Batteries shipped by Road

Lithium Batteries

Extract from the Road Code ADG 7.5

Table 3.2.3: Dangerous Goods List

UN No.	Name and Description	Class or Division	Subsidiary Risk	Packing Group	Special Provisions	Limited Quantities	Packagings & IBCs: Packing Instruction	Packagings & IBCs: Special Packing Instructions	Portable Tanks & Bulk Containers: Special Provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Ref	*3.1.2*	*2.0*	*2.0*	*2.0.1.3*	*3.3*	*3.4*	*4.1.4*	*4.1.4*	*4.2.5 4.3.2*	*4.2.5*
3480	LITHIUM ION BATTERIES (including lithium ion polymer batteries)	9			188 230 310 348 376 377 384	0	P903 P908 P909 P910 LP903 LP904			
3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT	9			188 230 310 348 360 376 377 384	0	P903 P908 P909 P910 LP903 LP904			
3090	LITHIUM METAL BATTERIES (including lithium alloy batteries)	9			188 230 310 376 377 384	0	P903 P908 P909 P910 LP903 LP904			
3091	LITHIUM METALBATTERIES CONTAINED IN EQUIPMENT or LITHIUM METALBATTERIES PACKED WITH EQUIPMENT	9			188 230 310 360 376 377 384	0	P903 P908 P909 P910 LP903 LP904			

See next page for special provisions and packing instructions

(Note: LP = Large Packages over 400 Kg. These Packing Instructions have not been included as it is unusual for them to be used within Australia)

For Li ion cells under 20 Wh or Li metal cells under 1 grams - see page 5
For Li ion batteries under 100 Wh or Li metal batteries under 2 grams - see page 5

For large Li ion cells over 20 Wh or Li metal cells over 1 grams - see page 6 & 7
For large Li ion batteries over 100 Wh or Li metal batteries over 2 grams - see page 6 & 7

Special Privision

188 Cells and batteries offered for transport are not subject to other provisions of this Code if they meet the following:

a) For a lithium metal or lithium alloy **cell**, the lithium content is not **more than 1 g**, and for a lithium ion cell, the Watt-hour rating is **not more than 20 Wh**; and

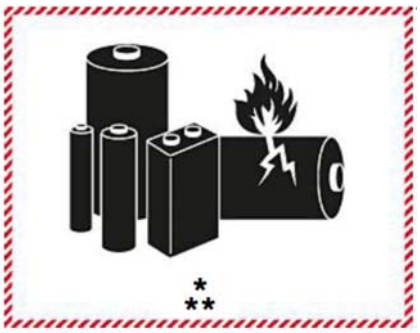
b) For a lithium metal or lithium alloy **battery** the aggregate lithium content is **not more than 2 g**, and for a lithium ion battery, the Watt-hour rating is **not more than 100 Wh**.
Lithium ion batteries subject to this provision must be marked with the Watt-hour rating on the outside case, except those manufactured before 1 January 2009; and

c) Each cell or battery meets the provisions of 2.9.4 (a) and € (Manufacturing & testing requirements); and

d) Cells and batteries, except when installed in equipment, must be packed in inner packagings that completely enclose the cell or battery. 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. The inner packagings must be packed in strong outer packagings which conform to the provisions of 4.1.1.1, 4.1.1.2, and 4.1.1.5; and

e) Cells and batteries when installed in equipment must be protected from damage and short circuit, and the equipment must be equipped with an effective means of preventing accidental activation. This requirement does not apply to devices which are intentionally active in transport (radio frequency identification (RFID) transmitters, watches, sensors, etc.) and which are not capable of generating a dangerous evolution of heat; and

f) Each package shall be marked with the appropriate lithium battery mark, as illustrated below;



* = UN Number

** = Telephone number

This requirement does not apply to:

(i) packages containing only button cell batteries installed in equipment (including circuit boards); and

(ii) packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.

g) Except when lithium batteries are installed in equipment, each package must be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and

h) Except when lithium batteries are installed in or packed with equipment, packages **must not exceed 30 kg gross mass**.

230 Lithium cells and batteries may be transported under this entry if they meet the provisions of 2.9.4.

310 The testing requirements in the Manual of Tests and Criteria, part III sub-section 38.3 do not apply to production runs, consisting of not more than 100 cells and batteries, or to pre-production prototypes of cells and batteries when these prototypes are transported for testing when packaged in accordance with packing instruction P910 of 4.1.4.1

The transport document shall include the following statement: “Transport in accordance with special provision 310”.

Damaged or defective cells, batteries, or cells and batteries contained in equipment shall be transported in accordance with special provision 376 and packaged in accordance with packing instructions P908 of 4.1.4.1 or LP904 of 4.1.4.3, as applicable.

Cells, batteries or cells and batteries contained in equipment transported for disposal or recycling may be packaged in accordance with special provision 377 and packing instruction P909 of 4.1.4.1.

348 Batteries manufactured after 31 December 2011 must be marked with the Watt hour rating on the outside case.

360 Vehicles only powered by lithium metal batteries or lithium ion batteries must be consigned under the entry UN 3171 BATTERY POWERED VEHICLE.

376 Lithium ion cells or batteries and lithium metal cells or batteries identified as being **damaged or defective** such that they do not conform to the type tested according to the applicable provisions of the Manual of Tests and Criteria must comply with the requirements of this special provision.

For the purposes of this special provision, these may include, but are not limited to:
- Cells or batteries identified as being defective for safety reasons;
- Cells or batteries that have leaked or vented;
- Cells or batteries that cannot be diagnosed prior to transport; or
- Cells or batteries that have sustained physical or mechanical damage.

NOTE: In assessing a battery as damaged or defective, the type of battery and its previous use and misuse must be taken into account.

Cells and batteries must be transported according to the provisions applicable to UN 3090, UN 3091, UN 3480 and UN 3481, except special provision 230 and as otherwise stated in this special provision.

Packages must be marked “DAMAGED/DEFECTIVE LITHIUM-ION BATTERIES” or “DAMAGED/ DEFECTIVE LITHIUM METAL BATTERIES”, as applicable.

Cells and batteries must be packed in accordance with packing instructions P908 of 4.1.4.1 or LP904 of 4.1.4.3, as applicable.

Cells and batteries liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of transport must not be transported except under conditions specified by the competent authority.

377 Lithium ion and lithium metal cells and batteries and equipment containing such cells and batteries transported **for disposal or recycling**, either packed together with or packed without non-lithium batteries, may be packaged in accordance with packing instruction P909 of 4.1.4.1.

These cells and batteries are not subject to the requirements of section 2.9.4. Additional exemptions may be provided under the conditions defined by modal transport regulations.

Packages must be marked “LITHIUM BATTERIES FOR DISPOSAL” or “LITHIUM BATTERIES FOR RECYCLING”.

Identified damaged or defective batteries must be transported in accordance with special provision 376 and packaged in accordance with P908 of 4.1.4.1 or LP904 of 4.1.4.3, as applicable.

384 The label to be used is Model No 9A, see 5.2.2.2.2.

NOTE: The Class 9 label (Model No 9) may continue to be used until 31 December 2018.

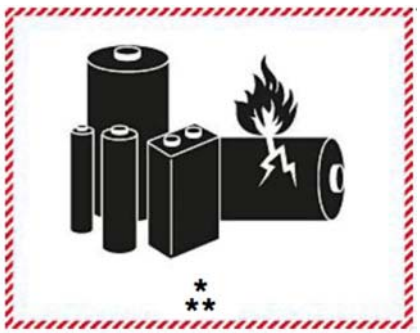
In summary:

Lithium ion cells 20 wh or under
Lithium metal cells 1 g or under

Lithium ion batteries 100 Wh or under
Lithium metal batteries 2 g or under

→ Special Provision 188

SP 188 states the batteries must be packed in inner packagings that completely enclose the cell or battery. 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. The inner packagings must be packed in strong outer packagings

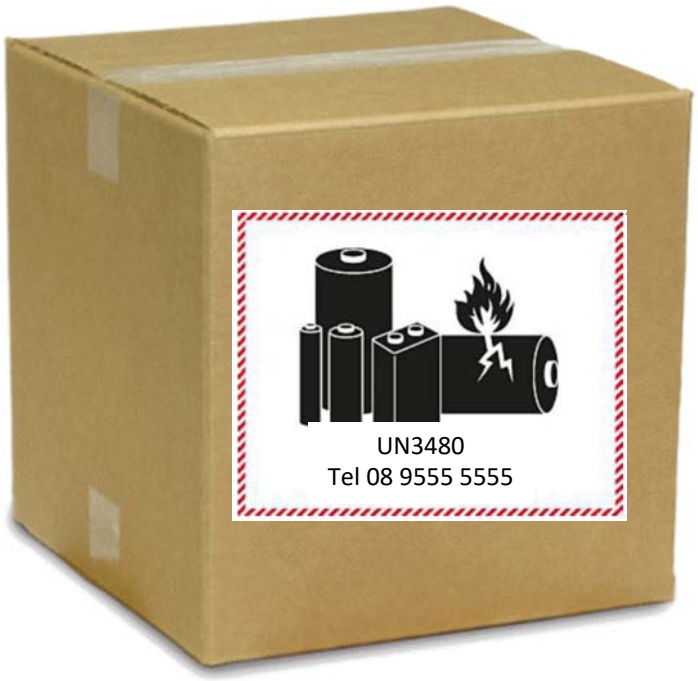


This label must be attached to each box.
It must display the UN number and telephone number of a person with knowledge of the shipment and contents.

Not needed if the batteries are in equipment and there are no more than 2 packages in the shipment and no more than 4 cells or 2 batteries per package.

DG documentation is not required.

Vehicle placarding and segregation is not required



If you overpack/load on skid, just place another Li Battery mark on the outside of the plastic.

If you can see the label through the overpack, nothing is required.

If the Lithium batteries are more than the above allowances then the packing Instructions must be used.

P903	PACKING INSTRUCTION – P903 (Table 4.1.4.1)	P903

This instruction applies to UN Nos. 3090, 3091, 3480 and 3481.

The following packagings are authorised provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) For cells and batteries:

Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);
Jerricans (3A2, 3B2, 3H2).

Cells or batteries must be packed in packagings so that the cells or batteries are protected against damage that may be caused by the movement or placement of the cells or batteries within the packaging.

Packagings must conform to the packing group II performance level.

(2) In addition for cells or batteries with a gross mass of 12 kg or more employing a strong, impact resistant outer casing, and assemblies of such cells or batteries:

(a) Strong outer packagings;
(b) Protective enclosures (e.g., fully enclosed or wooden slatted crates); or
(c) Pallets or other handling devices.

Cells or batteries must be secured to prevent inadvertent movement, and the terminals must not support the weight of other superimposed elements.

Packagings need not meet the requirements of 4.1.1.3.

(3) For cells or batteries packed with equipment:

Packagings conforming to the requirements in paragraph (1) of this packing instruction, then placed with the equipment in an outer packaging; or

Packagings that completely enclose the cells or batteries, then placed with equipment in a packaging conforming to the requirements in paragraph (1) of this packing instruction.

The equipment must be secured against movement within the outer packaging.

For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium metal or lithium ion cells or batteries with which it is packed for its operation.

(4) For cells or batteries contained in equipment:

Strong outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use. They must be constructed in such a manner as to prevent accidental operation during transport. Packagings need not meet the requirements of 4.1.1.3.

Large equipment can be offered for transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are 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 in strong outer packagings. 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.

Additional requirement: Batteries must be protected against short circuit.

The above Packing Instruction is for Lithium ion or metal **cells above 20 Wh or 1 gram** or **batteries above 100 Wh or 2 grams**.

Proper DG packages must be used compliant with packing group II standards
e.g. UN 4G / Y 30 / S / 16 / AUS / VB 1233

This code must be an X or Y

Full DG markings, labelling and declaration must be completed.
(See next page for example of declaration)

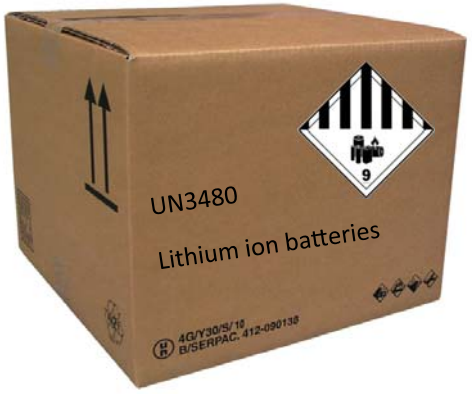


Figure B1MULTIMODAL DANGEROUS GOODS FORM

1. Shipper / Consignor /Sender		2. Transport document number	
		3. Page 1 of ..... pages	4. Shipper's reference
			5. Freight Forwarder's reference
6. Consignee		7. Carrier (to be completed by the carrier)	
		SHIPPER'S DECLARATION I hereby declare that the contents of this consignment are fully and accurately described below by the proper shipping name, and are classified, packaged, marked and labelled / placarded and are in all respects in proper condition for transport according to the applicable international and national governmental regulations.	
8. This shipment is within the limitations prescribed for: (Delete non-applicable) **PASSENGER AND CARGO AIRCRAFT** **CARGO AIRCRAFT ONLY**		9. Additional handling information	
10. Vessel / flight No. and date	11. Port / place of loading		
12. Port / place of discharge	13. Destination		

14. Shipping marks	* Number and kind of packages; description of goods	Gross mass (kg)	Net mass Cube (m^3)
	UN3480 Lithium ion batteries **Class 9** ***Number and type of package and either net per package or total net for shipment*** **E.g. 10 boxes = 200 Kg or 10 boxes x 20 kg each**		

15. Container identification No./ vehicle registration No.	16. Seal number(s)	17. Container/vehicle size & type	18. Tare (kg)	19. Total gross mass (including tare) (kg)

CONTAINER/VEHICLE PACKING CERTIFICATE I hereby declare that the goods described above have been packed/loaded into the container/vehicle identified above in accordance with the applicable provisions ** MUST BE COMPLETED AND SIGNED FOR ALL CONTAINER / VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING / LOADING	21. RECEIVING ORGANISATION RECEIPT Received the above number of packages/containers/trailers in apparent good order and condition unless stated hereon: RECEIVING ORGANISATION REMARKS:	
20. Name of company	Haulier's name	22. Name of company (OF SHIPPER PREPARING THIS NOTE)
Name / Status of declarant	Vehicle reg. no.	Name / Status of declarant
Place and date	Signature and date	Place and date
Signature of declarant	DRIVER'S SIGNATURE	Signature of declarant

Sign here

* FOR DANGEROUS GOODS you must specify: UN No., proper shipping name, hazard class, packing group (where assigned) and any other element of information required under applicable national and international regulations

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P908	PACKING INSTRUCTION – P908 (Table 4.1.4.1)	P908

This instruction applies to damaged or defective lithium ion cells and batteries and damaged or defective lithium metal cells and batteries, including those contained in equipment, of UN Nos. 3090, 3091, 3480 and 3481.

The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:

For cells and batteries and equipment containing cells and batteries:

Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G)

Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2)

Jerricans (3A2, 3B2, 3H2)

Packagings must conform to the packing group II performance level.

1. Each damaged or defective cell or battery or equipment containing such cells or batteries must be individually packed in inner packaging and placed inside of an outer packaging. The inner packaging or outer packaging must be leak-proof to prevent the potential release of electrolyte.
2. Each inner packaging must be surrounded by sufficient non-combustible and non-conductive thermal insulation material to protect against a dangerous evolution of heat.
3. Sealed packagings must be fitted with a venting device when appropriate.
4. Appropriate measures must be taken to minimize the effects of vibrations and shocks, prevent movement of the cells or batteries within the package that may lead to further damage and a dangerous condition during transport. Cushioning material that is non-combustible and non-conductive may also be used to meet this requirement.
5. Non combustibility must be assessed according to a standard recognized in the country where the packaging is designed or manufactured.

For leaking cells or batteries, sufficient inert absorbent material must be added to the inner or outer packaging to absorb any release of electrolyte.

A cell or battery with a net mass of more than 30 kg must be limited to one cell or battery per outer packaging.

Additional requirements:

Cells or batteries must be protected against short circuit.

P909	PACKING INSTRUCTION – P909 (Table 4.1.4.1)	P909

This packing instruction applies to UN Nos. 3090, 3091, 3480 and 3481 transported for disposal or recycling, either packed together with or packed without non-lithium batteries:

(1) Cells and batteries must be packed in accordance with the following:
  (a) The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3, are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H2); and Jerricans (3A2, 3B2, 3H2).
  (b) Packagings must conform to the packing group II performance level.
  (c) Metal packagings must be fitted with a non-conductive lining material (e.g., plastics) of adequate strength for the intended use.

(2) However, lithium ion cells with a Watt-hour rating of not more than 20 Wh, lithium ion batteries with a Watt-hour rating of not more than 100 Wh, lithium metal cells with a lithium content of not more than 1 g and lithium metal batteries with an aggregate lithium content of not more than 2 g may be packed in accordance with the following:
  (a) In strong outer packaging up to 30 kg gross mass meeting the general provisions of 4.1.1, except 4.1.1.3, and 4.1.3.
  (b) Metal packagings must be fitted with a non-conductive lining material (e.g., plastics) of adequate strength for the intended use.

(3) For cells or batteries contained in equipment, strong outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, may be used. Packagings need not meet the requirements of 4.1.1.3.Equipment may also be offered for transport unpackaged or on pallets when the cells or batteries are afforded equivalent protection by the equipment in which they are contained.

(4) In addition, for cells or batteries with a gross mass of 12 kg or more employing a strong, impact resistant outer casing, strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packagings capacity and its intended use, may be used. Packagings need not meet the requirements of 4.1.1.3.

Additional requirements:

1. Cells and batteries must be designed or packed to prevent short circuits and the dangerous evolution of heat.
2. Protection against short circuits and the dangerous evolution of heat includes, but is not limited to,
   - individual protection of the battery terminals,
   - inner packaging to prevent contact between cells and batteries,
   - batteries with recessed terminals designed to protect against short circuits, or
   - the use of a non-conductive and non-combustible cushioning material to fill empty space between the cells or batteries in the packaging.
3. Cells and batteries must be secured within the outer packaging to prevent excessive movement during transport (e.g. by using a non-combustible and non-conductive cushioning material or through the use of a tightly closed plastics bag).

P910	PACKING INSTRUCTION – P910(Table 4.1.4.2)	P910

This instruction applies to UN Nos. 3090, 3091, 3480 and 3481 production runs consisting of not more than 100 cells and batteries and to pre-production prototypes of cells and batteries when these prototypes are transported for testing.

The following packagings are authorized provided that the general provisions of **4.1.1** and **4.1.3** are met:

(1) For cells and batteries, including when packed with equipment:

Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);
Jerricans (3A2, 3B2, 3H2).

Packagings shall conform to the packing group II performance level and shall meet the following requirements:

(a) Batteries and cells, including equipment, of different sizes, shapes or masses shall be packaged in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;

(b) Each cell or battery shall be individually packed in an inner packaging and placed inside an outer packaging;

(c) Each inner packaging shall be completely surrounded by sufficient non-combustible and non-conductive thermal insulation material to protect against a dangerous evolution of heat;

(d) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the cells or batteries within the package that may lead to damage and a dangerous condition during transport. Cushioning material that is non-combustible and non-conductive may be used to meet this requirement;

(e) Non-combustibility shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured;

(f) A cell or battery with a net mass of more than 30 kg shall be limited to one cell or battery per outer packaging.

(2) For cells and batteries contained in equipment:

Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);
Jerricans (3A2, 3B2, 3H2).

Packagings shall conform to the packing group II performance level and shall meet the following requirements:

(a) Equipment of different sizes, shapes or masses shall be packaged in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;

(b) The equipment shall be constructed or packaged in such a manner as to prevent accidental operation during transport;

(c) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the equipment within the package that may lead to damage and a dangerous condition during transport. When cushioning material is used to meet this requirement it shall be non-combustible and non-conductive; and

(d) Non-combustibility shall be assessed according to a standard recognized in the country where the packaging is designed or manufactured.

(3) The equipment or the batteries may be transported unpackaged under conditions specified by the competent authority. Additional conditions that may be considered in the approval process include, but are not limited to:

(a) The equipment or the battery shall be strong enough to withstand the shocks and loadings normally encountered during transport, including trans-shipment between cargo transport units and between cargo transport units and warehouses as well as any removal from a pallet for subsequent manual or mechanical handling; and

(b) The equipment or the battery shall be fixed in cradles or crates or other handling de vices in such a way that it will not become loose during normal conditions of transport.

Additional requirements

The cells and batteries shall be protected against short circuit; Protection against short circuits