



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 RESTRICTED on the TNT Air Network	UN 3480 PI 965	≤ 2.7 Wh per cell or battery	2.5 kg net	Lithium Battery Label and CAO-Label	LB Transport Document	Lithium Ion Batteries in compliance with Section II of PI 965, CAO	HZ	YES ⁴
			> 2.7 ≤ 20 Wh per cell	not more than 8 cells	Lithium Battery Label and CAO-Label	LB Transport Document	Lithium Ion Batteries in compliance with Section II of PI 965, CAO	HZ	YES ⁴
			> 2.7 ≤ 100 Wh per battery	not more than 2 batteries	Lithium Battery Label and CAO-Label	LB Transport Document	Lithium Ion Batteries in compliance with Section II of PI 965, CAO	HZ	YES ⁴
	Packed with equipment	UN 3481 PI 966 ²	≤ 20 Wh per cell	5 kg net ¹	Lithium Battery Label	LB Transport Document	Lithium Ion Batteries in compliance with Section II of PI 966	LB	YES
			≤ 100 Wh per battery	5 kg net ¹	Lithium Battery Label	LB Transport Document	Lithium Ion Batteries in compliance with Section II of PI 966	LB	YES
	Contained in equipment	UN 3481 PI 967 ²	≤ 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	LB Transport Document	Lithium Ion Batteries in compliance with Section II of PI 967	LB	YES
≤ 20 Wh per cell ≤ 100 Wh per battery			Packages containing: • Only button cell batteries contained in equipment (incl. Circuit boards) • 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. ³	None	None	None	NONE	NO	
Lithium Metal Batteries	Batteries only RESTRICTED on the TNT Air Network	UN 3090 PI 968	≤ 0.3 gr of lithium per cell or battery	2.5 kg net	Lithium Battery Label and CAO-Label	LB Transport Document	Lithium Metal Batteries in compliance with Section II of PI 968, CAO	HZ	YES ⁴
			> 0.3 ≤ 1 gr of lithium per cell	not more than 8 cells	Lithium Battery Label and CAO-Label	LB Transport Document	Lithium Metal Batteries in compliance with Section II of PI 968, CAO	HZ	YES ⁴
			> 0.3 ≤ 2 gr of lithium per battery	not more than 2 batteries	Lithium Battery Label and CAO-Label	LB Transport Document	Lithium Metal Batteries in compliance with Section II of PI 968, CAO	HZ	YES ⁴
	Packed with equipment	UN 3091 PI 969 ²	≤ 1 gr of lithium per cell	5 kg net ¹	Lithium Battery Label	LB Transport Document	Lithium Metal Batteries in compliance with Section II of PI 969	LB	YES
			≤ 2 gr of lithium per battery	5 kg net ¹	Lithium Battery Label	LB Transport Document	Lithium Metal Batteries in compliance with Section II of PI 969	LB	YES
	Contained in equipment	UN 3091 PI 970 ²	≤ 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	LB Transport Document	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: • Only button cell batteries contained in equipment (incl. Circuit boards) • 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. ³	None	None	None	NONE	NO	

¹ 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.

² 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.

³ Shippers should take steps to implement this requirement as soon as possible, however consignments of more than two packages may continue to move without the lithium battery handling label until 31 December 2016.

⁴ List of approved countries for UN3480 / UN3090 Section II can be found UN3480-UN3090 by Air Approved Country List



Air Transport of **Section II** Lithium Batteries

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 57th/2016 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:

- 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 are the cell/battery capacity limitations?

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

How must I pack cells/batteries?

(PI 965 & 968)

Important Note: TNT require customers to be register in order to send any UN3480 and UN3090 lithium batteries without equipment in the TNT Air Network.

- Lithium ion cells and batteries must be offered for transport at a state of charge (SoC) not exceeding 30% of their rated design 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.
- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery. To provide protection from damage or compression to the batteries, the inner packagings must be placed in a strong rigid outer packaging of one of the packaging types shown below.
- Each 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.
- Cells and batteries must be packed strong rigid outer packaging that conform 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1 of the IATA DGR
- Maximum quantities:
(cells/batteries specified in rows 2, 3 & 4 may not be combined in the same package)

1	Contents	Lithium ION restricted on the TNT Air-Network!	Lithium METAL restricted on the TNT Air-Network!	Number of cells/batteries	Net quantity	Number of packages in consignment
2	Cells / Batteries	2.7Wh or less	0.3g or less	no limit	2.5 kg	1
3	Cells	more than 2.7Wh not more than 20Wh	more than 0.3g not more than 1g	8 cells	n.a.	1
4	Batteries	more than 2.7Wh not more than 100Wh	more than 0.3g not more than 2g	2 batteries	n.a.	1

- Packages and overpacks of lithium ion batteries prepared in accordance with the provisions of Section II must be offered to the operator separately from cargo which is not subject to these Instructions and must not be loaded into a unit load device before being offered to the operator.

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

(PI 966 & 969)

- Cells and batteries must be placed in inner packaging that completely enclose the cell or battery then placed in a following strong rigid outer packaging; or then placed with equipment in a strong rigid outer packaging.
- 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.
- 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.
- 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?

- Each package must be labelled with a completed lithium battery label.

 - This label must contain;
 - > the statement “Lithium ion battery” or “Lithium metal battery”
 - > a telephone number where more information on the shipment and it’s 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.
- For **UN3480 and UN3090** – Lithium Metal Batteries also Cargo Aircraft Only (CAO) label is required.
- The label / marking is not required for:
 - packages containing only button cell batteries installed in equipment (including circuit boards); and
 - packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.

Note:

Shippers should take steps to implement this requirement as soon as possible, however consignments of more than two packages may continue to move without the lithium battery handling label until 31 December 2016.



Air Transport of **Section II** Lithium Batteries

Must I provide a document with the package?

- Each LB consignment, bearing the lithium battery handling label must be accompanied by a document indicating that:
 - > the package contains lithium ion/metal batteries/cells (as applicable)
 - > the package must be handled with care and that a flammability hazard exists if the package is damaged
 - > special procedures must be followed if package is damaged, to include inspection and repacking if necessary
 - > a telephone number for additional information.
- The last page of this requirement summary contains a template “Shipper’s Confirmation for Section II Lithium Batteries” that is in line with these requirements. Use of this template is strongly recommended as its content is required for acceptance on certain commercial airlines. Shippers wishing to use their own document, must ensure that it contains all elements of the provided template (including the compliance statement) in order to ensure smooth transit.
- Above mentioned document is not required for packages containing not more than four cells or two batteries installed in equipment.
- A Shipper’s Declaration for DG 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 contained in equipment 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 and for UN3480 and UN3090 only “Cargo Aircraft Only” or “CAO”.

May I consolidate several packages containing Section II Lithium Batteries in one shipment?

- Individual packages each complying with the requirements may be consolidated by the shipper in an overpack.
- 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.

How must Data Entry be completed?

- For UN 3481 and UN3091, the TNT DG Option Code LB must be applied.
(not applicable for packages that don’t require marking because there are not more than 4 cells or 2 batteries or solely button-cells contained in equipment per package)
- For UN3480 and UN3090, the DG Option Code HZ must be applied. (For G30 and S30 option code LB is required)

Do all airlines accept Section II Lithium Batteries?

- 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
- For further information on commercial airlines restrictions of Lithium Batteries within TNT network please contact TNT Customer Service, or
- local TNT’s DG Specialist..

Are the transport requirements for Section II Lithium Batteries by ROAD and/or SEA different?

- Transport requirements for ROAD/SEA are similar but somewhat less restrictive.
- 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.
- For further information on ROAD/SEA transport of Lithium Batteries please consult the relevant transport regulations.

Does TNT accept Lithium Batteries that are above the limitations for Section II Lithium Batteries?

- Yes, TNT can accept these for transport however in this case all TNT DG policy & procedure requirements apply i.e.:
 - Accepted from DG approved customers only (each shipper must be specifically approved by HO)
 - From, through and to DG Approved Countries only
 - Option Code HZ must be used
- This above applies to all cells/batteries that are compliant with the requirements of Section 1 (1A & 1B) of the relevant packing instructions.

Where can I find further information?

- In the 57th / 2016 IATA Dangerous Goods Regulations.
- In the DG section of ExpressNet Global.
- By contacting your local DG Manager or IATA Cat 6 Certified DG Specialist.

Shipper's Confirmation for Section II Lithium Batteries

"Lithium batteries that have been identified or recalled by the manufacturer as being defective for safety reasons, or have been damaged, are forbidden for transport by Air."

DO NOT LOAD OR TRANSPORT THIS SHIPMENT IF THE PACKAGE IS DAMAGED <ul style="list-style-type: none"> • This package must be handled with care • A flammability hazard exists if the package is damaged • Special procedures must be followed in the event the package is damaged including inspection and repacking if necessary. 		TNT CONNOTE NUMBER: _____
		FOR ADDITIONAL INFORMATION, CALL: _____ <small>Full telephone number including international dialling code</small>
TRANSPORT BY:	CONTENT INFORMATION: <small>(tick the relevant box)</small>	
AIR	<input type="checkbox"/> UN3480, Lithium Ion Batteries in compliance with Section II of PI965 <input type="checkbox"/> UN3481, Lithium Ion Batteries <u>Packed with</u> Equipment in compliance with Section II of PI966 <input type="checkbox"/> UN3481, Lithium Ion Batteries <u>Contained in</u> Equipment in compliance with Section II of PI967 <input type="checkbox"/> UN3090, Lithium Metal Batteries in compliance with Section II of PI968 <input type="checkbox"/> UN3091, Lithium Metal Batteries <u>Packed with</u> Equipment in compliance with Section II of PI969 <input type="checkbox"/> UN3091, Lithium Metal Batteries <u>Contained in</u> Equipment in compliance with Section II of PI970	
ROAD and/or SEA <small>if applicable (*)</small>	<input type="checkbox"/> Lithium Ion Batteries "not restricted as per ADR/IMDG SP 188" <input type="checkbox"/> Lithium Metal Batteries "not restricted as per ADR/IMDG SP 188" <small>(*) Shipments that are compliant for Air transport (as above) are also compliant to SP188 of the ADR/IMDG. To be completed only in case the shipment is transported ONLY by road and/or sea.</small>	
Hereby I confirm that the shipment delivered to TNT Express containing above mentioned Lithium Batteries are Not Faulty and fully complies with the requirements of the relevant IATA DGR Packing Instructions and/or if applicable to ADR/IMDG Special Provision 188.		
DATE:	SHIPPER DETAILS: <small>(in block letters)</small> Company name <small>(if applicable)</small> _____ Name of signatory _____ Signature _____	COMPANY STAMP: <small>(if applicable)</small>

Please fold here

After entering the above details, please fold this document along the line and place it in the clear plastic envelope, in such a way that the LB information is clearly visible from the outside, without the need to open the plastic envelope and or manipulate the document.

This template;

- ↳ is compliant with the documentation requirements for Lithium Batteries as per Section II of the applicable Packing Instructions from the 57th/2016 IATA Dangerous Goods Regulations
- ↳ contains additional information required for acceptance of Section II Lithium Battery shipments on certain commercial airlines
- ↳ must be fully completed and signed by the shipper

Note: Shippers wishing to use their own document, must ensure that this contains all elements of this template (including the compliance statement) in order to ensure smooth transit.