

## PACKING INSTRUCTION 965

OPERATOR VARIATIONS: 5X-02/07, AC-06, AM-09, CI-01, D0-03, EY-04, QY-03, US-01

### Introduction

This instruction applies to lithium ion or lithium polymer cells and batteries (UN 3480) on passenger and Cargo Aircraft Only.

△ The general requirements apply to all lithium ion cells and batteries prepared for transport according to this packing instruction:

- Section IA applies to lithium ion cells with a Watt-hour rating in excess of 20 Wh and lithium ion batteries with a Watt-hour rating in excess of 100 Wh, or to quantities of lithium ion cells or batteries in excess of those permitted in Section IB of this packing instruction which must be assigned to Class 9 and are subject to all of the applicable requirements of these Regulations;
- Section IB applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section II, Table 965-II; and
- Section II applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities not exceeding the allowance permitted in Section II, Table 965-II.

### △ General Requirements

The following requirements apply to all lithium ion or lithium polymer cells and batteries:

- (a) each cell and 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. However, batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the 5<sup>th</sup> revised edition of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported;

**Note:**

*Batteries, including those which have been refurbished or otherwise altered, are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*

- (b) cells and batteries must be manufactured under a quality management program as described in 3.9.2.6(e);
- (c) 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);
- (d) 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;
- (e) 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.

**PACKING INSTRUCTION 965** (continued)

**Section IA**

These requirements apply to lithium ion cells with a Watt-hour rating in excess of 20 Wh and lithium ion batteries with a Watt-hour rating in excess of 100 Wh that have been determined to meet the criteria for assignment to Class 9.

The General Packing Requirements of 5.0.2 must be met.

Each cell or battery must:

1. meet the General Requirements, above;
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.

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

**Additional Requirements—Section IA**

- lithium ion 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 standards;
- lithium batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates). The packagings need not meet the requirements of Section 6 of these Regulations. The packagings must be approved by the appropriate authority of the State of origin. A copy of the document of approval must accompany the consignment;
- batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.



**TABLE 965-IA**

UN number	Net quantity per package Passenger aircraft	Net quantity per package Cargo Aircraft Only
UN 3480 <b>Lithium ion batteries</b>	5 kg	35 kg

**OUTER PACKAGINGS**

Type	Drums						Jerricans			Boxes							
	Steel	Alu- minium	Ply- wood	Fibre	Plastic	Other metal	Steel	Alu- minium	Plastic	Steel	Alu- minium	Wood	Ply- wood	Recon- stituted wood	Fibre- board	Plastic	Other metal
Spec.	1A2	1B2	1D	1G	1H2	1N2	3A2	3B2	3H2	4A	4B	4C1 4C2	4D	4F	4G	4H2	4N

## PACKING INSTRUCTION 965 *(continued)*

### □ Section IB

Section IB requirements apply to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section II, Table 965-II.

Quantities of lithium ion cells or batteries that exceed the allowance permitted in Section II, Table 965-II must be assigned to Class 9 and are subject to all of the applicable provisions of these Regulations (including the General Requirements of this packing instruction), except for the following:

- (a) the provisions of Section 6; and
- (b) a Shipper's Declaration is not required, provided that the following information must be contained on the air waybill when used, or in the appropriate location on alternative transport documentation. The information required by 2, 3 and 4 below must be shown in the "Nature and Quantity of Goods" box of the air waybill. 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 3480;
  3. Lithium ion batteries, PI 965, IB;
  4. the number of packages and the gross weight of each package.

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

- (a) for cells, the Watt-hour rating is not more than 20 Wh; and
- (b) for 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 those manufactured before 1 January 2009.

Cells and batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1.

### Additional Requirements—Section IB

Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.

Each package must be capable of withstanding a 1.2 m drop test in any orientation without:

- damage to cells or batteries contained therein;
- shifting of the contents so as to allow battery to battery (or cell to cell) contact;
- release of contents.

Each consignment must be accompanied with a document 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.

Each package must be labelled with a lithium battery handling label (Figure 7.4.H) in addition to the Class 9 hazard label (Figure 7.3.V).

Each package must be marked in accordance with the requirements of 7.1.5.1(a) and (b) and in addition the gross weight as required by 7.1.5.1(c) must be marked on the package.

**TABLE 965-IB**

	Quantity per package Passenger aircraft	Quantity per package Cargo Aircraft Only
Lithium ion cells and batteries	10 kg G	10 kg G

### OUTER PACKAGINGS

Type	Drums	Jerricans	Boxes
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**PACKING INSTRUCTION 965** (continued)

**Section II**

Lithium ion cells and batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:

- (a) dangerous goods in passenger and crew baggage (Subsection 2.3). Only those lithium ion batteries as specifically permitted may be carried in carry-on baggage;
- (b) dangerous goods in air mail (Subsection 2.4);
- (c) reporting of dangerous goods accidents, incidents and other occurrences (9.6.1 and 9.6.2).

Lithium ion cells and batteries offered for transport must meet the General Requirements of this packing instruction and:

- (a) for cells, the Watt-hour rating is not more than 20 Wh; and
- (b) for batteries, Watt-hour rating is not more than 100 Wh. The Watt-hour rating must be marked on the outside of the battery case except those manufactured before 1 January 2009;

Cells and batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1.

**Additional Requirements—Section II**

Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.

Each package must be capable of withstanding a 1.2 m drop test in any orientation without:

- damage to cells or batteries contained therein;
- shifting of the contents so as to allow battery to battery (or cell to cell) contact;
- release of contents.

Each consignment must be accompanied with a document 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.

Each package must be labelled with a lithium battery handling label (Figure 7.4.H).

A Shipper's Declaration for Dangerous Goods is not required.

△ The words "Lithium ion batteries in compliance with Section II of PI 965" must be included on the air waybill, when an air waybill is used. The information should be shown in the "Nature and Quantity of Goods" box of the air waybill.

Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

**Overpacks—Section II**

Individual packages each complying with the requirements of Section II may be placed in an overpack. The overpack may also contain packages of dangerous goods or goods not subject to these Regulations provided that there are no packages enclosing different substances which might react dangerously with each other. An overpack must be marked with the word "Overpack" and labelled with the lithium battery label (Figure 7.4.H), unless the label(s) on the package(s) inside the overpack are visible.

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**TABLE 965-II**

Contents	Lithium ion cells and/or batteries with a Watt-hour rating of 2.7 Wh or less	Lithium ion cells with a Watt-hour rating of more than 2.7 Wh but not more than 20 Wh	Lithium ion batteries with a Watt-hour rating of more than 2.7 Wh but not more than 100 Wh
1	2	3	4
Maximum number of cells/batteries per package	No limit	8 cells	2 Batteries
Maximum net quantity per package	2.5 kg	N/A	N/A

Cells and/or batteries specified in columns 2, 3 and 4 of Table 965-II must not be combined in the same package.

**OUTER PACKAGINGS**

Type	Drums	Jerricans	Boxes
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## PACKING INSTRUCTION 966

OPERATOR VARIATIONS: 5X-07, AC-06, AM-09, CI-01, D0-03, EY-04, QY-03, US-01

### Introduction

This instruction applies to lithium ion or lithium polymer cells and batteries packed with equipment (UN 3481) on passenger and Cargo Aircraft Only.

The general requirements apply to all lithium ion cells and batteries packed with equipment prepared for transport according to this packing instruction:

- Section I applies where the equipment is packed with lithium ion cells with a Watt-hour rating in excess of 20 Wh or lithium ion batteries with a Watt-hour rating in excess of 100 Wh, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Regulations; and
- Section II applies where the equipment is packed with lithium ion cells with a Watt-hour rating not exceeding 20 Wh or lithium ion batteries with a Watt-hour rating not exceeding 100 Wh.

### △ General Requirements

The following requirements apply to all lithium ion or lithium polymer cells and batteries:

- (a) each cell and 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. However, batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the 5<sup>th</sup> revised edition of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported;

**Note:**

*Batteries, including those which have been refurbished or otherwise altered, are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*

- (b) cells and batteries must be manufactured under a quality management program as described in 3.9.2.6(e);
- (c) 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);
- (d) 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.

### Section I

These requirements apply to lithium ion cells with a Watt-hour rating in excess of 20 Wh and lithium ion batteries with a Watt-hour rating in excess of 100 Wh that have been determined to meet the criteria for assignment to Class 9.

The General Packing Requirements of 5.0.2 must be met.

Each cell or battery must:

1. meet the General Requirements, above;
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.

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

### Additional Requirements—Section I

- 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 standards; 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 standards.
- the equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation;
- for the purpose of this packing instruction, “equipment” means apparatus requiring the lithium 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.

**PACKING INSTRUCTION 966** (continued)

**TABLE 966-I**

UN number	Net quantity per package Passenger aircraft	Net quantity per package Cargo Aircraft Only
UN 3481 <b>Lithium ion batteries packed with equipment</b>	5 kg	35 kg

**OUTER PACKAGINGS**

Type	Drums						Jerricans			Boxes							
Desc.	Steel	Alu- minium	Ply- wood	Fibre	Plastic	Other metal	Steel	Alu- minium	Plastic	Steel	Alu- minium	Wood	Ply- wood	Recon- stituted wood	Fibre- board	Plastic	Other metal
Spec.	1A2	1B2	1D	1G	1H2	1N2	3A2	3B2	3H2	4A	4B	4C1 4C2	4D	4F	4G	4H2	4N

**Section II**

Lithium ion cells and batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:

- (a) dangerous goods in passenger and crew baggage (Subsection 2.3). Only those lithium ion batteries as specifically permitted may be carried in carry-on baggage;
- (b) dangerous goods in air mail (Subsection 2.4);
- (c) reporting of dangerous goods accidents, incidents and other occurrences (9.6.1 and 9.6.2).

Lithium ion cells and batteries offered for transport must meet the General Requirements of this packing instruction and:

1. for cells, the Watt-hour rating is not more than 20 Wh; and
2. for batteries, Watt-hour rating is not more than 100 Wh. The Watt-hour rating must be marked on the outside of the battery case except those manufactured before 1 January 2009;

Cells and batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1.

**Additional Requirements—Section II**

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 equipment in a strong outer packaging.

The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.

The maximum number of batteries in each package must be the minimum number required to power the equipment 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 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.

## PACKING INSTRUCTION 966 *(continued)*

Each package must be labelled with a lithium battery handling label (Figure 7.4.H).

A Shipper's Declaration for Dangerous Goods is not required.

- △ The words "Lithium ion batteries in compliance with Section II of PI 966" must be included on the air waybill, when an air waybill is used. The information should be shown in the "Nature and Quantity of Goods" box of the air waybill.

Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

### Overpacks—Section II

Individual packages each complying with the requirements of Section II may be placed in an overpack. The overpack may also contain packages of dangerous goods or goods not subject to these Regulations provided that there are no packages enclosing different substances which might react dangerously with each other. An overpack must be marked with the word "Overpack" and labelled with the lithium battery label (Figure 7.4.H), unless the label(s) on the package(s) inside the overpack are visible.

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**TABLE 966-II**

	Passenger aircraft	Cargo Aircraft Only
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

  

OUTER PACKAGINGS			
Type	Drums	Jerricans	Boxes

966

## PACKING INSTRUCTION 967

OPERATOR VARIATIONS: 5X-07, AC-06, AM-09, CX-08, D0-03, EY-04, KA-08, LD-07, QY-03, US-01

### Introduction

This instruction applies to lithium ion or lithium polymer cells and batteries contained in equipment (UN 3481) on passenger and Cargo Aircraft Only.

The general requirements apply to all lithium ion cells and batteries contained in equipment prepared for transport according to this packing instruction:

- Section I applies where the equipment contains lithium ion cells with a Watt-hour rating in excess of 20 Wh or lithium ion batteries with a Watt-hour rating in excess of 100 Wh, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Regulations; and
- Section II applies where the equipment contains lithium ion cells with a Watt-hour rating not exceeding 20 Wh or lithium ion batteries with a Watt-hour rating not exceeding 100 Wh.

### △ General Requirements

The following requirements apply to all lithium ion or lithium polymer cells and batteries:

- (a)** each cell and 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. However, batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the 5<sup>th</sup> revised edition of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported;

**Note:**

*Batteries, including those which have been refurbished or otherwise altered, are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*

- (b)** cells and batteries must be manufactured under a quality management program as described in 3.9.2.6(e);
- (c)** 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);
- (d)** 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;
- (e)** equipment must be equipped with an effective means of preventing accidental activation;



**PACKING INSTRUCTION 967** (continued)

- (f) equipment containing batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1;
- (g) the equipment containing the cells or batteries must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport;

**Section I**

These requirements apply to lithium ion cells with a Watt-hour rating in excess of 20 Wh and lithium ion batteries with a Watt-hour rating in excess of 100 Wh that have been determined to meet the criteria for assignment to Class 9.

Each cell or battery must:

1. meet the General Requirements, above;
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.

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

**Additional Requirements—Section I**

- the equipment must be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;
- batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

**TABLE 967-I**

UN number	Net quantity per package Passenger aircraft	Net quantity per package Cargo Aircraft Only
UN 3481 Lithium ion batteries contained in equipment	5 kg	35 kg

**OUTER PACKAGINGS—Strong outer packagings, such as:**

Type	Drums						Jerricans			Boxes							
Desc.	Steel	Alu-minium	Ply-wood	Fibre	Plastic	Other metal	Steel	Alu-minium	Plastic	Steel	Alu-minium	Wood	Ply-wood	Reconstituted wood	Fibre-board	Plastic	Other metal

**Section II**

Lithium ion cells and batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:

- (a) dangerous goods in passenger and crew baggage (Subsection 2.3). Only those lithium ion batteries as specifically permitted may be carried in carry-on and checked baggage;
- (b) dangerous goods in air mail (Subsection 2.4);
- (c) reporting of dangerous goods accidents, incidents and other occurrences (9.6.1 and 9.6.2).

Lithium ion cells and batteries offered for transport must meet the General Requirements of this packing instruction and:

1. for cells, the Watt-hour rating is not more than 20 Wh; and
2. for batteries, Watt-hour rating is not more than 100 Wh. The Watt-hour rating must be marked on the outside of the battery case except those manufactured before 1 January 2009.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems.

**Additional Requirements—Section II**

The equipment must be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the cell or battery is afforded equivalent protection by the equipment in which it is contained.

Each package containing more than four cells or more than two batteries installed in equipment must be labelled with a lithium battery handling label (Figure 7.4.H), except for button cell batteries installed in equipment (including circuit boards);

## PACKING INSTRUCTION 967 *(continued)*

Each consignment with packages bearing the lithium battery handling label 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.

A Shipper's Declaration for Dangerous Goods is not required.

△ Where a consignment includes packages bearing the lithium battery handling label, the words "Lithium ion batteries in compliance with Section II of PI 967" must be included on the air waybill, when an air waybill is used. The information should be shown in the "Nature and Quantity of Goods" box of the air waybill.

Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

### Overpacks—Section II

Individual packages each complying with the requirements of Section II may be placed in an overpack. The overpack may also contain packages of dangerous goods or goods not subject to these Regulations provided that there are no packages enclosing different substances which might react dangerously with each other. An overpack must be marked with the word "Overpack" and labelled with the lithium battery label (Figure 7.4.H), unless the label(s) on the package(s) inside the overpack are visible, or a label is not required.

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**TABLE 967-II**

	Passenger aircraft	Cargo Aircraft Only
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

### OUTER PACKAGINGS

Type	Drums	Jerricans	Boxes
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## PACKING INSTRUCTION 968

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STATE VARIATIONS: USG-02/03

△ OPERATOR VARIATIONS: 5X-02/07, AC-06, AM-09, BA-02, CI-01, CZ-08, D0-03, EY-04, QR-04, QY-03, SK-01, US-01, UX-07

### Introduction

This instruction applies to lithium metal or lithium alloy cells and batteries (UN 3090) on passenger and Cargo Aircraft Only.

- △ The general requirements apply to all lithium metal batteries prepared for transport according to this packing instruction:
- 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, or to quantities of lithium metal cells or batteries in excess of those permitted in Section IB of this packing instruction which must be assigned to Class 9 and are subject to all of the applicable requirements of these Regulations;
  - 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.

**PACKING INSTRUCTION 968** (continued)

**△ General Requirements**

The following requirements apply to all lithium metal or lithium alloy cells and batteries:

- (a) each cell and 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. However, batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the 5<sup>th</sup> revised edition of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported;

**Note:**

*Batteries, including those which have been refurbished or otherwise altered, are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*

- (b) cells and batteries must be manufactured under a quality management program as described in 3.9.2.6(e);
- (c) 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);
- (d) waste lithium batteries and lithium batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of origin and the State of the operator;
- (e) 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.

**Section IA**

These 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.

The General Packing Requirements of 5.0.2 must be met.

Each cell or battery must:

1. meet the General Requirements, above;
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.

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

**Additional Requirements—Section IA**

- 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 standards;
- lithium batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates). The packagings need not meet the requirements of Section 6 of these Regulations. The packagings must be approved by the appropriate national authority of the State of origin. A copy of the document of approval must accompany the consignment.

**Lithium metal and lithium alloy cells and batteries prepared for transport on Passenger Aircraft as Class 9:**

- must be packed in either a rigid metal intermediate or a metal outer packaging;
- cells and batteries must be surrounded by cushioning material that is non-combustible and non-conductive before being placed in either the metal intermediate or metal outer packaging;
- when the package does not meet the above requirements, the package(s) must bear the “Cargo Aircraft Only” label and the Shipper’s Declaration must indicate “Cargo Aircraft Only”.

## PACKING INSTRUCTION 968 (continued)

**TABLE 968-IA**

UN number	Net quantity per package Passenger aircraft	Net quantity per package Cargo Aircraft Only
UN 3090 <b>Lithium metal batteries</b>	2.5 kg	35 kg

**OUTER PACKAGINGS**

Type	Drums						Jerricans			Boxes							
	Steel	Alu- minium	Ply- wood	Fibre	Plastic	Other metal	Steel	Alu- minium	Plastic	Steel	Alu- minium	Wood	Ply- wood	Recon- stituted wood	Fibre- board	Plastic	Other metal
Spec.	1A2	1B2	1D	1G	1H2	1N2	3A2	3B2	3H2	4A	4B	4C1 4C2	4D	4F	4G	4H2	4N

**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.

Quantities of lithium ion 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 Regulations (including the General Requirements of this packing instruction), except for the following:

- (a) the provisions of Section 6; and
- (b) a Shipper's Declaration is not required, provided that the following information must be contained on the air waybill when used, or in the appropriate location on alternative transport documentation. The information required by 2, 3 and 4 below must be shown in the "Nature and Quantity of Goods" box of the air waybill. 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;
  4. the number of packages and the gross weight of each package.

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

- (a) for cells, the lithium content is not more than 1 g; and
- (b) for batteries, the aggregate lithium content is not more than 2 g.

Cells and batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1.

**Additional Requirements—Section IB**

Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.

Each package must be capable of withstanding a 1.2 m drop test in any orientation without:

- damage to cells or batteries contained therein;
- shifting of the contents so as to allow battery to battery (or cell to cell) contact;
- release of contents.

Each consignment must be accompanied with a document 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.

Each package must be labelled with a lithium battery handling label (Figure 7.4.H) in addition to the Class 9 hazard label (Figure 7.3.V).

**PACKING INSTRUCTION 968** (continued)

Each package must be marked in accordance with the requirements of 7.1.5.1(a) and (b) and in addition the gross weight must be marked on the package.

**TABLE 968-IB**

	Quantity per package Passenger aircraft	Quantity per package Cargo Aircraft Only
Lithium metal cells and batteries	2.5 kg G	2.5 kg G

**OUTER PACKAGINGS**

Type	Drums	Jerricans	Boxes
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**Section II**

Lithium metal or lithium alloy cells and batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:

- (a) dangerous goods in passenger and crew baggage (Subsection 2.3). Only those lithium metal batteries as specifically permitted may be carried in carry-on baggage;
- (b) dangerous goods in air mail (Subsection 2.4);
- (c) reporting of dangerous goods accidents, incidents and other occurrences (9.6.1 and 9.6.2).

Lithium metal or lithium alloy cells and batteries offered for transport must meet the General Requirements of this packing instruction and:

1. for cells, the lithium content is not more than 1 g; and
2. for batteries, the aggregate lithium content is not more than 2 g;

Cells and batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1.

**Additional Requirements—Section II**

Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.

Each package must be capable of withstanding a 1.2 m drop test in any orientation without:

- damage to cells or batteries contained therein;
- shifting of the contents so as to allow battery to battery (or cell to cell) contact;
- release of contents.

Each consignment must be accompanied with a document 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.

Each package must be labelled with a lithium battery handling label (Figure 7.4.H);

A Shipper's Declaration for Dangerous Goods is not required.

- △ The words "Lithium metal batteries in compliance with Section II of PI 968" must be included on the air waybill, when an air waybill is used. The information should be shown in the "Nature and Quantity of Goods" box of the air waybill.

Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

**Overpacks—Section II**

Individual packages each complying with the requirements of Section II may be placed in an overpack. The overpack may also contain packages of dangerous goods or goods not subject to these Regulations provided that there are no packages enclosing different substances which might react dangerously with each other. An overpack must be marked with the word "Overpack" and labelled with the lithium battery label (Figure 7.4.H), unless the label(s) on the package(s) inside the overpack are visible.

## PACKING INSTRUCTION 968 *(continued)*



**TABLE 968-II**

Contents	Lithium metal cells and/or batteries with a lithium content of 0.3 g or less	Lithium metal cells with a lithium content of more than 0.3 g but not more than 1 g	Lithium metal batteries with a lithium content of 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 per package	2.5 kg	N/A	N/A

Cells and/or batteries specified in columns 2, 3 and 4 of Table 968-II must not be combined in the same package.

### OUTER PACKAGINGS

Type	Drums	Jerricans	Boxes
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## PACKING INSTRUCTION 969

STATE VARIATIONS: USG-02/03

OPERATOR VARIATIONS: 5X-07, AC-06, AM-09, CI-01, CZ-08, D0-03, EY-04, QR-04, QY-03, SK-01, US-01

### Introduction

This instruction applies to lithium metal or lithium alloy cells and batteries packed with equipment (UN 3091) on passenger and Cargo Aircraft Only.

The general requirements apply to all lithium metal batteries packed with equipment prepared for transport according to this packing instruction:

- Section I applies where equipment is packed with lithium metal cells with a lithium metal content in excess of 1 g or 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 Regulations; and
- Section II applies where equipment is packed with lithium metal cells with a lithium metal content not exceeding 1 g or lithium metal batteries with a lithium metal content not exceeding 2 g.

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### △ General Requirements

The following requirements apply to all lithium metal or lithium alloy cells and batteries:

- (a) each cell and 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. However, batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the 5<sup>th</sup> revised edition of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported;

**Note:**

*Batteries, including those which have been refurbished or otherwise altered, are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*

- (b) cells and batteries must be manufactured under a quality management program as described in 3.9.2.6(e);
- (c) 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);
- (d) 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.

### Section I

These 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 been determined to meet the criteria for assignment to Class 9.

The General Packing Requirements of 5.0.2 must be met.

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**PACKING INSTRUCTION 969** (continued)

Each cell or battery must:

1. meet the General Requirements, above;
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.

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

**Additional Requirements—Section I**

- 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 standards; 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 standards.
- the equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation;
- for the purpose of this packing instruction, “equipment” means apparatus requiring the lithium batteries with which it is packed for its operation.

**Lithium metal and lithium alloy cells and batteries prepared for transport on Passenger Aircraft as Class 9:**

- must be packed in either a rigid metal intermediate or a metal outer packaging;
- cells and batteries must be surrounded by cushioning material that is non-combustible and non-conductive, and being placed in either the metal intermediate or metal outer packaging;
- when the package does not meet the above requirements, the package(s) must bear the “Cargo Aircraft Only” label and the Shipper’s Declaration must indicate “Cargo Aircraft Only”.

**TABLE 969-I**

UN number	Net quantity per package Passenger aircraft	Net quantity per package Cargo Aircraft Only
UN 3091 <b>Lithium metal batteries packed with equipment</b>	5 kg	35 kg

**OUTER PACKAGINGS**

Type	Drums						Jerricans			Boxes							
	Steel	Alu- minium	Ply- wood	Fibre	Plastic	Other metal	Steel	Alu- minium	Plastic	Steel	Alu- minium	Wood	Ply- wood	Recon- stituted wood	Fibre- board	Plastic	Other metal
Spec.	1A2	1B2	1D	1G	1H2	1N2	3A2	3B2	3H2	4A	4B	4C1 4C2	4D	4F	4G	4H2	4N

**Section II**

Lithium metal or lithium alloy cells and batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:

- (a) dangerous goods in passenger and crew baggage (Subsection 2.3). Only those lithium metal batteries as specifically permitted may be carried in carry-on baggage;
- (b) dangerous goods in air mail (Subsection 2.4);
- (c) reporting of dangerous goods accidents, incidents and other occurrences (9.6.1 and 9.6.2).

Lithium metal or lithium alloy cells and batteries offered for transport must meet the General Requirements of this packing instruction and:

1. for cells, the lithium content is not more than 1 g; and
2. for batteries, the aggregate lithium content is not more than 2 g;

Cells and batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1.

**Additional Requirements—Section II**

Lithium metal cells and batteries must:

- be placed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging; or

## PACKING INSTRUCTION 969 *(continued)*

- be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a strong outer packaging.

The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.

The maximum number of batteries in each package must be the minimum number required to power the equipment 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 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.

Each package must be labelled with a lithium battery handling label (Figure 7.4.H);

A Shipper's Declaration for Dangerous Goods is not required.

- △ The words "Lithium metal batteries in compliance with Section II of PI 969" must be included on the air waybill, when an air waybill is used. The information should be shown in the "Nature and Quantity of Goods" box of the air waybill.

Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

### Overpacks—Section II

Individual packages each complying with the requirements of Section II may be placed in an overpack. The overpack may also contain packages of dangerous goods or goods not subject to these Regulations provided that there are no packages enclosing different substances which might react dangerously with each other. An overpack must be marked with the word "Overpack" and labelled with the lithium battery label (Figure 7.4.H), unless the label(s) on the package(s) inside the overpack are visible.



**TABLE 969-II**

	Passenger aircraft	Cargo Aircraft Only
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

### OUTER PACKAGINGS

Type	Drums	Jerricans	Boxes
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**PACKING INSTRUCTION 970**

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STATE VARIATIONS: USG-02/03

OPERATOR VARIATIONS: 5X-07, AC-06, AM-09, CI-01, CX-08, CZ-08, D0-03, EY-04, KA-08, LD-07, QR-04, QY-03, SK-01, US-01, UX-07

**Introduction**

This instruction applies to lithium metal or lithium alloy cells and batteries contained in equipment (UN 3091) on passenger and Cargo Aircraft Only.

The general requirements apply to all lithium metal and lithium alloy cells and batteries contained in equipment prepared for transport according to this packing instruction:

- Section I applies where equipment contains lithium metal cells with a lithium metal content in excess of 1 g or 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 Regulations; and
- Section II applies where equipment contains lithium metal cells with a lithium metal content not exceeding 1 g or lithium metal batteries with a lithium metal content not exceeding 2 g.

**PACKING INSTRUCTION 970** (continued)

△ **General Requirements**

The following requirements apply to all lithium metal or lithium alloy cells and batteries:

- (a) each cell and 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. However, batteries and cells manufactured before 1 January 2014 conforming to a design type tested according to the requirements of the 5<sup>th</sup> revised edition of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3 may continue to be transported;

**Note:**

*Batteries, including those which have been refurbished or otherwise altered, are subject to these tests irrespective of whether the cells of which they are composed have been so tested.*

- (b) cells and batteries must be manufactured under a quality management program as described in 3.9.2.6(e);
- (c) 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);
- (d) 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;
- (e) equipment must be equipped with an effective means of preventing accidental activation;
- (f) equipment containing cells or batteries must be packed in strong outer packagings that conform to 5.0.2.4, 5.0.2.6.1 and 5.0.2.12.1.
- (g) the equipment containing the cells or batteries must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport;

**Section I**

These 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:

1. meet the General Requirements, above;
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.

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

**Additional Requirements—Section I**

- the equipment must be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;
- the quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

**TABLE 970-I**

UN number	Net quantity per package Passenger aircraft	Net quantity per package Cargo Aircraft Only
UN 3091 <b>Lithium metal batteries contained in equipment</b>	5 kg	35 kg

**OUTER PACKAGINGS—Strong outer packagings, such as:**

Type	Drums						Jerricans			Boxes							
	Steel	Alu- minium	Ply- wood	Fibre	Plastic	Other metal	Steel	Alu- minium	Plastic	Steel	Alu- minium	Wood	Ply- wood	Recon- stituted wood	Fibre- board	Plastic	Other metal
Desc.	Steel	Alu- minium	Ply- wood	Fibre	Plastic	Other metal	Steel	Alu- minium	Plastic	Steel	Alu- minium	Wood	Ply- wood	Recon- stituted wood	Fibre- board	Plastic	Other metal

## PACKING INSTRUCTION 970 *(continued)*

### Section II

Lithium metal or lithium alloy cells and batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:

- (a) dangerous goods in passenger and crew baggage (Subsection 2.3). Only those lithium metal batteries as specifically permitted may be carried in carry-on and checked baggage;
- (b) dangerous goods in air mail (Subsection 2.4);
- (c) reporting of dangerous goods accidents, incidents and other occurrences (9.6.1 and 9.6.2).

Lithium metal or lithium alloy cells and batteries offered for transport must meet the General Requirements of this packing instruction and:

1. for cells, the lithium content is not more than 1 g; and
2. for batteries, the aggregate lithium content is not more than 2 g;

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems.

### Additional Requirements—Section II

The equipment must be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the cell or battery is afforded equivalent protection by the equipment in which it is contained.

Each package containing more than four cells or more than two batteries installed in equipment must be labelled with a lithium battery handling label (Figure 7.4.H), except for button cell batteries installed in equipment (including circuit boards);

Each consignment with packages bearing the lithium battery handling label 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.

A Shipper's Declaration for Dangerous Goods is not required.

△ Where a consignment includes packages bearing the lithium battery handling label, the words "Lithium metal batteries in compliance with Section II of PI 970" must be included on the air waybill, when an air waybill is used. The information should be shown in the "Nature and Quantity of Goods" box of the air waybill.

Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

### Overpacks—Section II

Individual packages each complying with the requirements of Section II may be placed in an overpack. The overpack may also contain packages of dangerous goods or goods not subject to these Regulations provided that there are no packages enclosing different substances which might react dangerously with each other. An overpack must be marked with the word "Overpack" and labelled with the lithium battery label (Figure 7.4.H), unless the label(s) on the package(s) inside the overpack are visible, or a label is not required.

□

**TABLE 970-II**

	Passenger aircraft	Cargo Aircraft Only
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

### OUTER PACKAGINGS

Type	Drums	Jerricans	Boxes
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