

How to ship a Li-Ion Battery

Lithium batteries (LIB) are under the scope of Dangerous Goods Transport Regulations. As such there are many specific requirements that apply for shipping as well as packing and labelling. Up until recently (2016), the regulation varied from region to region, carrier to carrier and was generally more relaxed than they are today.

This guide has been created to provide initial practical guidance of the regulations as they at the time of publishing. The regulations included must be fulfilled by the shipper for any commercial shipment.

What is your selected mode of transport?

Generally, there are different sets of rules for Air Freight vs. Rail, Road and Sea Freight. Refer to our **shipping guidance** for exact rules and guidance for all transport methods.

All lithium batteries can be transported on cargo-only aircraft compliantly, however, be mindful that airlines or transporters may have additional rules or variations in place which restrict lithium battery transportation.

Air freight restrictions – is your battery standalone?

Yes

Standalone lithium-ion batteries (i.e., batteries without their equipment) are classed as UN3480 under the United Nations (UN) agency classification. These types can **ONLY** be shipped by cargo aircraft.

No

Lithium batteries packed with or contained in equipment (UN3481) may also be shipped on a commercial aircraft (subject to further rules and regulations). On top of that, passengers are allowed to transport their battery powered devices and spare batteries in their carry-on luggage.

What is your battery energy capacity?

Batteries are separated into 2 groups: <100Wh and 100+Wh.

<100Wh

For batteries with capacity of <100Wh the limitations will be quantity and volume within the packages and consignments.

100+Wh

For batteries with capacity of 100Wh or above the limitations will be imposed on the maximum weight.

Refer to our **shipping guidance** for exact rules.

What is your battery classification?

The vast majority of lithium-ion batteries are covered under 3 classification titles covered by 2 UN codes:

1

Standalone Lithium Ion Batteries (**without equipment**) = UN 3480

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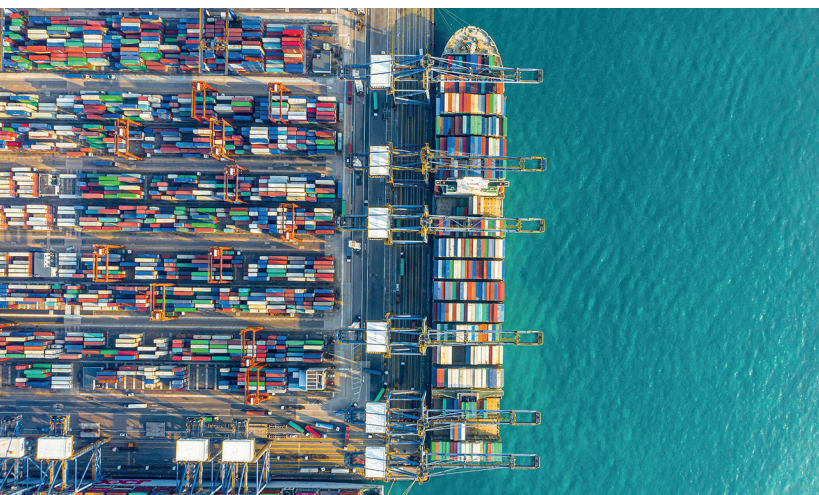
2

Lithium-ion batteries packed **with equipment** = UN 3481

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3

Lithium-ion batteries **contained in equipment** = UN 3481



How to correctly pack LIBs?

As Lithium batteries are inherently unstable the major risk associated with them is a short-circuit as a result of the terminals coming in contact with other batteries, metal objects or conductive surfaces, which is especially high-risk during transport. This can lead to a fire and thermal runaway.



Packaged batteries or cells must be separated in a way to prevent short circuits and damage to terminals.



They must be packed in strong rigid outer packaging unless when contained in equipment, which provides protection.



For batteries contained in equipment, the packing must provide protection against accidental operation during transportation.



Important note: 30% charge limit

Applicable to Air Freight only: all UN 3480 classed batteries must be offered for transport at a state of charge not exceeding 30% of rated capacity. This does not apply to UN 3481.

How long will shipping take?

Even though the transport time itself won't take longer than shipping any other items via the same route there are key areas you need to be aware of which will impact your lead time:

Admin

For someone experienced it will be matter of minutes, however, if forms are not completed correctly you run the risk of goods not being shipped at all.

Packing

It is not the same as packaging a book or a mug. For LIBs there are rules and regulations, people need to be trained and packaging appropriately marked. Typically can take 1-3 days depending on circumstances.

Shipping

If the weight or package count limit is exceeded for Air Freight, Road/Rail or Sea Freight will need to be chosen as an alternative which could add weeks to lead time depending on locations.

Express shipping – all of the above means that batteries are not eligible for overnight or express shipping, as also governed by federal shipping restrictions.

Get in touch

Find out how Vendigital can help.

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Shipping a battery at 0% state of charge/SoC (deep cycle) stresses the battery which is not good for the overall life and performance of the battery.

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Shipping guidance:

Rail, road and sea freight



	Up To 100Wh			100+Wh		
Classification	UN 3480 (LIBs Without Equipment)	UN 3481 (LIBs Contained in Equipment)	UN 3481 (LIBs Packed with Equipment)	UN 3480 (LIBs Without Equipment)	UN 3481 (LIBs Contained in Equipment)	UN 3481 (LIBs Packed with Equipment)
Packaging Instructions	ADR/RID SP 188, IMDG Code SP 188			P903, LP903	SP 390, P903, LP903	
Max Weight	30Kg Per Package	N/A		ADR 1.1.3.6: max. 333 kg (per transport unit, e.g. truck incl. trailer) If exceeded, further requirements for vehicle equipment and driver		
Max Q-ty	N/A					
Packaging	Batteries must be placed in inner packagings that completely enclose the battery, batteries must be protected to prevent short circuits. Strong outer packaging. Drop test passed: content shall not be damaged or shifted.		Strong outer packaging protection against unintentional activation short circuit protection	Batteries must be placed in inner packagings that completely enclose the battery, batteries must be protected to prevent short circuits. Batteries must be secured against movement within the outer packaging. UN approved packaging (Packing Group II: e.g. UN/4G/Y30/...)		Strong outer packaging protection against unintentional activation short circuit protection
Markings	Lithium Battery Mark		Lithium Battery Mark (Not needed if no more than 2 batteries installed & no more than 2 packaged shipped)	Hazard label No. 9A (10 cm x 10 cm) ADR: UN 3480 IMDG Code: LITHIUM-ION BATTERIES UN 3480"	Hazard label No. 9A (10 cm x 10 cm) ADR: UN 3481 IMDG Code: LITHIUM-ION BATTERIES PACKED WITH EQUIPMENT UN 3481 or LITHIUM-ION BATTERIES CONTAINED IN EQUIPMENT UN 3481	
Sea freight Container Marking	None			Container Plackards (min. 25 cm x 25 cm)		
Transport Document	N/A			UN 3480 LITHIUM ION BATTERIES, 9, (E)	UN 3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, 9, (E)	UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT, 9, (E)
Miscellaneous	Personnel shall be trained commensurate with responsibilities			Personnel shall be trained commensurate with responsibilities		

Shipping guidance:

Air freight – cargo and commercial



	Up To 100Wh				100+Wh		
Classification	UN 3480 (LIBs Without Equipment)		UN 3481 (LIBs Contained in Equipment)	UN 3481 (LIBs Packed with Equipment)	UN 3480 (LIBs Without Equipment)	UN 3481 (LIBs Contained in Equipment)	UN 3481 (LIBs Packed with Equipment)
Packaging Instructions	IATA PI965 Section IB	IATA PI965 Section II	IATA PI966 Section II	IATA PI967 Section II	IATA PI 965 Section IA	IATA PI 966 Section I	IATA PI 967 Section I
Max Weight	PAX: forbidden CAO: 10 kg battery weight per package	PAX: forbidden CAO: n/a	PAX/CAO: 5 kg net battery weight per package		PAX: forbidden CAO: 35 kg net battery weight per package)	PAX: 5 kg net battery weight per package CAO: 35 kg net battery weight per package	
Max Q-ty	None (more than 2 batteries per package)	2 batteries per package, 1 package per consignment 1 package per overpack	As required for operation, plus 2 for replacement	N/A	N/A	As required for operation, plus 2 for replacement	N/A
Packaging	Strong outer packaging (fibreboard box). Batteries must be placed in inner packaging that completely encloses the battery; Batteries must be secured against movement within the outer packaging; Batteries must be protected to prevent short circuits			Strong outer packaging or equivalent protection of the battery by the device Protection against unintended putting into service. Protection against movements within the packaging; Protection against short circuit	Batteries must be placed in inner packagings that completely enclose the battery, batteries must be protected to prevent short circuits UN approved packaging (Packing Group II: e.g. UN 4G/Y30/...)	Batteries must be placed in inner packagings that completely enclose the battery, batteries must be protected so as to prevent short circuits UN approved packaging (Packing Group II: e.g. UN 4G/Y30/...)	Equipment containing batteries must be secured and packed to prevent accidental operation during transport Batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging. Strong outer packaging (e.g. cardboard box) UN approved packaging not required (SP A48)
Markings	CARGO ONLY UN 3480 LITHIUM ION BATTERIES, battery weight (e.g. net qty xx kg) Shipper's / Consignee's address	CARGO ONLY UN 3480 LITHIUM ION BATTERIES	UN 3481 Lithium Battery Mark	Lithium Battery Mark (Not needed if no more than 2 batteries installed & no more than 2 packaged shipped)	CARGO ONLY UN 3480 LITHIUM ION BATTERIES, battery weight (e.g. net qty xx kg) Shipper's / Consignee's address	LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, UN 3481 Net weight (NET QTY) Shipper's/Consignee's address	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT, UN 3481 Net weight (NET QTY) Shipper's/Consignee's address
Air Waybill Information (AWB)	In the “Handling Information” box: “Dangerous Goods as per Shipper’s Declaration CAO”	In the “Nature and Quantity of Goods” box: “Lithium ion batteries in compliance with section II of PI 965 CAO”	In the “Nature and Quantity of Goods” box: “Lithium ion batteries in compliance with section II of PI 966”	Only if more than 2 batteries per package, in the “Nature and Quantity of Goods” box: “Lithium ion batteries in compliance with section II of PI 967”	In the “Handling Information” box: “Dangerous Goods as per Shipper ’s Declaration”” When a shipment contains both dangerous goods and non-dangerous goods, the number of packages containing dangerous goods shall be added in the “Handling Information” box.		
Transport Document	Shipper’s Declaration for Dangerous Goods	N/A			Shipper's Declaration for Dangerous Goods: "Classification Code & Full title"		
Miscellaneous	Official IATA-Training by authorized trainer required, If not available, please contact IATA authorized expert.	Batteries ≤ 2,7 Wh: Max. quantity: 2,5 kg	N/A		Official IATA-Training required. If not available, please contact IATA authorized expert.		
	State of charge (SoC) must not exceed 30 %.		Adequate instruction commensurate with responsibilities.		Special Provisions: A88, A99, A154, A164, A181, A183, A185, A201, A206, A331, A334, A802		
	Special Provisions: A88, A99, A154, A164, A181, A183, A185, A201, A206, A331, A334, A802				State of charge (SoC) must not exceed 30 %.		