* * * * *

A54 Irrespective of the quantity limits in Column 9B of the § 172.101 table, a lithium battery, including a lithium battery packed with, or contained in, equipment that otherwise meets the applicable requirements of § 173.185, may have a mass exceeding 35 kg if approved by the Associate Administrator prior to shipment.

* * * * *

A101 In addition to the applicable requirements of § 173.185, the quantity of lithium metal in the batteries contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

* * * * *

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

■ 9. The authority citation for part 173 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; 49 CFR 1.81, 1.97.

■ 10. Section 173.185 is revised to read as follows:

§ 173.185 Lithium cells and batteries.

As used in this section, *lithium cell(s) or battery(ies)* includes both lithium metal and lithium ion chemistries. *Equipment* means the device or apparatus for which the lithium cells or batteries will provide electrical power for its operation.

(a) *Classification.* (1) Each lithium cell or battery must be of the type proven to meet the criteria in Part III, sub-section 38.3 of the UN Manual of Tests and Criteria (IBR; see § 171.7 of this subchapter). Lithium cells and batteries are subject to these tests regardless of whether the cells used to construct the battery are of a tested type.

(i) Cells and batteries manufactured according to a type meeting the requirements of sub-section 38.3 of the UN Manual of Tests and Criteria, Revision 3, Amendment 1 or any subsequent revision and amendment applicable at the date of the type testing may continue to be transported, unless otherwise provided in this subchapter.

(ii) Cell and battery types only meeting the requirements of the UN Manual of Tests and Criteria, Revision 3, are no longer valid. However, cells and batteries manufactured in conformity with such types before July 2003 may continue to be transported if all other applicable requirements are fulfilled.

(2) Each person who manufactures lithium cells or batteries must create a record of satisfactory completion of the testing required by this paragraph prior to offering the lithium cell or battery for transport and must:

(i) Maintain this record for as long as that design is offered for transportation and for one year thereafter; and

(ii) Make this record available to an authorized representative of the Federal, state or local government upon request.

(3) Except for cells or batteries meeting the requirements of paragraph (c) of this section, each lithium cell or battery must:

(i) Incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport;

(ii) Be equipped with effective means of preventing external short circuits; and

(iii) Be equipped with an effective means of preventing dangerous reverse current flow (e.g., diodes or fuses) if a battery contains cells, or a series of cells that are connected in parallel.

(b) *Packaging.* (1) Each package offered for transportation containing lithium cells or batteries, including lithium cells or batteries packed with, or contained in, equipment, must meet all applicable requirements of subpart B of this part.

(2) Lithium cells or batteries, including lithium cells or batteries packed with, or contained in, equipment, must be packaged in a manner to prevent:

(i) Short circuits;

(ii) Movement within the outer package; and

(iii) Accidental activation of the equipment.

(3) For packages containing lithium cells or batteries offered for transportation:

(i) The lithium cells or batteries must be placed in non-metallic inner packagings that completely enclose the cells or batteries, and separate the cells or batteries from contact with equipment, other devices, or conductive materials (e.g., metal) in the packaging.

(ii) The inner packagings containing lithium cells or batteries must be placed in one of the following packagings meeting the requirements of part 178, subparts L and M, of this subchapter at the Packing Group II level:

(A) Metal (4A, 4B, 4N), wooden (4C1, 4C2, 4D, 4F), fiberboard (4G), or solid plastic (4H1, 4H2) box;

(B) Metal (1A2, 1B2, 1N2), plywood (1D), fiber (1G), or plastic (1H2) drum;

(C) Metal (3A2, 3B2) or plastic (3H2) jerrican.

(iii) When packed with equipment lithium cells or batteries must:

(A) Be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements as specified in paragraph (b)(3)(ii) of this section; or

(B) Be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a package that meets the Packing Group II performance requirements as specified in paragraph (b)(3)(ii) of this section.

(4) When lithium cells or batteries are contained in equipment:

(i) The outer packaging must be constructed of suitable material of adequate strength and design in relation to the capacity and intended use of the packaging, unless the lithium cells or batteries are afforded equivalent protection by the equipment in which they are contained;

(ii) Equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during transport; and

(iii) Any spare lithium ion cells or batteries packed with the equipment must be packaged in accordance with paragraph (b)(3) of this section.

(5) Lithium batteries that weigh 12 kg (26.5 pounds) or more and have a strong, impact-resistant outer casing and assemblies of such batteries, may be packed in strong outer packagings; in protective enclosures (for example, in fully enclosed or wooden slatted crates); or on pallets or other handling devices, instead of packages meeting the UN performance packaging requirements in paragraphs (b)(3)(ii) and (b)(4) of this section. Batteries or battery assemblies must be secured to prevent inadvertent movement, and the terminals may not support the weight of other superimposed elements. Batteries or battery assemblies packaged in accordance with this paragraph are not permitted for transportation by passenger-carrying aircraft, and may be transported by cargo aircraft only if approved by the Associate Administrator.

(c) *Exceptions for smaller cells or batteries.* A package containing lithium cells or batteries, or lithium cells or batteries packed with, or contained in, equipment, that meets the conditions of this paragraph, is excepted from the requirements in subparts C through H of part 172 of this subchapter and the UN performance packaging requirements in paragraphs (b)(3)(ii) and (b)(4) of this section under the following conditions and limitations.

(1) *Size limits:*

(i) The Watt-hour rating may not exceed 20 Wh for a lithium ion cell or 100 Wh for a lithium ion battery. After December 31, 2015, each lithium ion battery subject to this provision must be marked with the Watt-hour rating on the outside case.

(ii) The lithium content may not exceed 1 g for a lithium metal cell or 2 g for a lithium metal battery.

(iii) Except when lithium metal cells or batteries are packed with or contained in equipment in quantities less than 5 kg net weight, the outer package that contains lithium metal cells or batteries must be marked: ''PRIMARY LITHIUM BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT'' or ''LITHIUM METAL BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT.''

(iv) For transportation by highway or rail only, the lithium content of the cell and battery may be increased to 5 g for a lithium metal cell and 25 g for a lithium metal battery and 60 Wh for a lithium ion cell or 300 Wh for a lithium ion battery provided the outer package is marked: ''LITHIUM BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD AIRCRAFT AND VESSEL.''

(v) The marking specified in paragraphs (c)(1)(ii) and (c)(1)(iii) of this section must have a background of contrasting color, and the letters in the marking must be:

(A) At least 6 mm (0.25 inch) on packages having a gross weight of 30 kg (66 pounds) or less, except that smaller font may be used as necessary when package dimensions so require.

(B) At least 12 mm (0.5 inch) in height on packages having a gross weight of more than 30 kg (66 pounds).

(vi) Except when lithium cells or batteries are packed with, or contained in, equipment, each package must not exceed 30 kg (66 pounds) gross weight.

(2) *Packaging.* Except when lithium cells or batteries are contained in equipment, each package must be capable of withstanding a 1.2 meter drop test, in any orientation, without damage to the cells or batteries contained in the package, without shifting of the contents that would allow battery-to-battery (or cell-to-cell) contact, and without release of the contents of the package.

(3) *Hazard communication.* Except for a package containing button cell batteries installed in equipment (including circuit boards), or no more than four lithium cells or two lithium batteries installed in the equipment:

(i) The outer package must be marked with:

(A) An indication that the package contains ''lithium metal'' or ''lithium ion'' cells or batteries, as appropriate;

(B) An indication that the package is to be handled with care and that a flammable hazard exits if the package is damaged;

(C) An indication that special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary;

(D) A telephone number for additional information.

(ii) Each shipment of one or more packages marked in accordance with this paragraph must be accompanied by a document that includes the following:

(A) An indication that the package contains ''lithium metal'' or ''lithium ion'' cells or batteries, as appropriate;

(B) An indication that the package is to be handled with care and that a flammable hazard exits if the package is damaged;

(C) An indication that special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and

(D) A telephone number for additional information.

(4) *Air transportation.* For transportation by aircraft, lithium cells and batteries may not exceed the limits in the following table. The limits on the maximum number of batteries and maximum net quantity of batteries in the following table may not be combined in the same package:

Contents	Lithium metal cells and/or batteries with a lithium content not more than 0.3 g	Lithium metal cells with a lithium content more than 0.3 g but not more than 1 g	Lithium metal batteries with a lithium content more than 0.3 g but not more than 2 g	Lithium ion cells and/or batteries with a Watt-hour rating not more than 2.7 Wh	Lithium ion cells with a Watt-hour rating more than 2.7 Wh but not more than 20 Wh	Lithium ion batteries with a Watt-hour rating more than 2.7 Wh but not more than 100 Wh
Maximum number of cells/batteries per package.	No Limit	8 cells	2 batteries	No Limit	8 cells	2 batteries.
Maximum net quantity (mass) per package.	2.5 kg	n/a	n/a	2.5 kg	n/a	n/a.

(i) The outer package must be durably and legibly marked with the following handling marking, which is durable, legible and displayed on a background of contrasting color:

(A) The marking must be not less than 120 mm (4.7 inches) wide by 110 mm (4.3 inches) high except markings of 105 mm (4.1 inches) wide by 74 mm (2.9 inches) high may be used on a package containing lithium batteries when the package is too small for the larger marking;

(B) The symbols and letters must be black and the border must be red;

(C) The ''*'' must be replaced by ''lithium ion battery'' and/or ''Lithium metal battery'' as appropriate and the ''xxx-xxx-xxxx'' must be replaced by a telephone number for additional information; and

(D) When packages required to bear the handling marking are placed in an overpack, the handling marking must either be clearly visible through the overpack, or the handling marking must also be affixed on the outside of the overpack, and the overpack must be marked with the word ''Overpack''.

(ii) Each shipment with packages required to bear the handling marking must include an indication the shipment contains ''lithium ion batteries'' or ''lithium metal batteries,'' as appropriate, and when an air waybill is used, an indication on the air waybill of compliance with this paragraph (c)(4) (or the applicable ICAO Packing Instruction).

(iii) For lithium batteries packed with, or contained in, equipment, the number of batteries in each package is limited to the minimum number required to power the piece of equipment, plus two spares, and the total net quantity (mass) of the lithium cells or batteries in the completed package must not exceed 5 kg.

(iv) Each person who prepares a package for transport containing lithium cells or batteries, including cells or batteries packed with, or contained in, equipment in accordance with the conditions and limitations in this paragraph, must receive adequate instruction on these conditions and limitations, commensurate with their responsibilities.

(v) A package that exceeds the number or quantity (mass) limits in the table shown in this paragraph (c)(4) is subject to all applicable requirements of this subchapter, except that a package containing no more than 2.5 kg lithium metal cells or 10 kg lithium ion cells or batteries is not subject to:

(A) The UN performance packaging requirements in paragraphs (b)(3)(ii) of this section when the package displays both the lithium battery handling marking and the Class 9 label; and

(B) The shipping paper requirements of subpart C of part 172 when the offeror provides the air carrier alternative written documentation containing the name and address of the offeror and consignee, the UN number, an indication of compliance with this paragraph (c)(4) applies (or the applicable ICAO Packing Instruction), and the number of packages and the gross mass of each package and notification is given to the pilot-in-command in accordance with § 175.33 of this subchapter.

(d) *Lithium cells or batteries shipped for disposal or recycling.* A lithium cell or battery, including a lithium cell or battery contained in equipment, that is transported by motor vehicle to a permitted storage facility or disposal site, or for purposes of recycling, is

excepted from the testing and record keeping requirements of paragraph (a) and the specification packaging requirements of paragraph (b)(3) of this section, when packed in a strong outer packaging conforming to the requirements of §§ 173.24 and 173.24a. A lithium cell or battery that meets the size, packaging, and hazard communication conditions in paragraph (c)(1)–(3) of this section is excepted from subparts C through H of part 172 of this subchapter.

(e) *Low production runs and prototypes.* Low production runs (i.e., annual production runs consisting of not more than 100 lithium cells or batteries), or prototype lithium cells or batteries transported for purposes of testing, are excepted from the testing and record keeping requirements of paragraph (a) of this section provided:

(1) Except as provided in paragraph (e)(3) of this section, each cell or battery is individually packed in a non-metallic inner packaging, inside an outer packaging, and is surrounded by cushioning material that is non-combustible and non-conductive;

(2) The inner packages containing lithium cells or batteries are packed in one of the following packagings that meet the requirements of part 178, Subparts L and M at Packing Group I level.

(i) Metal (4A, 4B, 4N), wooden (4C1, 4C2, 4D, 4F), or solid plastic (4H2) box;

(ii) Metal (1A2, 1B2, 1N2), plywood (1D), or plastic (1H2) drum.

(3) Lithium batteries that weigh 12 kg (26.5 pounds) or more and have a strong, impact-resistant outer casing or assemblies of such batteries, may be packed in strong outer packagings, in protective enclosures (for example, in fully enclosed or wooden slatted crates), or on pallets or other handling devices, instead of packages meeting the UN performance packaging requirements in paragraphs (b)(3)(ii) and (b)(4) of this section. The battery or battery assembly must be secured to prevent inadvertent movement, and the terminals may not support the weight of other superimposed elements;

(4) Irrespective of the limit specified in column (9B) of the § 172.101 Hazardous Materials Table, the battery or battery assembly prepared for transport in accordance with this paragraph may have a mass exceeding 35 kg gross weight when transported by cargo aircraft; and

(5) Batteries or battery assemblies packaged in accordance with this paragraph are not permitted for transportation by passenger-carrying aircraft, and may be transported by cargo aircraft only if approved by the Associate Administrator prior to transportation.

(f) *Damaged, defective, or recalled cells or batteries.* Lithium cells or batteries, that have been damaged or identified by the manufacturer as being defective for safety reasons, that have the potential of producing a dangerous evolution of heat, fire, or short circuit (e.g. those being returned to the manufacturer for safety reasons) may be transported by highway, rail or vessel only, and must be packaged as follows:

(1) Each cell or battery must be placed in individual, non-metallic inner packaging that completely encloses the cell or battery;

(2) The inner packaging must be surrounded by cushioning material that is non-combustible, non-conductive, and absorbent; and

(3) Each inner packaging must be individually placed in one of the following packagings meeting the requirements of part 178, subparts L and M, of this subchapter at the Packing Group I level:

(i) Metal (4A, 4B, 4N), wooden (4C1, 4C2, 4D, 4F), or solid plastic (4H2) box;

(ii) Metal (1A2, 1B2, 1N2), plywood (1D), or plastic (1H2) drum; and

(4) The outer package must be marked with an indication that the package contains a ''Damaged/defective lithium ion battery'' and/or ''Damaged/defective lithium metal battery'' as appropriate.

(g) *Approval.* A lithium cell or battery that does not conform to the provisions of this subchapter may be transported only under conditions approved by the Associate Administrator.

■ 11. In § 173.219, paragraph (b)(3) is revised to read as follows:

§ 173.219 Life-saving appliances.

* * * * *

(b) * * *

(3) Electric storage batteries and lithium batteries (life-saving appliances containing lithium batteries must be packed in accordance with § 173.185 and Special Provisions A54 and A101 as applicable.);

* * * * *

■ 12. In § 173.220, paragraphs (d) and (f)(1) are revised to read as follows:

§ 173.220 Internal combustion engines, self-propelled vehicles, mechanical equipment containing internal combustion engines, battery powered equipment or machinery, fuel cell-powered equipment or machinery.

* * * * *

(d) *Lithium batteries.* Except as provided in § 172.102, special provision A101, of this subchapter, vehicles, engines, and machinery powered by lithium metal batteries, that are transported with these batteries installed, are forbidden aboard passenger-carrying aircraft. Lithium batteries contained in vehicles, engines, or mechanical equipment must be securely fastened in the battery holder of the vehicle, engine, or mechanical equipment, and be protected in such a manner as to prevent damage and short circuits (e.g., by the use of non-conductive caps that cover the terminals entirely). Except for vehicles transported by highway, rail, or vessel with prototype or low production lithium batteries securely installed, each lithium battery must be of a type that has successfully passed each test in the UN Manual of Tests and Criteria, as specified in § 173.185, unless approved by the Associate Administrator.

* * * * *

(f) *Other hazardous materials.* (1) Items containing hazardous materials, such as fire extinguishers, compressed gas accumulators, safety devices, and other hazardous materials that are integral components of the motor vehicle, engine, or mechanical equipment, and that are necessary for the operation of the vehicle, engine, or mechanical equipment, or for the safety of its operator or passengers, must be securely installed in the motor vehicle, engine, or mechanical equipment. Such items are not otherwise subject to the requirements of this subchapter. Equipment (other than vehicles, engines, or mechanical equipment), such as consumer electronic devices containing lithium batteries, must be described as ''Lithium metal batteries contained in equipment'' or ''Lithium ion batteries contained in equipment,'' as appropriate, and transported in accordance with § 173.185 of this subchapter, and applicable special provisions. Equipment (other than vehicles, engines, or mechanical equipment), such as consumer electronic devices containing fuel cells (fuel cell cartridges), must be described as ''Fuel cell cartridges contained in equipment'' and transported in accordance with § 173.230 of this subchapter.

* * * * *

PART 175—CARRIAGE BY AIRCRAFT

■ 13. The authority citation for part 175 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; 49 CFR 1.81, 1.97.

■ 14. In § 175.8, add a new paragraph (a)(4) to read as follows:

§ 175.8 Exceptions for operator equipment and items of replacement.

(a) * * *

(4) Unless otherwise addressed by FAA regulation or policy (e.g. Advisory Circular), hazardous materials used by the operator aboard the aircraft, when approved by the Administrator of the Federal Aviation Administration.

* * * * *

■ 15. In § 175.10, paragraph (a)(18) is revised to read as follows:

§ 175.10 Exceptions for passengers, crewmembers, and air operators.

(a) * * *

(18) Except as provided in § 173.21 of this subchapter, portable electronic devices (e.g., watches, calculating machines, cameras, cellular phones, laptop and notebook computers, camcorders, medical devices etc.) containing dry cells or dry batteries (including lithium cells or batteries) and spare dry cells or batteries for these devices, when carried by passengers or crew members for personal use. Portable electronic devices powered by lithium batteries may be carried in either checked or carry-on baggage. Spare lithium batteries must be carried in carry-on baggage only. Each installed or spare lithium battery must be of a type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, Sub-section 38.3 and each spare lithium battery must be individually protected so as to prevent short circuits (e.g., by placement in original retail packaging, by otherwise insulating terminals by taping over exposed terminals, or placing each battery in a separate plastic bag or protective pouch). In addition, each installed or spare lithium battery must not exceed the following:

(i) For a lithium metal battery, a lithium content of not more than 2 grams per battery; or

(ii) For a lithium ion battery, the Watt-hour rating must not exceed 100 Wh. With the approval of the operator, portable electronic devices may contain lithium ion batteries exceeding 100 Wh, but not exceeding 160 Wh and no more than two individually protected lithium ion batteries each exceeding 100 Wh, but not exceeding 160 Wh, may be carried per person as spare batteries in carry-on baggage.

* * * * *

■ 16. In § 175.30, add a new paragraph (a)(5) to read as follows:

§ 175.30 Inspecting shipments.

(a) * * *

(5) Described on alternative written documentation when authorized in accordance with § 173.185(c)(4)(v). See § 175.33 for alternative written documentation retention requirements.

* * * * *

■ 17. In § 175.33, add new paragraphs (a)(12) and (c)(5) to read as follows:

§ 175.33 Shipping paper and notification of pilot-in-command.

(a) * * *

(12) For shipments of lithium cells or batteries (UN3090 or UN3480) offered for transportation, or transported in accordance with § 173.185(c)(4)(v) of this subchapter, only the UN Number, proper shipping name, hazard class, and the total quantity at each specific loading location and whether the package must be loaded on a cargo only aircraft.

* * * * *

(c) * * *

(5) Retain a copy of the alternative written documentation when provided in accordance with § 173.185(c)(4)(v)(B) of this subchapter or an electronic image thereof, or the information contained therein for 90 days at the airport of departure or the operator's principal place of business.

* * * * *

Issued in Washington, DC, on July 29, 2014 under authority delegated in 49 CFR part 1.97.

Cynthia L. Quarterman,

Administrator.

[FR Doc. 2014–18146 Filed 8–5–14; 8:45 am]

BILLING CODE 4910–60–P