

FULLY REGULATED LITHIUM ION BATTERY GUIDE

To safely and compliantly package for ground transportation the fully regulated 100+ watthour lithium ion batteries, please utilize the most updated version of ADR - Agreement concerning the International Carriage of Dangerous Goods by Road. The ADR volumes can be downloaded from [here](#).

Please seek advice from your Dangerous Goods Safety Adviser and utilize the ADR sections based on the battery type from your product. ADR outlines the requirements for lithium ion batteries being shipped as fully regulated Class 9 lithium ion batteries.

Lithium Ion battery 100+ watthour requirements:

1. Battery Test Summary:

To ship, you should always have Battery Test Summary. The lithium ion batteries offered for transportation have to pass the design tests found in the United Nations (UN) Manual of Tests and Criteria, Section 38.3. Effective January 1, 2022, lithium cell and battery manufacturers and subsequent distributors of lithium cells and batteries manufactured after January 1, 2008 must make a lithium battery test summary available to others in the supply chain. The test summary includes a standardized set of elements that provide traceability and accountability to ensure that lithium cell and battery designs offered for transport meet UN 38.3 test requirements.

See [ADR contents](#) for all testing and test summary requirements. Seek advice from your Dangerous Goods Safety Adviser.

2. Closure instructions:

To ship and use UN packaging, you must always have closing instructions (also known as packing instructions). The closure instruction essentially tells how the package was tested and exactly how to assemble your packaging. **Note:** the closure instructions will have to include documentation for any variations from the original/tested closure instructions and steps necessary to assemble the package.

See [ADR contents](#) regarding closing instructions. Seek advice from your Dangerous Goods Safety Adviser

3. Packaging, marking, and labeling:

Lithium batteries are Class 9 (miscellaneous) hazardous materials. There are eight possible descriptions for lithium cells and batteries, depending on the battery chemistry. These descriptions, or proper shipping names, are found in the Hazardous Materials Table (HMT) in ADR. The fully regulated lithium ion battery 100+ watthour follows as:

- a) Stand-alone - package contains only the cells/batteries—no equipment.
- b) Packed with - package contains not only the equipment, but also cells/batteries that are not installed in the equipment.
- c) Contained in - package contains equipment with cells/batteries installed.

a) UN3480 LITHIUM ION BATTERIES - (FULLY REGULATED - 100+ watthour)

UN ID Number: UN3480

Proper Shipping Name: LITHIUM ION BATTERIES

Hazard Class Label: Class 9 Lithium Battery

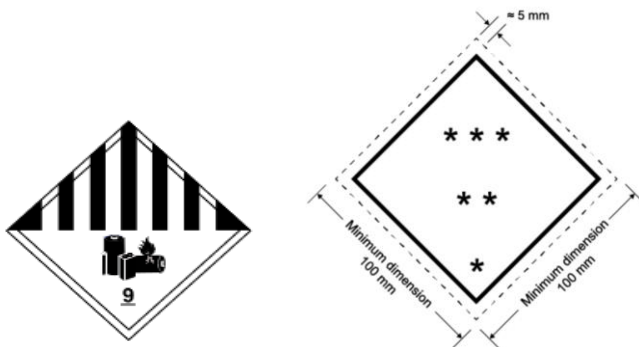
To ensure that the requirements are met, we will do the validation based on the requirements from ADR. Below we have summarized the information for an easier review, however, please always reference the ADR volumes.

Packaging Requirements – check ADR and Seek advice from your Dangerous Goods Safety Adviser

- Batteries must be:
 - ❖ Protected against short circuiting. This means that terminals must be protected!
 - ❖ Packed to prevent shifting that could cause damage to the batteries within the outer packaging.
- The outer packaging must be a UN specification packaging meeting Packing Group II performance requirements.

Required Hazard Communication – check ADR and Seek advice from your Dangerous Goods Safety Adviser

- Class 9A Lithium Battery label – size 100mm x 100mm



- UN ID number

UN3480

- Proper Shipping Name mark

LITHIUM ION BATTERIES

- Consignor (shipper) or Consignee (recipient) name and address
- UN Specification Package Marking
- When overpacked (e.g., authorized outer packagings are further packaged or consolidated by any means), the Class 9A Lithium Battery label, UN ID number, and Proper Shipping Name must be visible or replicated on the overpack.
- The orientation arrows are not required on packages for batteries, unless a liquid is included inside the package. If the orientation arrows are present on your packages even for batteries, then:

- ❖ Must be displayed on two opposite sides of the package or overpack.
- ❖ Must show the proper package orientation for the closures of the inner packaging to be in the upright position.
- ❖ Minimum dimensions: 74 x 105 mm.
- ❖ Color: Red (Pantone Color No. 186U) or Black on a contrasting background.



Packaging and Required Hazard Communication Example for LITHIUM ION BATTERIES (Stand-alone)

The inner packaging must completely enclose the cells or batteries in the package. The inner packaging may also be used to meet protection against short circuiting/terminal protection requirements.



Protection against short circuiting/terminal protection is an important aspect of packaging. Any method is acceptable, provided this important performance requirement is met.



CARGO AIRCRAFT ONLY Label
(if being shipped for air transport)

Consignor (shipper) or
Consignee (recipient)
Name and Address -

UN ID Number and
Proper Shipping Name -



Class 9 Lithium Battery Label



4G/Y50/S/19/
USA/0000

Sample UN Specification Package Marking

For UN Specification packaging, always
follow the packaging manufacturer's
packaging and closure instructions

Authorized Specification Outer Packaging Types*:

Boxes: Metal (4A, 4B, 4N), wooden (4C1, 4C2, 4D, 4F), fiberboard (4G), or solid plastic (4H1, 4H2)
Drums: Metal (1A2, 1B2, 1N2), plywood (1D), fiber (1G), or plastic (1H2)
Jerricans: Metal (3A2, 3B2) or plastic (3H2)

b) UN3481 LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (FULLY REGULATED - 100+ watthour)

UN ID Number: UN3481

Proper Shipping Name: LITHIUM ION BATTERIES PACKED WITH EQUIPMENT

Hazard Class Label: Class 9 Lithium Battery

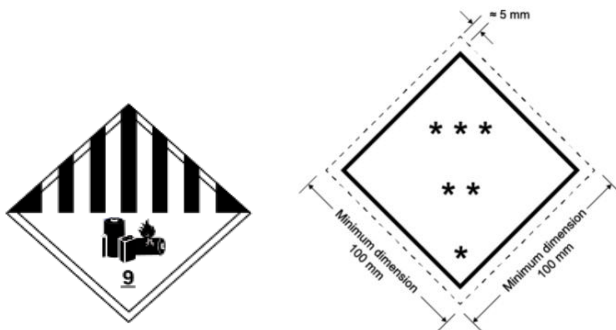
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Packaging Requirements - check ADR and Seek advice from your Dangerous Goods Safety Adviser

- Batteries must be:
 - ❖ Protected against short circuiting. This means that terminals must be protected!
 - ❖ Packed to prevent shifting that could cause damage to the cells or batteries within the outer packaging.
- Equipment must be protected from accidental activation.
- For packages with lithium batteries packed with equipment:
 - ❖ Batteries must be placed in non-metallic inner packagings that completely enclose the cell or battery and separate them from contact with equipment or electrically conductive materials (e.g., metal) in the packaging.
 - ❖ A UN specification packaging meeting Packing Group II performance requirements must be used as either the outer packaging for any spare batteries or the outer packaging for both the batteries and the equipment.

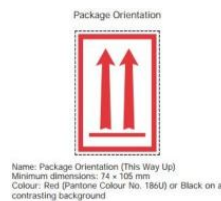
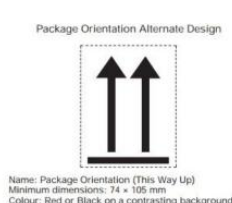
Required Hazard Communication – check ADR and Seek advice from your Dangerous Goods Safety Adviser

- Class 9A Lithium Battery label - Size - 100mm x 100mm



- UN ID number
UN3481
- Proper Shipping Name mark
LITHIUM ION BATTERIES PACKED WITH EQUIPMENT
- Consignor (shipper) or Consignee (recipient) name and address
- UN Specification Package Marking

- When overpacked (e.g., authorized outer packagings are further packaged or consolidated by any means), the Class 9 Lithium Battery label, UN ID number, and Proper Shipping Name must be visible or replicated on the overpack
 - Note: if the package contains both lithium ion batteries packed with and contained in equipment, the proper shipping name is "Lithium Ion Batteries Packed with Equipment".
- The orientation arrows are not required on packages for batteries, unless a liquid is included inside the package. If the orientation arrows are present on your packages even for batteries, then:
 - Must be displayed on two opposite sides of the package or overpack.
 - Must show the proper package orientation for the closures of the inner packaging to be in the upright position.
 - Minimum dimensions: 74 x 105 mm.
 - Color: Red (Pantone Color No. 186U) or Black on a contrasting background.



Packaging and Required Hazard Communication Example for LITHIUM ION BATTERIES PACKED WITH EQUIPMENT

The inner packaging must completely enclose the cells or batteries in the package. The inner packaging may also be used to meet protection against short circuiting/terminal protection requirements.



Protection against short circuiting/terminal protection is an important aspect of packaging. Any method is acceptable, provided this important performance requirement is met.



CARGO AIRCRAFT ONLY Label
(required if shipped by air and lithium cells and batteries exceed 5 kg net weight)



Class 9 Lithium Battery Label

Consignor (shipper) or
Consignee (recipient) Name
and Address -

UN ID Number and Proper Shipping Name



**4G/Y50/S/19/
USA/0000**

Sample UN Specification Package Marking
For UN Specification packaging, always follow the packaging manufacturer's packaging and closure instructions

Authorized Specification Outer Packaging Types*:

Boxes: Metal (4A, 4B, 4N), wooden (4C1, 4C2, 4D, 4F), fiberboard (4G), or solid plastic (4H1, 4H2)
Drums: Metal (1A2, 1B2, 1N2), plywood (1D), fiber (1G), or plastic (1H2)
Jerrycans: Metal (3A2, 3B2) or plastic (3H2)

c) UN3481 LITHIUM ION BATTERIES PACKED CONTAINED IN EQUIPMENT (FULLY REGULATED - 100+ watthour)

UN ID Number: UN3481

Proper Shipping Name: LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT

Hazard Class Label: Class 9 Lithium Battery

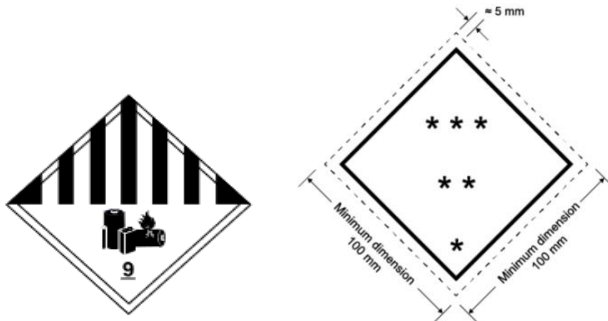
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Packaging Requirements – check ADR and Seek advice from your Dangerous Goods Safety Adviser

- Batteries must be:
 - ❖ Protected against short circuiting. This means that terminals must be protected!
 - ❖ Packed to prevent shifting that could cause damage to the cells or batteries within the outer packaging.
- Equipment must be protected from accidental activation.
- For packages with lithium batteries contained in equipment:
 - ❖ The outer packaging, when used, must be constructed of suitable material of adequate strength and design in relation to the capacity and intended use of the packaging, unless the lithium cells or batteries are afforded equivalent protection by the equipment in which they are contained.
 - ❖ Equipment must be secured to prevent damage caused by shifting within the outer packaging and be packed to prevent accidental operation during transport.

Required Hazard Communication – check ADR and Seek advice from your Dangerous Goods Safety Adviser

- Class 9A Lithium Battery label - 100mm x 100mm



- UN ID number
UN3481
- Proper Shipping Name mark
LITHIUM ION BATTERIES IN CONTAINED EQUIPMENT
- Consignor (shipper) or Consignee (recipient) name and address
- When overpacked (e.g., authorized outer packagings are further packaged or consolidated by any means), the Class 9 Lithium Battery label, UN ID number, and Proper Shipping Name must be visible or replicated on the overpack.
 - ❖ Note: if the package contains both lithium ion batteries packed with and contained in equipment, the proper shipping name is “Lithium Ion Batteries Packed with Equipment”.

- The orientation arrows are not required on packages for batteries, unless a liquid is included inside the package. If the orientation arrows are present on your packages even for batteries, then:
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