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## **TOPICS – 10 June 2012**

### **Changes to the ICAO/IATA Dangerous Goods Regulations effective 2013**

#### **Subject: Lithium Batteries**

Due to repeated aircraft accidents said to involve lithium batteries, ICAO focused its attention to the fact that there are quantities of lithium batteries of Section II being carried on the aircraft as cargo however without the knowledge of the captain. ICAO therefore concluded to place a new regulation into effect as from 1 January 2013 to enhance safety however not imposing additional burden to the shipping public.

Lithium batteries processed under Section II are currently exempted from Acceptance Check List and are not listed on the NOTOC. To provide full information to the captain as to what is actually loaded on his aircraft, there will be less items that will be exempted from acceptance check and exempted from listing on the NOTOC.

On the other hand, if the new rule would impose a need to use UN specification packagings and mandate preparation of Dangerous Goods Declarations, the shipping public will object the extra burden. Accommodating the concern of all parties of the lithium battery supply chain, ICAO has come up with the following changes to the current regulation to be enforced from January 1, 2013.

- 1) Confined only to shipment of cells/batteries (PI 965 and PI 968), a new Section IB will be installed between the current Section I and Section II. Lithium ion cells will be limited to more than 2.7Wh but not more than 20Wh, and lithium ion batteries to more than 2.7Wh but not more than 100Wh. Lithium metal cells will be limited to more than 0.3g but not more than 1 g, and lithium metal batteries to more than 0.3g but not more than 2 g. Contents per package for both lithium ion or lithium metal cells/batteries will be more than 8 cells or 2 batteries. Acceptance check list must be used, and must be reported on NOTOC. No need for a UN specification packaging or a Shipper's Declaration. To alert the airline that an Acceptance Check List and an entry on the NOTOC are mandated, Class 9 Hazard Label is required in addition to the Lithium Battery Handling Label.
- 2) Exempted shipments under Section II will be confined to lithium ion cells/batteries not more than 2.7Wh or lithium metal cells/batteries not more than 0.3g both with a maximum net quantity per package of 2.5kg. Lithium ion cells of more than 2.7Wh but not more than 20Wh, and lithium ion batteries of more than 2.7Wh but not more than 100Wh must be limited to 8 cells or 2 batteries per package. Lithium metal cells of more than 0.3g but not more than 1 g, and lithium metal batteries of more than 0.3g but not more than 2 g will also be limited to 8 cells or 2 batteries per package. No need to use UN specification packagings. Lithium Battery Handling Label is required. No declaration required except for inserting of 4 mandatory entries. The words "Lithium ion (metal) batteries in compliance with Section II of PI 965 (PI 968)" must be placed on the AWB. The term "Not Restricted" is no longer to be used.
- 3) There are no changes to Lithium batteries packed with equipment (PI 966 and PI 969) or Lithium batteries already contained in equipment (PI 967 and PI 970). This is because these batteries are isolated and not packed next to each other as with PI 965 and PI 968. It is considered that there are less chances of a thermal runaway.

The major aim of the change is to get more on the NOTOC form to let the captain know what he is carrying.

Please refer to the new Flow Chart attached.

Other than the above, effective 2013, Lithium batteries contained in equipment will be permitted in POST. However, postal personnel will be added to Table 1.5.A and will be subjected to mandatory training.

Nothing more.

**Lithium Ion Cells and Batteries Shipping Requirements**

**General Requirements**  
 1. Defective, damaged cells/batteries cannot be airlifted.  
 2. Waste cells/batteries and those for recycling/disposal are forbidden unless approved by States of Origin and of the Operator.

1. Cells/batteries must meet requirements of the tests of UN Manual of Test & Criteria Part III Subsection 38.3.  
 2. Incorporate a safety venting device or be designed to preclude a violent rupture under normal conditions and be equipped with effective means of preventing external short circuits.  
 3. Be manufactured under a quality management programme.

Lithium Ion Batteries

Lithium Ion Batteries Packed With Equipment

Lithium Ion Batteries Contained in Equipment

UN3480 PI965 Section IA applies  
 Cell: > 20 Wh/Cell  
 Battery/pack: > 100Wh/Battery  
 Packages require Class 9 label.  
 Consignments require DGD.  
 UN Specification Package required.  
 PAX limit: 5 kg /package  
 CAO limit: 35 kg /package

UN3481 PI966 Section I applies  
 Cell: >20 Wh/Cell  
 Battery/pack: > 100Wh/Battery  
 Packages require Class 9 label.  
 Consignments require DGD.  
 UN Specification Package required.  
 PAX limit: 5 kg/package  
 CAO limit: 35 kg/package  
 Note: Weight of lithium ion cells or batteries. Weight of equipment not included.

UN3481 PI967 Section I applies  
 Cell: > 20 Wh/Cell  
 Battery/pack: > 100Wh/Battery  
 Packages require Class 9 label.  
 Consignments require DGD.  
 PAX limit: 5 kg/package  
 CAO limit: 35 kg/package  
 Note: Weight of lithium ion cells or batteries. Weight of equipment not included.  
 There is no limit to the number of equipment in one outer package. Equipment must not activate accidentally. Must be packed secured against movement in strong outer packagings.

OR  
 UN3480 PI965 Section 1B applies  
 Cell ≤ 20 Wh/Cell  
 Battery/pack: ≤ 100Wh/Battery  
 More than 8 cells Wh > 2.7 but ≤ 20 Wh  
 More than 2 batteries Wh > 2.7 but ≤ 100 Wh  
 UN Spec. packaging not required.  
 Lithium Batt Handling Label and Class 9 Label required as warning to the airlines.  
 No DGD, but AWB to show Shpr/Cnee name & address, UN3480 Lithium ion battery PI 965 Section 1B, nbr pkgs, gross mass of each pkg.  
 Max limit 10 kg G/package  
 Check Sheet/NOTOC required.

OR

OR

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UN3480 PI965 Section II applies  
 (1) If cells/batteries do not exceed 2.7 Wh, no limit in the number of cells/batteries but Net Weight must not exceed 2.5kg/package.  
 (2) Cell: > 2.7 but ≤ 20 Wh Max 8 cells per package.  
 (3) Battery > 2.7 but ≤ 100 Wh Max 2 batteries per package.  
 Note: Items (1), (2) and (3) must not be combined in one outer package.  
 Packages require Lithium Battery Handling Label. Document re lithium battery must be attached to AWB. AWB must show "Lithium ion batteries", "in compliance with Section II of PI965".  
 PAX/CAO limit: 2.5 kg/package but cells/batteries must not exceed 2.7 Wh. When exceeding, limit is 8 cells or 2 batteries.  
 Check Sheet/NOTOC not required.

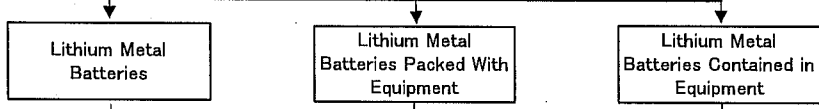
UN3481 PI966 Section II applies  
 Cell: ≤ 20 Wh/Cell  
 Battery/pack: ≤ 100Wh/Battery  
 Packages require Lithium Battery Handling Label.  
 Document re lithium battery must be attached to AWB. AWB must show "Lithium ion batteries", "in compliance with Section II of PI966".  
 No more than minimum number to power the equipment plus 2 spares per equipment.  
 PAX/CAO limits: Net quantity of Lithium cells/batteries per package 5kg.

UN3481 PI967 Section II applies  
 Cell: ≤ 20 Wh/Cell  
 Battery/pack: ≤ 100Wh/Battery  
 Packages require Lithium Battery Handling Label if more than 4 cells or 2 batteries per package. Thence, AWB must show entries on lithium batteries or attach information to AWB. AWB must show "Lithium ion batteries", "in compliance with Section II of PI967".  
 PAX/CAO limits: Net quantity of Lithium cells/batteries per package 5kg.

**Lithium Metal Cells and Batteries Shipping Requirements**

**General Requirements**  
 1. Defective, damaged cells/batteries cannot be airlifted.  
 2. Waste cells/batteries and those for recycling/disposal are forbidden unless approved by States of Origin and of the Operator.

1. Cells/batteries must meet requirements of the tests of UN Manual of Test & Criteria Part III Subsection 38.3.  
 2. Incorporate a safety venting device or be designed to preclude a violent rupture under normal conditions and be equipped with effective means of preventing external short circuits.  
 3. Be manufactured under a quality management programme.



**Lithium Metal Batteries**  
 UN3090 PI968 Section IA applies  
 Cell: > 1 g/Cell  
 Battery/pack: > 2 g/Battery  
 Packages require Class 9 label.  
 Consignments require DGD.  
 UN Specification Package required.  
 PAX limit: 5 kg /package  
 CAO limit: 35 kg /package

**Lithium Metal Batteries Packed With Equipment**  
 UN3091 PI969 Section I applies  
 Cell: > 1 g/Cell  
 Battery/pack: > 2 g/Battery  
 Packages require Class 9 label.  
 Consignments require DGD.  
 UN Specification Package required.  
 PAX limit: 5 kg/package  
 CAO limit: 35 kg/package  
 Note: Weight of lithium metal cells or batteries, Weight of equipment not included.

**Lithium Metal Batteries Contained in Equipment**  
 UN3091 PI970 Section I applies  
 Cell: > 1 g/Cell  
 Battery/pack: > 2 g/Battery  
 Packages require Class 9 label.  
 Consignments require DGD.  
 PAX limit: 5 kg/package  
 CAO limit: 35 kg/package  
 Note: Weight of lithium metal cells or batteries. Weight of equipment not included.  
 There is no limit to the number of equipment in one outer package.  
 Equipment must not activate accidentally. Must be packed secured against movement in strong outer packagings.

**OR**  
 UN3090 PI968 Section 1B applies  
 Cell ≤ 1 g/Cell  
 Battery/pack: ≤ 2 g/Battery  
 More than 8 cells > 0.3 g but ≤ 1 g  
 More than 2 batteries > 0.3 g but ≤ 2 g  
 UN Spec. packaging not required.  
 Lithium Batt Handling Label and Class 9 Label required as warning to the airlines.  
 No DGD, but AWB to show Shpr/Cnee name & address, UN3090 Lithium metal battery PI 968 Section IB, nbr pkgs, gross mass of each pkg.  
 Max limit 2.5 kg G/package  
 Check Sheet/NOTOC required.

**OR**

**OR**

EXCEPTED

EXCEPTED

EXCEPTED

**UN3090 PI968 Section II applies**  
 (1) If cells/batteries do not exceed 2.7 Wh, no limit to the number of cells/batteries but Net Weight must not exceed 2.5kg/package.  
 (2) Cell: > 0.3 g but ≤ 1 g Max 8 cells per package.  
 (3) Battery: > 0.3 g but ≤ 2 g Max 2 batteries per package  
 Note: Items (1), (2) and (3) must not be combined in one outer package.  
 Packages require Lithium Battery Handling Label. Document re lithium battery must be attached to AWB. AWB must show "Lithium metal batteries", "in compliance with Section II of PI968".  
 PAX/CAO limit: 2.5 kg/package but cells/batteries must not exceed 0.3 g Lithium contents. When exceeding, limit is 8 cells or 2 batteries.  
 Check Sheet/NOTOC not required.

**UN3091 PI969 Section II applies**  
 Cell: ≤ 1 g/Cell  
 Battery/pack: ≤ 2 g/Battery  
 Packages require Lithium Battery Handling Label.  
 Document re lithium battery must be attached to AWB. AWB must show "Lithium metal batteries", "in compliance with Section II of PI969".  
 No more than minimum number to power the equipment plus 2 spares per equipment.  
 PAX/CAO limits: Net quantity of Lithium cells/batteries per package 5kg.

**UN3091 PI970 Section II applies**  
 Cell: ≤ 1 g/Cell  
 Battery/pack: ≤ 2 g/Battery  
 Packages require Lithium Battery Handling Label if more than 4 cells or 2 batteries.  
 Thence, AWB must show entries on lithium batteries or attach information to AWB.  
 AWB must show "Lithium metal batteries", "in compliance with Section II of PI970".  
 PAX/CAO limits: Net quantity of Lithium cells/batteries per package 5kg.



## Lithium Battery RECAP

### Secondary (rechargeable)

Lithium ion cells/batteries  
Lithium polymer cells/batteries

### Primary (non-rechargeable)

Lithium metal cells/batteries  
Lithium alloy cells/batteries

### Package conditions

#### **UN 3480**

**Lithium ion batteries**  
PI 965

When just the batteries  
are being shipped.

#### **UN 3090**

**Lithium metal batteries**  
PI 968

#### **UN 3481**

**Lithium ion batteries  
packed with equipment**  
PI 966

When batteries are packed  
together with the equipment  
with which they are to be used  
(in an overpacked condition).

#### **UN 3091**

**Lithium metal batteries  
packed with equipment**  
PI 969

#### **UN 3481**

**Lithium ion batteries  
contained in equipment**  
PI 967

When batteries are already  
installed in the equipment.

#### **UN 3091**

**Lithium metal batteries  
contained in equipment**  
PI 970

### To be shipped as Regulated shipment

General Requirements and Section I of the Packing Instructions must be met.  
Class 9 Hazard Label mandatory. Must not affix Lithium Battery Handling Label.  
DGD required.  
AWB required but no additional information necessary.  
Check List must be used for acceptance. Must notify captain by NOTOC.

### To be shipped as Non-regulated shipment

General Requirements and Section II of the Packing Instructions must be met.  
Must affix Lithium Battery Handling Label (Figure 7.4.I). Must not affix Class 9 Hazard Label.  
DGD not required.  
AWB must show required information (4 items) or the information must be written on a separate document and attached to the AWB.  
Check List not required for acceptance. NOTOC not required.

## **New Regulation effective January 1, 2013**

### **New Section IB**

- Since there are too many “exempted” lithium batteries that are transported without being reported on the NOTOC, i.e., without the captain not knowing that he is carrying such cargo on board, a new Section IB is inserted between Section I and Section II effective from January 1, 2013. Applicable only to PI 965 and PI 968 where lithium batteries themselves are shipped. Lithium Ion Cells of more than 2.7 Wh but not more than 20 Wh, Lithium Ion Batteries of more than 2.7 Wh but not more than 100 Wh, Lithium Metal Cells of more than 0.3 g but not more than 1 g, and Lithium Metal Batteries of more than 0.3 g but not more than 2 g must be accepted using the Acceptance Check List and the captain must be notified through the NOTOC form. If there are more than 8 cells or 2 batteries per package, such shipments must be accepted by using the Acceptance Check List and entered on the NOTOC form.
- General Requirement and Section IB of PI 965 and PI 968, as applicable, must be met.
- Not to give extra burden to the shippers, there is no need to use UN specification packagings, and no need to make a Shipper’s Declaration for Dangerous Goods. AWB is necessary with the required entries. In addition to the Lithium Battery Handling Label, Class 9 Hazard Label must be affixed to warn the airline that a Check List acceptance and a NOTOC entry is needed.
- The use of Acceptance Check List is made mandatory, and entry to the NOTOC must also be followed.

### **New Section II**

- Where non-regulated lithium batteries only are shipped, a new revised Section II will become applicable for PI 965 and PI 968. Refer to the table on the following page.
- Lithium Ion cells and/or batteries with a Watt-hour rating not more than 2.7 Wh, and Lithium Metal cells/batteries with a lithium content of not more than 0.3 grams, provided the net quantity per package does not exceed 2.5 kg, these can be shipped as “Non-Regulated Shipment”.
- If Lithium Ion cell is more than 2.7 Wh but less than 20 Wh; if lithium ion batteries is more than 2.7 Wh but less than 100 Wh; if lithium metal cells is more than 0.3 g but not more than 1 g; and if lithium metal batteries is more than 0.3 g but not more than 2 g; provided the number of cells do not exceed 8 cells or the number of batteries do not exceed 2 batteries per package, these can also be shipped as “Non-Regulated Shipment”. Refer to the Table on the next page.
- The aforementioned cells and batteries must not be combined in the same outer packaging.
- No Declaration is needed. AWB must carry the 4 required entries or such document must be attached to the AWB. No need to use UN specification packagings. Apply Lithium Battery Handling Label only. Class 9 hazard label must not be affixed.
- Shipper-load ULDs are permitted for Section II.

### **For shipments where the battery is packed with the equipment or installed in the equipment**

- Since there are less chances of a thermal runaway for PI 966 and PI 969 where the cells/batteries are packed together with the equipment and also for PI 967 and PI 970 where the cells/batteries are already installed in the equipment, the new Section IB rule do not apply.

**PI 965 Section II Lithium ion cells/batteries (Maximum Quantity per Package)**

**(Must be in Combination Packagings)**

Contents [ 1 ]	Lithium ion cells and/or batteries not more than 2.7Wh [ 2 ]	Lithium ion cells more than 2.7Wh but not more than 20Wh [ 3 ]	Lithium ion batteries more than 2.7Wh but not more than 100Wh [ 4 ]
Max number of cells/batteries per package	No Limit	8cells	2batteries
Max net quantity (mass) per package	2.5 kg	n/a	n/a

Note: Items specified in columns [ 2 ], [ 3 ] and [ 4 ] above must not be combined in the same outer package.

**PI 968 Section II Lithium metal cells/batteries (Maximum Quantity per Package)**

**(Must be in Combination Packagings)**

Contents [ 1 ]	Lithium metal cells and/or batteries not more than 0.3g [ 2 ]	Lithium metal cells more than 0.3g but not more than 1g [ 3 ]	Lithium metal batteries more than 0.3g but not more than 2g [ 4 ]
Max number of cells/batteries per package	No Limit	8 cells	2 batteries
Max net quantity (mass) per package	2.5 kg	n/a	n/a

Note: Items specified in columns [ 2 ], [ 3 ] and [ 4 ] above must not be combined in the same outer package.