2019 Lithium Battery Guidance Document

Transport of Lithium Metal and Lithium Ion Batteries

Revised for the 2019 Regulations

Introduction

△ This document is based on the provisions set out in the 2019-2020 Edition of the ICAO *Technical Instruction for the Safe Transport of Dangerous Goods by Air* (Technical Instructions) and the 60th Edition of the IATA Dangerous Goods Regulations (DGR).
The provisions of the DGR with respect to lithium batteries may also be found in the IATA lithium Battery Shipping Guidelines (LBSG) 6th Edition. In addition to the content from the DGR, the LBSG also has additional classification flowcharts and detailed packing and documentation examples for lithium batteries.

Information on the DGR and LBSG can be found here:

http://www.iata.org/publications/dgr/Pages/index.aspx

http://www.iata.org/publications/store/Pages/lithium-battery-shipping-guidelines.aspx

The purpose of this document is to provide guidance for complying with provisions applicable to the transport by air of lithium batteries as set out in the DGR. Specifically, the document provides information on:

- Definitions;
- Classification (including classification flowcharts);
- Prohibitions;
- Restrictions;
- Frequently Asked Questions
- Additional Information
- Abbreviations, Acronyms, Symbols

Definitions

Lithium Battery – The term "lithium battery" refers to a family of batteries with different chemistries, comprising many types of cathodes and electrolytes. For the purposes of the DGR they are separated into:

Lithium metal batteries. Are generally primary (non-rechargeable) batteries that have lithium metal or lithium compounds as an anode. Also included within lithium metal are lithium alloy batteries. Lithium metal batteries are generally used to power devices such as watches, calculators, cameras, temperature data loggers, car key fobs and defibrillators.

Note:
Lithium metal batteries packed by themselves (not contained in or packed with equipment) (Packing Instruction 968) are forbidden for transport as cargo on passenger aircraft) unless shipped under exemption issued by all States concerned, see Special Provision A201.

Figure 1 - Example of Lithium Metal Cells and Batteries

Lithium-ion batteries (sometimes abbreviated Li-ion batteries) are a secondary (rechargeable) battery where the lithium is only present in an ionic form in the electrolyte. Also included within the category of lithium-ion batteries are lithium polymer batteries. Lithium-ion batteries are generally used to power devices such as mobile telephones, laptop computers, tablets, power tools and e-bikes.

Figure 2 - Example of Lithium Ion Cells and Batteries

Note:
Lithium ion batteries packed by themselves (Packing Instruction 965) (not contained in or packed with equipment):

(a) must be shipped at a state of charge (SoC) not exceeding 30% of their rated capacity. Cells and/or batteries at a SoC of greater than 30% may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities, see Special Provision A331; and

(b) are forbidden for transport as cargo on passenger aircraft unless shipped under exemption issued by all States concerned, see Special Provision A201.

Aggregate lithium content means the sum of the grams of lithium content contained by the cells comprising a battery.

The technical definition of a battery and cell, as indicated in the UN Manual of Tests and Criteria, is as follows:

Battery means two or more cells or batteries which are electrically connected together and fitted with devices necessary for use, for example, case, terminals, marking and protective devices. Units which have two or more cells that are commonly referred to as "battery packs", "modules" or "battery assemblies" having the primary function of providing a source of power to another piece of equipment are for the purposes of the UN Model Regulations and this guidance document treated as batteries. See definitions for "cell" and "single cell battery". (See also "Power Banks")

Button cell or battery means a round small cell or battery when the overall height is less than the diameter.

Cell means a single encased electrochemical unit (one positive and one negative electrode) which exhibits a voltage differential across its two terminals. Under the UN Model Regulations, *UN Manual of Tests and Criteria* and this guidance, to the extent the encased electrochemical unit meets the definition of "cell" herein, it is a "cell", not a "battery", regardless of whether the unit is termed a "battery" or a "single cell battery" outside of the UN Model Regulations, the *UN Manual of Tests and Criteria* and this guidance.

Consignment, one or more packages of dangerous goods accepted by an operator (airline) from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address.

Net Quantity Either:

(a) the weight or volume of the dangerous goods contained in a package excluding the weight or volume of any packaging material; or

(b) the weight of an unpackaged article of dangerous goods (e.g. UN 3166).

For the purposes of this definition "dangerous goods" means the substance or article as described by the proper shipping name shown in Table 4.2, e.g. for "Fire extinguishers", the net quantity is the weight of the fire extinguisher. For articles packed with equipment or contained in equipment, the net quantity is the net weight of the article, e.g. for "Lithium ion batteries contained in equipment", the net quantity is the net weight of the lithium ion batteries in the package.

Overpack means an enclosure used by a single shipper to contain one or more packages and to form one handling unit for convenience of handling and stowage. Dangerous goods packages contained in the overpack must be properly packed, marked, labelled and in proper condition as required by the IATA Dangerous Goods Regulations.

The overpack must not contain packages enclosing different substances which might react dangerously with each other or packages of dangerous goods which require segregation according to Table 9.3.A. In addition, packages containing UN 3090, lithium metal batteries prepared in accordance with Section IA or Section IB of PI968 or UN 3480, lithium ion batteries prepared in accordance with Section IA or Section IB of PI 965 are not permitted in an overpack with packages containing dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1.

Power Bank (power pack, mobile battery, etc.). These are portable devices designed to be able to charge consumer devices such as mobile phones and tablets. For the purposes of this guidance document and the IATA Dangerous Goods Regulations, power banks are to be classified as batteries and must be assigned to UN 3480, lithium ion batteries, or UN 3090, lithium metal batteries, as applicable. For carriage by passengers, power banks are considered spare batteries and must be individually protected from short-circuit and carried in carry-on baggage only.

Rated capacity means the capacity, in ampere-hours or milliampere-hours, of a cell or battery as measured by subjecting it to a load, temperature and voltage·cut-off point specified by the manufacturer.

***Note**:*

The following IEC standards provide guidance and methodology for determining the rated capacity:

(1) IEC 61960 (First Edition 2003-12): Secondary cells and batteries containing alkaline or other non-acid electrolytes -Secondary lithium cells and batteries for portable applications;

(2) IEC 62133 (First Edition 2002-10): Secondary cells and batteries containing alkaline or other non-acid electrolytes — Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications;

(3) IEC 62660-1 (First Edition 2011-01): Secondary lithium-ion cells for the propulsion of electric road vehicles- Part 1: Performance testing.

State of Origin, the country (State) in the territory of which the consignment is to first be loaded on an aircraft.

State of the Operator, the country (State) in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.

Classification (DGR 3.9.2.6)

Lithium batteries are classified in Class 9 – Miscellaneous dangerous goods as:

- UN 3090, **Lithium metal batteries**; or
- UN 3480, **Lithium ion batteries**

or, if inside a piece of equipment or packed separately with a piece of equipment to power that equipment as:

- UN 3091, **Lithium metal batteries contained in equipment**; or
- UN 3091, **Lithium metal batteries packed with equipment**; and
- UN 3481, **Lithium ion batteries contained in equipment**; or
- UN 3481, **Lithium ion batteries packed with equipment**.

☐ Lithium battery test summary – effective 1 January 2020, manufacturers and subsequent distributors of cells or batteries and equipment powered by cells and batteries manufactured after 30 June 2003 must make available the test summary as specified in the UN Manual of Tests and Criteria, Revision and amend. 1, Part III, sub-section 38.3, paragraph 38.3.5.

Note:
The requirement is for the manufacturer and subsequent distributors to make this test summary available. There are numerous ways this can be achieved, such as by listing the applicable summary document on the company website. There is no expectation for the shipper/distributor to provide paper copies with each consignment containing lithium batteries. The supply chain are encouraged to make use of technology to facilitate the availability of the test summary.

The following table provides details of the information required in the test summary:

Lithium cell or battery test summary in accordance with sub-section 38.3 of Manual of Tests and Criteria
The following information shall be provided in this test summary: **(a)** Name of cell, battery, or product manufacturer, as applicable; **(b)** Cell, battery, or product manufacturer's contact information to include address, phone number, email address and website for more information; **(c)** Name of the test laboratory to include address, phone number, email address and website for more information; **(d)** A unique test report identification number; **(e)** Date of test report; **(f)** Description of cell or battery to include at a minimum: **(i)** Lithium ion or lithium metal cell or battery; **(ii)** Mass; **(iii)** Watt-hour rating, or lithium content; **(iv)** Physical description of the cell/battery; and **(v)** Model numbers. **(g)** List of tests conducted and results (i.e., pass/fail); **(h)** Reference to assembled battery testing requirements, if applicable (i.e. 38.3.3 (f) and 38.3.3 (g)); **(i)** Reference to the revised edition of the Manual of Tests and Criteria used and to amendments thereto, if any; and **(j)** Signature with name and title of signatory as an indication of the validity of information provided.

Further information on the test summary and FAQ's is available in Part 4 of this guidance document.

Classification Flowcharts

The following (2) classification flowcharts are intended to provide guidance on the classification for lithium ion and lithium metal batteries.

Classification Flowchart – Lithium Ion Batteries

All cells and batteries must be tested in accordance with the UN Manual of Tests and Criteria Part III Subsection 38.3 (DGR 3.9.2.6)

Passed UN?

No → Redesign

Yes

Lithium Ion Batteries Contained in Equipment

Cells >20 Wh;
Batteries > 100 Wh

UN3481
PI 967 Section I
IMP: RLI

Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Cells ≤20 Wh;
Batteries ≤100 Wh
UN3481

PI 967 Section II *
IMP: ELI

Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

* exceptions exist to the marking requirements – see PI 967 Section II

Lithium Ion Batteries (limited to a maximum of 30% SoC)

Cells > 20 Wh;

Batteries > 100 Wh

UN3480

PI 965

Section IA

IMP: RBI

Limit per package:

Pax A/C = Forbidden
CAO = 35 kg

Cells ≤ 20 Wh;
Batteries ≤100 Wh

UN3480
PI 965
Section IB
IMP: RBI

NOTE: Use "IB" if package exceeds Section II Limits or more than 1 package.
Limit per package:
Pax A/C = Forbidden
CAO = 10 kg

Cells ≤20 Wh;
Batteries ≤100 Wh

UN3480
PI: 965
Section II
IMP: EBI

(not more than 1 package) Limit per package:
≤ 2.7 Wh = 2.5kg; or
cells > 2.7 Wh ≤ 20 Wh = 8 cells; or
batteries > 2.7 Wh ≤ 100 Wh = 2 batteries
Pax A/C = Forbidden

Lithium Ion Batteries Packed With Equipment

Cells > 20 Wh;

Batteries > 100 Wh

UN3481
PI 966
Section I
IMP: RLI

Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Cells ≤ 20 Wh;
Batteries ≤100 Wh

UN3481
PI 966
Section II
IMP: ELI

Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

Classification Flowchart – Lithium Metal Batteries

All cells and batteries must be tested in accordance with the UN Manual of Tests and Criteria Part III Subsection 38.3 (DGR 3.9.2.6)

Passed UN?

No → Redesign

Yes

Lithium Metal Batteries Contained in Equipment

Cells >1 g; **Batteries** > 2 g

UN3091
PI 970
Section I
IMP: RLM

Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Cells ≤ 1 g; **Batteries** ≤ 2 g

UN3091
PI 970
Section II *
IMP: ELM

Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

* exceptions exist to the marking requirements – see PI 970 Section II

Lithium Metal Batteries

Cells >1 g;

Batteries > 2 g

UN3090
PI 968
Section IA
IMP: RBM

Limit per package:
Pax A/C = Forbidden
CAO = 35 kg

Cells ≤ 1 g; **Batteries** ≤ 2 g

UN3090
PI 968
Section IB
IMP: RBM

Note: "IB" must be used if package exceeds Section II limits and more than 1 package

Limit per package:
Pax A/C = forbidden
CAO = 2.5 kg

Cells ≤1 g; **Batteries** ≤ 2 g

UN3090
PI 968
Section II
IMP: EBM

Limit per package: (not more than 1 package)
Lithium metal content ≤ 0.3g = 2.5 kg; or
cells > 0.3 g ≤ 1 g = 8 cells; or
batteries > 0.3 g ≤ 2 g = 2 batteries
Forbidden on PAX aircraft

Lithium Metal Batteries Packed With Equipment

Cells >1 g;

Batteries > 2 g

UN3091
PI 969
Section I
IMP: RLM

Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Cells ≤ 1 g; **Batteries** ≤ 2 g

UN3091
PI 969
Section II
IMP: ELM

Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

Prohibitions

Lithium ion batteries

All lithium ion cells and batteries shipped by themselves (UN 3480) are forbidden for transport as cargo on passenger aircraft. All packages prepared in accordance with Packing Instruction 965, Section IA, IB and II, must bear a Cargo Aircraft Only label, in addition to existing marks and/or labels.

Lithium metal batteries

All lithium metal cells and batteries shipped by themselves (UN 3090) are forbidden for transport as cargo on passenger aircraft. All packages prepared in accordance with Packing Instruction 968, Section IA, IB and II, must bear a Cargo Aircraft Only label, in addition to existing marks and/or labels.

Restrictions

Lithium ion batteries

All lithium ion cells and batteries (UN 3480 only) must be shipped at a state of charge (SoC) not exceeding 30% of their rated capacity. Cells and/or batteries at a SoC of greater than 30% may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities, see Special Provision A331.

Packing Restrictions

PI965 & PI968 Section IA & IB

UN 3090, lithium metal batteries prepared in accordance with Section IA or Section IB of PI 968 and UN 3480, lithium ion batteries prepared in accordance with Section IA or Section IB of PI 965 must not be packed in the same outer packaging with dangerous goods classified in Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers). Packages containing cells or batteries must not be placed in an overpack with packages containing dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1.

PI965 & PI968 Section II

Cells and batteries must not be packed in the same outer packaging with other dangerous goods.

Frequently Asked Questions

Part 1 – Questions Related to Definitions

A. What are the various types of lithium batteries?

Lithium batteries fall into two broad classifications; lithium metal batteries and lithium ion batteries. Lithium metal batteries are generally non-rechargeable and contain metallic lithium. Lithium ion batteries contain lithium which is only present in an ionic form in the electrolyte and are rechargeable.

Within these two broad classifications there are many different chemistries. For example within lithium ion batteries there are lithium polymer, lithium iron phosphate ($LiFePO_4$), lithium air to name a few.

B. What is the difference between a lithium cell and a lithium battery?

A lithium cell is a single encased electrochemical unit consisting of one positive and one negative electrode that exhibits a voltage differential across the two terminals. A lithium battery is two or more cells electrically connected. A single cell battery is considered a cell and not a battery for the purposes of the limitations set out in the DGR.

***Note**:*
Units that are commonly referred to as "battery packs" or "power banks" having the primary function of providing a source of power to another piece of equipment are for the purposes of these Regulations treated as batteries. Refer to the section on Definitions for complete details.

C. How are component cells connected to form a battery?

Cells in batteries may be connected in parallel, in series, or in a combination of the two. When cells are connected in series, the voltage of the battery increases but the capacity in ampere-hours (Ah) does not change. By contrast, when cells are connected in parallel the capacity in ampere-hours of the battery (Ah) increases but the voltage stays the same.

D. How do I determine the watt-hour rating for a particular lithium ion battery?

The Watt-hour (Wh) rating is a measure by which lithium ion batteries are regulated. Section I lithium ion batteries manufactured after 31 December 2011 and Section IB and Section II lithium ion batteries manufactured after 1 January 2009 are required to be marked with the Watt-hour rating on the outside case.

You can also arrive at the number of Watt-hours your battery provides if you know the battery's nominal voltage (V) and capacity in ampere-hours (Ah):

Ah x V = Wh

Note:
If only the milliampere-hours (mAh) are marked on the battery then divide that number by 1000 to get ampere-hours (Ah) (i.e. 4400 mAh / 1000 = 4.4. Ah).

Most lithium ion batteries marketed to consumers are below 100 Watt-hours. If you are unsure of the Watt-hour rating of your lithium ion battery, contact the manufacturer.

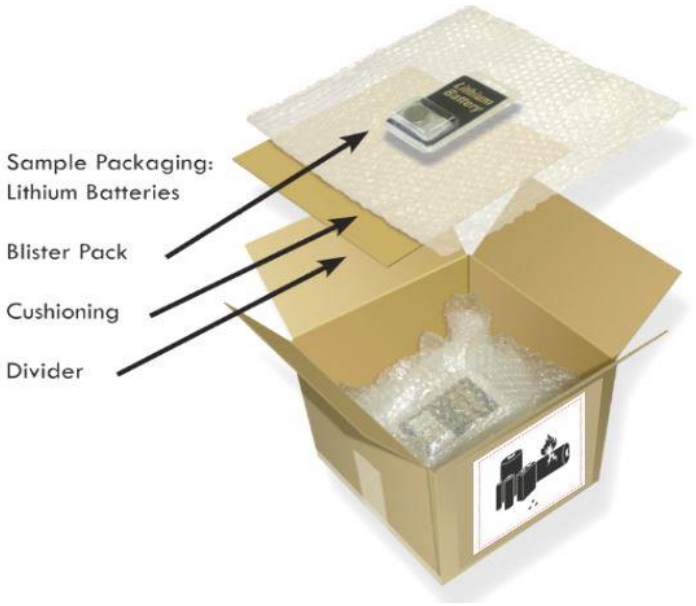
E. What is a button cell battery?

A button cell battery is a round small cell where the overall height is less than the diameter. Button cells are often referred to as "coin" cells.

Part 2 – Questions related to Packaging and Transport Provisions

A. How do I safely package lithium batteries for transport?

One of the major risks associated with the transport of batteries and battery-powered equipment is short-circuit of the battery as a result of the battery terminals coming into contact with other batteries, metal objects, or conductive surfaces. Packaged batteries or cells must be separated in a way to prevent short circuits and damage to terminals. They must be packed in a strong rigid outer packaging unless when contained in equipment, the battery is afforded equivalent protection by the equipment in which it is contained. Sample packaging meeting these requirements is shown below:



B. How can batteries be effectively protected against short circuit?

Methods to protect against short circuit include, but are not limited to, the following methods:

a. Packing each battery or each battery-powered device when practicable, in fully enclosed inner packagings made of non-conductive material (such as a plastic bag);

b. Separating or packing batteries in a manner to prevent contact with other batteries, devices or conductive materials (e.g. metal) in the packagings; and

c. Ensuring exposed terminals or connectors are protected with non-conductive caps, non-conductive tape, or by other appropriate means.

If not impact resistant, the outer packaging must not be used as the sole means of protecting the battery terminals from damage or short-circuiting. Batteries should be securely cushioned and packed to prevent shifting which could loosen terminal caps or reorient the terminals to produce short circuits.

Terminal protection methods include but are not limited to the following:

a. Securely attaching covers of sufficient strength to protect the terminals;

b. Packaging the battery in a rigid plastic packaging; and

c. Constructing the battery with terminals that are recessed or otherwise protected so that the terminals will not be subjected to damage if the package is dropped.

C. I'm shipping using Section II of the packing instructions, what constitutes "adequate instruction"?

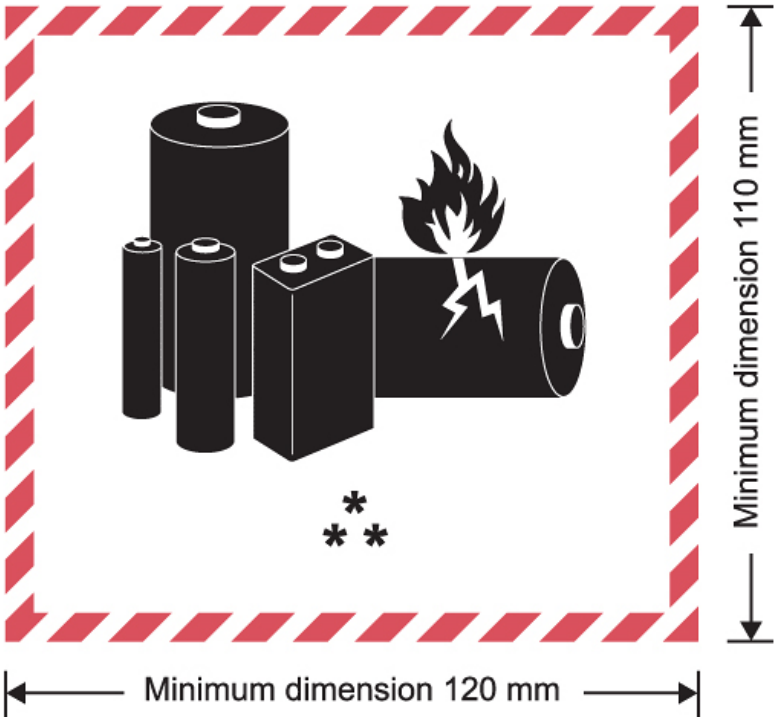
Shippers of lithium batteries prepared in accordance with Section II of the lithium battery packing instructions are not subject to the formal dangerous goods training requirements set out in DGR 1.5, however, persons preparing such shipments must be provided with "adequate instruction" as described in DGR 1.6.

The following is offered as a starting point for an employer on what could be considered as being adequate instruction:

1. The employer must identify the different configurations of lithium batteries that they ship, i.e. lithium batteries and/or lithium batteries packed with equipment and/or lithium batteries contained in equipment; lithium metal batteries and/or lithium ion batteries.
2. The employer must document the procedures that apply to the configurations and battery types that they ship as determined in 1, above.
3. The procedures should be written up as a clear work instruction or other information that is available to all employees responsible for the preparation of lithium battery shipments.
4. All employees that are involved in the process of preparing lithium battery shipments must be taken through the procedure to ensure that they understand and can demonstrate the correct application of documented procedures for the packing, labelling, marking and documentations requirements, as applicable to their job function.
5. A record must be maintained that identifies each applicable employee and the date(s) that this instruction was provided.
6. Employees should be given periodic refresher, or at least demonstrate that they remain "adequately" instructed on how to perform the task. This should be done at least every two years or whenever the procedure is revised, or regulations are changed, whichever is sooner.
7. Companies that are involved in reverse logistics, i.e. arranging for returns of lithium batteries, lithium batteries packed with equipment or lithium batteries contained in equipment must develop a clear instruction for consumers on the process to be followed for returning products. This instruction must include packaging materials and lithium battery marks, as necessary. The instruction must also include the transport method and mode of transport that must be followed; this must include a clear statement on applicable prohibitions.

D. What does the lithium battery mark look like and when is it required?

The lithium battery mark is required as specified in the additional requirements of Section II of packing instructions 965, 966, 967, 968, 969 and 970. It is also required as specified in the additional requirements of Section IB of packing instructions 965 and 968 in addition to the Class 9 lithium battery hazard label and Cargo Aircraft Only label. The mark is as shown in Figure 7.1.C of the IATA Dangerous Goods Regulations. The border of the mark must have red diagonal hatchings with a minimum width of 5mm. The symbol (group of batteries, one damaged and emitting flame, above the UN number for lithium ion or lithium metal batteries or cells) must be black on white or suitable contrasting background. The lithium battery mark may be printed directly on the outer packaging provided that there is sufficient contrast between the elements of the lithium battery mark and the colour of the packaging material. The minimum dimensions are 120 mm wide x 110 mm high. If the size of the package so requires, the dimensions/line thickness may be reduced to not less than 105 mm wide × 74 mm high.



* Place for UN number(s), i.e. UN 3090, UN 3091, UN 3480 and/or UN 3481, as applicable. The UN number(s) indicated on the mark should be at least 12 mm high.

** Place for telephone number

☐ ***Notes:***

1. *The telephone number should be of a person knowledgeable about the shipment but is not intended to be for the purposes of obtaining immediate emergency response guidance, and is therefore not required to be monitored at all times that the package is in transit. It is acceptable for the number to be monitored during the company's normal business hours in order to provide product-specific information relative to the shipment. However, it also is acceptable to use an emergency response, 24-hour phone number on the lithium battery mark.*
2. *The lithium battery handling label is no longer valid and must not be applied to packages after 31 December 2018.*

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E. If I have smaller packages, can I use a smaller lithium mark?

Where the packages are of dimensions such that they cannot bear the full size lithium battery mark, the mark dimensions may be reduced to 105 mm wide × 74 mm high. The design specifications remain otherwise the same.

F. When is a lithium battery mark not required on the package?

A lithium battery mark must not be affixed to packages prepared in accordance with Section IA of Packing Instructions 965 and 968 and Section I of Packing Instructions 966, 967, 969 and 970.

A lithium battery mark is not **required** for packages prepared in accordance with Section II of PI 967 or PI 970 containing only button cell batteries installed in equipment (including circuit boards) or consignments of two packages or less where each package contains no more than four cells or two batteries installed in equipment.

Note:
The Air Waybill is only required to contain the statements "Lithium [ion or metal] batteries in compliance with Section II of PI9XX" when the lithium battery mark is affixed to the package(s).

G. Section II in Packing Instructions 967 and 970 states that "the lithium battery mark is not required on consignments of two packages or less where each package contains no more than four cells, or two batteries installed in equipment." What is the intent of this provision?

This provision is to require, where there are more than two packages in the consignment, that each package bears the lithium battery mark, and therefore the air waybill has the compliance statement e.g. "Lithium [ion or metal] batteries in compliance with Section II of PI 9xx [67 or 70]".

The provision continues to allow for small consignments of one or two packages containing no more than four cells or two batteries installed in equipment per package to move without the lithium battery mark and therefore without the compliance statement on the air waybill.

Note:
A consignment is one or more packages of dangerous goods accepted by an operator (airline) from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address.

H. I have an MP3 player that contains one single-cell lithium ion battery. Do I have to mark the shipping box that contains each MP3 player? What if I place five MP3 players in a shipping box? Does this require the lithium battery mark?

For packages of single MP3 players, no lithium battery mark would be required since you can place up to 4 of these single-cell batteries in a box without applying the lithium battery mark on the outer box. In the case where 5 MP3 players are in a shipping package, a lithium battery mark on the shipping package is required.

I. Can a single lithium battery mark be used to identify that both lithium metal and lithium ion batteries are contained inside the package?

Yes. The mark may bear all applicable UN numbers, e.g. UN 3091, UN 3481, to identify that the package contains lithium metal batteries packed with or contained in equipment and lithium ion batteries packed with, or contained in equipment.

J. What are the requirements for the telephone number on the lithium battery mark?

The telephone number should be of a person knowledgeable about the shipment but is not intended to be for the purposes of obtaining immediate emergency response guidance and is therefore not required to be monitored at all times that the package is in transit. It is acceptable for the number to be monitored during the company's normal business hours in order to provide product-specific information relative to the shipment. However, it also is acceptable to use an emergency response, 24-hour phone number on the lithium battery mark.

K. For the purposes of the lithium battery packing instructions, what is considered the "package"?

The package is the complete product of the packing operation that satisfies the requirements of the packing instruction and in a manner ready to be presented for transport (shipper/consignee information, hazard communication, etc.). The package may contain multiple batteries or pieces of equipment provided the limitations set out in the applicable packing instruction are not exceeded. The package must be marked and labelled as required by the packing instruction. A single package may be offered for transport, or one or more packages may then be placed into an overpack for ease of handling or transport purposes. When an overpack is used, the package marks and labels must be duplicated on the overpack unless the marks and labels required on individual packages are visible or are not required by the packing instruction (i.e. not more than 4 cells or 2 batteries when contained in equipment and no more than two packages in the consignment).

L. Does the IATA DGR require a MSDS or SDS containing the UN test data?

No. The IATA DGR does not require a safety data sheet (SDS) when offering lithium batteries for transport.

☐ ***Note:***
A SDS is not a transport document. A SDS is only required for the supply and use of a substance or mixture meeting the Globally Harmonised System of Classification and Labelling of Chemicals (GHS) classification criteria. GHS does not include provisions for manufactured articles.

△ **M. Under Packing Instructions 966 and 969, it states that "The maximum number of batteries in each package must be the minimum number required to power the equipment, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment". If a package contains 4 power tools (each tool contains 1 lithium ion battery), can 2 extra lithium ion batteries be placed in the package for each piece of equipment for a total of 12 batteries?**

Yes, providing you do not exceed the maximum net quantity for the relevant section of the packing instruction and the chosen aircraft type. The 12 batteries reflect two spare sets (8) for each of the 4 power tools in the outer package plus one each to power the device (4).

N. May lithium battery packages be placed in an overpack in accordance with the IATA Dangerous Goods Regulations?

Yes, but there are segregation requirements that need to be considered for certain other classes of dangerous goods. UN 3090, lithium metal batteries prepared in accordance with Section IA or Section IB of PI 968 and UN 3480, lithium ion batteries prepared in accordance with Section IA or Section IB of PI 965 are not permitted in the same outer packaging with dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1. The overpack may also contain goods not subject to the Regulations provided there are no packages enclosing different substances which might react dangerously with each other. An overpack must be marked with the word "overpack" and must be labelled with the lithium battery mark (DGR Figure 7.1.C), unless the mark(s) on the package(s) inside the overpack are visible or not required by the Packing Instruction.

In addition, the word "overpack" must be marked on overpacks containing packages transported in accordance with Section I of the applicable Packing Instructions (i.e. bearing the Class 9 lithium battery hazard label).

Note:
For Section II of PI 965 and PI 968 the shipper is limited to one (1) package per consignment (shipment) and no more than one (1) package complying with the requirements of Section II may be placed in an overpack. This overpack may also contain packages of non-dangerous goods and/or packages prepared in accordance with Section IA and/or IB of PI 965 and/or PI 968 and/or packages of other dangerous goods, excluding packages containing dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1.

O. Do the quantity limits shown in the lithium battery packing instructions apply to overpacks containing lithium batteries?

The quantity limits shown in the packing instructions refer to the maximum net weight of lithium batteries in each package. Provided each package remains within the limit specified in the packing instruction, there are no limits specified for an overpack.

Note:
For Section II of PI 965 and PI 968 the shipper is limited to one (1) package per consignment (shipment) and no more than one (1) package complying with the requirements of Section II may be placed in an overpack. This overpack may also contain packages of non-dangerous goods and/or

packages prepared in accordance with Section IA and/or IB of PI 965 and/or PI 968 and/or packages of other dangerous goods, excluding packages containing dangerous goods classified in Class 1 other than Division 1.4S, Division 2.1, Class 3, Division 4.1 or Division 5.1.

P. Packing Instructions 966 and 969 Section II include a requirement for a 1.2 metre drop test. What portion or portions of the package are subject to this test?

The completed package containing batteries as prepared for transport in accordance with the relevant packing instruction must be capable of withstanding the 1.2 m drop test. This could apply to a package solely containing batteries that is packaged in full compliance with the provisions of the packing instruction (to include the 1.2 m drop test capability requirement) and is then packed with equipment in a strong rigid outer packaging and offered for transport (see item 2N for additional information related to overpacks). Or, it could apply to a package that includes batteries properly packed in inner packaging and equipment or other non-dangerous goods that are placed in an strong rigid outer packaging. The package that includes both the inner packaging containing batteries and the equipment must comply with the packing instruction to include meeting the capability to pass the 1.2 m drop test.

Q. How do I transport prototype lithium cells and batteries that have not passed the UN 38.3 Tests?

Pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low-production runs (i.e. annual production runs consisting of no more than 100 lithium cells and batteries) of lithium cells or batteries that have not been tested to the requirements in subsection 38.3 of the UN Manual of Tests and Criteria may be transported aboard cargo aircraft, if approved by the appropriate authority of the State of origin and the requirements in Packing Instruction 910 of the Supplement to the Technical Instructions are met (see Special Provision A88).

The appropriate authority of the State of origin will provide details of PI 910 as part of the approval process.

R. Can I ship recalled, damaged or non-conforming cells or batteries?

Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport by air (e.g. those being returned to the manufacturer for safety reasons). This applies also to lithium cells or batteries installed inside equipment such as mobile phones, laptops or tablets where the devices are subject to recall due to the safety concerns of the lithium cell or battery installed in the device.

Batteries which have some other defective feature (e.g. LEDs not showing charge, incorrect model number on label, or batteries not holding enough charge) could still be shipped by air. Also, laptops being returned may not have a defective battery, it may not meet the needs of the customer, may be defective itself (but not the battery), etc. In these situations air transport would be permitted. The battery or equipment manufacturer should be contacted to determine the appropriate shipping method.

S. How do I protect against "inadvertent activation"?

When batteries are contained in equipment, the equipment must be packaged in a manner that prevents unintentional activation or must have an independent means of preventing unintentional activation (e.g., packaging restricts access to activation switch, switch caps or locks, recessed switches, trigger locks, temperature sensitive circuit breakers, etc.). This requirement does not apply to devices which are intentionally active in transport (RFID transmitters, watches, sensors etc.) and which are not capable of generating a quantity of heat sufficient to be dangerous to packaging or personal safety.

T. What is the maximum weight of batteries per package for fully regulated batteries contained in equipment (Section I)?

The maximum weight is 5 kg of lithium batteries per package for passenger and cargo aircraft and 35 kg of lithium batteries per package for cargo aircraft only.

	Net Quantity per Package Passenger Aircraft	Net Quantity per Package Cargo Aircraft Only
Lithium Ion & Lithium Metal cells and batteries contained in equipment	5 kg	35 kg

U. Do I need to declare a gross weight or a net weight for lithium batteries (Section I)?

All lithium battery shipments, including when packed with or contained in equipment, must be declared by the net weight as per the definition of "net weight", see page 3.

V. I have 2 kg of 2.7Wh cells and 2 batteries that meet the Section II limitations; can I place them in one package?

No. The limits found in Table 965-II and Table 968-II cannot be combined. Shippers are not permitted to ship more than one package of Section II PI 965 at one time. Therefore quantities of lithium ion cells or batteries that exceed the limit for one package must be shipped as Section IB of the applicable packing instruction.

W. I am shipping Section IB lithium [ion or metal] batteries; do I need dangerous goods training?

Yes. All the provisions of the Dangerous Goods Regulations apply to shipments of Section IB batteries except the references listed in Section IB. Therefore, dangerous goods training as indicated in Subsection 1.5 of the Dangerous Goods Regulations is required.

X. What are the additional marking requirements for a package prepared under Section IB of Packing Instruction 965 and 968?

Because all of the requirements of the dangerous goods regulations apply other than the requirement to use UN specification packaging, each package must be marked with:

- the UN Number preceded by "UN" and the Proper Shipping Name (DGR 7.1.4.1 (a));
- the shipper and consignee address (DGR 7.1.4.1 (b));
- in addition, the net weight as required by (DGR 7.1.4.1(c)) must be marked on the package; and
- the lithium battery mark (see item 2D) in addition to the Class 9 lithium battery hazard label and Cargo Aircraft Only label.

Note:
When using an overpack, each package must be marked in accordance with the Regulations and then, when placed in an overpack, marked as required by DGR 7.1.7.

Y. I am shipping perishable cargo with lithium battery powered temperature or data loggers; do I need to follow the Dangerous Goods Regulations?

Yes. All the applicable provisions for lithium batteries will need to be followed by the shipper of such devices, including the limitations for devices that are "active" (on) during transport.

Note:

1. *The perishable cargo regulations (PCR) also apply to such shipments.*

2. *Further information on active devices can be found on the IATA website - https://www.iata.org/whatwedo/cargo/pharma/Documents/lithium-battery-guidance-document-2017-for%20pharma-en.pdf*

Z. Do I need to include an additional document or statement to certify that my lithium ion batteries are at no more than 30% SoC?

No. For lithium ion batteries shipped in accordance with Section IA or Section IB of PI 965, which must be on a Shipper's Declaration, the Shipper's Declaration includes a certification statement "I declare that all of the applicable air transport requirements have been met."

By signing the Shipper's Declaration the shipper is making a legal statement that all the applicable provisions of the DGR have been complied with, which includes that the lithium ion batteries are at no more than 30% SoC.

For Section II of PI 965, the provision of the compliance statement "lithium ion batteries in compliance with Section II of PI 965" on the air waybill will be taken by regulatory authorities as a legal declaration of compliance.

AA. I have lithium ion batteries packed with equipment (PI 966, Section I) where the lithium ion batteries are packed in a fibreboard (4G) box and then that box is packed with the equipment in a fibreboard outer packaging. Is this an overpack?

No, Section I of PI 966 (and also PI 969) allows two methods of having lithium batteries packed with equipment. Either:

(a) the lithium batteries are packed into a UN specification packaging meeting PG II performance standards and then packed with the equipment in an outer packaging; or

(b) the lithium batteries and the equipment are packed into UN specification packaging meeting PG II performance standards.

In either case what is presented for transport is a "package" and not an overpack.

△ **BB. I have packagings pre-printed with the Class 9 hazard label can these still be used now that there is a new lithium battery Class 9 hazard label?**

No, effective 1 January 2019, the Class 9 lithium battery hazard label can only be used for packages containing lithium batteries:

⊗

CC. Does the definition of "consignment" apply to the house air waybill (HAWB) or to the master air waybill (MAWB)?

The use of HAWB or MAWB has no direct relationship to what is a "consignment". For example a MAWB may have multiple consignments where each of the consignments are from separate shippers, or are from one shipper but to separate consignees, or the MAWB may be just be a single consignment from one shipper to one consignee.

The following limitations apply to consignments:

1. a shipper is not permitted to consign more than one package of Section II, PI 965 or PI 968; and
2. a shipper is not permitted to consign more than two packages of lithium batteries contained in equipment under Section II of PI 967 and PI 970 where there are no more than 4 cells or 2 batteries in the package without the application of the lithium battery handling label (lithium battery mark) on the package.

The objective of these two conditions is to:

1. restrict the number of packages of just lithium batteries that are carried by air that are not subject to the dangerous goods acceptance check and that are not shown on the written information to the pilot-in-command. The intention here is to force shippers of multiple packages to declare these on a Shipper's Declaration for Dangerous Goods and therefore make the consignment subject to the full checks for air transport.
2. require appropriate hazard communication on packages and on the air waybill where a shipper has more than two packages of lithium batteries contained in equipment.

Notes:

1. *This does not mean that every retail "package" must bear the lithium battery mark. A shipper may place multiple retail boxes, each containing a lithium battery meeting Section II installed in equipment, into an outer packaging to form the package for air transport. There is no limit on the number of individual retail boxes that can be placed into the outer packaging, except that a "package" must not contain more than 5 kg net weight of lithium batteries. Each such package must bear the lithium battery mark and when an air waybill is used the air waybill must show the applicable compliance statement, e.g. "lithium ion batteries in compliance with section II of PI 967".*
2. *Shippers or freight forwarders should not try to split a consignment across multiple air waybills to try to avoid the application of the lithium battery mark where there are more than two packages with lithium batteries contained in equipment under Section II in a consignment.*

Part 3 – Questions Related to Design Type Testing Provisions

A. Where can I find requirements related to testing of battery design types?

The UN Manual of Tests and Criteria sets out specific tests that must be conducted on each lithium cell or battery design type. Each test is intended to either simulate a common transportation occurrence such as vibration or changes in altitude or to test the integrity of a cell or battery. You may obtain a copy of these testing requirements via the following website: http://www.unece.org/trans/danger/publi/manual/manual_e.html

B. What constitutes a design change requiring renewed design type testing?

The following provisions are taken from the 6th revised edition, Amend. 1 of the UN Manual of Tests and Criteria, paragraph 38.3.2.2.

A cell or battery that differs from a tested design by:

(a) For primary cells and batteries, a change of more than 0.1 g or 20% by mass, whichever is greater, to the cathode, to the anode, or to the electrolyte;

(b) For rechargeable cells and batteries, a change in Watt-hours of more than 20% or an increase in voltage of more than 20%; or

(c) A change that would materially affect the test results.

shall be considered a new type and shall be subjected to the required tests.

Note: the type of change that might be considered to differ from a tested type, such that it might lead to a failure of any of the test results, may include, but is not limited to:

(a) A change in the material of the anode, the cathode, the separator or the electrolyte;

(b) A change of protective devices, including the hardware and software;

(c) A change of safety design in cells or batteries, such as a venting valve;

(d) A change in the number of component cells;

(e) *A change in connection mode of component cells;*

(f) *For batteries which are to be tested according to T.4 with a peak acceleration less than 150 g_n, a change in the mass which could adversely impact the result of the T.4 test and lead to a failure.*

In the event that a cell or battery type does not meet one or more of the test requirements, steps shall be taken to correct the deficiency or deficiencies that caused the failure before such a cell or battery type is retested.

C. What edition of the UN Manual of Tests and Criteria must be used when testing new lithium cell or battery designs

If a newly produced lithium cell or battery design is being tested for the first time, then the edition of the UN *Manual of Tests and Criteria* in effect at the time that the cell or battery designs are first tested must be used. For example, a new lithium ion battery design is produced for the first time in March 2019. This battery must be tested in accordance with the provisions of the 6th revised edition of the UN *Manual of Tests and Criteria* as this is the edition in effect, see Note under DGR 1.1.1 (1.1 of the LBSG).

☐ **Part 4 – Questions Related to the Lithium Battery Test Summary[1]**

A. Does the test summary apply to equipment containing lithium cells or batteries?

Yes, the test summary applies to the cells and batteries irrespective of whether they are shipped alone or contained in equipment.

B. Can multiple batteries/manufacturers/products be listed on one report?

Yes, it is acceptable to have a single document that addresses multiple batteries/manufacturers/products, provided all required information is stated. For example, a tablet manufacturer may purchase lithium ion batteries from three different battery manufacturers. The test summary for the product will therefore list batteries and all related information (e.g., Watt-hours, test labs) from the three battery manufacturers without naming the manufacturer due to confidentiality issues.

C. Is it acceptable to list the various test houses, tests and range of revisions tested to for the UN 38.3 revision and amendments?

Yes, it is acceptable to have multiple test houses and their addresses, email information, etc. listed provided all required information is stated. The test house is not required to be aligned to a specific battery or product on the test summary when the test summary covers multiple batteries/products. It is required to have the test report number and date of test for each cell/battery/product listed on the test summary.

D. What is meant by physical description of cell or battery?

A physical description is intended to provide a check for the person requesting the test summary to know that it applies to the cell/battery/product covered by the test summary. i.e. if a cellular phone is the product being shipped, the invoice description or marketing name of the product as the physical description could be used on the test summary.

E. What does availability of report mean: "When requested?"

Any individual or entity in the supply chain may request the test summary i.e. regulator, consumer, or transport provider.

F. Can the test summary provider require a requestor to obtain the document from a website?

Yes, it is acceptable for the provider to require the requestor to obtain a document electronically from a provider's website. The provider must ensure that the cell/battery/product has appropriate identifiers to align to the test summary.

G. If a manufacturer considers their suppliers, test house and battery data confidential and competitive information, how would test summary compliance be achieved?

All 10 data elements and listed subsets of information are required to be on the test summary. As indicated above, the test house information may be listed to cover a range of products.

H. If a test summary is requested by a dangerous goods enforcement agency, how quickly must the test summary be made available? For example, would a manufacturer be expected to immediately produce a test summary or provide it within a certain amount of time (e.g., 72 hours)

Due to the large volume of lithium batteries and lithium battery powered products that are shipped daily, manufacturers and distributors should not be expected to immediately provide a test summary for every product they ship. Manufacturers and distributors should be provided a reasonable amount of time to provide the required test summary.

I. Would manufacturers and distributors of battery powered vehicles (UN3171) and hybrid vehicles containing a lithium battery (UN3166) be expected to provide a test summary?

Yes. The test summary requirement applies to manufacturers and distributors of lithium battery powered vehicles and other vehicles containing lithium batteries.

J. Is there a mandated format for the test summary that manufacturers and distributors must follow?

No. Manufacturers and distributors may compile the information required in the test summary using any format. Below are 3 examples of a test summary:

Example 1 of a Lithium Ion Battery Test Summary

LITHIUM CELLS OR BATTERIES TEST SUMMARY
IN ACCORDANCE WITH SUB-SECTION 38.3
OF UN MANUAL OF TESTS AND CRITERIA

Revision Date: March 27, 2017 Revision Number: 001

Product Manufacturer: Beta Bell Phone Company
123 Beta Bell Lane
Bellweather, Arizona 99999

Telephone: 800-999-4545
Email: betabell@gmail.com
Web: www.betabell.com

Beta Bell's product lithium ion cells and batteries have been successfully tested and comply with the UN Model Regulations, Manual of Test and Criteria, Part III, subsection 38.3.

PERFORMED TESTS			RESULTS
38.3.4.1	T1	Altitude Simulation	Pass
38.3.4.2	T2	Thermal Test	Pass
38.3.4.3	T3	Vibration	Pass
38.3.4.4	T4	Shock	Pass
38.3.4.5	T5	External Short Circuit	Pass
38.3.4.6	T6	Impact / Crush	Pass
38.3.4.7	T7	Overcharge	Pass
38.3.4.8	T8	Forced Discharge	Pass

The UN38.3 tests were performed by one of the following test houses and were tested to UN Manual Test and Criteria Revision 3 Amendment 1 or subsequent revisions or amendments.

Test House A 123 Alpha Street Shanghai China E: testhousea@gmail.com T: 086-0310-04566 U: www.testhousea.com	Test House C 123 Chi Street Shanghai China E: testhouseC@gmail.com T: 086-0310-04588 U: www.testhousec.com
Test House B 123 Beta Street Shanghai China E: testhouseb@gmail.com T: 086-0310-04577 U: www.testhouseb.com	Test House D 123 Delta Street Shanghai China E: testhoused@gmail.com T: 086-0310-04599 U: www.testhoused.com

LITHIUM CELLS OR BATTERIES TEST SUMMARY
IN ACCORDANCE WITH SUB-SECTION 38.3
OF UN MANUAL OF TESTS AND CRITERIA

Product Test Information

Model numbers	Physical Description	Battery weight (kg) Mass	Wh rating	Test report number	Test report date
BB12389	Li ion polymer Cell phone Alpha A	0.035	6.25	RTS123, NMD456PO98 N4569-2 BN890A	03.02.2010 03.07.2010 03.10.2010 03.15.2010
BB12450	Li ion polymer Cell Phone Beta B	0.090	6.76	TYh765-KL-09 567-908HGT	08.09.2012 09.01.2012
BB67896	Li ion polymer Cell phone Chi C	0.026	5.25	89065RT-90 NHI-kl09	07.07.2010 07.04.2010
etc					
etc					
etc					
etc					
etc					
etc					

Signature _____

Name, Title

Example 2 of a Lithium Ion Battery Test Summary

	UN38.3 Lithium Battery Test Summary for GreenTech Tablet Model No. T54321
1	**Battery Manufacturer** *Confidential and Proprietary GreenTech Information*
2	**Product Manufacturer** GreenTech 123 Main Street Annapolis, MD 21012 888.111.2345 contact@greentech.com; www1.greentech.com
3	**UN38.3 Test Lab** Bob's Battery Test Lab 1600 Pennsylvania Avenue Smithfield, VA 12345 Phone: 211.789.2345 bob@testlab.org; www.testlab.org
4	**Test Report Number** Liion621345
5	**Date of Test Report** April 1, 2017
6	**Description of Cell or Battery** 7.4 V, 1800 mAh, 13.32 Wh Li ion battery, Model No. P1789 Small, rectangular plastic case, 100 grams
7	**UN38.3 Tests Performed and Successfully Passed** T.1, T.2, T.3, T.4, T.5, and T.7. (Note that T.6 and T.8 are not applicable to batteries.)
8	**Assembled Battery Testing Requirements** Not Applicable
9	**Edition of UN Manual of Tests and Criteria Used** Sixth Revised Edition
10	**Name and Title of Signatory** *Jason Alexander* Jason Alexander GreenTech Staff Engineer

Example 3 of a Lithium Ion Cell Test Summary

LITHIUM CELLS OR BATTERIES TEST SUMMARY
IN ACCORDANCE WITH SUB-SECTION 38.3
OF MANUAL OF TESTS AND CRITERIA

BATTERY TRANSPORTION INFORMATION

Name of cell, battery or product manufacturer, as applicable:

Item Number : 4A23123
Item Name : Battery Alpha Prime
Item Description : Lithium Metal Battery (Primary)

Cell, battery or product manufacturer's contact information to include address, phone number, email address and website for more information:

Manufacturer XYZ
3480 Lithium cells Rd
Lithiumionville, CA 98765
United States
(+1-987) 987-6543
email@xyz.com

Name of the test laboratory to include address, phone number, email address and website for more information:

Test Lab A
1919 Alpha St
Testcity, IA 55555
USA
(+1-333) 555-1122
email@testlab.com

A unique test report identification number:
ABC12345

Date of the test report:
03-Apr-2013

Description of cell or battery to include at a minimum: Lithium ion or Lithium metal cell or battery; Mass; Watt-hour rating, or lithium content; Physical description of the cell/battery; and Model numbers:

Battery used in consumer power tools

Cell/battery Type : Lithium metal
Cell or Battery : Cell
LC or W/h rating : LC (g): >0.3 <= 1
Cell or Battery Weight : 12.00 Grams

List of tests conducted and results (i.e., pass/fail):

Test T.1: Altitude Simulation	:	Pass
Test T.2: Thermal Test	:	Pass
Test T.3: Vibration	:	Pass
Test T.4: Shock	:	Pass
Test T.5: External short circuit	:	Pass
Test T.6: Impact/Crush	:	Pass
Test T.7: Overcharge	:	Not applicable
Test T.8: Forced discharge	:	Pass

Testing additional comments:

Reference to assembled battery testing requirements, if applicable (i.e., 38.3.3(f) and 38.3.3;(g)):
Not applicable

Reference to the revised edition of the Manual of Tests and Criteria used and to amendments thereto, if any:
Revision 5

For air transport only:
Does the cell or battery comply with the 30% State of Charge?
Not Applicable

PRODUCT CLASSIFICATION FOR TRANSPORT (According to UN - DGP)

UN Classification:
UN 3090

Proper Shipping Name:
Lithium metal batteries

Signature with name and title of signatory as an indication of the validity of information provided:
Wayne Purple
Testing Manager

Date document was generated:
04-Mar-2017 11:49 am

This document remains valid as long as no changes, modifications, or additions are made to the model(s) described in this document, after being transported from a Manufacturer XYZ facility.
The model(s) has (have) been classified according to the applicable transport regulations and the UN Manual of Tests and Criteria as of the date of the certification. The model(s) must be packaged, labeled, and documented according to country and other international regulations for transportation.

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[1] Information in Part 4 kindly provided by PRBA – The Rechargeable Battery Association, RECHARGE the Advanced Rechargeable & Lithium Batteries Association and the Medical Device Battery Transport Council

Additional Information

Further information can be found here:

http://www.iata.org/lithiumbatteries

Information for passengers can be found here:

http://www.iata.org/whatwedo/cargo/dgr/Pages/dgr-guidance.aspx

www.faa.gov/go/safecargo

You may also contact the airline of your choice or your national civil aviation authority if you have any further concerns about travelling with lithium metal or lithium ion batteries.

You can also contact the IATA Dangerous Goods Support team if you have questions or concerns which may not have been addressed in this document: dangood@iata.org

Abbreviations, Acronyms, Symbols

The following abbreviations, acronyms and symbols are used throughout the document.

Symbol	Meaning
≥	Equal to or greater than
≤	Equal to or less than
>	Greater than
<	Less than
□	Addition of an item
△	Change to an item
⊗	Deletion of an item
Abbreviation	**Meaning**
A/C	Aircraft
Li Ion (li-ion)	Lithium ion
Li batt.	Lithium battery
PAX	Passenger
Acronym	**Meaning**
CAO	Cargo Aircraft Only
DGD	Shipper's Declaration for Dangerous Goods
DGR	IATA Dangerous Goods Regulations
LBSG	IATA Lithium Battery Shipping Guidelines