

Lithium Batteries Best Practice – 018

(Revision 1 – updated 10 Dec 2020)

Important Notes for All Lithium Cells / Batteries of All Sections:

- Each cell and battery must have completed the UN38.3 test.
- Manufacturers and subsequent distributors of cells or batteries manufactured after 30 June 2003 must make available the test summary as specified in the UN Manual of Test and Criteria, Part III, sub-section 38.3, paragraph 38.3.5 [62 Edition of IATA DGR 3.9.2.6.1 point (g)].
- Section IA / I batteries manufactured after 31 December 2011 and Section IB / Section II batteries manufactured after 1 January 2009 must be marked with the watt-hour rating on the outside case. (62 Edition of IATA DGR PI965 / PI966 & PI967)
- Cells and batteries must be manufactured under a quality management programme.
- Waste cells and batteries, cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, having the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for air transport.
- Cells and batteries must be protected so as to prevent short circuits, and equipment must be equipped with an effective means of preventing accidental activation.
- Subject to the decision of individual carriers, relevant supporting documents of the shipment could be requested from shippers / forwarders. Supporting documents can be in the form of UN38.3 test report, UN38.3 test summary or SDS, or others, such as Product Data Sheet (PDS), and Product Information Sheet (PIS) that meet the acceptance needs of individual carriers.

Best Practice for Consigning Lithium Cells / Batteries in Hong Kong

Following the latest changes on the air transport of Lithium Cells / Batteries shipment as per the 62th edition of the IATA Dangerous Goods Regulations, the Lithium Battery Best Practice 018 will replace Best Practice 017 and take effect from 1 January 2021 until 31 December 2021. Shippers consigning Lithium Cells and / or Batteries from 1 January 2021 and onwards are recommended to follow the best practice as stated below.

The best practice is jointly issued by the Carrier Liaison Group – Dangerous Goods Working Group (CLG – DGWG) and HAFFA. It is a recommended practice (not mandatory) for industry reference only. Shippers and freight forwarders shall always follow the IATA Dangerous Goods Regulations, requirement of the HK Civil Aviation Department and requirement of individual carriers for the air carriage of shipments containing lithium batteries at all times. States' and operators' variations shall always be observed.

This guideline consists of five parts,

- Part 1 – Classification - Lithium Ion Batteries & Lithium Metal Batteries
- Part 2 – Documentation / Packaging & Labelling / Packing Requirements
- Part 3 – Lithium Battery Hazard Label and Lithium Battery Mark
- Part 4 – “Adequate Instruction” for Shipping Section II Lithium Batteries
- Part 5 – Shipper’s Letter of Instruction (SLI)
- Part 6 – Case Sharing

Part 1 – Classification - Lithium Ion Batteries (Rechargeable)

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)

UN3480
PI 965 Section IA
IMP: RBI

Cells > 20 Wh;
Batteries > 100 Wh
Limit per package:
Pax A/C = Forbidden
CAO = 35 kg

Marking & Labelling:



UN3480
PI 965 Section IB
IMP: RBI

Cells ≤ 20 Wh;
Batteries ≤ 100 Wh
Limit per package:
Pax A/C = Forbidden
CAO = 10 kg
*Use "IB" if package exceeds Section II
Limits or more than 1 package

Marking & Labelling:



UN3480
PI 965 Section II
IMP: EBI

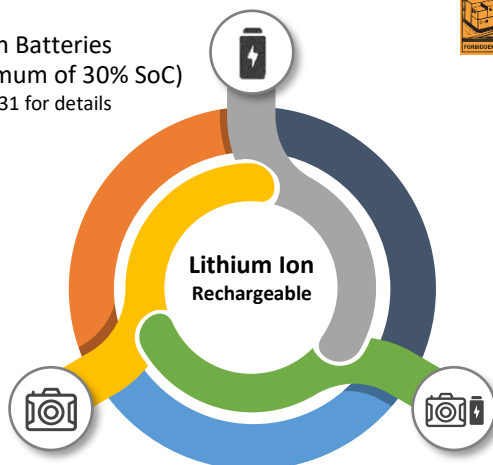
Cells ≤ 20 Wh;
Batteries ≤ 100 Wh
Limit per package:
(not more than 1 package)
Pax A/C = Forbidden
CAO = Cells and/or batteries ≤ 2.7 Wh = 2.5kg; or
Cells > 2.7 Wh ≤ 20 Wh = 8 cells; or
Batteries > 2.7 Wh ≤ 100 Wh = 2 batteries
(Above content must not be combined in the
same package)

Marking & Labelling:



Lithium Ion Batteries
(limited to a maximum of 30% SoC)
Please refer A331 for details

Lithium Ion Batteries
Contained in Equipment



Lithium Ion Batteries
Packed With Equipment

UN3481
PI 967 Section I
IMP: RLI

Cells > 20 Wh;
Batteries > 100 Wh
Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Marking & Labelling:



UN3481
PI 967 Section II *
IMP: ELI

Cells ≤ 20 Wh;
Batteries ≤ 100 Wh
Limit per package:
Pax A/C = 5 kg
CAO = 5 kg
*Less than 4 cells or 2 batteries
(max 2 packages per
consignment is exempted from
markings. See PI967 Section II)

Marking & Labelling:



UN3481
PI 966 Section I
IMP: RLI

Cells > 20 Wh;
Batteries > 100 Wh
Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Marking & Labelling:



UN3481
PI 966 Section II
IMP: ELI

Cells ≤ 20 Wh;
Batteries ≤ 100 Wh
Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

Marking & Labelling:



Part 1 – Classification - Lithium Metal Batteries (Non – Rechargeable)

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)

UN3090
PI 968 Section IA
IMP: RBM

Cells > 1 g;
Batteries > 2 g
Limit per package:
Pax A/C = Forbidden
CAO = 35 kg

Marking & Labelling:



UN3090
PI 968 Section IB
IMP: RBM

Cells ≤ 1 g;
Batteries ≤ 2 g
Limit per package:
Pax A/C = forbidden
CAO = 2.5 kg
*Must use "IB" if package exceeds
Section II Limits or more than 1 package

Marking & Labelling:



UN3090
PI 968 Section II
IMP: EBM

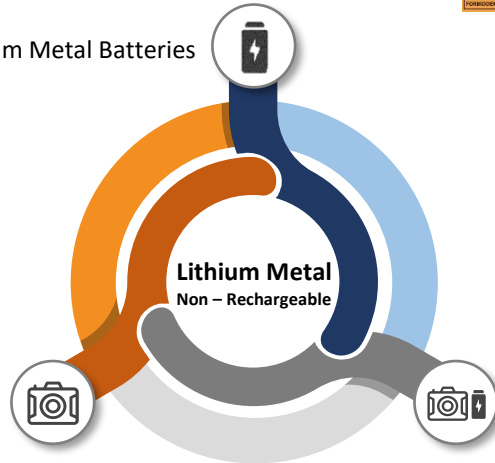
Cells ≤ 1 g;
Batteries ≤ 2 g
Limit per package:
(not more than 1 package)
Pax A/C = Forbidden
Lithium metal content
CAO = Cells or Batteries: ≤ 0.3g = 2.5 kg; or
cells > 0.3 g ≤ 1 g = 8 cells; or
batteries > 0.3 g ≤ 2 g = 2 batteries

Marking & Labelling:



Lithium Metal Batteries

Lithium Metal Batteries
Contained in Equipment



Lithium Metal Batteries
Packed With Equipment

UN3091
PI 970 Section I
IMP: RLM

Cells > 1 g;
Batteries > 2 g
Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Marking & Labelling:



UN3091
PI 970 Section II *
IMP: ELM

Cells ≤ 1 g;
Batteries ≤ 2 g
Limit per package:
Pax A/C = 5 kg
CAO = 5 kg
*exceptions exist to the
marking requirements
See PI 970 Section II

Marking & Labelling:



UN3091
PI 969 Section I
IMP: RLM

Cells > 1 g;
Batteries > 2 g
Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Marking & Labelling:



UN3091
PI 969 Section II
IMP: ELM

Cells ≤ 1 g;
Batteries ≤ 2 g
Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

Marking & Labelling:



Part 2 – Documentation / Packaging & Labelling / Packing Requirements

Item/UN/Section	UN3480 & UN3090			UN3481 & UN3091	
	Section IA	Section IB	Section II	Section I	Section II
Documentation					
Shipper's DGD ¹ form	✓	✓	✗	✓	✗
Information indicated in "Handling Information" in AWB	1. Dangerous Goods as per associated DGD ² 2. Cargo Aircraft Only or CAO	1. Dangerous Goods as per associated DGD 2. Cargo Aircraft Only or CAO	1. Lithium ion / metal batteries in compliance with section II of PI965 / 968 2. Cargo Aircraft Only or CAO *This information should be shown in "Nature & Quantity of Goods" Box. *If the consignment contains both Section II of PI965 and PI968, the statement can be illustrated as follows. Lithium ion and lithium metal batteries in compliance with section II of PI965 and 968	Dangerous Goods as per associated DGD	Lithium ion batteries in compliance with section II of PI966 / 967 or Lithium metal batteries in compliance with section II of PI969 / 970 *This information should be shown in "Nature & Quantity of Goods" Box. *If the consignment contains both Section II of PI966 and PI967, the statement can be illustrated as follows. Lithium ion batteries in compliance with section II of PI966 and 967
Packaging & Labelling					
UN specification outer packaging meets the Packing Group II performance standard	✓	✗	✗	PI966 & PI969 ³	✗
Strong rigid outer packaging	UN specification outer packaging	✓	✓	PI967 & PI970	✓
Each package must be capable of withstanding a 1.2 m drop test in any orientation.	UN specification outer packaging	✓	✓	✗	PI966 & PI969
Class 9 lithium battery hazard label	✓	✓	✗	✓	✗
Lithium battery mark ⁴	✗	✓	✓	✗	✓
CAO label	✓	✓	✓	Required if intended for transport on cargo aircraft	✗

¹ Shipper's Declaration for Dangerous Goods (DGD)

² The statement "Dangerous goods as per attached Shipper's Declaration" or "Dangerous goods as per attached DGD" as shown in the 61st Edition of these Regulations may continue to be used until 31 December 2022.

³ PI969: When prepared for transport on Passenger Aircraft, must be packed in a rigid metal intermediate or metal outer packaging

PI966 & PI969: The number of cells or batteries in each package must not exceed the number required for the equipment to operate, plus 2 spare sets.

⁴ Lithium battery mark is NOT REQUIRED to be affixed, when:


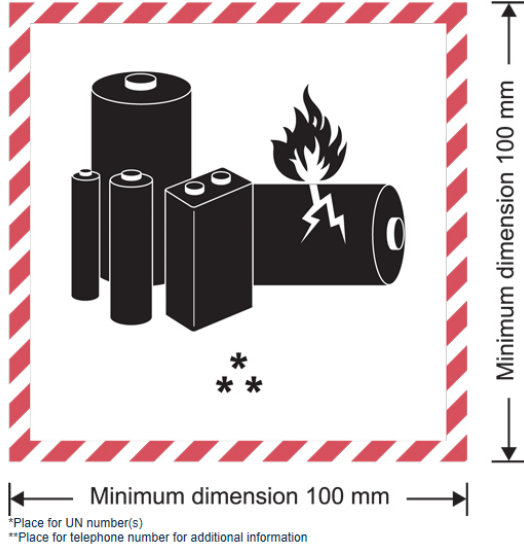
- The packages contain only button cell batteries contained in equipment (including circuit boards); or
- The packages contain no more than 4 cells or no more than 2 batteries contained in equipment and no more than two of these packages per consignment under Section II of PI967 / PI970
 - Declare Package contains 4 cells or less; or Package contains 2 batteries or less on MAWB or an alternate document to avoid confusion

Item/UN/Section	UN3480 & UN3090			UN3481 & UN3091	
	Section IA	Section IB	Section II	Section I	Section II
Packing Requirements					
Must not packed in the same outer packaging with dangerous goods classified as Class 1 other than Div 1.4S, Div 2.1, Class 3, Div 4.1 or Div 5.1	✓	✓	The overpack must not contain dangerous goods classified in Class 1 other than Div 1.4S, Div 2.1, Class 3, Div 4.1 or Div 5.1	X	The overpack must not contain dangerous goods classified in Class 1 other than Div 1.4S, Div 2.1, Class 3, Div 4.1 or Div 5.1
No more than one package in any single consignment ⁵	X	X	✓	X	X
Packages must be tendered in loose to airlines	X	X	✓	X	X
Additional Requirement	<p>Contains both lithium metal cells and lithium ion cells that is not designed to be charged externally. They must meet the following conditions: (Hybrid Lithium Battery and SP A213)</p> <ul style="list-style-type: none"> •The lithium ion cells can only be charged from the lithium metal cells; •Overcharge of the lithium ion cells is precluded by design; •The battery has been tested as a lithium metal battery; •Component cells must have passed the respective UN 38.3 test; •Must be assigned to UN 3090 or UN 3091, as appropriate. 			<p>When a package contains a combination of lithium batteries packed with equipment (PI 966 / PI 969) and lithium batteries contained in equipment (PI 967 / PI 970), please refer A181 for details.</p>	
Overpack Requirements					
Overpack Requirement	<p>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.</p>		<ol style="list-style-type: none"> 1. No more than one package may be placed in an overpack. 2. The package contained within an overpack must be properly packed, marked, labelled and be free of damage or leakage and be secured within the overpack. 3. An overpack must be marked with the word "Overpack" in lettering at least 12 mm high and durably and legibly marked unless, the marks and label representative of those on the package inside the overpack are visible. 	X	<ol style="list-style-type: none"> 1. Each package contained within an overpack must be properly packed, marked, labelled and be free of damage or leakage and be secured within the overpack. 2. The overpack must be marked with the word "Overpack" in lettering at least 12 mm high and durably and legibly marked unless, the marks and label representative of those on the package inside the overpack are visible.

⁵ Consignment means "One or more packages of dangerous goods accepted by an operator from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address." (IATA Dangerous Goods Regulations Appendix A)

*NOTE: Some regulators might have a different interpretation on the term "consignment", shippers / freight forwarders are suggested to contact individual airlines to confirm the requirement.

Part 3 – Lithium Battery Hazard Label and Lithium Battery Mark

<p>Class 9 Lithium Battery Hazard Label for Section I, IA and IB</p>	<p>Lithium Battery Mark for Section IB and II</p>
 <p>The image shows a diamond-shaped hazard label with a black border and a white background. The top half of the diamond is filled with black vertical bars. In the center, there is a small illustration of three lithium batteries, one of which is on fire. Below the illustration is the number '9'.</p>	 <p>The image shows a square lithium battery mark with a red and white diagonal hatched border. Inside the square, there are illustrations of three lithium batteries: two cylindrical ones and one rectangular one that is on fire with a lightning bolt symbol. Below the batteries are two asterisks (**). Dimension lines indicate a minimum width of 100 mm and a minimum height of 100 mm. Below the square, there are two asterisks (**).</p> <p><small>*Place for UN number(s) **Place for telephone number for additional information</small></p>
<p>Minimum dimensions: 100 × 100 mm</p>	<p>Minimum dimensions: 100mm wide x 100mm high Hatching must be 5 mm</p> <ul style="list-style-type: none"> • The mark must have red diagonal hatchings. (Black and white photocopied mark is not permitted) • The lithium battery mark must be completed with the UN number and a valid telephone number. • Smaller size mark, 100mm wide x 70mm high, can only be used the package is of dimension without sufficient space for the standard mark. • The mark can be printed on the outer packaging but must have sufficient contrast and the specification is met. • The mark illustrated in Figure 7.1.C of the 61st Edition of these Regulations with minimum dimensions of 120 mm x 110 mm may continue to be used.

Part 4 – Adequate Instruction for Shipping Section II Lithium Batteries

It is mandatory for persons preparing or offering cells or batteries for transport to receive adequate instruction on the Section II lithium battery shipping requirements commensurate with their responsibilities.

IATA recommends employees shipping Section II lithium battery shipments be provided with knowledge on the following areas at a minimum of every two years, or as the documented instructions or regulations are revised.

- Classification of lithium batteries being shipped.
- Documentation of procedures applied to the lithium batteries being shipped.
- Written work instructions or other documentation.
- Reverse logistics, include transport mode and applicable prohibitions (if required).

The instruction given should be recorded with the date(s).




Part 5 – Shipper’s Letter of Instruction (SLI)

Design a check box and the shippers must clearly indicate below information on SLI:

- The type of cells or batteries: Lithium ion cells / Lithium ion batteries / Lithium metal cells / Lithium metal batteries
- The relevant Packing Instruction: “PI965 / PI966 / PI967 / PI968 / PI969 / PI970”
- Section of Packing Instruction referring: “Section I / Section IA / Section IB / Section II”

Forwarders must check the declared content and ensure there is no suspicious commodity. If there is doubt, freight forwarders must ask for supporting document such as MSDS, packing list and invoice for verification.

Part 6 – Case Sharing

Undeclared Shipment	
	<p style="text-align: center;"><u>UN3480 – Lithium-ion battery</u></p> <p>13 boxes were detected with suspected Lithium Battery inside. Un-declared “Lithium Battery” items (mobile-phone/Laptop batteries) were found</p> <p style="text-align: center;"><u>Good Description</u></p> <p>Cable, Mobile case, Mobile protective film without battery</p> <p style="text-align: center;"><u>Mitigation</u></p> <ol style="list-style-type: none"> 1. Raises the awareness of acceptance staff on the invoice / packing list advised by shipper.
Mis-Undeclared Shipment	
	<p style="text-align: center;"><u>UN3480 – Lithium-ion battery</u></p> <p>Mis-declared UN3480 PI965 as UN3481 PI967</p> <p style="text-align: center;"><u>Good Description</u></p> <p>Phone Case, Not Restricted without nicotine, Lithium-ion batteries in compliance with section II of PI967</p> <p style="text-align: center;"><u>Mitigation</u></p> <ol style="list-style-type: none"> 1. Raises the awareness of acceptance and handling staff 2. Knowledge sharing within organization 3. Random X-Ray check and physical hand search
Improper Handling	
	<p style="text-align: center;"><u>UN3481 – Lithium-ion batteries packed with equipment</u></p> <p>Part of loose packages fall on ground when the forklift operator lifting the skid from the top of pallet.</p> <p style="text-align: center;"><u>Good Description</u></p> <p>Mobile phone & dispenser</p> <p style="text-align: center;"><u>Mitigation</u></p> <ol style="list-style-type: none"> 1. Training on proper handling <p>*If a package containing lithium batteries falls on the ground after acceptance, the concerned package shall be placed in an isolated area inside the warehouse. At least after 3-hour of observation, if there is no irregularity (e.g. does not emit any heat or smoke) from the package, it can be planned for continue transportation</p>