



# Air Transport of **Section II** Lithium Batteries



## Overview of Air Transport of Section II Lithium Batteries

	Packed	UN number / Packing Instruction	Battery capacity / Lithium content per battery	Max net weight or quantity	Label	Documentation	Required text on the consignment note	DG Option Code	Commercial airlines restrictions
Lithium Ion Batteries	Batteries only	<a href="#">UN 3480</a> <a href="#">PI 965</a>	<b>FORBIDDEN on the TNT Air Network</b>						
	Packed with equipment	<a href="#">UN 3481</a> <a href="#">PI 966</a> <sup>2</sup>	≤ 20 Wh per cell	5 kg net <sup>1</sup>	Lithium Battery Label	None	Lithium Ion Batteries in compliance with Section II of PI 966	LB	YES
			≤ 100 Wh per battery	5 kg net <sup>1</sup>	Lithium Battery Label	None	Lithium Ion Batteries in compliance with Section II of PI 966	LB	YES
	Contained in equipment	<a href="#">UN 3481</a> <a href="#">PI 967</a> <sup>2</sup>	≤ 20 Wh per cell or ≤ 100 Wh per battery and more than 4 cells or more than 2 batteries per package	5 kg net	Lithium Battery Label	None	Lithium Ion Batteries in compliance with Section II of PI 967	LB	YES
≤ 20 Wh per cell ≤ 100 Wh per battery			Packages containing: <ul style="list-style-type: none"> <li>• Only button cell batteries contained in equipment (incl. Circuit boards)</li> <li>• Max 4 cells or 2 batteries or only button-cells installed in equipment, where there are not more than <u>2</u> packages in the consignment.</li> </ul>	None	None	None	NONE	NO	
Lithium Metal Batteries	Batteries only	<a href="#">UN 3090</a> <a href="#">PI 968</a>	<b>FORBIDDEN on the TNT Air Network</b>						
	Packed with equipment	<a href="#">UN 3091</a> <a href="#">PI 969</a> <sup>2</sup>	≤ 1 gr of lithium per cell	5 kg net <sup>1</sup>	Lithium Battery Label	None	Lithium Metal Batteries in compliance with Section II of PI 969	LB	YES
			≤ 2 gr of lithium per battery	5 kg net <sup>1</sup>	Lithium Battery Label	None	Lithium Metal Batteries in compliance with Section II of PI 969	LB	YES
	Contained in equipment	<a href="#">UN 3091</a> <a href="#">PI 970</a> <sup>2</sup>	≤ 1 gr of lithium per cell or ≤ 2 gr of lithium per battery and more than 4 cells or more than 2 batteries per package	5 kg net	Lithium Battery Label	None	Lithium Metal Batteries in compliance with Section II of PI 970	LB	YES
≤ 1 gr of lithium per cell ≤ 2 gr of lithium per battery			Packages containing: <ul style="list-style-type: none"> <li>• Only button cell batteries contained in equipment (incl. Circuit boards)</li> <li>• Max 4 cells or 2 batteries or only button-cells installed in equipment, where there are not more than <u>2</u> packages in the consignment.</li> </ul>	None	None	None	NONE	NO	

<sup>1</sup> For batteries/cells packed with equipment the number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation plus two spares.

<sup>2</sup> For the purposes of this packing instruction "equipment" means the device or apparatus for which the lithium cells or batteries will provide electrical power for its operation. Therefore devices like Powerbanks must be classified as batteries and not as batteries contained in equipment.



## Why Dangerous Goods?

- Lithium batteries (or cells) which are used to power a very large variety of electronic devices are considered as Dangerous Goods due to the fact that they can overheat and ignite under certain conditions.

## What are the applicable regulations for the different transport modes?

- The 58th/2017 edition of the IATA DGR: Section II of the relevant Packing Instructions

UN Number	Proper Shipping Name	Packing Instruction
UN3480	Lithium ion batteries	965 (section II)
UN3481	Lithium ion batteries packed with equipment	966 (section II)
	Lithium ion batteries contained in equipment	967 (section II)
UN3090	Lithium metal batteries	968 (section II)
UN3091	Lithium metal batteries packed with equipment	969 (section II)
	Lithium metal batteries contained in equipment	970 (section II)

## General requirements for Lithium Batteries as per IATA DGR 3.9.2.6

Cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment, containing lithium in any form must be assigned to UN 3090, UN 3091, UN 3480 or UN 3481, as appropriate. They may be transported under these entries if they meet the following provisions:

- (a) each cell or battery is of the type proved to meet the requirements of each test of the UN Manual of Tests and Criteria, Part III, subsection 38.3. Cells and batteries manufactured according to a type meeting the requirements of subsection 38.3 of the UN Manual of Tests and Criteria, Revision 3, Amendment 1 or any subsequent revision and amendment applicable at the date of the type testing may continue to be transported, unless otherwise provided in these Regulations.

Cell and battery types only meeting the requirements of the Manual of Tests and Criteria, Revision 3, are no longer valid. However, cells and batteries manufactured in conformity with such types before 1 July 2003 may continue to be transported if all other applicable requirements are fulfilled.

### Note:

*Batteries must be of a design type proved to meet the testing requirements of the Manual of Tests and Criteria, Part III, subsection 38.3, irrespective of the whether the cells of which they are composed are of a tested design type.*

- (b) each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under conditions normally incident to transport;
- (c) each cell and battery is equipped with an effective means of preventing external short circuits;
- (d) each battery containing cells or series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g., diodes, fuses, etc.);
- (e) cells and batteries must be manufactured under a quality management program that includes:
- a description of the organizational structure and responsibilities of personnel with regard to design and product quality;
  - the relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;
  - process controls that should include relevant activities to prevent and detect internal short circuit failure during manufacture of cells;
  - quality records, such as inspection reports, test data, calibration data and certificates. Test data must be kept and made available to the appropriate national authority upon request;
  - management reviews to ensure the effective operation of the quality management programme;
  - a process for control of documents and their revision;
  - a means for control of cells or batteries that are not conforming to the type tested as mentioned in (a) above;
  - training programmes and qualification procedures for relevant personnel; and
  - procedures to ensure that there is no damage to the final product.

### Note:

*In house quality management programmes may be accepted. Third party certification is not required, but the procedures listed in 1. to 9. above must be properly recorded and traceable. A copy of the quality management programme must be made available to the appropriate national authority upon request.*

## What are the general requirements for the transport of Section II Lithium Batteries?



## Air Transport of **Section II** Lithium Batteries

### General requirements for lithium batteries as per appropriate Packing Instructions:

- A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN Manual of Tests and Criteria is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.
- Cells and 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 (e.g. those being returned to the manufacturer for safety reasons);
- Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of origin and the State of the operator;
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
- Equipment containing cells or batteries;
  - must be equipped with an effective means of preventing accidental activation;
  - must be packed in strong rigid outer packaging that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1 of the IATA DGR;
  - must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

What is the minimum adequate instruction for person preparing these shipments?

At a minimum, an employer should consider the following as being adequate instruction:

- Classification of lithium batteries being shipped.
- Documentation of procedures applied to lithium batteries being shipped
- Written work instructions or other documentation, including automated controls.
- Review and understanding of documented procedures as applicable to job function.
- Instruction records including date(s) for all employees.
- Refresher instructions provided at a minimum every two years or as the documented instructions are revised or regulations are changed.
- Reverse logistics, including transport mode and applicable prohibitions.

What are the cell/battery capacity limitations?

	Lithium ION Max. Watt-hour rating	Lithium METAL Max. lithium content
<b>Cells</b>	20 Wh	1 gram
<b>Batteries</b>	100 Wh	2 gram

How must I pack cells/batteries?

(PI 965 & 968)

### Important Note:

**UN3480 and UN3090 Section II, lithium batteries without equipment in the TNT Air Network are strictly forbidden.**

How must I pack cells/batteries that are packed with equipment?

(PI 966 & 969)

- For the purposes of this packing instruction "equipment" means the device or apparatus for which the lithium cells or batteries will provide electrical power for its operation.
- Cells and batteries must be placed in inner packaging that completely enclose the cell or battery then placed in a strong rigid outer packaging; or then placed with equipment in a strong rigid outer packaging.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The maximum number of batteries in each package must be the minimum number required to power the equipment plus two spares.
- Each package of cells or batteries, or the completed package must be capable of withstanding a 1.2 m drop test in any orientation without:
  - damage to cells or batteries contained therein;
  - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  - release of contents.
- Maximum Net Quantity of cells or batteries per package: 5kg.

How must I pack cells/batteries that are contained in equipment?

(PI 967 & 970)

- For the purposes of this packing instruction “equipment” means the device or apparatus for which the lithium cells or batteries will provide electrical power for its operation. Therefore devices like Powerbanks must be classified as batteries and not as equipment.
- The equipment must be packed in strong rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the cell or battery is afforded equivalent protection by the equipment in which it is contained.
- Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. **The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport.**
- Maximum Net Quantity of cells or batteries per package: 5kg.

What kind of outer packaging I can use?

(all PIs)

- Only following outer packaging may be used:
  - Drums: Steel, Aluminium, Plywood, Fibre, Plastic, Other metal;
  - Jerricans: Steel, Aluminium, Plastic,
  - Boxes: Steel, Aluminium, Wood, Plywood, Reconstituted wood, Fibreboard, Plastic, Other metal

How must I label/mark the packages?



This **marking** must contain;  
 -> UN Number  
 -> a telephone number where more information on the shipment and its content can be obtained

**Marking** specifications:  
 -> Design: see example.  
 -> Minimum dimensions: 120 x 110 mm

The previous provisions for the lithium battery label may continue to be used until 31 December 2018:



This label must contain;  
 -> the statement “Lithium ion battery” or “Lithium metal battery”  
 -> a telephone number where more information on the shipment and its content can be obtained

Label specifications:  
 -> Design: see example.  
 -> Minimum dimensions: 120 x 110 mm

- The information on the lithium battery handling label must be in English. Additionally, if required, the wording in English may be supplemented by an accurate printed translation in another language.
- The label / marking is not required for:
  - packages containing only button cell batteries installed in equipment (including circuit boards); and
  - **consignments of two packages or less where each package contains no more than four cells or two batteries installed in equipment**

Must I provide a document with the package?

- **As of January 2017 the Lithium Battery Transport document is not required.**

How must I complete the TNT Consignment note (Air Waybill)?

- Collection Address (4): must contain the telephone number of the shipper
- Dangerous Goods (7): the ‘Yes’ must be ticked  
*(not applicable for packages where there are not more than 4 cells or 2 batteries installed in equipment, where are not more than two packages in the consignment and for button cell batteries installed in equipment (including circuit boards))*
- For each consignment bearing the lithium battery handling label, the “Goods Description” (10) or “Special Delivery Instructions” (9) must contain the statement (as applicable):  
 “Lithium Ion Batteries in compliance with Section II of PI#” (\*)  
 “Lithium Metal Batteries in compliance with Section II of PI#” (\*)  
 (\*) insert the applicable IATA DGR Packing Instruction Number.



## Air Transport of **Section II** Lithium Batteries

<b>May I consolidate PI 966 and PI 967 (or respectively PI 969 and 970) in one shipment?</b>	<p>Where a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment that meet the limits for lithium cells or batteries of Section II, the following additional requirements apply:</p> <ul style="list-style-type: none"><li>the shipper must ensure that all applicable parts of both packing instructions are met. The total weight of lithium batteries contained in any package must not exceed 5 kg;</li><li>the words “lithium ion batteries, in compliance with Section II of PI966” or respectively “lithium metal batteries, in compliance with Section II of PI969” must be placed on the air waybill, when an air waybill is used.</li></ul>
<b>May I consolidate several packages containing Section II Lithium Batteries (UN3481/UN3091 only) in one shipment?</b>	<ul style="list-style-type: none"><li>Individual packages each complying with the requirements may be consolidated by the shipper in an overpack.</li><li>An overpack must be marked with the word “overpack” and labelled with the Lithium battery handling label unless the labels on the individual packages inside the overpack are visible or the label is not required.</li></ul>
<b>How must Data Entry be completed?</b>	<ul style="list-style-type: none"><li>For UN 3481 and UN3091, the TNT DG Option Code LB must be applied together with <b>applicable Packing Instruction.</b> <i>(not applicable for packages where there are not more than 4 cells or 2 batteries installed in equipment, where are not more than two packages in the consignment and for button cell batteries installed in equipment (including circuit boards))</i></li></ul>
<b>Do all airlines accept Section II Lithium Batteries?</b>	<ul style="list-style-type: none"><li>In addition to regulations, a number of air operators have implemented ad hoc restrictions on the carriage of lithium batteries on their flights. This is leading to service disruption with shipments being stopped by the airlines or by the handling agents</li><li>For further information on commercial airlines restrictions of Lithium Batteries within TNT network please contact TNT Customer Service, or local TNT’s DG Specialist.</li></ul>
<b>Are the transport requirements for Section II Lithium Batteries by ROAD and/or SEA different?</b>	<ul style="list-style-type: none"><li>Transport requirements for ROAD/SEA are similar but somewhat less restrictive.</li><li>Any shipment that is compliant for Air transport may also be transported by ROAD/SEA. However shipment that are only compliant for ROAD/SEA transport may not be in line with the air transport regulations.</li><li>For further information on ROAD/SEA transport of Lithium Batteries please consult the relevant transport regulations.</li></ul>
<b>Does TNT accept Lithium Batteries that are above the limitations for Section II Lithium Batteries?</b>	<ul style="list-style-type: none"><li>Yes, TNT can accept these for transport however in this case all TNT DG policy &amp; procedure requirements apply i.e.:<ul style="list-style-type: none"><li>Accepted from DG approved customers only (each shipper must be specifically approved by HO)</li><li>From, through and to DG Approved Countries only</li><li>Option Code HZ must be used</li></ul></li><li>This above applies to all cells/batteries that are compliant with the requirements of Section 1 (1A &amp; 1B) of the relevant packing instructions.</li></ul>
<b>Where can I find further information?</b>	<ul style="list-style-type: none"><li>In the <b>58<sup>th</sup> / 2017</b> IATA Dangerous Goods Regulations.</li><li>In the DG section of ExpressNet Global.</li><li>By contacting your local DG Manager or IATA Cat 6 Certified DG Specialist.</li></ul>