DGP/24-WP/81
8/11/13
Addendum/Corrigendum No. 1
11/4/14

DANGEROUS GOODS PANEL (DGP)

TWENTY-FOURTH MEETING

Montréal, 28 October to 8 November 2013

ADDENDUM/CORRIGENDUM NO. 1

1. INTRODUCTION

1.1 The Second Dangerous Goods Panel (DGP) Working Group on Lithium Batteries (DGP-WG/LB/2) was held in Montréal from 7 to 11 April 2014 to continue discussions begun at DGP/24 on mitigating risks posed by lithium metal batteries (see paragraph 5.1.2 of the DGP/24 Report).

1.2 The DGP-WG/LB/2 Report (English only) can be downloaded from:

http://www.icao.int/safety/DangerousGoods/Pages/Working-Group-on-Lithium-Batteries-2014.aspx

2. LITHIUM METAL BATTERIES — BAN ON PASSENGER AIRCRAFT (DGP-WG/LB/2-WP/2)

2.1 Following much discussion, DGP-WG/LB/2 agreed to prohibit the carriage of lithium metal batteries as cargo on passenger aircraft. Provisions for the granting of State approvals for the transport of lithium metal batteries on passenger aircraft to areas not serviced by cargo aircraft were developed for the Technical Instructions. Consequential amendments to the provisions for the carriage of lithium metal batteries on cargo aircraft were also recommended.

2.2 DGP-WG/LB/2 agreed that both deliberate and unintentional non-compliance was a significant concern and that measures to mitigate this risk were necessary. The importance of developing a safety culture from start to finish between each entity of the entire supply chain was stressed. It was suggested that there was a lack of awareness, technical expertise and oversight procedural expertise in many States and that there was a need to provide assistance to them. It was proposed that efforts be taken to ensure manufacturers were manufacturing cells and batteries under a quality management programme

in compliance with UN Recommendations provided for in the Technical Instructions and that they were subjecting their cells and batteries to the applicable UN tests. The meeting developed the following recommendation:

Recommendation 5/3 — Development of a safety oversight and awareness programme for the safe transport of dangerous goods

That ICAO take measures to increase awareness of the risks posed by the transport of lithium batteries and to assist States in developing oversight and awareness programmes related to the safe transport of all dangerous goods, with an emphasis on lithium batteries through:

a) awareness campaigns (including training);

b) the development of guidance material; and

c) focused audits of States manufacturing large quantities of lithium batteries.

This could be achieved through the establishment of a small working group tasked with developing awareness and guidance material and setting up a plan of action for ICAO to implement.

3. PROPOSED AMENDMENTS TO THE EMERGENCY RESPONSE GUIDANCE FOR AIRCRAFT INCIDENTS INVOLVING DANGEROUS GOODS (DGP-WG/LB/2-WP/3)

3.1 New guidance material on procedures for addressing incidents involving lithium batteries in the cabin were agreed by DGP/24 for incorporation in the *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481), subject to a review by members of the ICAO Cabin Safety Group (ICSG) (see paragraph 4.2 of the DGP/24 Report). The ICSG developed a revised proposal for consideration by the DGP. DGP-WG/LB/2 took advantage of the fact that the ICSG was convening a meeting concurrently at ICAO Headquarters. The groups jointly discussed and agreed to revised guidance material for incorporation in Section 3 of Doc 9481.

3.2 DGP-WG/LB/2 also agreed to an amendment to the provisions for the new entry added at DG/24 for UN 3497 — **Krill meal** in Table 3-1. The amendment addresses an unintended consequence identified post DGP/24 that the addition of the new entry caused

4. AMENDMENDMENTS TO THE TECHNICAL INSTRUCTIONS

4.1 The proposed amendments to the Technical Instructions are reflected in the following pages.

Agenda Item 2

1. Page 2A-46, Appendix to the Report on Agenda Item 2, *add* the following new special provision:

A201 Lithium metal batteries may be transported on passenger aircraft, only with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the written conditions established by those authorities. The conditions must include the quantity limitations, size limitations and packing requirements established in the Supplement (see S-3;4, Table S-3 1). Copies of the documents of approval, showing the quantity limitations and packing requirements, must accompany the consignment and must be sent to the Secretary of the Dangerous Goods Panel via email at DGS@icao.int or via post to the following address:

Secretary, Dangerous Goods Panel
International Civil Aviation Organization
999 University Street
Montreal, Quebec
CANADA H3C 5H7

When States, other than the State of Origin and the State of the Operator, have notified ICAO that they require prior approval of shipments made under this special provision, approval must also be obtained from these States, as appropriate.

2. Pages 2A-83 to 2A-2A-85 and 2A-89 to 2A-96, Appendix to the Report on Agenda Item 2, *replace* with the attached pages.

Note.— Changes in addition to those agreed at DGP/24 are highlighted with grey shading.

3. Page 3-2-8, Attachments A and Attachment B to the Appendix to the Report on Agenda Item 2, **Lithium metal batteries** (including lithium alloy batteries), UN 3090:

— *add* "A201" to column 7; and
— *replace* "See 968" under columns 10 and 11 to read "Forbidden".

5. Page 3-2-13 of Attachment A and 3-2-7 of Attachment B to the Appendix to the Report on Agenda Item 2, **Krill meal**, UN 3497:

— *replace* the value in column 7 with "A3";
— *add* "II" and "III" to column 8;
— *add* "E2" and "E1" to column 9 for Packing Groups II and III respectively;
— *delete* "Forbidden" from columns 10 and 11;
— *add* "467" and "469 to column 10 for Packing Groups II and III respectively;
— *and* "15 kg" and "25 kg" to column 11 for Packing Groups II and III respectively;
— *delete* "Forbidden" from columns 12 and 13;
— *add* "470" and "471" to column 12 for Packing Groups II and III respectively; and
— *add* "50 kg" and "100 kg" to column 13 for Packing Groups II and III respectively.

Agenda Item 4

6. *Replace* the Appendix to the Report on Agenda Item 4 with the attached pages.

Agenda Item 5

20. Pages 5A-7 to 5A-9 and 5A-13 to 5A-20, Appendix A to the Report on Agenda Item 5, *replace* with the attached pages.

Note.— Changes in addition to those agreed at DGP/24 are highlighted with grey shading.

— — — — — — — —

Part 4

PACKING INSTRUCTIONS

. . .

Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

. . .

Packing Instruction 966

Passenger and cargo aircraft for UN 3481 (packed with equipment) only

1. **Introduction**

This entry applies to lithium ion or lithium polymer batteries packed with equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. **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 meet all the provisions of 2;9.3.~~:~~.

~~1) 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria, *Part III, subsection 38.3 may continue to be transported.*~~

~~2) 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; and~~

~~3) be manufactured under a quality management programme as described in 2;9.3.1 e).~~

~~Each battery containing cells or a 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).~~

I.1 **General requirements**

Part 4;1 requirements must be met.

UN number and proper shipping name	*Package quantity (Section I)*	
	Passenger	*Cargo*
UN 3481 **Lithium ion batteries packed with equipment**	5 kg of lithium ion cells or batteries	35 kg of lithium ion cells or batteries

Packing Instruction 966

I.2 **Additional requirements**

— Lithium ion cells and batteries must be protected against short circuits.
— Lithium ion cells or batteries must:
  — be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
  — be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a package that meets the Packing Group II performance requirements.
— The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.

DGP-WG/LB/2 (was discovered that this provision was missing during review of lithium metal battery packing instructions) (text aligned with text in Section II):

— The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
— For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium ion batteries with which it is packed for its operation.
— Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

I.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

II. **SECTION II**

With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;4.4 (Reporting of dangerous goods accidents and incidents), 8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium ion cells and batteries packed with equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and ~~if they meet all of~~ the following:

1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
2) for 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 except for those batteries manufactured before 1 January 2009~~;~~.

~~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;~~

~~*Note 1. Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2. Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported.*~~

~~4) cells and batteries must be manufactured under a quality management programme as described in 2;9.3.1 e).~~

Packing Instruction 966

II.1 **General requirements**

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

II.2 **Additional requirements**

- Lithium ion cells and batteries must:
  - be placed in inner packagings that completely enclose the cell or battery, then placed in a strong outer packaging; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong outer packaging.
- 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 equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.

DGP/24-WP/64 (paragraph 5.1.14 of this report)

- The ~~maximum~~ number of cells or batteries in each package must ~~be~~ not exceed the ~~minimum~~appropriate number ~~required to power~~ for the equipment's operation, plus two spares.
- Each package of cells or batteries, or the completed 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 package must be labelled with a lithium battery handling label (Figure 5-31).
- Each consignment must be accompanied with a document 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 must be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  - a telephone number for additional information.
- The words "lithium ion batteries, in compliance with Section II of PI966" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 Outer packagings

Boxes *Drums* *Jerricans*

Strong outer packagings

II.4 **Overpacks**

When packages are placed in an overpack, the lithium battery handling label required by this packing instruction must either be clearly visible or the label must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

. . .

Packing Instruction 968

~~Passenger and c~~Cargo aircraft only for UN 3090

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries. This packing instruction is structured as follows:

— Section IA applies to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with a lithium metal content in excess of 2 g, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions;
— Section IB applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities that exceed the allowance permitted in Section II, Table 968-II; and
— Section II applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities not exceeding the allowance permitted in Section II, Table 968-II.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

DGP/24-WP/3 (paragraph 3.5.3) and paragraph 2.4.1.1 of this report

IA. **SECTION IA**

~~Section IA requirements apply to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with a lithium metal content in excess of 2 g that have been determined to meet the criteria for assignment to Class 9.~~

Each cell or battery must meet all the provisions of 2;9.3.~~:~~

~~1) 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN Manual of Tests and Criteria, Part III, subsection 38.3 may continue to be transported.*~~

~~2) 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; and~~

~~3) be manufactured under a quality management programme as described in 2;9.3.1 e).~~

~~Each battery containing cells or a 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).~~

Packing Instruction 968

IA.1 **General requirements**

Part 4;1 requirements must be met.

Table 968-IA

UN number and proper shipping name	*Net quantity per package*	
	Passenger	*Cargo*
UN 3090 **Lithium metal batteries**	~~2.5 kg~~ Forbidden	35 kg

IA.2 **Additional requirements**

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells and batteries must be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
- Lithium metal 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 or protective enclosures (e.g. in fully enclosed or wooden slatted crates) 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; and~~
  - ~~cells and batteries must be surrounded by cushioning material that is non-combustible and non-conductive, and placed inside an outer packaging.~~

IA.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

IB. **SECTION IB**

~~Section IB requirements apply to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities that exceed the allowance permitted in Section II, Table 968-II.~~

DGP/24-WP/55 (paragraph 5.1.10 of this report)

Quantities of lithium metal cells or batteries that exceed the allowance permitted in Section II, Table 968-II, ~~must be assigned to Class 9 and~~ are subject to all of the applicable provisions of these Instructions (including the requirements in paragraph 2 of this packing instruction and of this section) except for ~~the following:~~ : the provisions of Part 6.

Lithium metal cells or batteries shipped in accordance with the provisions of Section IB must be described on a dangerous goods transport document as set in Part 5;4. The packing instruction number “968” required by 5;4.1.5.8.1 a) must be supplemented with “IB”. All other applicable provisions of Part 5;4 apply.

~~- the provisions of Part 6; and~~
~~- the dangerous goods transport document requirements of 5;4, provided alternative written documentation is provided by the shipper describing the contents of the consignment. Where an agreement exists with the operator, the shipper may provide the information by electronic data processing (EDP) or electronic data interchange (EDI) techniques. The information required is as follows and should be shown in the following order:~~

~~1) the name and address of the shipper and consignee;~~
~~2) UN 3090;~~
~~3) Lithium metal batteries PI 968 IB;~~

Packing Instruction 968

DGP/24-WP/3 (paragraph 3.5.4) DGP/24-WP/55 and paragraphs 2.4.1.1 and 5.1.10 of this report

~~4) the number of packages and the gross mass of each package.~~

DGP/24-WP/3 (paragraph 3.5.3) and paragraph 2.4.1.1 of this report

Lithium metal or lithium alloy cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and~~if they meet all of~~ the following:

1) for lithium metal cells, the lithium content is not more than 1 g;
2) for lithium metal or lithium alloy batteries, 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported.*~~

~~4) cells and batteries must be manufactured under a quality management programme as described in 2;9.3.1 e).~~

IB.1 **General requirements**

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

DGP/24-WP/3 (paragraph 3.5.4) and paragraph 2.4.1.1 of this report

Table 968-IB

Contents	*Net quantity per ~~P~~package ~~quantity~~*	
	Passenger	*Cargo*
Lithium metal cells and batteries	~~2.5 kg G~~ Forbidden	2.5 kg ~~G~~

IB.2 **Additional requirements**

— Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.
— 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 package must be labelled with a lithium battery handling label (Figure 5-31) in addition to the Class 9 hazard label and the cargo aircraft only label (Figure 5-26).
— Each consignment must be accompanied with a document 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 must be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  — a telephone number for additional information.

DGP/24-WP/55 (paragraph 5.1.10 of this report)

Note.— This information may be provided on the dangerous goods transport document.

Packing Instruction 968

IB.3 **Outer packagings**

Boxes *Drums* *Jerricans*

Strong outer packagings

DGP/24-WP/3 (paragraph 3.5.3) and paragraph 2.4.1.1 of this report

II. **SECTION II**

With the exception of Part 1;2.3 (Transport of dangerous goods by post), 5;1.1 h), 5;1.1.k) (Shipper's responsibilities — general requirements), 7;2.1.1 (Loading restrictions on the flight deck and passenger aircraft), 7;2.4.1 (Loading of cargo aircraft), 7;4.4 (Reporting of dangerous goods accidents and incidents), 8;1.1 (Dangerous goods carried by passengers or crew)and paragraph 2 of this packing instruction, 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 of this section.

Lithium metal or lithium alloy cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and ~~if they meet all of~~ the following:

1) for a lithium metal cell, the lithium content is not more than 1 g;
2) for 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported.*~~

~~4) cells and batteries must be manufactured under a quality management programme as described in 2;9.3.1 e).~~

II.1 **General requirements**

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Table 968-II

Contents	*Lithium metal cells and/or batteries with a lithium content not more than 0.3 g*	*Lithium metal cells with a lithium content more than 0.3 g but not more than 1 g*	*Lithium metal batteries with a lithium content more than 0.3 g but not more than 2 g*
1	*2*	*3*	*4*
Maximum number of cells / batteries per package	No limit	8 cells	2 batteries
Maximum net quantity (mass) per package	2.5 kg	n/a	n/a

The limits specified in columns 2, 3 and 4 of Table 968-II must not be combined in the same package.

Packing Instruction 968

II.2 **Additional requirements**

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery, then placed in a strong outer packaging.
- 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 package must be labelled with a lithium battery handling label (Figure 5-31) and the cargo aircraft only label (Figure 5-26).
  - The cargo aircraft only label must be located on the same surface of the package near the lithium battery handling label, if the package dimensions are adequate.
- Each consignment must be accompanied with a document 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 must be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  - a telephone number for additional information.
- The words “lithium metal batteries, in compliance with Section II of PI968,” and “cargo aircraft only” or “CAO” must be placed on the air waybill, when an air waybill is used.
- Consignments of lithium metal batteries prepared in accordance with the provisions of Section II must not be consolidated with other shipments of dangerous goods or non-dangerous goods and must not be loaded into a unit load device before being offered to the operator.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

II.4 **Overpacks**

When packages are placed in an overpack, the lithium battery handling label and the cargo aircraft only label (Figure 5-26) required by this packing instruction must either be clearly visible or the labels must be affixed on the outside of the overpack and the overpack must be marked with the word “Overpack”.

Packing Instruction 969

Passenger and cargo aircraft for UN 3091 (packed with equipment) only

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries packed with equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. **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 meet all the provisions of 2;9.3.~~:~~.

~~1) 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; and~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported.*~~

~~2) 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; and~~

~~3) be manufactured under a quality management programme as described in 2;9.3.1 e).~~

~~Each battery containing cells or a 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).~~

I.1 **General requirements**

Part 4;1 requirements must be met.

UN number and proper shipping name		*Package quantity (Section I)*	
		Passenger	*Cargo*
UN 3091	**Lithium metal batteries packed with equipment**	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

Packing Instruction 969

DGP-WG/LB/2 (inconsistencies discovered during review of lithium metal battery packing instructions) (shown as shaded text):

I.2 **Additional requirements**

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells or batteries must:
  - be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a ~~package~~ packaging that meets the Packing Group II performance requirements.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium batteries with which it is packed for its operation.
- 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 surrounded by cushioning material that is non-combustible and non-conductive and placed inside an outer packaging.

I.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

II. **SECTION II**

With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;4.4 (Reporting of dangerous goods accidents and incidents),8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium metal cells and batteries packed with equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) ~~if they meet all of~~ and the following:

1) for a lithium metal cell, the lithium content is not more than 1 g;
2) for 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria, *Part III, subsection 38.3 may continue to be transported.*~~

4) ~~cells and batteries must be manufactured under a quality management programme as described in 2;9.3.1 e).~~

Packing Instruction 969

II.1 **General requirements**

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

II.2 **Additional requirements**

- Lithium metal cells or batteries must:
  - be placed in inner packagings that completely enclose the cell or battery, then placed in a strong outer packaging; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong outer packaging.
- 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 equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.

DGP/24-WP/64 (paragraph 5.1.14 of this report)

- The ~~maximum~~ number of cells or batteries in each package must ~~be~~ not exceed the ~~minimum~~appropriate number ~~required to power~~ for the equipment's operation, plus two spares.
- Each package of cells or batteries, or the completed 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 package must be labelled with a lithium battery handling label (Figure 5-31).
- Each consignment must be accompanied with a document 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 must be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  - a telephone number for additional information.
- The words “lithium metal batteries, in compliance with Section II of PI969” must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 **Outer packagings**

Boxes *Drums* *Jerricans*

Strong outer packagings

II.4 **Overpacks**

When packages are placed in an overpack, the lithium battery handling label required by this packing instruction must either be clearly visible or the label must be affixed on the outside of the overpack and the overpack must be marked with the word “Overpack”.

APPENDIX

PROPOSED AMENDMENTS TO THE EMERGENCY RESPONSE GUIDANCE FOR AIRCRAFT INCIDENTS INVOLVING DANGEROUS GOODS

DGP/24-WP/38, Addendum/Corrigendum No. 2 (see paragraph 4.2 of the report on this agenda item) and DGP-WG/LB/2-WP/3 (see paragraph 3 of Addendum/Corrigendum No. 1 to the DGP/24 Report)

Replace Sections 3.3 and 3.4 with the following:

3.3 CABIN CREW CHECKLIST FOR DANGEROUS GOODS INCIDENTS IN THE PASSENGER CABIN DURING FLIGHT

BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE	
Step	**Cabin Crew Action**
1.	Identify the item *Note. — It may not be possible to identify the item (source of fire) immediately. In this case, apply Step 2 first, and then attempt to identify it.* Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames
2.	Apply fire-fighting procedure: i. Obtain and use the appropriate fire extinguisher ii. Retrieve and use protective equipment, as applicable to the situation iii. Move passengers away from the area, if possible iv. Notify pilot-in-command / other cabin crew members *Note. — Actions should occur simultaneously in a multi-crew operation*
3.	Remove power: i. Disconnect the device from the power supply, if safe to do so ii. Turn off in-seat power, if applicable iii. Verify that power to the remaining electrical outlets remains off, if applicable Caution: i. Do not attempt to remove the battery from the device
4.	Douse the device with water (or other non-flammable liquid) *Note.— Liquid may turn to steam when applied to the hot battery*
5.	Leave the device in its place and monitor for any re-ignition i. If smoke or flames re-appear, repeat Steps 2 then 4 Caution: i. Do not attempt to pick-up or move the device ii. Do not cover or enclose the device iii. Do not use ice or dry ice to cool the device

BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE	
Step	**Cabin Crew Action**
6.	When the device has cooled (e.g. approximately 10 to 15 minutes): i. Obtain a suitable empty container ii. Fill the container with enough water (or other non-flammable liquid) to submerge the device iii. Using protective equipment, place the device in the container and completely submerge in water (or other non-flammable liquid) iv. Stow and (if possible) secure the container to prevent spillage
7.	Monitor the device and the surrounding area for the remainder of the flight
8.	After landing at the next destination: i. Apply operator's post-incident procedures

OVERHEAD BIN BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE	
Step	**Cabin Crew Action**
1.	Apply fire-fighting procedure: i. Obtain and use the appropriate fire extinguisher ii. Retrieve and use protective equipment, as applicable to the situation iii. Move passengers away from the area, if possible iv. Notify pilot-in-command / other cabin crew members *Note. — Actions should occur simultaneously in a multi-crew operation*
2.	Identify the item: If the device is visible and accessible, or If the device is contained in baggage and flames are visible: i. Re-apply Step 1 to extinguish the flames, if applicable ii. Apply Steps 3 to 5 If smoke is coming from the overhead bin, but the device is not visible or accessible: i. Remove other baggage from the overhead bin to access the affected baggage/item ii. Identify the item iii. Apply Steps 3 to 5 Caution: In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames
3.	Douse the device (baggage) with water (or other non-flammable liquid) *Note.— Liquid may turn to steam when applied to the hot battery*
4.	When the device has cooled: i. Obtain a suitable empty container ii. Fill the container with enough water (or other non-flammable liquid) to submerge the device iii. Using protective equipment, place the device in the container and completely submerge in water (or other non-flammable liquid) iv. Stow and (if possible) secure the container to prevent spillage
5.	Monitor the device and the surrounding area for the remainder of the flight
6.	After landing at the next destination: i. Apply operator's post-incident procedures

OVERHEATED BATTERY / ELECTRICAL SMELL INVOLVING A PORTABLE ELECTRONIC DEVICE (PED) - NO VISIBLE FIRE OR SMOKE	
Step	**Cabin Crew Action**
1.	Identify the item
2.	Instruct the passenger to turn off the device immediately
3.	Remove power: i. Disconnect the device from the power supply, if safe to do so ii. Turn off in-seat power, if applicable iii. Verify that power to the remaining electrical outlets remains off, if applicable iv. Verify that the device remains off for the remainder of the flight Caution: Do not attempt to remove the battery from the device
4.	Instruct the passenger to keep the device visible and monitor closely Caution: i. Unstable batteries may ignite even after the device is turned off
5.	If smoke or flames appear: i. Apply **BATTERY / PED FIRE / SMOKE** checklist
6.	After landing at the next destination: i. Apply operator's post-incident procedures

PED INADVERTENTLY CRUSHED OR DAMAGED IN ELECTRICALLY ADJUSTABLE SEAT	
Step	**Cabin Crew Action**
1.	Notify the pilot-in-command / other cabin crew members
2.	Obtain information from passenger, by asking him/her: i. To identify the item ii. Where he/she suspects that the item may have dropped or slipped into iii. If the seat was moved since misplacing the item
3.	Retrieve and use protective equipment, if available
4.	Retrieve the item. Caution: i. Do not move the seat electrically or mechanically when attempting to retrieve the item.
5.	If smoke or flames appear: i. Apply **BATTERY / PED FIRE / SMOKE** checklist
6.	After landing at the next destination: i. Apply operator's post-incident procedures

FIRE INVOLVING DANGEROUS GOODS	
Step	**Cabin Crew Action**
1.	Identify the item *Note. — It may not be possible to identify the item (source of fire) immediately. In this case, apply Step 2 first, and then attempt to identify it.* Caution: In order to avoid injury from a flash fire, it is not recommended to not open the affected baggage when there is any indication of smoke or flames
2.	Apply fire-fighting procedure: i. Obtain and use the appropriate fire extinguisher / check use of water ii. Retrieve and use protective equipment, as applicable to the situation iii. Move passengers away from the area, if possible iv. Notify pilot-in-command / other cabin crew members *Note. — Actions should occur simultaneously in a multi-crew operation*
3.	Monitor for any re-ignition: i. If smoke/flames re-appear, repeat Step 2.
4.	Once the fire has been extinguished: i. Apply **SPILLAGE OR LEAKAGE OF DANGEROUS GOODS** checklist, if required.
5.	After landing at the next destination: i. Apply operator's post-incident procedures

SPILLAGE OR LEAKAGE OF DANGEROUS GOODS	
Step	**Cabin Crew Action**
1.	Notify pilot-in-command/ other cabin crew members
2.	Identify the item
3.	Collect emergency response kit or other useful items
4.	Don rubber gloves and smoke hood
5.	Move passengers away from area and distribute wet towels or cloths
6.	Place dangerous goods item in polyethylene bags
7.	Stow polyethylene bags
8.	Treat affected seat cushions / covers in the same manner as dangerous goods item
9.	Cover spillage on carpet / floor
10.	Regularly inspect items stowed away / contaminated furnishings
11.	After landing at the next destination: i. Apply operator's post-incident procedures

3.4 AMPLIFIED CABIN CREW CHECKLIST FOR DANGEROUS GOODS INCIDENTS IN THE PASSENGER CABIN DURING FLIGHT

Note.— Although this guidance material presents sequences of tasks, some of these actions occur simultaneously when carried out by crew members.

3.4.1 BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE/SMOKE

1) IDENTIFY THE ITEM

It may not be possible to identify the item (source of fire) right away, especially if the fire has started in a seat pocket or the device is not readily accessible. In this case, fire-fighting procedures should be applied as a first step. Once it is possible to do so, identify the item after the fire is under control. If the item is contained in baggage, the crew's actions would be similar to the actions for a device that is visible or readily accessible.

Caution:
In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames. However, in certain situations cabin crew members may assess and deem it necessary to slightly open baggage to allow entry of the extinguishing agent and non-flammable liquid. This should be done with extreme caution and only after donning appropriate protective equipment, available on the aircraft.

2) APPLY FIRE-FIGHTING PROCEDURE

Any occurrence concerning a fire in the cabin should be notified immediately to the pilot-in-command who should be kept informed of all actions taken and of the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each are kept fully informed of the other's actions and intentions.

Appropriate fire-fighting and emergency procedures must be used to deal with any fire. In a multi-cabin crew operation, the actions detailed in the fire-fighting procedure should be conducted simultaneously. On aircraft operated with only one cabin crew member, the aid of a passenger should be sought in dealing with the situation.

Halon, Halon replacement or water extinguisher should be used to extinguish the fire and prevent its spread to additional flammable materials. It is important to wear available protective equipment (e.g. protective breathing equipment, fire gloves) when fighting a fire.

If fire develops, cabin crew should take prompt action to move passengers away from the area involved and, if necessary, provide wet towels or cloths and give instructions for passengers to breathe through them. Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination is of utmost importance. The use of the interphone is the primary means of communication unless the interphone system fails.

3) REMOVE POWER

It is important to instruct the passenger to disconnect the device from the power supply, if it is deemed safe to do so. A battery has a higher likelihood of catching fire due to overheating during or immediately following a charging cycle, although the effects may be delayed for some period of time. By removing the external power supply from the device, it will be assured that additional energy is not being fed to the battery to promote a fire.

Turn off the in-seat power to the remaining electrical outlets until it can be assured that a malfunctioning aircraft system does not contribute to additional failures of the passengers' portable electronic devices.

Visually check that power to the remaining electrical outlets remains off until the aircraft's system can be determined to be free of faults, if the device was previously plugged in.

The removal of power may occur simultaneously to other cabin crew actions (e.g. obtaining water to douse the device). Depending on the aircraft type, in-seat power may have to be turned-off by the flight crew members.

Caution:
Do not attempt to remove the battery from the device.

4) DOUSE THE DEVICE WITH WATER (OR OTHER NON-FLAMMABLE LIQUID)

Water (or other non-flammable liquid) must be used to cool a battery that has ignited to prevent the spread of heat to other cells in the battery. If water is not available, any non-flammable liquid may be used to cool the device.

Note.— Liquid may turn to steam when applied to the hot battery.

5) LEAVE THE DEVICE IN ITS PLACE AND MONITOR FOR ANY RE-IGNITION

A battery involved in a fire can reignite and emit flames multiple times as heat is transferred to other cells in the battery. Therefore, the device must be monitored regularly to identify if there is any indication that a fire risk may still exist. If there is any smoke or indication of fire, the device must be doused with more water (or other non-flammable liquid).

Caution:

i. Do not attempt to pick-up or move the device; batteries may explode or burst into flames without warning. The device must not be moved if displaying any of the following: flames/flaring, smoke, unusual sounds (such as crackling), debris, or shards of material separating from the device;
ii. Do not cover or enclose the device as it could cause it to overheat; and
iii. Do not use ice or dry ice to cool the device. Ice or other materials insulate the device, increasing the likelihood that additional battery cells will reach thermal runaway.

6) WHEN THE DEVICE HAS COOLED (E.G. APPROXIMATELY 10-15 MINUTES)

The device can be moved with caution following a certain period, once it has cooled down and if there is no evidence of smoke, heat, or if there is a reduction in the crackling or hissing sound usually associated with a lithium battery fire (e.g. after approximatly10-15 minutes). The waiting period may vary based on the device and its size. The different circumstances (e.g. types of devices, phase of flight, etc.) should be addressed in the operator's training programme.

A suitable empty container, such as a pot, jug, galley unit or toilet waste bin, must be filled with enough water or non-flammable liquid to completely submerge the device. It is important to wear available protective equipment (e.g. protective breathing equipment, fire gloves), when moving any device involved in a fire. Once the device is completely submerged, the container used must be stowed and, if possible, secured to prevent spillage.

7) MONITOR THE DEVICE AND THE SURROUNDING AREA FOR THE REMAINDER OF THE FLIGHT

Monitor the device and the surrounding area for the remainder of the flight to verify that the device does not pose further risk.

8) AFTER LANDING AT THE NEXT DESTINATION

Upon arrival, apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.

Complete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.

3.4.2 OVERHEAD BIN BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE

1) APPLY FIRE-FIGHTING PROCEDURE

Any occurrence concerning a fire in the cabin should be notified immediately to the pilot-in-command who should be kept informed of all actions taken and of the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each are kept fully informed of the other's actions and intentions.

Appropriate fire-fighting and emergency procedures must be used to deal with an overhead bin fire. In a multi-cabin crew operation, the actions detailed in the fire-fighting procedure should be conducted simultaneously. On aircraft operated with only one cabin crew member, the aid of a passenger should be sought in dealing with the situation.

Halon, Halon replacement or water extinguisher should be used to extinguish the fire and prevent its spread to additional flammable materials. It is important to wear available protective equipment (e.g. protective breathing equipment, fire gloves) when fighting a fire.

If fire develops, cabin crew should take prompt action to move passengers away from the area involved and, if necessary, provide wet towels or cloths and give instructions for passengers to breathe through them.

Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination is of utmost importance. The use of the interphone is the primary means of communication unless the interphone system fails.

2) IDENTIFY THE ITEM

It may not be possible to identify the item right away, especially if the fire has started in the overhead bin and the device is not readily accessible.

If the device is visible and accessible or if the device is contained in baggage and flames are visible, the fire-fighting procedures should be applied as a first step.

If smoke is coming from the overhead bin, but the device is not visible or accessible, or there is no indication of fire, the fire-fighting procedures should be applied as a first step. Afterwards, all baggage should be removed from the overhead bin with caution until the item can be identified. Once the item is identified, apply steps 3 to 5 of the OVERHEAD BIN BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE checklist.

Caution:
In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames. However, in certain situations cabin crew members may assess and deem it necessary to slightly open baggage to allow entry of the extinguishing agent and non-flammable liquid. This should be done with extreme caution and only after donning appropriate protective equipment, available on the aircraft.

3) DOUSE THE DEVICE (BAGGAGE) WITH WATER (OR OTHER NON-FLAMMABLE LIQUID)

Water (or other non-flammable liquid) must be used to cool a battery that has ignited to prevent the spread of heat to other cells in the battery. If water is not available, any non-flammable liquid may be used to cool the device.

Note.— Liquid may turn to steam when applied to the hot battery.

4) WHEN THE DEVICE HAS COOLED

The device should be moved from the overhead bin to prevent a hidden fire from potentially developing. The device can be moved with caution following a certain period, once it has cooled down and if there is no evidence of smoke, heat, or if there is a reduction in the crackling or hissing sound usually associated with a lithium battery fire. The waiting period may vary based on the device and its size. The different circumstances (e.g. types of devices, phase of flight, etc.) should be addressed in the operator's training programme.

A suitable empty container, such as a pot, jug, galley unit or toilet waste bin, must be filled with enough water or non-flammable liquid to completely submerge the device. It is important to wear available protective equipment (e.g. protective breathing equipment, fire gloves), when moving any device involved in a fire. Once the device is completely submerged, the container used must be stowed and, if possible, secured to prevent spillage.

5) MONITOR THE DEVICE AND THE SURROUNDING AREA FOR THE REMAINDER OF THE FLIGHT

Monitor the device and the surrounding area for the remainder of the flight to verify that the device does not pose further risk.

6) AFTER LANDING AT THE NEXT DESTINATION

Upon arrival, apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.

Complete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.

3.4.3 OVERHEATED BATTERY OR ELECTRICAL SMELL INVOLVING A PORTABLE ELECTRONIC DEVICE (PED) - NO VISIBLE FIRE OR SMOKE

1) IDENTIFY THE ITEM

Identify the source of overheat or electrical smell. Ask the passenger concerned to identify the item.

2) INSTRUCT THE PASSENGER TO TURN OFF THE DEVICE IMMEDIATELY

It is important to instruct the passenger to turn off the device immediately.

3) REMOVE POWER

It is important to instruct the passenger or crew member to disconnect the device from the power supply, if it is deemed safe to do so. A battery has a higher likelihood of catching fire due to overheating during or immediately following a charging cycle, although the effects may be delayed for some period of time. By removing the external power supply from the device, it will be assured that additional energy is not being fed to the battery to promote a fire.

Turn off the in-seat power to the remaining electrical outlets until it can be assured that a malfunctioning aircraft system does not contribute to additional failures of the passengers' portable electronic devices.
Visually check that power to the remaining electrical outlets remains off until the aircraft's system can be determined to be free of faults, if the device was previously plugged in.

The removal of power may occur simultaneously to other cabin crew actions (e.g. obtaining water to douse the device). Depending on the aircraft type, in-seat power may have to be turned-off by the fight crew members.

It is important to verify that the device remains powered off for the duration of the flight.

Caution:
Do not attempt to remove the battery from the device.

4) INSTRUCT THE PASSENGER TO KEEP THE DEVICE VISIBLE AND MONITOR CLOSELY

The device must remain visible (not stowed such as in baggage or seat pocket or on a person (pocket)) and should be monitored closely. Unstable batteries may ignite even after the device is turned off. Verify that the device is stowed for landing.

5) IF SMOKE OR FLAMES APPEAR

If smoke or flames appear, apply the BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE checklist.

6) AFTER LANDING AT THE NEXT DESTINATION

Upon arrival, apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.

Complete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.

3.4.4 PED INADVERTENTLY CRUSHED OR DAMAGED IN ELECTRICALLY ADJUSTABLE SEAT

Due to the design of some electrically adjustable passenger seats, a PED can slip under a seat covering and/or cushion, behind an armrest or down the side of a seat. Inadvertent crushing of the device poses a risk of fire.

1) NOTIFY THE PILOT-IN-COMMAND / OTHER CABIN CREW MEMBERS

Any occurrence concerning a risk of fire in the cabin should be notified immediately to the pilot-in-command who should be kept informed of all actions taken and of the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each are kept fully informed of the other's actions and intentions

2) OBTAIN INFORMATION FROM PASSENGER

Ask the passenger concerned to identify the item, and where he/she suspects it may have dropped or slipped into, and if he/she has moved the seat since misplacing the item.

3) RETRIEVE AND USE PROTECTIVE EQUIPMENT, IF AVAILABLE

If available, cabin crew members should don fire gloves before trying to retrieve the item.

4) RETRIEVE THE ITEM

To prevent crushing of the PED and reduce the potential fire risk to the device and the surrounding area, cabin crew members and/or passengers must not use the electrical or mechanical seat functions in an attempt to retrieve the item. Move the passenger and, if applicable, the passenger seated next to the affected seat from the area, to facilitate the search. Do not move the seat. If the cabin crewmember is unable to retrieve the item, it may be necessary to move the passenger to another seat.

5) IF SMOKE OR FLAMES APPEAR

If smoke or flames appear, apply the BATTERY / PORTABLE ELECTRONIC DEVICE (PED) FIRE / SMOKE checklist.

6) AFTER LANDING AT THE NEXT DESTINATION

Upon arrival, apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is located and providing all information about the item.

Complete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and any aircraft equipment used is replenished or replaced, if applicable.

3.4.5 FIRE INVOLVING DANGEROUS GOODS

1) IDENTIFY THE ITEM

Ask the passenger concerned to identify the item. The passenger may be able to give some guidance on the hazard(s) involved and how these could be dealt with. If the passenger can identify the item, refer to Section 4 for the appropriate emergency response drill.

It may not be possible to identify the item right away, especially if the source of the fire is unknown or the item is not readily accessible. In this case, fire-fighting procedures should be applied as a first step. Once it is possible to do so, identify the item after the fire is under control. If the item is contained in baggage, the crew's actions would be similar to the actions for an item that is visible or readily accessible.

Caution:
In order to avoid injury from a flash fire, it is not recommended to open the affected baggage when there is any indication of smoke or flames. However, in certain situations cabin crew members may assess and deem it necessary to slightly open baggage to allow entry of the extinguishing agent and non-flammable liquid. This should be done with extreme caution and only after donning appropriate protective equipment, available on the aircraft.

2) APPLY THE FIRE-FIGHTING PROCEDURE

Any occurrence concerning a fire in the cabin should be notified immediately to the pilot-in-command who should be kept informed of all actions taken and of the effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each are kept fully informed of the other's actions and intentions.

Appropriate fire-fighting and emergency procedures must be used to deal with any fire. In a multi-cabin crew operation, the actions detailed in the fire-fighting procedure should be conducted simultaneously. On aircraft operated with only one cabin crew member, the aid of a passenger should be sought in dealing with the situation.

In general, water should not be used on a spillage or when fumes are present since it may spread the spillage or increase the rate of fuming. Consideration should also be given to the possible presence of electrical components when using water extinguishers.

If fire develops, cabin crew should take prompt action to move passengers away from the area involved and, if necessary, provide wet towels or cloths and give instructions for passengers to breathe through them.

Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination is of utmost importance. The use of the interphone is the primary means of communication unless the interphone system fails.

3) MONITOR FOR ANY RE-IGNITION

Monitor the area regularly to identify if there is any indication that a fire risk may still exist. If there is any smoke or indication of fire continue to apply the fire-fighting procedure.

4) ONCE THE FIRE HAS BEEN EXTINGUISHED

In the event of a fire involving dangerous goods, the SPILLAGE OR LEAKAGE INVOLVING DANGEROUS GOODS checklist may need to be applied once the fire has been extinguished.

5) AFTER LANDING AT THE NEXT DESTINATION

Upon arrival, apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.

Complete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable.

3.4.6 SPILLAGE OR LEAKAGE INVOLVING DANGEROUS GOODS

1) NOTIFY PILOT-IN-COMMAND

Any incident concerning dangerous goods should be notified immediately to the pilot-in-command who should be kept informed of all actions taken and of their effect. It is essential that the cabin crew and the flight crew coordinate their actions and that each are kept fully informed of the other's actions and intentions.

Minimizing the spreading of smoke and fumes into the flight deck is critical for the continued safe operation of the aircraft, therefore it is essential to keep the flight deck door closed at all times. Crew communication and coordination is of utmost importance. The use of the interphone is the primary means of communication unless the interphone system fails.

2) IDENTIFY THE ITEM

Ask the passenger concerned to identify the item and indicate its potential hazards. The passenger may be able to give some guidance on the hazard(s) involved and how these could be dealt with. If the passenger can identify the item, refer to Section 4 for the appropriate emergency response drill.

On aircraft with only one cabin crew member, consult with the pilot-in-command as to whether the aid of a passenger should be sought in dealing with the incident.

3) COLLECT EMERGENCY RESPONSE KIT OR OTHER USEFUL ITEMS

Collect emergency response kit, if provided, or collect for use in dealing with the spillage or leakage:

— a supply of paper towels or newspapers or other absorbent paper or absorbent fabric (e.g. seat cushion covers, head rest protectors);
— oven gloves or fire-resistant gloves, if available;
— at least two large polyethylene waste bin bags; and
— at least three smaller polyethylene bags, such as those used for duty-free or bar sales or, if none available, airsickness bags.

4) DON RUBBER GLOVES AND SMOKE HOOD

The hands should always be protected before touching suspicious packages or items. Fire-resistant gloves or oven gloves covered by polyethylene bags are likely to give suitable protection.

Gas-tight breathing equipment should always be worn when attending to an incident involving smoke, fumes or fire.

5) MOVE PASSENGERS AWAY FROM AREA

The use of therapeutic oxygen bottles or the passenger drop-out oxygen system to assist passengers in a smoke- or fume-filled passenger cabin should not be considered since considerable quantities of fumes or smoke would be inhaled through the valves or holes in the masks. A more effective aid to passengers in a smoke- or fume-filled environment would be the use of a wet towel or cloth held over the mouth and nose. A wet towel or cloth aids in filtering and is more effective at doing this than a dry towel or cloth. Cabin crew should take prompt action if smoke or fumes develop and move passengers away from the area involved and, if possible, provide wet towels or cloths and give instructions to breathe through them.

6) PLACE DANGEROUS GOODS ITEM IN POLYETHYLENE BAGS

Note.— In the case of a spill of known or suspected dangerous goods in powder form:

— leave everything undisturbed;
— do not use fire agent or water;
— cover area with polyethylene or other plastic bags and blankets;
— keep area isolated until after landing.

With emergency response kit

If it is absolutely certain that the item will not create a problem the decision may be made not to move it. In most circumstances, however, it will be better to move the item and this should be done as suggested below. Place the item in a polyethylene bag as follows:

— prepare two bags by rolling up the sides and placing them on the floor;
— place the item inside the first bag with the closure of the item, or the point from which it is leaking from its container, at the top;
— take off the rubber gloves while avoiding skin contact with any contamination on them;
— place the rubber gloves in the second bag;
— close the first bag while squeezing out the excess air;
— twist the open end of the first bag and use a bag tie to tie it sufficiently tight to be secure but not so tight that pressure equalization cannot take place;
— place the first bag (containing the item) in the second bag, which already contains the rubber gloves and secure the open end in the same manner as that used for the first bag.

With no emergency response kit

Pick up the item and place it in a polyethylene bag. Ensure the receptacle containing the dangerous goods is kept upright or the area of leakage is at the top. Using paper towels, newspaper, etc., mop up the spillage, after having ascertained there will be no reaction between what is to be used to mop up and the dangerous goods. Place the soiled towels, etc., in another polyethylene bag. Place the gloves and bags used to protect the hands either in a separate small polyethylene bag or with the soiled towels. If extra bags are not available, place the towels, gloves, etc., in the same bag as the item. Expel excess air from the bags and close tightly so as to be secure but not so tight that pressure equalization cannot take place.

7) STOW POLYETHYLENE BAGS

If there is a catering or bar box on board, empty any contents and place the box on the floor, with the door upward. Place the bag(s) containing the item and any soiled towels, etc., in the box and close the door. Take the box or, if there is no box, the bag(s) to a position as far away as possible from the flight deck and passengers. If a galley or toilet is fitted, consider taking the box or bag(s) there, unless it is close to the flight deck. Use a rear galley or toilet wherever possible, but do not place the box or bag(s) against the pressure bulkhead or fuselage wall. If a galley is used, the box or bag(s) can be stowed in an empty waste bin container. If a toilet is used, the box can be placed on the floor or the bag(s) stowed in an empty waste container. The toilet door should be locked from the outside. In a pressurized aircraft, if a toilet is used, any fumes will be vented away from passengers. However, if the aircraft is unpressurized there may not be positive pressure in a toilet to prevent fumes from entering the passenger cabin.

Ensure when moving a box that the opening is kept upward or when moving a bag that either receptacle containing the dangerous goods is kept upright or the area of leakage is kept at the top.

Wherever the box or bag(s) have been located, wedge them firmly in place to prevent them from moving and to keep the item upright. Ensure that the position of the box or bags will not impede disembarkation from the aircraft.

8) TREAT AFFECTED SEAT CUSHIONS / COVERS IN THE SAME MANNER AS DANGEROUS GOODS ITEM

Seat cushions, seat backs or other furnishings which have been contaminated by a spillage should be removed from their fixtures and placed in a large bin bag or other polyethylene bag, together with any bags used initially to cover them. They should be stowed away in the same manner as the dangerous goods item causing the incident.

9) COVER SPILLAGE ON CARPET / FLOOR

Cover any spillage on the carpet or furnishings with a waste bag or other polyethylene bags, if available. If not, use airsickness bags opened out so that the plastic side covers the spillage or use the plastic covered emergency information cards.

Carpet which has been contaminated by a spillage and which is still causing fumes despite being covered, should be rolled up, if possible, and placed in a large bin bag or other polyethylene bag. It should be placed in a waste bin and stowed, when possible, either in the rear toilet or rear galley. If the carpet cannot be removed it should remain covered by a large bin bag or polyethylene bags, etc., and additional bags should be used to reduce the fumes.

10) REGULARLY INSPECT ITEMS STOWED AWAY / CONTAMINATED FURNISHINGS

Any dangerous goods, contaminated furnishings or equipment which have been removed and stowed away or covered for safety should be subject to regular inspection.

11) AFTER LANDING AT THE NEXT DESTINATION

Upon arrival, apply the operator's post-incident procedures. These may include identifying to ground personnel where the item is stowed and providing all information about the item.

Complete the required documentation, as per operator procedures, so that the operator is notified of the event, proper maintenance action is undertaken and the emergency response kit or any aircraft equipment used is replenished or replaced, if applicable

.

Section 4

CHART OF DRILLS AND LIST OF DANGEROUS GOODS WITH DRILL REFERENCE NUMBERS

Amend Tables 4-2 and 4-3 as indicated:

UN No.	*Drill Code*	*Proper shipping name*
DGP/24-WP/76 (see paragraph 4.3 of this report):		
3480	9F~~Z~~	Lithium ion batteries
3481	9F~~Z~~	Lithium ion batteries contained in equipment
3481	9F~~Z~~	Lithium ion batteries packed with equipment
DGP/24-WP/21 (see paragraph 4.1 of this report):		
3507	8L	Uranium hexafluoride, radioactive material, excepted package
3508	9L	Capacitor, asymmetric
3509	9L	Packaging discarded, empty, uncleaned
3510	10L	Adsorbed gas, flammable, n.o.s.*
3511	2L	Adsorbed gas, n.o.s.*
3512	2P	Adsorbed gas, toxic, n.o.s.*
3513	2X	Adsorbed gas, oxidizing, n.o.s.*
3514	10P	Adsorbed gas, toxic, flammable, n.o.s.*
3515	2PX	Adsorbed gas, toxic, oxidizing, n.o.s.*
3516	2CP	Adsorbed gas, toxic, corrosive, n.o.s.*
3517	10CP	Adsorbed gas, toxic, flammable, corrosive, n.o.s.*
3518	2PX	Adsorbed gas, toxic, oxidizing, corrosive, n.o.s.*
3519	2CP	Boron trifluoride, adsorbed
3520	2PX	Chlorine, adsorbed
3521	2CP	Silicon tetrafluoride, adsorbed
3522	10P	Arsine, adsorbed
3523	10P	Germane, adsorbed
3524	2CP	Phosphorus pentafluoride, adsorbed
3525	10P	Phosphine, adsorbed
3526	10P	Hydrogen selenide, adsorbed

— — — — — — — —

Part 4

PACKING INSTRUCTIONS

. . .

Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

. . .

Packing Instruction 966

Passenger and cargo aircraft for UN 3481 (packed with equipment) only

1. **Introduction**

This entry applies to lithium ion or lithium polymer batteries packed with equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. **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 meet all the provisions of 2;9.3.~~:~~.

~~1) 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria, *Part III, subsection 38.3 may continue to be transported.*~~

~~2) 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; and~~

~~3) be manufactured under a quality management programme as described in 2;9.3.1 e).~~

~~Each battery containing cells or a 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).~~

I.1 **General requirements**

Part 4;1 requirements must be met.

UN number and proper shipping name	*Package quantity (Section I)*	
	Passenger	*Cargo*
UN 3481 **Lithium ion batteries packed with equipment**	5 kg of lithium ion cells or batteries	35 kg of lithium ion cells or batteries

Packing Instruction 966

I.2 **Additional requirements**

— Lithium ion cells and batteries must be protected against short circuits.
— Lithium ion cells or batteries must:
  — be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
  — be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a package that meets the Packing Group II performance requirements.
— The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.

DGP-WG/LB/2 (was discovered that this provision was missing during review of lithium metal battery packing instructions) (text aligned with text in Section II):

— The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
— For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium ion batteries with which it is packed for its operation.
— Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

I.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

II. **SECTION II**

With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;4.4 (Reporting of dangerous goods accidents and incidents), 8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium ion cells and batteries packed with equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and ~~if they meet all of~~ the following:

1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
2) for 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 except for those batteries manufactured before 1 January 2009~~;~~.

~~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;~~

~~*Note 1. Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2. Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported.*~~

~~4) cells and batteries must be manufactured under a quality management programme as described in 2;9.3.1 e).~~

Packing Instruction 966

II.1 **General requirements**

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

II.2 **Additional requirements**

- Lithium ion cells and batteries must:
  - be placed in inner packagings that completely enclose the cell or battery, then placed in a strong outer packaging; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong outer packaging.
- 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 equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.

DGP/24-WP/64 (paragraph 5.1.14 of this report)

- The ~~maximum~~ number of cells or batteries in each package must ~~be~~ not exceed the ~~minimum~~appropriate number ~~required to power~~ for the equipment's operation, plus two spares.
- Each package of cells or batteries, or the completed 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 package must be labelled with a lithium battery handling label (Figure 5-31).
- Each consignment must be accompanied with a document 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 must be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  - a telephone number for additional information.
- The words "lithium ion batteries, in compliance with Section II of PI966" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 Outer packagings

Boxes *Drums* *Jerricans*

Strong outer packagings

II.4 **Overpacks**

When packages are placed in an overpack, the lithium battery handling label required by this packing instruction must either be clearly visible or the label must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

. . .

Packing Instruction 968

~~Passenger and c~~Cargo aircraft only for UN 3090

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries. This packing instruction is structured as follows:

— Section IA applies to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with a lithium metal content in excess of 2 g, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions;
— Section IB applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities that exceed the allowance permitted in Section II, Table 968-II; and
— Section II applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities not exceeding the allowance permitted in Section II, Table 968-II.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

DGP/24-WP/3 (paragraph 3.5.3) and paragraph 2.4.1.1 of this report

IA. **SECTION IA**

~~Section IA requirements apply to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with a lithium metal content in excess of 2 g that have been determined to meet the criteria for assignment to Class 9.~~

Each cell or battery must meet all the provisions of 2;9.3.~~:~~

~~1) 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN Manual of Tests and Criteria, Part III, subsection 38.3 may continue to be transported.*~~

~~2) 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; and~~

~~3) be manufactured under a quality management programme as described in 2;9.3.1 e).~~

~~Each battery containing cells or a 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).~~

Packing Instruction 968

IA.1 **General requirements**

Part 4;1 requirements must be met.

Table 968-IA

UN number and proper shipping name		*Net quantity per package*	
		Passenger	*Cargo*
UN 3090	**Lithium metal batteries**	~~2.5 kg~~ Forbidden	35 kg

IA.2 **Additional requirements**

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells and batteries must be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
- Lithium metal 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 or protective enclosures (e.g. in fully enclosed or wooden slatted crates) 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; and~~
  - ~~cells and batteries must be surrounded by cushioning material that is non-combustible and non-conductive, and placed inside an outer packaging.~~

IA.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

IB. **SECTION IB**

~~Section IB requirements apply to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities that exceed the allowance permitted in Section II, Table 968-II.~~

DGP/24-WP/55 (paragraph 5.1.10 of this report)

Quantities of lithium metal cells or batteries that exceed the allowance permitted in Section II, Table 968-II, ~~must be assigned to Class 9 and~~ are subject to all of the applicable provisions of these Instructions (including the requirements in paragraph 2 of this packing instruction and of this section) except for ~~the following:~~ : the provisions of Part 6.

Lithium metal cells or batteries shipped in accordance with the provisions of Section IB must be described on a dangerous goods transport document as set in Part 5;4. The packing instruction number “968” required by 5;4.1.5.8.1 a) must be supplemented with “IB”. All other applicable provisions of Part 5;4 apply.

~~- the provisions of Part 6; and~~
~~- the dangerous goods transport document requirements of 5;4, provided alternative written documentation is provided by the shipper describing the contents of the consignment. Where an agreement exists with the operator, the shipper may provide the information by electronic data processing (EDP) or electronic data interchange (EDI) techniques. The information required is as follows and should be shown in the following order:~~

~~1) the name and address of the shipper and consignee;~~
~~2) UN 3090;~~
~~3) Lithium metal batteries PI 968 IB;~~

Packing Instruction 968

DGP/24-WP/3 (paragraph 3.5.4) DGP/24-WP/55 and paragraphs 2.4.1.1 and 5.1.10 of this report

~~4) the number of packages and the gross mass of each package.~~

DGP/24-WP/3 (paragraph 3.5.3) and paragraph 2.4.1.1 of this report

Lithium metal or lithium alloy cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and~~if they meet all of~~ the following:

1) for lithium metal cells, the lithium content is not more than 1 g;
2) for lithium metal or lithium alloy batteries, 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported.*~~

~~4) cells and batteries must be manufactured under a quality management programme as described in 2;9.3.1 e).~~

IB.1 **General requirements**

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

DGP/24-WP/3 (paragraph 3.5.4) and paragraph 2.4.1.1 of this report

Table 968-IB

Contents	*Net quantity per ~~P~~package ~~quantity~~*	
	Passenger	*Cargo*
Lithium metal cells and batteries	~~2.5 kg G~~ Forbidden	2.5 kg ~~G~~

IB.2 **Additional requirements**

— Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.
— 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 package must be labelled with a lithium battery handling label (Figure 5-31) in addition to the Class 9 hazard label and the cargo aircraft only label (Figure 5-26).
— Each consignment must be accompanied with a document 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 must be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  — a telephone number for additional information.

DGP/24-WP/55 (paragraph 5.1.10 of this report)

Note.— This information may be provided on the dangerous goods transport document.

Packing Instruction 968

IB.3 **Outer packagings**

Boxes *Drums* *Jerricans*

Strong outer packagings

DGP/24-WP/3 (paragraph 3.5.3) and paragraph 2.4.1.1 of this report

II. **SECTION II**

With the exception of Part 1;2.3 (Transport of dangerous goods by post), 5;1.1 h), 5;1.1.k) (Shipper's responsibilities — general requirements), 7;2.1.1 (Loading restrictions on the flight deck and passenger aircraft), 7;2.4.1 (Loading of cargo aircraft), 7;4.4 (Reporting of dangerous goods accidents and incidents), 8;1.1 (Dangerous goods carried by passengers or crew)and paragraph 2 of this packing instruction, 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 of this section.

Lithium metal or lithium alloy cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and ~~if they meet all of~~ the following:

1) for a lithium metal cell, the lithium content is not more than 1 g;
2) for 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported.*~~

4) ~~cells and batteries must be manufactured under a quality management programme as described in 2;9.3.1 e).~~

II.1 **General requirements**

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Table 968-II

Contents	*Lithium metal cells and/or batteries with a lithium content not more than 0.3 g*	*Lithium metal cells with a lithium content more than 0.3 g but not more than 1 g*	*Lithium metal batteries with a lithium content more than 0.3 g but not more than 2 g*
1	*2*	*3*	*4*
Maximum number of cells / batteries per package	No limit	8 cells	2 batteries
Maximum net quantity (mass) per package	2.5 kg	n/a	n/a

The limits specified in columns 2, 3 and 4 of Table 968-II must not be combined in the same package.

Packing Instruction 968

II.2 **Additional requirements**

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery, then placed in a strong outer packaging.
- 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 package must be labelled with a lithium battery handling label (Figure 5-31) and the cargo aircraft only label (Figure 5-26).
  - The cargo aircraft only label must be located on the same surface of the package near the lithium battery handling label, if the package dimensions are adequate.
- Each consignment must be accompanied with a document 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 must be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  - a telephone number for additional information.
- The words “lithium metal batteries, in compliance with Section II of PI968,” and “cargo aircraft only” or “CAO” must be placed on the air waybill, when an air waybill is used.
- Consignments of lithium metal batteries prepared in accordance with the provisions of Section II must not be consolidated with other shipments of dangerous goods or non-dangerous goods and must not be loaded into a unit load device before being offered to the operator.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

II.4 **Overpacks**

When packages are placed in an overpack, the lithium battery handling label and the cargo aircraft only label (Figure 5-26) required by this packing instruction must either be clearly visible or the labels must be affixed on the outside of the overpack and the overpack must be marked with the word “Overpack”.

Packing Instruction 969

Passenger and cargo aircraft for UN 3091 (packed with equipment) only

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries packed with equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. **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 meet all the provisions of 2;9.3.~~:~~.

~~1) 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; and~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported.*~~

~~2) 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; and~~

~~3) be manufactured under a quality management programme as described in 2;9.3.1 e).~~

~~Each battery containing cells or a 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).~~

I.1 **General requirements**

Part 4;1 requirements must be met.

UN number and proper shipping name		*Package quantity (Section I)*	
		Passenger	*Cargo*
UN 3091	**Lithium metal batteries packed with equipment**	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

Packing Instruction 969

DGP-WG/LB/2 (inconsistencies discovered during review of lithium metal battery packing instructions) (shown as shaded text):

I.2 **Additional requirements**

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells or batteries must:
  - be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a ~~package~~ packaging that meets the Packing Group II performance requirements.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium batteries with which it is packed for its operation.
- 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 surrounded by cushioning material that is non-combustible and non-conductive and placed inside an outer packaging.

I.3 **Outer packagings**

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Other metal (4N)	Plastics (1H2)	
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

II. **SECTION II**

With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;4.4 (Reporting of dangerous goods accidents and incidents),8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium metal cells and batteries packed with equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) ~~if they meet all of~~ and the following:

1) for a lithium metal cell, the lithium content is not more than 1 g;
2) for 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;~~

~~*Note 1.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*~~

~~*Note 2.— Batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the fifth revised edition of the UN* Manual of Tests and Criteria, *Part III, subsection 38.3 may continue to be transported.*~~

4) ~~cells and batteries must be manufactured under a quality management programme as described in 2;9.3.1 e).~~

Packing Instruction 969

II.1 **General requirements**

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

II.2 **Additional requirements**

- Lithium metal cells or batteries must:
  - be placed in inner packagings that completely enclose the cell or battery, then placed in a strong outer packaging; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong outer packaging.
- 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 equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.

DGP/24-WP/64 (paragraph 5.1.14 of this report)

- The ~~maximum~~ number of cells or batteries in each package must ~~be~~ not exceed the ~~minimum~~appropriate number ~~required to power~~ for the equipment's operation, plus two spares.
- Each package of cells or batteries, or the completed 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 package must be labelled with a lithium battery handling label (Figure 5-31).
- Each consignment must be accompanied with a document 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 must be followed in the event the package is damaged, to include inspection and repacking if necessary; and
  - a telephone number for additional information.
- The words “lithium metal batteries, in compliance with Section II of PI969” must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 **Outer packagings**

Boxes *Drums* *Jerricans*

Strong outer packagings

II.4 **Overpacks**

When packages are placed in an overpack, the lithium battery handling label required by this packing instruction must either be clearly visible or the label must be affixed on the outside of the overpack and the overpack must be marked with the word “Overpack”.