

Lithium Batteries Best Practice – 021

(Revision 1 – updated 30 Jun 2023)

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

- Each cell and battery must have completed the UN38.3 test.
- Except for button cells installed in equipment (including circuit boards), 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 [64th Edition of IATA DGR 3.9.2.6.1 point (g)].
- Section IA of PI 965/ Section I of PI 966 & PI 967 batteries manufactured after 31 December 2011 and Section IB of PI 965/ Section II of PI 966 & PI 967 batteries manufactured after 1 January 2009 must be marked with the watt-hour rating on the outside case. (64th 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 64th edition of the IATA Dangerous Goods Regulations, the Lithium Battery Best Practice 021 will replace Best Practice 020 and take effect from 27 June 2023 until 31 December 2023. Shippers consigning Lithium Cells and / or Batteries from 1 January 2023 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 eight 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 7 – Other Recommended Practice
- Part 8 – Un/mis-declared lithium battery incidents summary (ex-HKG 2019-2022)

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 3.9.2.6.1 (a))

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;

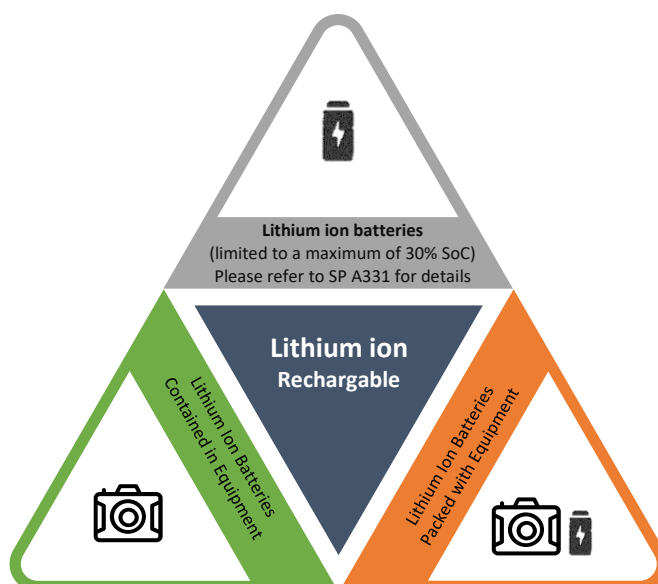
Batteries ≤ 100 Wh

Limit per package:

Pax A/C = Forbidden

CAO = 10 kg

Marking & Labelling:



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 3.9.2.6.1 (a))

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;

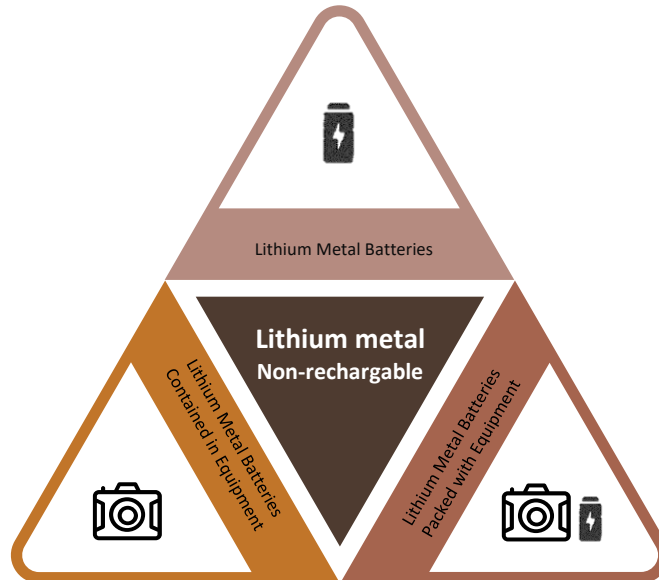
Batteries ≤ 2 g

Limit per package:

Pax A/C = forbidden

CAO = 2.5 kg

Marking & Labelling:



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 I	Section II
Documentation				
Shipper's DGD ¹ form	✓	✓	✓	X
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	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	✓	X	PI966 & PI969 ³	X
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	✓	X	PI966 & PI969
Class 9 lithium battery hazard label	✓	✓	✓	X
Each package must be capable of withstanding a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3m for a duration of 24 hours	UN specification outer packaging	✓	X	X
Lithium battery mark ⁴	X	✓	X	✓
CAO label	✓	✓	Required if intended for transport on cargo aircraft	X

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 2024.

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


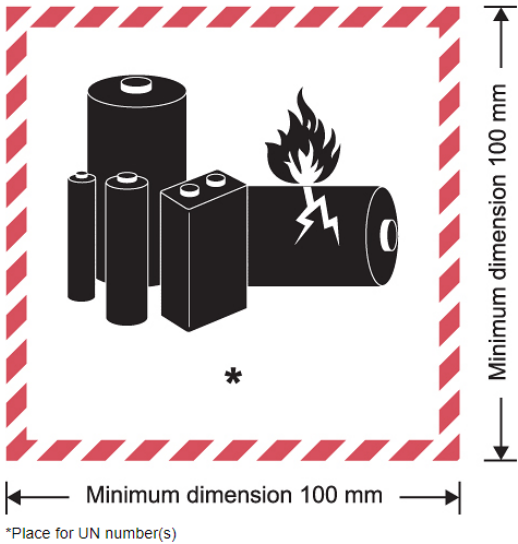
Item/UN/Section	UN3480 & UN3090		UN3481 & UN3091	
	Section IA	Section IB	Section I	Section II
Packing Requirements				
Must not packed in the same outer packaging with dangerous goods classified as Class 1 other than Div 1.4S, Div 2.1, Class 3, Div 4.1 or Div 5.1	✓	✓	X	X**
No more than one package in any single consignment ⁵	X	X	X	X
Additional Requirement	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) •The rechargeable lithium ion cells can only be charged from the primary lithium metal cells; •Overcharge of the rechargeable 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.		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 SP A181 for details.	
Overpack Requirements				
Overpack Requirement	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.		X**	
	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 1: Some regulators might have a different interpretation on the term "consignment". Shippers / freight forwarders are suggested to contact individual airlines to confirm the requirement.

** NOTE 2: Some regulators might have different requirements on packing and segregation. Shippers / freight forwarders are suggested to contact individual airlines to confirm.

Part 3 – Lithium Battery Hazard Label and Lithium Battery Mark

<p style="text-align: center;"><u>Class 9 Lithium Battery Hazard Label for Section I, IA and IB</u></p>	<p style="text-align: center;"><u>Lithium Battery Mark for Section IB and II</u></p>
 <p>The label is a diamond shape with a black border. Inside, there are seven vertical black bars of varying heights. At the bottom center, there is a small illustration of a lithium battery with a flame and a lightning bolt, and the number '9' below it.</p>	 <p>The mark is a rectangular box with a red and white diagonal hatched border. Inside, there is an illustration of a lithium battery with a flame and a lightning bolt, and an asterisk (*) below it. The text 'Minimum dimension 100 mm' is written vertically on the right side and horizontally at the bottom. Below the box, there is a note: '*Place for UN number(s)'.</p>
<p>Minimum dimensions: 100mm × 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. • Smaller size mark, 100mm wide x 70mm high, can only be used if 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 63rd Edition of these Regulations may continue to be used until 31 December 2026.

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

UN3480 – Lithium ion batteries

Fire incident happened after shipment acceptance. After the fire was put out, some burned items from the wreckage were suspected to be large size undeclared lithium ion batteries of UN3480 PI965.

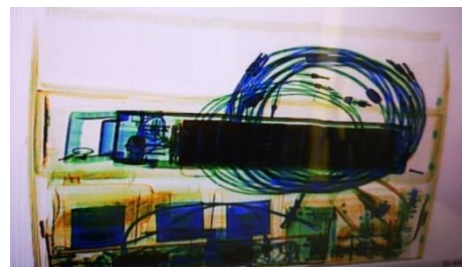


Goods Description

Clothes, Toning lotion, Headset, Lithium ion batteries in compliance with Section II of PI967

Mitigation

1. Cargo agent increased percentage of random hand search
2. Knowledge sharing within organisation
3. Increased screening at cargo terminal
4. Conduct open box check according to x-ray images.
Scenario includes:
 - a. X-ray images show solid dark colour, high density, unable to penetrate (example on the right)



UN3480 – Lithium ion batteries

An e-commerce shipment has been found to contain undeclared lithium ion batteries (UN3480 PI965). Each nylon package contained numerous individual parcel bags stacked together during x-ray screening, which increased the difficulty to obtain a clear image. The packing list also contained suspicious and hidden DG descriptions such as glue, cigarette lighter, perfume, and paint.

Goods Description

Tester, receiver, wrist watch, touch pen, nightlight, lotion, kitchen knife (unsharpened), nail polish, not restricted, lithium ion batteries, in compliance with, section II of PI 967 and PI 966

Mitigation

1. Exercise extra vigilance on cargo goods description during document acceptance and x-ray screening. Review document (such as invoice, packing list, and cargo manifest) and check for suspicious cargo description. Seek clarification from freight forwarder or shipper when in doubt
2. Advise to lay out individual parcels, instead of placing whole stacks of outer packages into the x-ray machine

UN3091 – Lithium metal batteries contained in equipment

UN3091 Lithium metal batteries contained in equipment has been found during x-ray screening at warehouse. The batteries were not declared.

Goods Description

Blood glucose monitoring system// blood glucose strips 50s// lancets 50s// dry battery// not restricted as per SP A123

Mitigation

1. Ensure effective communication between x-ray screening, warehouse, and office/operation staff regarding accurate and consistent information

Mis-Undeclared Shipment

UN3480 – Lithium ion batteries

UN3480 PI965 was mis-declared as UN3481 PI967. Upon arrival, smoke was emitted from shipment.

Goods Description

Parts LCD for mobile, memory module

Mitigation

1. Cargo agent increased percentage of random hand search
2. Knowledge sharing within organisation



Improper Handling

UN3481 – Lithium-ion batteries packed with equipment

A fire incident took place during breakdown of shipment in warehouse. Some carton boxes dropped off from the pallet and after that, smoke and fire emerge from one of the dropped boxes.



Goods Description

LED RGB Light, Data Cable

Mitigation

Training on proper handling

Part 7 – Other Recommended Practice

Three-hour observation: 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. After at least three hours 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.

Part 8 – Un/Mis-declared lithium battery incidents summary **(ex-HKG 2019-2022)**

This section contains information on un/mis-declared lithium battery incidents departing from HKG from 2019 to 2022. Shippers/freight forwarders are encouraged to stay vigilant when accepting shipments containing similar goods descriptions, which may potentially contain un/mis-declared lithium batteries. Below information on shipment destination may be referenced to when considering to conduct additional checks at shipment acceptance.

Shipment containing un/mis-declared lithium battery – examples of goods description on Air Waybill

- CONSOL SHIPMENT AS PER CARGO MANIFEST ATTACHED W/O BATTERY, NOT RESTRICTED
- Remote control helicopter model accessory W/O BATTERY, NOT RESTRICTED
- ENDOSCOPE CAMERA SYSTEM (WITHOUT BATTERY) (NOT RESTRICTED) (NO MAGNETITE)
- SEATCOVER, GAME MACHINE, RING, SUNSCREEN (NOT RESTRICTED), HAIR CARE POWDER, CONTACT LENS SOLUTION, LIPSTICK, GEL POLISH, ESSENTIAL (BERGAMOT) OIL (NOT RESTRICTED)
NO E/L REQUIRED

Shipment destination by region

