

OVERPACK[®]

PACK

packaging solutions



Lithium Batteries Packaging Solutions



Lithium Batteries

Lithium Batteries are widely used in everyday life because they guarantee outstanding performances and long-lasting charge.

They are used in several electrical and electronic devices as smartphones, tablets, laptops, signalling devices, electronic measuring equipment, electrical vehicles and many others.

There are mainly two types of Lithium Batteries on the market:

Lithium Metal Batteries – they contain lithium metal, they are not rechargeable and they have more energy density.

They are used, for example, in watches, pacemakers, hearing aids, cameras and calculators.

Lithium Ion Batteries – they do not contain lithium metal and are considered more stable over time. They are rechargeable and generally used in mobile phones, tablets, personal computers and notebooks.

Within the context of dangerous goods transport regulation, Lithium Batteries classification depends on whether they are dispatched alone, packed with or contained in equipment.

Lithium batteries belong to **CLASS 9 MISCELLANEOUS DANGEROUS GOODS**.



They are classified with the following UN codes:

- **UN 3090** - Lithium Metal Batteries (packed alone);
- **UN 3480** - Lithium Ion Batteries (packed alone).

If the batteries are contained in equipment or packed separately but together with their device, they are classified as follows:

- **UN 3091** - Lithium Metal Batteries contained in equipment;
- **UN 3091** - Lithium Metal Batteries packed with equipment;
- **UN 3481** - Lithium Ion Batteries contained in equipment;
- **UN 3481** - Lithium Ion Batteries packed with equipment.
- **UN 3171** - Battery-powered vehicle/equipment

Ref. IATA Dangerous Goods Regulations 64th edition – Packing Instructions 965-966-967-968-969-970.

Ref. IMDG Code 2020 Edition – Packing Instructions 903-908-909-910-911.

Ref. ADR 2023 – Packing Instructions 903-908-909-910-911.

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Transport Accidents

Transportation of this type of goods presents a high risk of accidents, as in the event of short circuit, perforation or high temperatures Lithium Batteries could overheat and burn.

Lithium Batteries, in fact, are characterized by "thermal instability".

The above-mentioned events can result in the process of "thermal runaway", a term that describes a situation during which an imbalance is created within a component of the battery that leads to an uncontrolled and unstoppable increase in temperature. A chain reaction, which in the worst case leads first to combustion and then, in the



absence of an outlet, to an explosion.

Large amounts of batteries therefore represent a significant safety hazard, in particular within airplanes.

Many airplane accidents have in fact proved to be caused by fires started from Lithium Batteries.

As a result of the increasing safety issues raised from air transport vectors, Transport Regulations have become stricter and the carriers are obliged to rigorously comply with them.

How to properly ship

Due to the increasing fear of accidents caused by the transport of Lithium Batteries, it's no longer possible to dispatch them packed in any container.

In order to transport Lithium Batteries, carriers must comply with precise packaging and shipping instructions and rules contained in regulation handbooks, where all the necessary information are available.



To correctly manage the transportation of Lithium Batteries, it is necessary to attend certified training courses in order to be constantly updated on the regulations, as restrictions are changing and increasing every year.

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UN Approved and Certified fibreboard boxes

UN Approved and Certified fibreboard boxes suitable for the packaging of Lithium Batteries, easily adaptable and cost effective.

Fully compliant with all modes of transport according to the following regulations:

- **ISO 16106:2020 Packaging** – Transport packaging for Dangerous Goods - Test methods
- **UN Recommendation on the transport of Dangerous Goods;**
- **ADR**, for road transportation;
- **IMDG**, for maritime transportation;
- **ICAO-TI** (International Civil Aviation Organization – Technical Instructions for the Safe Transport of Dangerous Goods by air) and **IATA** (International Air Transport Association), for air transportation.

Ensure that your UN Approved fiberboard box complies with the Regulations: it must be specified on the UN Approval Certification.



Overpack Code	4GV	4G	Internal dimensions mm.
OV-4G/4GV001S	X5	X10	204x204x373
OV-4GV001	X3,5		177x177x298
OV-4GV002	X14		352x340x308
OV-4GV003	X30		588x388x463
OV-4G/4GV004	X85	Y95	775x575x410
OV-4GV005	X18		393x393x383
OV-4G04		Y16	480x280x250
OV-4G35		Y19	350x350x275
OV-4G27		Y31	388x288x442
OV-4G05		Y44	579x379x423
OV-4G1074		Y7	193x155x125
OV-4G1027		Y2,7	455x170x72
OV-4G1081		Y3,55	285x185x100
OV-4G91		Y253	1175x775x720
OV-4G1088		Y1,7	175x115x115
OV-4G1101		Y3,5	430x150x75
OV-4G1090		Y19	446x236x252
OV-4G1106		Y17	385x510x160
OV-4G1113		Y2,5	170x135x240
OV-4G1114		Y2	515x55x50

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UN Approved and Certified plywood boxes



UN Approved and Certified collapsible plywood boxes suitable for the packaging of Lithium Batteries, fully compliant with all modes of transport according to the following regulations:

- **ISO 16106:2020 Packaging** – Transport packaging for Dangerous Goods - Test methods;
- **UN Recommendation on the transport of Dangerous Goods;**
- **ADR**, for road transportation;
- **IMDG**, for maritime transportation;
- **ICAO-TI** (International Civil Aviation Organization – Technical Instructions for the Safe Transport of Dangerous Goods by air) and **IATA** (International Air Transport Association), for air transportation.

Our UN Approved and Certified plywood boxes for the packaging of Lithium Batteries are equipped with a locking tongue closure, which simplifies assembling and fixing operations and complies with ISPM15-FAO standard.

IMPORTANT: our UN approved collapsible plywood boxes passed the laboratory tests with 2-way or 4-way palletized bottom and with no palletized bottom.

Overpack Code	4DV	4D	50D	4C1	Internal dimensions mm.
OV-4D/4DV001	X22	X33			400x300x260
OV-4D/4DV003	X51	X89			580x380x380
OV-4D/4DV004	X88	X173			780x580x380
OV-4D/4DV005	X140	X250			780x580x580
OV-4D/4DV006	X252	X320			1180x780x580
OV-4D/4DV007	X300	X400			1180x780x780
OV-4D1043		Y400			1500x1000x1000
OV-4D1077		Y230			1160x700x310
OV-4D1102		Y265			1000x600x840
OV-50D1030			Y2074		1035x865x793
OV-50D1112			Y1672		1860x1000x1020
OV-50D1000			Y1000		2250x1400x500
OV-50DW1500			Y1500		2800x2000x750
OV-4C11078				Y200	1750x300x330
OV-4C11094				Y305	1150x750x282

Ensure that your UN approved plywood box complies with the Regulations: it must be specified on the UN Approval Certification.

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Lithium Batteries are the most commonly used batteries in consumer electronics.

Tablets, smartphones, digital cameras, for example, are powered by this technology, as well as electric vehicles (cars, motorcycles, bicycles, scooters) which are increasingly common in the mobility sector.

Batteries and electronic components can be irreparably damaged by electrostatic discharges.

Overpack offers a wide range of ESD antistatic products with safe and customized packaging solutions.

Overpack Code	Description
OV-SAC001A	ESD Antistatic polyethylene bag dim. cm. 40x60
OV-SAC002A	ESD Antistatic polyethylene bag dim. cm. 40x(20 + 20)x80
OV-SAC003A	ESD Antistatic polyethylene bag dim. cm. 75x(25+25)x113
OV-SAC004VA	ESD Antistatic polyethylene bag dim. cm. 80x(30+30)x115
OV-SAC004A	ESD Antistatic polyethylene bag dim. cm. 120x(50+50)x200
OV-POLY01A	ESD Antistatic polyam sheet thickness 2 cm., dim. cm. 200x120
OV-POLY02A	ESD Antistatic polyam sheet thickness 5 cm., dim. cm. 200x120
OV-TUB150/500A	ESD Antistatic polyethylene tubular, thickness 80µm, pink color, dim. 150mm. x 500m.
OV-TUB250/500A	ESD Antistatic polyethylene tubular, thickness 80µm, pink color, dim. 250mm. x 500m.
OV-TUB400/250A	ESD Antistatic polyethylene tubular, thickness 80µm, pink color, dim. 400mm. x 250m.
OV-BOLL25/80A	ESD Antistatic bubble wrap in low density polyethylene (LDPE), h. cm. 25 mtl. 200, 80 g/m ²
OV-BOLL50/80A	ESD Antistatic bubble wrap in low density polyethylene (LDPE), h. cm. 50 mtl. 200, 80 g/m ²
OV-BOLL100/80A	ESD Antistatic bubble wrap in low density polyethylene (LDPE), h. cm. 100 mtl. 200, 80 g/m ²
OV-FE50/300A	ESD Antistatic manual and machine stretch film, h. cm. 50 mtl. 300, thickness: 0,02 mm.
OV-SCTSPUGNA05A	ESD Antistatic box with profiled dissipative sponge, dim. mm. 150x115x40 h.
OV-SCTSPUGNA10A	ESD Antistatic box with profiled dissipative sponge, dim. mm. 200x140x50 h.
OV-SCTSPUGNA20A	ESD Antistatic box with profiled dissipative sponge, dim. mm. 280x140x100 h.

Filling materials

To complement the packaging solutions, Overpack offers a wide range of **filling materials**.

The products in our portfolio guarantee full compliance with the reference standards for the transport of Lithium Batteries, whether they are new, damaged or to be disposed.



Overpack Code	Description
OV-STYRO	Polystyrene bag ¼ mc
OV-BOLL	Air bubbles available in rolls with different grammages, heights and linear meters
OV-VERMICULITE	Inert absorbent material
OV-PAN01R	Universal absorbent fabric in roll
OV-PAN1D	Universal absorbent fabric in dispenser
OV-POLY01	Foam sheet thickness 2 cm., dim. 200x120 cm.
OV-POLY02	Foam sheet thickness 5 cm., dim. 200x120 cm.

Labelling and Marking of the packages

Due to the specifications on Lithium Batteries classification, the Regulation establishes precise **labelling and marking** of the packages in order to highlight the nature of the danger presented by the package content.



Image	Overpack Code	Description	Packaging
	OV-E9A	Package label class 9 Lithium battery	50 pcs.
	OV-E9AR	Package label class 9 Lithium battery	roll 250 pcs.
	OV-E/ LITHIUMN	Package Mark Lithium Batteries, 2021 Edition	50 pcs.
	OV-E/ LITHIUMNR	Package Mark Lithium Batteries, 2021 Edition	roll 250 pcs.
	OV-EC9	Placard class 9 Miscellaneous	12 pcs.
	OV-ECAO	Package label Cargo Aircraft Only	50 pcs.
	OV-ECAOR	Package label Cargo Aircraft Only	roll 250 pcs.

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UN Approved metal box



Damaged or defective Lithium Batteries can be very dangerous if not handled properly.

Thanks to this innovative packaging solution it is possible to safely store and transport one or more damaged or defective Lithium Batteries in a critical condition, which could evolve towards thermal runaway.

Our UN approved 4A metal box complies with Special Provision 376 and P911 packing instruction of the ADR regulation for road transportation.

Description	Metal safety container
Structure	1 base and 1 bell-shaped cover
Material	Steel with thermal insulating material
External dimension	2060x1552x800 mm
Internal dimension	1739x1211x495 mm
Tare weight	478 kg
Capacity	466,70
Volume	1 m ³
Finishing	Paint
UN Approved	4A/X945/S...
Stackable	Yes
Smoke and gas control system	Activated carbon filter
Ancillary materials included	n.2 bags of 100 l vermiculite
	n.1 antistatic bag of the size suitable for battery pack
	n.2 insulating pillows to be placed on the base of the safety container and above the battery
	n.5 fixing straps

UN Approved collar

Designed for the packaging of dangerous goods, the collar has been UN approved 4C1 especially for the transport of Lithium Batteries. It is built with planned and dried fir wood planks, joined at the 4 corners with hinges fixed with riveted rivets.

The phenolic plywood cover fits perfectly inside the folding side by means of appropriate stops, ensuring a greater stability and ease of overlap in addition to the closure and total protection of the content from light and dust.

Customizable, stackable, foldable and reusable, the collar occupies a minimum storage space



(reducing volume from 20 to 1) and has an average life of 8/10 years.

Ease of assembly, strength and safety are the advantages of this packaging, which allows to save time and space during the packaging and shipping of products.

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There are currently precise instructions for the packaging of Lithium Batteries and lithium battery powered equipment:

- They have to be packed in UN approved or certified boxes (according to their technical characteristics) that can be made of plywood or fibreboard;
- Packages must be correctly marked and/or labelled;
- The shipment often requires to be accompanied by a Transport Document, Imo Multimodal or Shipper's declaration.

The knowledge of a product is fundamental to manage it in compliance with the Regulations and to grant its safe delivery to destination, both in the initial phase of classification and in the following steps of packaging, marking and labelling.

OVERPACK has at his disposal a wide range of packages suitable for dangerous goods transportation. They are UN approved or certified and compliant for all modes of transport. They are available on stock and



customizable on demand, depending on your business needs.

Our **Dangerous Goods Specialists** help our clients in the design of the suitable transport packaging, ensuring extremely competitive costs and the preparation of goods (packaging and labelling) in a very short time.

Furthermore, our specialists can help our clients with the preparation of the Transport Document, Imo Multimodal or Shipper's declaration if required, and also sign it with assumption of responsibility.



PROCEDURE FOR AIR TRANSPORT OF LITHIUM ION BATTERIES

LITHIUM ION BATTERIES

UN 3480
PI 965

LITHIUM ION BATTERIES PACKED WITH EQUIPMENT

UN 3481
PI 966

Section IA



Cells greater than 20 Wh;
and
Batteries greater than 100 Wh

NOTE: Use "IA" if Package exceeds Section IB Limits (net weight over 10 kg)

Limit per package:
Pax A/C = Forbidden
CAO = 35 kg

Section IB



Cells equal to or less than 20 Wh;
and
Batteries equal to or less than 100 Wh

Limit per package:
Pax A/C = Forbidden
CAO = 10 kg

Section I



Cells greater than 20 Wh;
and
Batteries greater than 100 Wh

Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Section II



Cells equal to or less than 20 Wh;
and
Batteries equal to or less than 100 Wh

Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

Section I



Cells greater than 20 Wh;
and
Batteries greater than 100 Wh

Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Section II



Cells equal to or less than 20 Wh;
and
Batteries equal to or less than 100 Wh

Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT

UN 3481
PI 967



PROCEDURE FOR AIR TRANSPORT OF LITHIUM METAL BATTERIES

LITHIUM METAL BATTERIES

UN 3090
PI 968

LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT

UN 3091
PI 969

Section IA



Cells greater than 1 g;
and
Batteries greater than 2 g

NOTE: Use "IA" if Package exceeds Section IB Limits (net weight over 10 kg)

Limit per package:
Pax A/C = Forbidden
CAO = 35 kg

Section IB



Cells equal to or less than 1 g;
and
Batteries equal to or less than 2 g

Limit per package:
Pax A/C = Forbidden
CAO = 2.5 kg

Section I



Cells greater than 1 g;
and
Batteries greater than 2 g

Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Section II



Cells equal to or less than 1 g;
and
Batteries equal to or less than 2 g

Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

Section I



Cells greater than 1 g;
and
Batteries greater than 2 g

Limit per package:
Pax A/C = 5 kg
CAO = 35 kg

Section II



Cells equal to or less than 1 g;
and
Batteries equal to or less than 2 g

Limit per package:
Pax A/C = 5 kg
CAO = 5 kg

LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT

UN 3091
PI 970



PROCEDURE FOR AIR TRANSPORT OF BATTERY-POWERED VEHICLE/BATTERY-POWERED EQUIPMENT

**BATTERY-POWERED VEHICLE/
BATTERY-POWERED EQUIPMENT**

**UN 3171
PI 952**



**ALL BATTERIES
MUST BE INSTALLED
IN THE VEHICLE/
EQUIPMENT**

**EACH CELL OR
BATTERY IS OF
THE TYPE PROVED
TO MEET THE
REQUIREMENTS OF
EACH TEST OF THE
MANUAL OF TESTS
AND CRITERIA, PART
III, SUBSECTION 38.3.**

Limit per package:
Pax A/C = NO LIMIT
CAO = NO LIMIT



PROCEDURE FOR ROAD/SEA TRANSPORT OF LITHIUM ION BATTERIES

LITHIUM ION BATTERIES

UN 3480

LITHIUM ION BATTERIES PACKED WITH EQUIPMENT

UN 3481

SP 188



Cells equal to or less than 20 Wh;

Batteries equal to or less than 100 Wh

Limit per package:
30 Kg Gross weight

PI 903



Cells greater than 20 Wh;

Batteries greater than 100 Wh

Documentation:
DDT ADR or
Multimodal Dangerous
Goods Form

Limit per package:
NO LIMIT

SP 188



Cells equal to or less than 20 Wh;

Batteries equal to or less than 100 Wh

Limit per package:
NO LIMIT

PI 903



Cells greater than 20 Wh;

Batteries greater than 100 Wh

Documentation:
DDT ADR or
Multimodal Dangerous
Goods Form

Limit per package:
NO LIMIT

LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT

UN 3481

SP 188



Cells equal to or less than 20 Wh;

Batteries equal to or less than 100 Wh

Limit per package:
NO LIMIT

PI 903



PI 903

Cells greater than 20 Wh;

Batteries greater than 100 Wh

Documentation:
DDT ADR or
Multimodal Dangerous
Goods Form

Limit per package:
NO LIMIT



PROCEDURE FOR ROAD/SEA TRANSPORT OF LITHIUM METAL BATTERIES

LITHIUM METAL BATTERIES

UN 3090

LITHIUM METAL BATTERIES

PACKED WITH EQUIPMENT

UN 3091

SP 188



Cells equal to or less than 1 g;

Batteries equal to or less than 2 g

Limit per package:
30 Kg Gross weight

PI 903



Cells greater than 1 g;

Batteries greater than 2 g

Documentation:
DDT ADR or
Multimodal Dangerous
Goods Form

Limit per package:
NO LIMIT

SP 188



Cells equal to or less than 1 g;

Batteries equal to or less than 2 g

Limit per package:
NO LIMIT

PI 903



Cells greater than 1g;

Batteries greater than 2 g

Documentation:
DDT ADR or
Multimodal Dangerous
Goods Form

Limit per package:
NO LIMIT

SP 188



Cells equal to or less than 1 g;

Batteries equal to or less than 2 g

Limit per package:
NO LIMIT

PI 903



Cells greater than 1 g;

Batteries greater than 2 g

Documentation:
DDT ADR or
Multimodal Dangerous
Goods Form

Limit per package:
NO LIMIT

LITHIUM METAL BATTERIES *CONTAINED IN EQUIPMENT*

UN 3091

General Notes

- "Hoverboards" and similar items are considered "vehicles" (SP 388) and are shipped as UN 3171;
- "Hybrid" batteries have to be shipped as UN 3090 or UN 3091 (SP 387);
- Defective and/or malfunctioning batteries have to be shipped according to SP 376 and packed according to PI 908 and/or LP 904 or PI 911 and/or LP 906, according to the case;
- Batteries for disposal are shipped in accordance with SP 377 and packed in accordance with PI 909;
- Batteries not tested according to the "Manual of Tests and Criteria" manual are shipped according to SP 310 and packed according to PI 910;
- Damaged or defective batteries which may react dangerously, produce a flame or a dangerous heat development have to be packed in accordance with PI 911.

DANGEROUS GOODS PACKAGING



**YOUR DANGEROUS GOODS
IN GOOD HANDS!**

OVER
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