



## **DANGEROUS GOODS PANEL (DGP)**

### **TWENTY-EIGHTH MEETING**

**Virtual, 15 to 19 November 2021**

**Agenda Item 4: Managing safety risks posed by the carriage of lithium batteries by air (Ref: Job Card DGP.003.03)**

### **RECOMMENDATIONS TO FURTHER ENHANCE THE SAFETY IN THE TRANSPORT OF LITHIUM BATTERIES CONTAINED IN EQUIPMENT**

(Presented by P. Guo)

#### **SUMMARY**

With the growing use of lithium batteries to power various electronic devices, the global logistics industry has continued to maintain vigilance and make targeted efforts in recent years to further enhance the safety in the transport of lithium batteries by sea, land and air. Over the years, the global air cargo community has also discussed and put in place various measures to further enhance the safety in air transport of lithium batteries. This paper presents the safety enhancement measures identified by Hong Kong, China to further enhance the safety in air transport of lithium batteries contained in equipment for discussion with the local air cargo industry. Such safety enhancement measures may also be adopted by sea and land transport as appropriate.

#### **1. INTRODUCTION**

1.1 With the growing use of lithium batteries to power various electronic devices, the global logistics industry has continued to maintain vigilance and make targeted efforts in recent years to further enhance the safety in the transport of lithium batteries by sea, land and air.

1.2 On 11 April 2021 an incident occurred at the apron of Hong Kong International Airport whereby a skid of air cargo had started a fire. The investigation by the Civil Aviation Department of Hong Kong (HKCAD) concluded that there was no indication of non-compliance with the requirements of the ICAO Technical Instructions by relevant entities in relation to the air cargo documentation, packing and marking of the skid of air cargo concerned which comprised lithium ion batteries contained in equipment.

1.3 Although compliance with the Technical Instructions has been concluded, as an initiative to further enhance the safety of air transport of lithium battery products, the HKCAD had identified four possible safety enhancement measures for discussion with the local air cargo industry, including:

- a) using strong rigid materials for overpacks containing UN 3481 or UN 3091 lithium ion or metal batteries contained in equipment in compliance with Section II of Packing Instructions 967 or 970, and securing those packages within the overpack;
- b) applying fire containment bags/covers and fire resistant containers for lithium battery shipments;
- c) allowing cargo holding time for lithium battery shipments which have been subject to impact/crash; and
- d) using temperature detection devices to monitor or detect temperature of lithium battery shipments.

## 2. DISCUSSION

2.1 Based on the feedback gathered from rounds of discussion between the HKCAD and the local air cargo industry, a general consensus was reached among stakeholders that using strong rigid packaging materials for overpack on packages of lithium ion or metal batteries contained in equipment in compliance with Section II of Packing Instruction 967 or Packing Instruction 970 is a recommended practice that can result in an immediate safety enhancement in transporting such goods without introducing significant costs or procedural challenges. In this connection, nylon bags which are common packaging materials for overpacks of e-commerce shipments in Hong Kong should not be considered strong rigid if they contain packages of Section II of Packing Instruction 967 or Packing Instruction 970. Besides, these packages should be secured within the overpack. As a result, a Dangerous Goods Advisory Circular was issued by the HKCAD in August 2021 to promulgate this recommendation, a copy of which is provided in the appendix to this information paper.

2.2 As for the other three possible safety enhancement measures set out in paragraph 1.3, the implementation of additional procedures and / or the use of additional tools would necessitate further review and deliberation.

2.3 It is also noteworthy that some stakeholders are exploring the feasibility of extending the safety enhancement measure of setting a state of charge (SoC) limit on UN 3480 lithium ion batteries to UN 3481 lithium ion batteries packed with / contained in equipment following the recent fire incident. It is noted that such concept is possible and being implemented by a mobile phone manufacturer by incorporating a process in their production line to control the SoC range of the devices before final packing and shipping.

2.4 To this end, the HKCAD has discussed with the local air cargo industry and international organization representatives. It is recognized that further deliberation with the equipment manufacturers and the air cargo industry may be required in extending the SoC limit to UN3481 as a requirement; in particular, there is a need for greater coordination between manufacturers and subsequent distributors of the related products especially for large volumes of e-commerce air consignments. Being a step towards improving the safety of transporting lithium ion batteries packed with / contained in equipment, extending the SoC limit to UN 3481 warrants further evaluation. As a start, it may also be a pursuable option to

consider the extension of the SoC limit to lithium ion batteries packed with / contained in certain types of electronic device, rather than all equipment. Such safety enhancement measure may also be adopted by sea and land transport as appropriate.

2.5 The HKCAD is committed to upholding aviation safety. With Hong Kong's full implementation of the ICAO policy direction on 100% export air cargo security screening from July 2021, the x-ray screening may now serve as an additional tool to detect the presence of undeclared lithium batteries in air cargo. We will continue to work together with the stakeholders and keep in view the safety enhancement measures available to ensure the safe transport of lithium batteries by air.

### 3. ACTION BY THE DGP

3.1 The DGP is invited to:

- a) note the information contained in this information paper;
- b) recognize the growing use of lithium batteries to power various electronic devices and the efforts made by the global logistics industry to further enhance the safety in the transport of lithium batteries by sea, land and air; and
- c) share experience, challenges and considerations with regard to the safety enhancement measures to further enhance the safety in air transport of lithium batteries.

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**APPENDIX**

**DANGEROUS GOODS ADVISORY CIRCULAR ISSUED BY HKCAD ON  
RECOMMENDATIONS TO ENHANCE PACKAGING FOR LITHIUM BATTERY SHIPMENTS**





香港特別行政區政府  
民航處

**Civil Aviation Department**

**The Government of the Hong Kong Special Administrative Region**

## **Dangerous Goods Advisory Circular DGAC 2/2021**

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### **Recommendations to enhance packaging for cargo with lithium ion or metal batteries contained in equipment**

This Department (“the CAD”) noted that the packaging of certain air shipments declared to be lithium ion or metal batteries in compliance with Section II of PI967 or PI970 under the International Civil Aviation Organisation’s Technical Instructions for the Safe Transport of Dangerous Goods by Air (“ICAO TIs”) may not be able to provide adequate protection to the equipment contained therein (e.g. use of soft-padded envelopes), while it is difficult for cargo acceptance staff to determine if the equipment can afford equivalent protection to the built-in batteries. Besides, the packages concerned are often loosely placed in overpacks<sup>1</sup> of nylon bags which also contain assorted commodities and are shipped in bulk.

2. In this connection, the CAD hereby introduces two recommendations for adoption by the air cargo industry in addition to the requirements stipulated under the ICAO TIs. When an overpack is used for packages prepared in accordance with Section II of PI967 or PI970 –

- i. the packaging materials for the overpack should be **strong rigid** (e.g. carton box of adequate strength). **Nylon bags alone should not be considered as strong rigid** (see Figure 1A). They may only be used as an extra layer of protection for strong rigid overpacks of PI 967 and PI 970 Section II lithium battery shipments (see Figure 1B);

and

- ii. the packages concerned should be **secured within the overpack** in order to provide further assurance on the protection of the lithium ion or metal batteries contained in equipment therein (see Figure 1C).

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<sup>1</sup> The ICAO TIs defines overpack as “an enclosure used by a single shipper to contain one or more packages and to form one handling unit for convenience of handling and stowage”. A unit load device is not considered as an overpack.

3. The CAD hereby strongly urges all stakeholders in the air cargo industry especially shippers to adopt the above-mentioned enhanced packaging measures with a view to providing further protection to cargo with lithium batteries contained in equipment and ensuring aviation safety.



A.



B.



C.



D.

Figure 1. Illustration of enhanced packaging measures

#### Reminder to industry

4. In addition, the CAD would also like to remind the air cargo industry to keep up the various risk mitigating measures being taken, some of which are described below –

Shippers, freight forwarders and aircraft operators

- i. Handling lithium battery shipments with care, and preventing cargo packages from rough handling (such as impact, crush, etc.) or falling from height;



and

- ii. In case of doubt, documented clarification from the shippers about the actual contents of the shipments should be sought, and appropriate checks on such shipments should be conducted with documented evidence to demonstrate on record that due diligence has been exercised by the parties concerned.

Aircraft operators

- iii. Taking into consideration factors such as quantity of lithium battery shipments, types of lithium batteries, the risk profiles of lithium battery suppliers and their quality control systems, etc. when conducting safety risk assessment for the transport of lithium batteries;

and

- iv. Applying additional checking on certain shipments, taking into account results of the safety risk assessment and relevant quality control activities, and previous occurrence record of relevant parties, etc., as appropriate.

5. Should there be any query regarding this circular, please contact the Dangerous Goods Office at 2910 6856 or 2910 6857.

– END –

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An electronic version of this circular can be downloaded at  
<http://www.cad.gov.hk/english/DGAC.html>