



Shipping lithium-ion batteries for power tools and electric garden tools: Implementation of the dangerous goods regulations

As of August 2017

Lithium-ion batteries are classified as "dangerous goods" under international transport law. This means that the various regulations for the transport of dangerous goods are relevant to them. The safetransport of dangerous goods is in the interest of the shipping industry, the contracted transport companies and all other parties involved in the transport chain of lithium-ion batteries.

The following notes are based on recommendations of EPTA and ZVEI. These are intended to provide initial practical guidance on the regulations governing the shipping of lithium-ion batteries for power tools and electric garden equipment.

The shipper is solely responsible for complying with these stipulations for each commercial shipment of lithium-ion batteries. Along with other criteria, the energy content in particular is decisive in deciding which dangerous goods regulations must be observed for transporting lithium-ion batteries. For batteries with energy of up to 100 Wh, simplified requirements apply due to an exemption regulation of the dangerous goods law.

On the other hand, lithium-ion batteries with energy of more than 100 Wh must always be treated as Class 9 dangerous goods.

This guide covers commercial transportation by

- Road/rail (ADR/RID)
- Sea freight (IMDG Code):
- Air freight (IATA)

RID

n/a

International shipping of dangerous goods:

Not every parcel service provider offers international shipping of dangerous goods (batteries). DPD ships only inside Germany! Providers for the shipment of dangerous goods within Europe: DSV, UPS, Fedex, in each case with high risk surcharges.

DPD national delivery of dangerous goods:

Delivery with drop-off permit or in a pickup parcel shop are not possible!

DPD national returns of dangerous goods:

Return collections related to dangerous goods are not permitted!

Lithium-ion batteries are categorised as follows:

- UN3480 Lithium-ion batteries
- UN3481 Lithium-ion batteries in equipment
- UN3481 Lithium-ion batteries packed with equipment

In individual cases, it may be necessary to involve a dangerous goods expert.

This document is current as of 1st August 2017. The regional authorities are responsible for the interpretation and enforcement of the relevant provisions and may, within the scope of their discretion, make their own decisions, including decisions deviating from this guide. Despite the greatest possible care in editing and writing these recommendations, no liability can therefore be accepted for the content and completeness of these statements.

Please also note the FLEX-specific stipulations in the appendix!

Definitions and abbreviations

ADR Accord européen relatif au transport international des marchandises Dangereuses par Route,

(European Agreement concerning the International Carriage of Dangerous Goods by Road)

Règlement concernant le transport International ferroviaire de marchandises Dangereuses

(Regulation on the international carriage of dangerous goods by rail)

IMDG Code International Maritime Code for Dangerous Goods

IATA International Air Transport Association

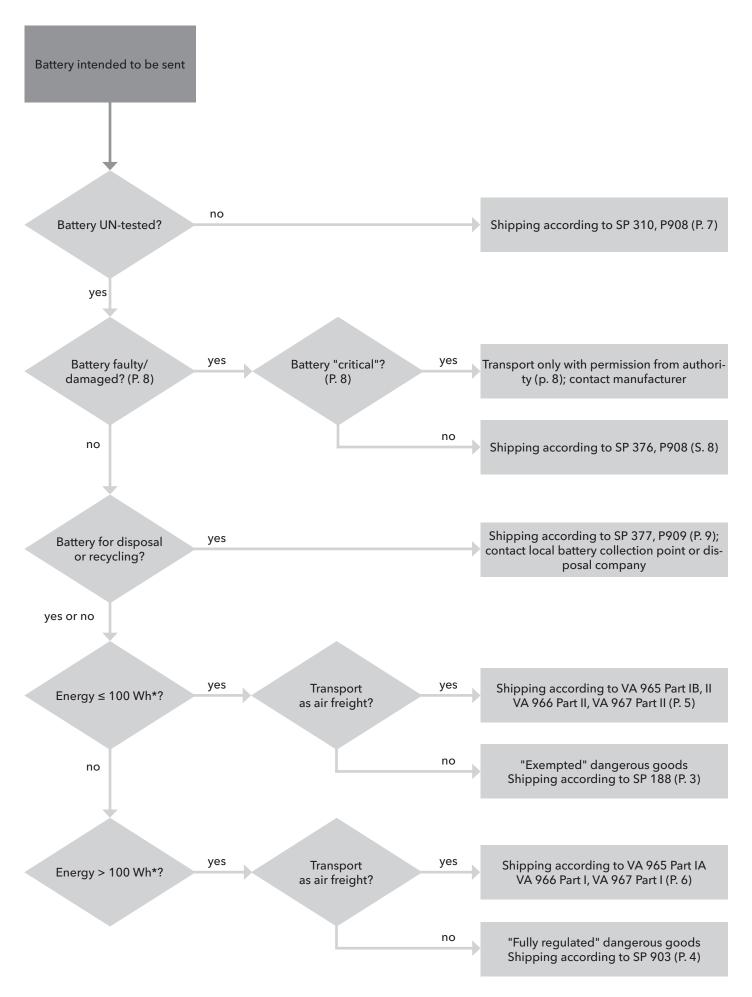
not applicable

SV Special Provision
VA Packaging Instruction

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Flow chart to determine the correct packaging instruction





Mode of transport	Road/rail (ADR/RID), se	ea freight (IMDG Code)							
	≤ 100 Wh (per battery)								
	Batteries (excluding unit)	Batteries packed with equipment (minimum 1 battery enclosed)	Batteries in equipment (inserted/installed in unit)						
Packaging regulation	ADR/RID SP 188, IMDG Code SP 188								
Max. quantity	n/a								
Weight limit	30 kg gross / package	n/a							
Packaging	Inner packaging must completely enclose secured against short-circuiting. Strong outer packaging, e.g. shipping bo damaged or slip)	e the batteries, and the batteries must be x (drop test passed: Contents must not be	Strong outer packaging Protection against unintentional activa- tion Protection against short circuit						
Package labelling	Labels for lithium batteries UN 3480 Tel.	Labels for lithium batteries UN 3481 Tel.	Not applicable unless more than 2 batteries are installed or the shipment consists of more than 2 packages						
Labelling repackaging		REPACKAGING							
Sea freight container labelling	no								
Shipping document	n/a								
Other	Instruction of the employees involved acc	cording to their tasks and responsibilities							



Mode of transport	Road/rail (ADR/RID), se	a freight (IMDG Code)	
	> 100 Wh (per battery)		
	Batteries (excluding unit)	Batteries packed with equipment (minimum 1 battery enclosed)	Batteries in equipment (inserted/installed in unit)
Packaging regulation	ADR/RID P903, LP903, IMDG Code P903		
Max. quantity	ADR 1.1.3.6: max. 333 kg / transport unit (truck incl. trailer) if exceeded further require	ements for forwarding agent
Weight limit	n/a		
Packaging	Our batteries are delivered in a certified sa The box must be undamaged when shippe The sales box is placed in a transport box of Inner packaging must completely enclose secured against short-circuiting.	ed by the dealer to the customer. on which the dangerous goods label (see Pa	ackage labelling) must be affixed. Strong outer packaging Protection against unintentional activa-
	Batteries must be secured to prevent accidulates UN-tested packaging, (packaging group II		tion Protection against short circuit
Package labelling	Danger label No. 9A (10 x 10 cm) ADR: UN 3480	ADR: UN 3481	
	IMDG Code: UN 3480 LITHIUM ION BATTERIES	IMDG Code: UN 3481 LITHIUM ION BATTERIES PACKE ION BATTERIES CONTAINED IN EQUIPMI	ED WITH EQUIPMENT or UN 3481 LITHIUM ENT
Sea freight container labelling	Placard (min. 25 x 25 cm)		
Shipping document	UN 3480, LITHIUM-ION BATTERIES, 9, (E) Quantity and description of packages (e.g. a cardboard box) Weight of batteries (e.g. xx kg) Address of shipper and recipient Sea freight (IMDG Code): (Language English) IMO DANGEROUS GOODS DECLA-RATION (SOLAS 74, KAP. VII, REG 5, MARPOL 73/79, ANNEX III REG. 4 OF IMDG CODE)	UN 3481, LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, 9, (E) Quantity and description of packages (e.g. a cardboard box) Weight of batteries (e.g. xx kg) Address of shipper and recipient Sea freight (IMDG Code): (Language English) IMO DANGEROUS GOODS DECLA- RATION (SOLAS 74, KAP. VII, REG 5, MARPOL 73/79, ANNEX III REG. 4 OF IMDG CODE)	UN 3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT, 9, (E) Quantity and description of packages (e.g. a cardboard box) Weight of batteries (e.g. xx kg) Address of shipper and recipient Sea freight (IMDG Code): (Language English) IMO DANGEROUS GOODS DECLARATION (SOLAS 74, KAP. VII, REG 5, MARPOL 73/79, ANNEX III REG. 4 OF IMDG CODE)
Other	Instruction of the employees involved acco	ording to their tasks and responsibilities	



Mode of transport	Air transport (IATA)									
	≤ 100 Wh (per battery)									
	Batteries (excluding unit)	Batteries packed with equipment (minimum 1 battery enclosed)	Batteries in equipment (inserted/installed in unit)							
Packaging regulation	IATA VA965 Part IB	IATA VA965 Part II	IATA VA966 Part II	IATA VA967 Part II						
Max. quantity	free (more than 2 batteries per package)	2 batteries per package 1 package per consignment 1 package per repackaging	Quantity as required for operation, plus 2 spare	n/a						
Weight limit	Passenger aircraft: prohibited Cargo aircraft only: 10 kg net battery weight per package	Passenger aircraft: prohibited Cargo aircraft only: n/a	Passenger and cargo aircraft: ! package	5 kg net battery weight per						
Packaging	Inner packaging must completely enclose the with equipment);	batteries, the batteries must be	e protected against short circuit (only batteries, batteries packe						
	Secure to prevent movement inside the packa	aging;								
	Batteries in equipment (i.e. power tools) must		tal operation during carriage;							
	Strong outer packaging (shipping box).									
Package labelling	UN 3480 Lithium ion batteries, battery weight (e.g. net weight xx kg) Address of shipper/ recipient	CARGO AIRCRAFT ONLY FORBIDDEN IN PASSENGER AIRCRAFT		Not applicable unless more than 2 batteries are installed or the shipment consists of more than 2 packages						
	UN 3480 Tel. 9	UN 3480 Tel.	UN 3481 Tel	UN 3481 Tel.						
Shipping docu- ment	Shipper's declaration: UN 3480 Lithium ion batteries, 9, // Fibre-board box(es) x kg // 965 // IB, see. Example 1, delete "PASSENGER AND CARGO AIRCRAFT" box	n/a	n/a	n/a						
Entry in the air waybill	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", see Example 2	in the "Nature and Quantity of Goods" box: "Lithium ion batteries in compliance with section II of PI 966"	Only if there are more than 2 batteries in the package, in the "Nature and Quantity of Goods" box: "Lithium ion batteries in compliance with section II of PI 967"						
Other	Official IATA training by approved trainer required; if not available, external expert required.	Batteries ≤ 2.7 Wh can be tran	of the employees involved according to their tasks and responsibilities 2.7 Wh can be transported according to VA 965 Part II. ity per package max. 2.5 kg (battery weight).							
	. Squirour	Net quantity per package max	ivet quantity per package max. 2.5 kg (battery weight).							
	State of charge (SoC) must not exceed 30 %.	Net quantity per package max	a. 2.5 kg (battery weight).							

Example 1 Shipper's declaration, lithium batteries VA 965 Part IB

Shipper's Declaration Completion

	NATURE A	AND QUANTITY OF DANGERO				· · · · ·	
	UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group	Quality and Type of packing	Packing Inst.	Authorisation
	UN 3480	Lithium ion batteries	II	Ν	1 Fibreboard box x 5,5 kg G	965	1B
₹.			Щ				

The appropriate method of describing a lithium ion battery in accordance with Section IB

Example 2 Air waybill, lithium batteries VA 965 Part II

Consignment Containing Lithium Batteries Packed According to Section II of PI 965-970

Airg	port of Desti	natio	n		leque	sted Flight/D	ate			Amount of insurance	rea	pester	NCE — if carrier offers insurance, and such insurance is d in accordance with the conditions thereof, indicate amount ord in figures in box marked "Amount of insurance".
Handling	g information	1											SCI
No. of Pieces RCP	Gross Weight	kg Ib	Ra	Commodity Item No.	(hargeable Weight	П	Rate Charge	Ī	Total		T	Nature and Quantity of Goods (incl. Dimensions of Volume)
													Lithium ion batteries in compliance with Section II of PI965 CAO



Mode of transport	Air transport (IATA)						
	> 100 Wh (per battery)						
	Batteries (excluding unit)	Batteries packed with equipment (minimum 1 battery enclosed)	Batteries in equipment (inserted/installe in unit)				
Packaging regulation	IATA VA965 Part IA	IATA VA966 Part I	IATA VA967 Part I				
Max. quantity	n/a	Quantity as required for operation, plus 2 spare	n/a				
Weight limit	Passenger aircraft: prohibited Cargo aircraft only: 35 kg net battery weight per package Cargo aircraft only: 35 kg net battery weight per package Cargo aircraft only: 35 kg net battery weight per package						
Packaging	Inner packaging must completely enclose the batteries, and the batteries must be secured against short-circuiting UN-tested packaging Packaging Group II (e.g. N 4G/Y30/)	Inner packaging must completely enclose the batteries, and the batteries must be secured against short-circuiting UN-tested packaging Packaging Group II (e.g. UN 4G/Y30/)	When batteries are inserted or fitted, the unit must be secured in such a way that accidental operation is not possible. Batteries must be protected in such a wa that contact with conductive materials inside the same packaging cannot cause a short circuit. Strong outer packaging (shipping box) UN-tested packaging not required (SP A48)				
Package labelling	UN 3480 Lithium-ion batteries Net weight (NET QTY) Address of shipper/recipient CARGO AIRCRAFT ONLY TORRODOEN IN PASSENGER AIRCRAFT	UN 3481 Lithium-ion batteries packed with equipment Net weight (NET QTY) Address of shipper/recipient	UN 3481 Lithium-ion batteries contained in equipment Net weight (NET QTY) Address of shipper/recipient				
Shipping document	Shipper's declaration for dangerous goods: UN 3480 Lithium-ion batteries, 9 // 965, delete "PASSENGER AND CARGO AIRCRAFT" box	Shipper's declaration for dangerous goods: UN 3481 Lithium-ion batteries packed with equipment, 9 // 966	Shipper's declaration for dangerous goods: UN 3481 Lithium-ion batteries contained in equipment, 9 // 967				
Entry in the air waybill	In the "Handling Information" box: "Dangerous Goods as per Shipper's Declaration CAO"	In the "Handling Information" box: "Dange, see example 3	erous Goods as per Shipper's Declaration"				
	For a consignment containing dangerous goods must be completed in the "Handlin	goods and non-dangerous goods, the numb g information" box.	per of packages containing dangerous				
Other	Official IATA training by approved trainer	required. If not available, external expert rec	quired.				
	State of charge (SoC) must not exceed 30 %.						
	Special provisions: A88, A99, A154, A164,	A181, A182, A183, A185, A201, A206, A33	1				

Example 3 Air waybill with 5 packages of lithium batteries in equipment (power tools) or with equipment packed together with 20 packages of non-dangerous goods (such as conventional corded mains operated power tools).

For a Shipment Containing Dangerous Goods and Non-Dangerous Goods

		_				_		_	
Air	port of Dest	natio		Requested Flight/D.	ite /	Ar	mount of insurance	requested	NCE — If carrier offers insurance, and such insurance is in accordance with the conditions thereof, indicate amount ired in figures in box marked "Amount of insurance".
	g informatio								
5	Packag	jes	Dangerous	Goods as	per attach	ed	Shipper's [Decla	ration
No. of Pieces RCP	Gross Weight	kg Ib	Rate Class Commodity Item No.	Chargeable Weight	Rate Charge	\prod	Total		Nature and Quantity of Goods (incl. Dimensions of Volume)
25		П							Power tools



Mode of transport	Prototypes, road/rail	Prototypes, air					
	Prototypes: Lithium batteries not tested in accordance with UN Test 38.3; lithium batteries; lithium batteries in equipment or packed with equipment. Transport exclusively of: • small production series of max. 100 batteries (IATA: annual production) • Prototypes for test purposes						
Packaging regulation	ADR/RID/IMDG Code SP 310, P910	IATA DGR SP A88, P910 (only with the approval of the aviation authority in the country of dispatch) Note: additional approval of the U.S. authority (DOT) necessar to/via USA					
Max. quantity	see above	as stated in the approval					
Weight limit	n/a	as stated in the approval					
Packaging	UN-tested packaging (Packaging Group II, e.g. cardboard box): e.g. UN 4G/Y30/) • Pack every battery individually, e.g. in a plastic bag • Pad the package with vermiculite • Secure to prevent movement inside the outer packaging	as stated in the approval					
Package labelling ⁴⁾	ADR/RID: UN 3480 IMDG Code: UN 3480 LITHIUM ION BATTERIES (100 x 100	as stated in the approval					
Shipping document	Address of shipper/recipient: UN 3480 LITHIUM-ION BATTERIES, 9, (E) Number of packages and packaging type (e.g. cardboard box) Battery weight (e.g. xx kg) "CARRIAGE ACCORDING TO SPECIAL PROVISION 310" IMDG Code: IMO DANGEROUS GOODS DECLARATION (SOLAS 74, CH. VII), REG 5, MARPOL 73/79, ANNEX III REG. 4 OF IMDG CODE	as stated in the approval					
Other	Instruction of the employees involved according to their tasks and responsibilities	as stated in the approval					



Padding material, e.g. vermiculite



Mode of transport	Damaged or faulty batteries - road/	rail/sea	
Packaging regulation	"Not critical" (probably no danger during transport) Such batteries are not compliant with the tested type according to the applicable requirements of the UN Manual of Tests and Criteria, 38.3 This covers: Batteries that have been identified as faulty for safety reasons Leaking or degassed batteries, Batteries that cannot be diagnosed before carriage, or Batteries that have suffered external or mechanical damage If no danger can arise during transport (see criteria for "critical" damaged or faulty batteries in the right-hand table column), the transport requirements apply as shown below	"Critical" (probably a danger during transport) Batteries liable to rapid disintegration, dangerous reaction, flame formation, dangerous heating or dangerous emission o toxic, corrosive or flammable gases or vapours under normal conditions of carriage must not be carried except under cond tions specified by the competent authority. Note: The battery type and the previous use and misuse of the battery must be taken into account when assessing whether a battery is damaged or faulty. Transport only following approval by the responsible authority (in Germany: Federal Institute of Materials Research and Testing (BAM)) Precise requirements are stated in the permit	
Max. quantity	n/a		
Weight limit	If the net mass of a battery exceeds 30 kg, the outer packaging	must contain only a single battery.	
Packaging	Each battery individually in tight inner packaging (leakage protection and protection against short circuit) UN-tested (Packaging Group II), e.g. cardboard box, for all battery types Secure to prevent movement inside the outer packaging due to filler material Airtight packaging only with air vents Filled with non-combustible and non-conductive thermal insulation material, building material class A1 or A2 ("non-combustible", e.g. rock wool, glass wool, cellular glass, vermiculite) Sufficient absorbent material to suck up escaping electrolyte	as stated in the approval	
Package labelling	UN 3480 DAMAGED/FAULTY LITHIUM ION BATTERIES UN 3481 DAMAGED/FAULTY LITHIUM ION BATTERIES IN EQUIPMENT	as stated in the approval	
Shipping document	Address of shipper/recipient UN 3480 LITHIUM ION BATTERIES, 9, (E), Number of packages and packaging type (e.g.1 aluminium box) Battery weight (e.g. xx kg)	as stated in the approval	
Other	Instruction of the employees involved according to their tasks at	nd responsibilities	

Air transport of damaged or faulty batteries

Batteries that have been identified as faulty by the manufacturer for safety reasons, or that have been damaged in such a way that there is a risk that the batteries will cause intense heat, fire or a short circuit, must not be transported (e.g. those that are being returned to the manufacturer for safety reasons) (IATA DGR SV A154).



Mode of transport	Batteries for disposal & recycling - road/rail/sea								
	≤ 100 Wh (per battery)	> 100 Wh (per battery)							
Packaging regulation	SP 377 P909								
Max. quantity	n/a								
Weight limit	30 kg gross weight per package	n/a							
Packaging	Packaging with UN approval number is required (Packing Group II) for batteries > 100 Wh. For batteries of ≤ 100 Wh or batteries in equipment, it is permissible to use resistant outer packagings made of a suitable material and having appropriate strength and design with respect to their capacity and intended use. Batteries should be packed in such a way that short circuits or strong heating is prevented. This can be achieved by: individual battery pole protection Inner packaging to prevent batteries making contact with each other Batteries with recessed terminals designed for protection against short circuit, or Use of a non-conductive and non-flammable padding material to fill the empty space between the batteries in the packaging Batteries must be secured inside the outer packaging in order to prevent excessive movement during carriage (e.g. by using a non-flammable and non-conductive padding material or a tightly sealed plastic bag).								
Package labelling	UN 3480 LITHIUM BATTERIES FOR DISPOSAL or LITHIUM BATTERIES FOR RECYCLING								
Shipping document	Address of shipper/recipient UN 3480 WASTE LITHIUM-ION BATTERIES, 9, (E) Number of packages and packaging type (e.g. cardboard box (4G)) Battery weight (e.g. xx kg)								
Other	Instruction of the employees involved according to their tasks	and responsibilities							

Damaged/faulty batteries

Batteries found to be damaged or defective must be transported in accordance with Special Provision 376 (P. 8)

Transporting waste batteries by air

Waste batteries and batteries being transported for recycling or disposal are excluded from air cargo unless approved by the competent national authorities of the country of origin and the country of the exporting company. (IATA DGR SV A183)

Batteries for disposal and recycling

Alternatively, lithium batteries for disposal and recycling may also be transported (like unused lithium batteries) according to ADR SV 230 and SV 188, as applicable, or - if they have a gross mass of not more than 500 g, according to ADR SV 636 b).



Other requirements:

UN Test 38.3 as transport prerequisite

Fundamentally, only batteries that meet the requirements of the "UN Manual of Tests and Criteria, Chapter 38.3" may be transported. The manufacturer can provide further information if doubt arises. Special packaging requirements must be observed for transporting prototypes (without UN 38.8 test) and faulty batteries, see pages 7 and 8 (ADR 2.2.9.1.7(a) and SP 230, SV 188).

Quality assurance programme

Batteries must be manufactured in accordance with a quality assurance program that includes:

- (i) a description of the organisational structure and staff responsibilities with regard to design and product quality;
- (ii) the relevant instructions used for testing, quality control, quality assurance and work procedures;
- (iii) process controls, which should include appropriate activities to prevent and detect internal short circuit defects during the manufacture of cells;
- (iv) quality records, such as inspection reports and test and calibration data, plus supporting documents; test data must be retained and made available to the competent authority upon request;
- (v) reviews by management to ensure the successful operation of the quality assurance programme;
- (vi) a procedure for the control of documents and their revision; (vii) a means for checking cells or batteries that do not conform to the tested type referred to in paragraph (a); (viii) training programmes and qualification procedures for the staff concerned; and
- (ix) procedures to ensure that there is no damage to the final product.

Note: In-house quality assurance programmes may be approved. Third-party certification is not required, but the procedures listed in paragraphs (i) to (ix) must be accurately recorded and traceable. A copy of the quality assurance programme must be made available to the competent authority upon request.

What do we need to bear in mind when returning goods?

The shipper, the carrier and also, if applicable, the shipper's client are responsible for the proper carriage. Fundamentally, the same regulations apply to return transports as listed above. If possible, the original packaging should be used for transport. If the original packaging, labelling or the required transport documents are not available, the client (e.g. manufacturer, supplier, etc.) must provide them to the shipped or to the carrier before the return is collected.

Disposal and recycling

see page 9

Exemptions from requirements for the transport of dangerous goods (ADR)

The ADR regulations do not apply to companies that perform carriage as an ancillary activity to their principal activity (e.g. deliveries to or return deliveries from construction sites or for demonstration purposes). ("Tradesmen's regulation" ADR 1.1.3.1c).

Furthermore, the ADR requirements do not apply to private individuals, provided that the batteries are packaged for retail sale and if the transport is for private purposes (ADR 1.1.3.1a).

Exemptions relating to quantities per means of carriage

For lithium-ion batteries or devices containing lithium-ion batteries with energy > 100 Wh, a weight limit of max. 333 kg battery weight applies for the applicability of an exemption regulation ("1000 point rule"). If this limit is complied with, less stringent requirements apply with regard to the driver's truck equipment qualification.

Securing cargo

Measures must be taken to ensure safe carriage (securing cargo).

Cells and single-cell batteries

This information only covers batteries with two or more cells. Different exemption limits apply to cells and single-cell batteries.



FLEX-specific stipulations

If the battery is to be shipped without transport packaging in the FLEX sales packaging only, this is already adequately labelled (Danger label No. 9A + label for lithium batteries), see the example below. An additional sticker is therefore no longer necessary, and the "outer packaging" sticker is also left off.

The labels

- must not have stickers put over them
- must be undamaged
- must not be torn or tattered
- must not be written on or crossed out or have other random lines applied

Example, FLEX battery 8 Ah sales packaging





Class 9 danger Various dangerous substances and objects (ADR 5.2.2.2.2) Danger label No. 9A

Template for label in original size.

UN 3480 Lithium-ion batteries (excluding unit)





UN 3480



Class 9 danger Various dangerous substances and objects (ADR 5.2.2.2.2) Danger label No. 9A

Template for label in original size

UN 3481 Lithium-ion batteries in equipment or packed with equipment





UN 3481



Labels for lithium batteries (ADR 5.2.1.9.2, IATA DGR 7.1.5.5, Fig. 7.1.C)

Template for label in original size. (minimum size 10 x 10 cm, minimum character height 6 mm.)

UN 3480 Lithium-ion batteries (excluding unit)

- cut outside the red shaded or black border.
- enter phone number (24-hour availability in case of emergency)
- (in addition, the "REPACKAGING" sticker must be affixed to the transport box (minimum character size 12 mm)





REPACKAGING



Labels for lithium batteries (ADR 5.2.1.9.2, IATA DGR 7.1.5.5, Fig. 7.1.C)

Template for label in original size

UN 3481

Lithium-ion batteries

in equipment or packed with equipment

- cut outside the red shaded or black border.
- enter phone number (24-hour availability in case of emergency)
- (in addition, the "REPACKAGING" sticker must be affixed to the transport box (minimum character size 12 mm)





REPACKING