



The 2009 amendments to the regulations regarding transport of Lithium Batteries

Executive summary

Lithium Batteries are dangerous goods and are generally subject to transport regulations, depending on the mode of transport. However, many Lithium Batteries are exempted from the regulations if certain listed conditions are met.

The 2009 editions of RID/ADR/ADN and the ICAO technical instructions make significant changes to the regulations and exemptions regarding the transport of Lithium Batteries and Lithium Batteries contained in or packed with equipment. A summary of the changes is found in this document.

A major change affecting all modes is the reclassification of Lithium Batteries into separate UN numbers for Lithium Metal Batteries and Lithium Ion Batteries. A second major change is the new requirement to have an emergency telephone number on certain documents and certain exempted packages containing Lithium Batteries. The changes vary by the differing modes of transport and the guidance will review the requirements for each mode in turn.

This guidance note will answer some of the most frequently asked questions and provides pointers toward the relevant legislation. It does not give an authoritative interpretation of the law, and is not a substitute for reading the legislation itself.

The National Chemical Emergency Centre (NCEC) plays a key role in UK national arrangements for responding to chemical incidents. It provides a 24-hour national advice service to the emergency services when dealing with chemical incidents and is a central part of the Chemical Industries Association (CIA) Chemsafe scheme. In addition to its national role, NCEC offers a number of commercial emergency response services, such as Carechem 24, to assist companies in providing and obtaining chemical emergency response advice and information.

NCEC has been operating the UK's national 24-hour chemical emergency response centre since 1973. This makes it one of the most experienced teams in the world in understanding the requirements of both the chemical industry and the emergency services. NCEC is staffed by a team of Emergency Responders, all qualified chemists who have received extensive training in chemical health and safety, emergency response and communication skills.

For further advice on interpreting and implementing the changes to the regulations, please call NCEC on +44 (0) 870 190 6621 or visit our website <http://www.the-ncec.com>

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Changes to Lithium Battery UN numbers

It has been noted that the risks associated with the transport of Lithium Metal Batteries is significantly higher when compared to the risks of transport of Lithium Ion Batteries. As such, new separate entries for Lithium Ion Batteries (UN 3480 and UN 3481) have been added in the dangerous goods list with the consequence that the existing entries UN 3090 and UN 3091 now deal solely with Lithium Metal Batteries. This applies to both Air and RID/ADR/ADN transport and brings the modes into line with the Lithium Batteries classifications in the 15th edition of the UN recommendations on the transport of dangerous goods model regulations.

1.7 Lithium Metal Batteries

1.7.1 New UN Numbers for Lithium Metal Batteries

LITHIUM METAL BATTERIES	
UN NUMBER	Proper Shipping Name
3090	LITHIUM METAL BATTERIES (including Lithium alloy Batteries)
3091	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including Lithium alloy Batteries)
3091	LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including Lithium alloy Batteries)

1.8 Lithium Ion Batteries

1.8.1 New UN Numbers for Lithium Ion Batteries

LITHIUM METAL BATTERIES	
UN NUMBER	Proper Shipping Name
3480	LITHIUM ION BATTERIES (including Lithium ion polymer Batteries)
3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including Lithium ion polymer Batteries)
3481	LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including Lithium ion polymer Batteries)

2009 RID/ADR/ADN Regulations

1.9 Changes for 2009

The details of the changes from ADR 2009 are supplied in the following chapter. Where further information is not supplied there has been no change from ADR 2007.

1.9.2 Changes to Table A of Chapter 3.2

LITHIUM ION BATTERIES									
1	2	3	4	5	6	7	8	9	10
3480	LITHIUM ION BATTERIES (including Lithium ion polymer Batteries)	9	M4	II	188 230 310 636	LQ0	E0	P903 P903a) P903b)	2 (E)
3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including Lithium ion polymer Batteries)	9	M4	II	188 230 636	LQ0	E0	P903 P903a) P903b)	2 (E)
3481	LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including Lithium ion polymer Batteries)	9	M4	II	188 230 636	LQ0	E0	P903 P903a) P903b)	2 (E)

LITHIUM METAL BATTERIES									
1	2	3	4	5	6	7	8	9	10
3090	LITHIUM METAL BATTERIES (including Lithium alloy Batteries)	9	M4	II	188 230 310 636	LQ0	E0	P903 P903a) P903b)	2 (E)
3091	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including Lithium alloy Batteries))	9	M4	II	188 230 636	LQ0	E0	P903 P903a) P903b)	2 (E)
3091	LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including Lithium alloy Batteries)	9	M4	II	188 230 636	LQ0	E0	P903 P903a) P903b)	2 (E)

Key

1. UN Number	Table A of 3.2
2. Proper Shipping Name	Table A of 3.2
3. Class	2.2
4. Classification code	2.2
5. Packing Group	2.1.1.3
6. Special Provisions	3.3
7. Limited Quantity Code	3.4.6
8. Exempted Quantity Code	3.5
9. Packing Instructions	4.1.4
10. Transport Category and Tunnel Code	1.1.3.6 & (8.6)

For further details see ADR 2009 Chapter

1.9.3 Changes to Special Provision 188

Changes to SP188 have been made to recognise the changes in the Lithium Batteries industry and to reflect improved knowledge of accidents involving Lithium Batteries. The text of Special Provision 188 follows below:

Cells and Batteries offered for transport are not subject to other provisions of these (ADR 2009) regulations 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;
- (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 shall be marked with the Watt-hour rating on the outside case; except those manufactured before 1 January 2009 which may be carried in accordance with this special provision and without this marking until 31 December 2010
- (c) Each cell or battery is of the type proved to meet the requirements of each test in the Manual of Tests and Criteria, Part III, sub-section 38.3;
- (d) Cells and Batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and Batteries shall 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 shall 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;
- (e) Cells and Batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. When Lithium Batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;
- (f) Except for packages containing no more than four cells installed in equipment or no more than two Batteries installed in equipment, each package shall be marked with the following:
 - (i) an indication that the package contains "Lithium metal" or "Lithium ion" cells or Batteries, as appropriate;
 - (ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;

- (iii) an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - (iv) a telephone number for additional information;
- (g) Each consignment of one or more packages marked in accordance with paragraph (f) shall be accompanied with a document including the following:
- (i) an indication that the package contains “Lithium metal” or “Lithium ion” cells or Batteries, as appropriate;
 - (ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;
 - (iii) an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - (iv) a telephone number for additional information;
- (h) Except when Lithium Batteries are installed in equipment, each package shall 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
- (i) Except when Lithium Batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass.

As used above and elsewhere in these Regulations, “Lithium content” means the mass of Lithium in the anode of a Lithium metal or Lithium alloy cell.

Separate entries exist for Lithium Metal Batteries and Lithium Ion Batteries to facilitate the transport of these Batteries for specific modes of transport and to enable the application of different emergency response actions.

1.9.4 Changes to Packing Instruction P903b

P903b	PACKING INSTRUCTION	P903b
This instruction applies to used cells and Batteries of UN Nos. 3090, 3091, 3480 and 3481.		
Used Lithium cells and Batteries with a gross mass of not more than 500 g each, collected for disposal, may be carried together with other used non-Lithium Batteries or alone without being individually protected, under the following conditions:		
<p>(1) In 1H2 drums or 4H2 boxes conforming to the packing group II performance level for solids;</p> <p>(2) In 1A2 drums or 4A boxes fitted with a polyethylene bag and conforming to the packing group II performance level for solids. The polyethylene bag</p> <ul style="list-style-type: none"> – shall have an impact resistance of at least 480 grams in both parallel and perpendicular planes with respect to the length of the bag; – shall have a minimum of 500 microns of thickness with an electrical resistivity of more than 10 Mohms and a water absorption rate over 24 hours at 25 °C lower than 0.01%; – shall be closed and – may only be used once; <p>(3) In collecting trays with a gross mass of less than 30 kg made from non-conducting material meeting the general conditions of 4.1.1.1, 4.1.1.2 and 4.1.1.5 to 4.1.1.8.</p>		
<p>Additional requirements:</p> <p>The empty space in the packaging shall be filled with cushioning material. The cushioning material may be dispensed with when the packaging is entirely fitted with a polyethylene bag and the bag is closed. Hermetically sealed packagings shall be fitted with a venting device according to 4.1.1.8. The venting device shall be so designed that an overpressure caused by gases does not exceed 10 kPa.</p>		

2009 IATA Regulations

1.10 Changes for 2009

1.10.2 Changes to table 3-1. Dangerous Goods List

LITHIUM ION BATTERIES											
1	2	3	4	5	6	7	8	9	10	11	12
3480	LITHIUM ION BATTERIES (including Lithium ion polymer Batteries)	9		Miscellaneous		A88 A99 A154	II	965	5Kg	965	35Kg
3481	LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including Lithium ion polymer Batteries)	9		Miscellaneous		A48 A154	II	See 966		See 966	
3481	LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including Lithium ion polymer Batteries)	9		Miscellaneous		A88 A154	II	See 967		See 967	
LITHIUM METAL BATTERIES											
1	2	3	4	5	6	7	8	9	10	11	12
3090	LITHIUM METAL BATTERIES (including Lithium alloy Batteries)	9		Miscellaneous		A88 A99 A154 A164	II	968	2.5Kg	968	35Kg
3091	LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT (including Lithium alloy Batteries)	9		Miscellaneous		A48 A154 A164	II	See 969		See 969	
3091	LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT (including Lithium alloy Batteries)	9		Miscellaneous		A154 A164	II	See 970		See 970	

- | | | |
|----------------------|-------------------------------|------------------------------------------------------|
| 1. UN Number | 5. Labels | 10. Passenger aircraft max. net quantity per package |
| 2. Name | 6. State variations | 11. Cargo aircraft packing |
| 3. Class or division | 7. Special provisions | 12. Cargo aircraft max. net quantity per package |
| 4. Subsidiary risk | 8. UN packing group | |
| | 9. Passenger aircraft packing | |

1.10.3 Changes to table 3-2. Special provisions

With respect to special provision A45 it had been considered by the ICAO Dangerous Goods Panel that the wording had become so detailed as to create confusion for shippers. It was therefore determined that the applicable provisions in A45 relating to Batteries should be transferred to a packing instruction to more clearly detail the requirements. A similar approach would also be taken for Batteries under A45 packed with or contained in equipment. Separate packing instructions were created for Lithium Metal Batteries and Lithium Ion Batteries to reflect the differences in the two chemistries and the separation of the UN numbers

1.10.4 Changes to the packing instructions

PACKING INSTRUCTION 968 Passenger and Cargo Aircraft for UN 3090 Lithium Metal Cells and Batteries
<p>This entry applies to lithium metal or lithium alloy batteries in Class 9 (Section I) and lithium metal or lithium alloy batteries subject to specific requirements of the Technical Instructions (Section II).</p>
<p>Section I</p> <p>Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.</p> <ul style="list-style-type: none"> • Each cell or battery must: <ul style="list-style-type: none"> i. Be of the type proven to meet the requirements of each test in the <i>UN Manual of Tests and Criteria</i>, Part III, subsection 38.3. ii. Incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits. • Each battery containing cells or series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses). • Cells, batteries containing one or more cells, with a liquid cathode containing sulphur dioxide, sulphuryl chloride or thionyl chloride which have been discharged to the extent that the open circuit voltage is less than the lower of: <ul style="list-style-type: none"> a) 2 volts; or b) two-thirds of the voltage of the undischarged cell; <p>are forbidden from transport.</p>

General Requirements:

Part 4;1 requirements must be met.

Outer Packagings**Boxes Drums Jerricans**

Aluminium (4B) Aluminium (1B2) Aluminium (3B2)

Fibreboard (4G) Fibreboard (1G) Plastic (3H2)

Natural wood (4C1, 4C2) Plastic (1H2) Steel (3A2)

Plastic (4H2) Plywood (1D)

Plywood (4D) Steel (1A2)

Reconstituted wood (4F)

Steel (4A)

Additional Requirements**All lithium metal cells and batteries prepared for transport as Class 9 must:**

- Be protected against short circuits;
- Packagings must meet Packing Group II performance requirements;
- Lithium batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings and protective enclosures not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of origin. A copy of the document of approval must accompany the consignment. **For lithium metal cells and batteries prepared for transport on Passenger Aircraft as Class 9:**

- Cells and batteries offered for transport on passenger aircraft must be packed in intermediate or outer rigid metal packaging.
- Cell and batteries must be surrounded by cushioning material that is non-combustible and non-conductive, and placed inside an outer packaging.

Package Quantity for Passenger**Aircraft****Package Quantity for Cargo Aircraft****Lithium Metal Cells and Batteries 2.5 kg G 35 kg G****Section II****Lithium metal or lithium alloy cells and batteries offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements in Section II.**

Lithium metal or lithium alloy cells and batteries may be offered for transport if they meet the following:

1. A lithium metal cell, the lithium content is not more than 1 g;
2. A lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.
3. Each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3.

General Requirements:

Batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 4;1.1.3.1 and 4;1.1.9 (except 4;1.1.9.1)

STRONG OUTER PACKAGINGS**Boxes Drums Jerricans****Additional Requirements**

- Cells and 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.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each consignment must be accompanied with a document such as an air waybill with an indication that:
 - the package contains lithium metal cells or batteries;
 - the package must be handled with care and that a flammability hazard exists if the package is damaged;
 - special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - a telephone number for additional information.
- Each package must be labelled with a lithium battery handling label
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

Package Quantity for Passenger**Aircraft****Package Quantity for Cargo Aircraft**

Lithium Metal Cells and Batteries 2.5 kg G 2.5 kg G

PACKING INSTRUCTION 969**Passenger and Cargo Aircraft for UN 3091****Lithium Metal Cells and Batteries packed with equipment**

This entry applies to lithium metal or lithium alloy batteries in Class 9 (Section I) and lithium metal or lithium alloy batteries subject to specific requirements of the Technical Instructions (Section II).

Section I

Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.

• Each cell or battery must:

- i. Be of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3.
- ii. Incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits.

• Each battery containing cells or series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).

• Cells, batteries containing one or more cells, with a liquid cathode containing sulphur dioxide, sulphuryl chloride or thionyl chloride which have been discharged to the extent that the open circuit voltage is less than the lower of:

- a) 2 volts; or
 - b) two-thirds of the voltage of the undischarged cell;
- are forbidden from transport.

General Requirements:

Part 4;1 requirements must be met.

Outer Packagings**Boxes Drums Jerricans**

Aluminium (4B) Aluminium (1B2) Aluminium (3B2)

Fibreboard (4G) Fibreboard (1G) Plastic (3H2)

Natural wood (4C1, 4C2) Plastic (1H2) Steel (3A2)

Plastic (4H2) Plywood (1D)

Plywood (4D) Steel (1A2)

Reconstituted wood (4F)

Steel (4A)

Additional Requirements**All lithium metal cells and batteries prepared for transport as Class 9 must:**

- Be protected against short circuits;
- The completed package for the cells or batteries must meet the Packing Group II packaging requirements.
- Each completed package containing lithium cells or batteries must be marked and labelled in accordance with the applicable requirements of Part 5, Chapters 1, 2 and 3;
- The equipment and the packages of lithium cells or batteries must be placed in an overpack. The overpack must bear applicable marks and labels as set out in Part 5;1 and 5;2.4.9;
- For the purpose of this packing instruction, “equipment” means apparatus requiring the lithium batteries with which it is packed for its operation.

Lithium metal cells and batteries prepared for transport on Passenger Aircraft as Class 9 must in addition meet the following requirements:

- Cells and batteries offered for transport on passenger aircraft must be packed in intermediate or outer rigid metal packaging.
- Surrounded by cushioning material that is non-combustible and non-conductive, and placed inside an outer packaging.

Package Quantity for Passenger**Aircraft****Package Quantity for Cargo Aircraft****Packaged Quantity of Lithium Metal****Cells and Batteries per overpack****(Excluding Equipment)****5 kg 35 kg****Section II****Lithium metal cells and batteries offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements in Section II.**

Lithium metal cells and batteries may be offered for transport if they meet the following:

1. A lithium metal cell, the lithium content is not more than 1 g;
2. A lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.
3. Each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3.

General Requirements:

Batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 4;1.1.3.1 and 4;1.1.9 (except 4;1.1.9.1)

STRONG OUTER PACKAGINGS**Boxes Drums Jerricans**

Additional Requirements

- Cells and 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 maximum number of batteries in each package must be the minimum number required to power the equipment, plus two spares;
- Each package of batteries must be capable of withstanding a 1.2 m drop test in any orientation without
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each consignment must be accompanied with a document such as an air waybill with an indication that:
 - the package contains lithium metal cells or batteries;
 - the package must be handled with care and that a flammability hazard exists if the package is damaged;
 - special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - a telephone number for additional information.
- Each package must be labelled with a lithium battery handling label.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

PACKING INSTRUCTION 970**Passenger and Cargo Aircraft for UN 3091
Lithium Metal Cells and Batteries contained in equipment**

This entry applies to lithium metal or lithium alloy batteries in Class 9 (Section I) and lithium metal or lithium alloy batteries subject to specific requirements of the Technical Instructions (Section II).

Section I

Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.

- Each cell or battery must:

- i. Be of the type proven to meet the requirements of each test in the *UN Manual of Tests and Criteria*, Part III, subsection 38.3.

- ii. Incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits.

- Each battery containing cells or series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).

- Cells, batteries containing one or more cells, with a liquid cathode containing sulphur dioxide, sulphuryl chloride or thionyl chloride which have been discharged to the extent that the open circuit voltage is less than the lower of:

- a) 2 volts; or

- b) two-thirds of the voltage of the undischarged cell;

are forbidden from transport.

General Requirements:

Part 4;1 requirements must be met.

Outer Packagings**Boxes Drums Jerricans**

Additional Requirements**For all lithium metal cells and batteries prepared for transport as Class 9:**

- Outer packaging must be waterproof or made waterproof through the use of a liner, such as a plastic bag unless the equipment is made waterproof by nature of its construction.
- The equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport.
- The quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

Net Quantity of Lithium Metal**Batteries per Piece of Equipment****5 kg 35 kg****Section II**

Lithium metal cells and batteries contained in equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements in Section II.

Lithium metal cells and batteries may be offered for transport if they meet the following:

1. A lithium metal cell, the lithium content is not more than 1 g;
2. A lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.
3. Each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3.

General Requirements:

- Equipment containing batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 4;1.1.3.1 and 4;1.1.9 (except 4;1.1.9.1)

STRONG OUTER PACKAGINGS**Boxes Drums Jerricans**

Additional Requirements

- The equipment must be equipped with an effective means of preventing accidental activation.
- Cells and batteries must be protected so as to prevent short circuits.
- The equipment must be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
- Each consignment with packages bearing the lithium battery handling label (DB) must be accompanied with a document such as an air waybill with an indication that:
 - the package contains lithium metal cells or batteries;
 - the package must be handled with care and that a flammability hazard exists if the package is damaged;
 - special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - a telephone number for additional information.
- Each package containing more than four cells or more than two batteries installed in equipment (DB) must be labeled with a lithium battery handling label.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

PACKING INSTRUCTION 965**Passenger and Cargo Aircraft for UN 3480****Lithium Ion Cells and Batteries (including lithium polymer)**

This entry applies to lithium ion or lithium polymer batteries in Class 9 (Section I) and lithium ion or lithium polymer batteries subject to specific requirements of the Technical Instructions (Section II).

Section I

Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.

- Each cell or battery must:

- i. Be of the type proven to meet the requirements of each test in the *UN Manual of Tests and Criteria*, Part III, subsection 38.3.

- ii. Incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits.

- Each battery containing cells or series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).

General Requirements:

Part 4;1 requirements must be met.

Outer Packagings**Boxes Drums Jerricans**

Aluminium (4B) Aluminium (1B2) Aluminium (3B2)

Fibreboard (4G) Fibreboard (1G) Plastic (3H2)

Natural wood (4C1, 4C2) Plastic (1H2) Steel (3A2)

Plastic (4H2) Plywood (1D)

Plywood (4D) Steel (1A2)

Reconstituted wood (4F)

Steel (4A)

Additional Requirements**For all lithium ion cells and batteries prepared for transport as Class 9:**

- Protected against short circuits;
- Packagings must meet Packing Group II performance requirements;
- Lithium ion batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings and protective enclosures not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of origin. A copy of the document of approval must accompany the consignment

Package Quantity for Passenger**Aircraft****Package Quantity for Cargo Aircraft****Lithium Ion Cells and Batteries 5 kg G 35 kg G****Section II****Lithium ion cells and batteries offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements in Section II.**

Lithium ion cells and batteries may be offered for transport if they meet the following:

1. Lithium ion cells, the Watt-hour rating is not more than 20 Wh;
2. Lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - The Watt-hour rating must be marked on the outside of the battery case.
3. Each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3.

General Requirements:

Batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 4;1.1.3.1 and 4;1.1.9 (except 4;1.1.9.1)

STRONG OUTER PACKAGINGS**Boxes Drums Jerricans**

Additional Requirements

- Cells and 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.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each consignment must be accompanied with a document such as an air waybill with an indication that:
 - the package contains lithium ion cells or batteries;
 - the package must be handled with care and that a flammability hazard exists if the package is damaged;
 - special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - a telephone number for additional information.
- Each package must be labelled with a lithium battery handling label.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

Package Quantity for Passenger**Aircraft****Package Quantity for Cargo Aircraft****Lithium Ion Cells and Batteries 10 kg G 10 kg G**

PACKING INSTRUCTION 966 Passenger and Cargo Aircraft for UN 3481 Lithium Ion Cells and Batteries (including lithium polymer) packed with equipment
<p>This entry applies to lithium ion or lithium polymer batteries packed with equipment in Class 9 (Section I) and lithium ion or lithium polymer batteries packed with equipment subject to specific requirements of the Technical Instructions (Section II).</p>
<p>Section I</p> <p>Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.</p> <ul style="list-style-type: none"> • Each cell or battery must: <ul style="list-style-type: none"> i. Be of the type proven to meet the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3. ii. Incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits. • Each battery containing cells or series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).
<p>General Requirements:</p> <p>Part 4;1 requirements must be met.</p> <p>Outer Packagings</p> <p>Boxes Drums Jerricans</p> <p>Aluminium (4B) Aluminium (1B2) Aluminium (3B2) Fibreboard (4G) Fibreboard (1G) Plastic (3H2) Natural wood (4C1, 4C2) Plastic (1H2) Steel (3A2) Plastic (4H2) Plywood (1D) Plywood (4D) Steel (1A2) Reconstituted wood (4F) Steel (4A)</p>
<p>Additional Requirements</p> <p>For all lithium ion cells and batteries prepared for transport as Class 9:</p> <ul style="list-style-type: none"> • Protected against short circuiting. • The completed package for the cells or batteries must meet the Packing Group II packaging requirements. • The equipment and the packages of lithium cells or batteries must be placed in an overpack. The overpack must bear applicable marks and labels as set out in Part 5;1 and 5;2.4.9. • For the purpose of this packing instruction, “equipment” means apparatus requiring the lithium ion batteries with which it is packed for its operation.

Section I**Package Quantity for Passenger****Aircraft****Package Quantity for Cargo Aircraft****Packaged Quantity of Lithium Ion****Cells and Batteries per overpack****(excluding equipment)****5 kg 35 kg****Section II****Lithium ion cells and batteries (including lithium polymer) offered for transport are not subject to other additional****requirements of these Instructions if they meet the requirements in Section II.**

Lithium ion cells and batteries may be offered for transport if they meet the following:

1. Lithium ion cells, the Watt-hour rating is not more than 20 Wh;
2. Lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - The Watt-hour rating must be marked on the outside of the battery case.
3. Each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3.

General Requirements:

Batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 4;1.1.3.1 and 4;1.1.9 (except 4;1.1.9.1).

STRONG OUTER PACKAGINGS**Boxes Drums Jerricans**

Additional Requirements

- Cells and 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 maximum number of batteries in each package must be the minimum number required to power the equipment, plus two spares;
- Each package of batteries must be capable of withstanding a 1.2 m drop test in any orientation without
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each consignment must be accompanied with a document such as an air waybill with an indication that:
 - the package contains lithium ion cells or batteries;
 - the package must be handled with care and that a flammability hazard exists if the package is damaged;
 - special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and
 - a telephone number for additional information.
- Each package must be labelled with a lithium battery handling label.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

<p>PACKING INSTRUCTION 967</p> <p>Passenger and Cargo Aircraft for UN 3481</p> <p>Lithium Ions Cells and Batteries (including lithium polymer) contained in equipment</p>
<p>This entry applies to lithium ion or lithium polymer batteries contained in equipment in Class 9 (Section I) and lithium ion or lithium polymer batteries contained in equipment subject to specific requirements of the Technical Instructions (Section II).</p>
<p>Section I</p> <p>Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.</p> <ul style="list-style-type: none"> • Each cell or battery must: <ol style="list-style-type: none"> i. Be of the type proven to meet the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3. ii. Incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits. • Each battery containing cells or series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).
<p>General Requirements:</p> <p>Part 4;1 requirements must be met.</p> <p>Outer Packagings</p> <p>Boxes Drums Jerricans</p>
<p>Additional Requirements</p> <ul style="list-style-type: none"> • Outer packaging must be waterproof or made waterproof through the use of a liner, such as a plastic bag unless the equipment is made waterproof by nature of its construction. • The equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport.
<p>Section I</p> <p>Package Quantity for Passenger Aircraft</p> <p>Package Quantity for Cargo Aircraft</p> <p>Net Quantity of Lithium Ion Batteries Per Piece of Equipment</p> <p>5 kg 35 kg</p>

Section II

Lithium ion cells and batteries (including lithium polymer) contained in equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements in Section II.

Lithium ion cells and batteries may be offered for transport if they meet the following:

1. Lithium ion cells, the Watt-hour rating is not more than 20 Wh;
2. Lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 The Watt-hour rating must be marked on the outside of the battery case.
3. Each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3.

General Requirements:

Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 4;1.1.3.1 and 4;1.1.9 (except 4;1.1.9.1).

STRONG OUTER PACKAGINGS

Boxes Drums Jerricans

1.10.5 Changes to shippers responsibilities

To alert all persons in the transport chain that the packages contain Lithium metal or Lithium Ion Batteries, as applicable it was agreed to require a new red-hatched marking on packages. The red-hatched marking would contain the ISO “wineglass” symbol to identify that the packages were to be handled with care, a “flame” symbol to indicate that if the packages were damaged that a fire risk was present and then indication that the packages contain Lithium metal or Lithium Ion Batteries and the telephone number for use in an emergency.

New headings as follows will be inserted into the regulations to express the altered shippers responsibilities. These are new heading 3.5.2.1 and new paragraph 3.5.2.2.

3.5.2.1 Handling label specifications

An illustration of each of the handling labels showing the approved design and colour is given in Figures 5-23 to 5-25 and Figures 5-27 to 5-29. The minimum label dimensions are shown in the figures; however, labels having dimensions not smaller than half of those indicated may be used on packages containing infectious substances when the packages are of dimensions such that they can only bear smaller labels.

3.5.2.2 Lithium battery handling label

Packages containing Lithium Batteries packed according to packing instructions 965 to 970 that are not subject to other additional requirements of these Instructions must bear a “Lithium battery” handling label (as shown in Appendix 1 of this document). The label must show “Lithium Metal Batteries” or “Lithium Ion Batteries”, as applicable.

Appendices

Appendix 1: Lithium battery handling label

Appendix 1

Lithium battery handling label



Red on a contrasting background of dimensions: 120×110 mm

* Place for “Lithium ion battery” or “Lithium metal battery”