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منظمة الطيران
المدني الدولي

国际民用
航空组织

Ref.: AN 11/2

To: President of the Council

From: President of the Air Navigation Commission

Subject: **Approval by the Air Navigation Commission of an amendment to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284, 2015-2016 Edition) (Council Subject No. 14.3.17)**

The Dangerous Goods Panel (DGP) has asked the Air Navigation Commission to consider incorporating amendments into the current edition of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) to address two separate safety issues. The first would introduce additional restrictions on the transport of lithium batteries. The second would forbid the transport of Catecholborane by air without State-issued approvals. The amendments were recommended by the twenty-fifth meeting of the DGP (DGP/25, Montréal, 19 to 30 October 2015) and reviewed by the Air Navigation Commission at the thirteenth meeting of its 200th Session (200-13). The Commission was asked to consider expediting the review and approval of the amendments provided in Attachments B and C as they address immediate safety concerns.

Additional restrictions on the transport by air of lithium batteries

The panel recommended that amendments introducing additional restrictions on the transport of lithium batteries be incorporated in the current edition of the Technical Instructions as they provide significant improvements to safety and should therefore not be delayed. The panel recommended that the amendments become applicable ninety days after Council approval but no earlier than 1 April 2016 to allow time for the battery industry to adjust their technical and logistical processes. The amendments are seen as an interim measure until performance-based packaging standards are developed. A summary of discussions and a brief history of events which led to the DGP/25 proposals for amendment to lithium battery provisions are provided in Attachment A. The details can be found in the DGP/25 Report on Agenda Item 5 (www.icao.int/safety/DangerousGoods/Pages/DGP25.aspx).

The Commission supports adopting these amendments with the recognition that they do provide significant improvements to safety but believes further work is needed to ensure the risks posed by lithium batteries transported as cargo by air are fully mitigated. Although work on developing performance-based packaging standards is underway and it is believed these standards will achieve a comprehensive strategy to mitigate risks, it will take time for development to be completed and implemented. As an interim measure, several entities, including airframe manufacturers, the Flight

Operations Panel (FLTOPSP) and the DGP have recommended that operators perform safety risk assessments before choosing to carry lithium ion batteries as cargo. Guidance on how to conduct and evaluate such assessment has yet to be developed and is considered essential. The ANC has requested that the FLTOPSP lead efforts in developing this material with members of the Dangerous Goods and Airworthiness Panels.

Forbidding the transport of Catecholborane by air

The panel recommended an immediate prohibition on the transport of Catecholborane without State-issued approvals based on a report of an explosion and fire involving bottles of Catecholborane two weeks after the bottles had been transported by air. There is a concern that the substance may have been incorrectly classified because of a gap in classification criteria. It would be up to the United Nations Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals to determine whether there is indeed a gap, as it is the responsibility of this group to establish classification criteria for dangerous goods for all modes of transport. Accordingly, the issue is being raised to the Forty-eighth session of the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods. In the meantime, DGP/25 has recommended that a prohibition be implemented immediately.

The Commission supports this amendment and agrees it should be incorporated in the current edition of the Technical Instructions. Although further investigation by the UN Sub-Committee is needed, the known risks to transport by air cannot be ignored.

Conclusion

The proposed amendments to the Technical Instructions are forwarded for approval under your delegated authority. In keeping with the dangerous goods fast track procedure approved by the Council (C-DEC 187/8), once approved, an addendum to the Technical Instructions containing the amendment will be published.

In accordance with the procedure, should you approve the English language version of the amendment under delegated authority, the amendment in English, Chinese, French, Russian and Spanish, would then be distributed to Council Representatives who could, prior to a specified date, request discussion of the issue at the next available opportunity.



Farid Zizi

Enclosures:

- A — Background information and summary of discussions on DGP/25 proposals
- B — Proposed amendments to provisions related to lithium batteries in the Technical Instructions
- C — Proposed amendments to the Technical Instructions to forbid the transport of Catecholborane by air

ATTACHMENT A

BACKGROUND INFORMATION AND SUMMARY OF DISCUSSIONS ON DGP/25 PROPOSALS

1. ADDITIONAL RESTRICTIONS ON THE TRANSPORT BY AIR OF LITHIUM BATTERIES

1.1 Background

1.1.1 The twenty-fourth meeting of the Dangerous Goods Panel (DGP/24, Montréal, 28 October to 8 November 2013) recommended a prohibition on the transport of lithium metal batteries for transport as cargo on passenger aircraft. It was introduced into the current edition of the Technical Instructions following ANC and Council approval (C-DEC 201/3). At that time the risks posed by lithium metal batteries were considered to be greater than the risks posed by lithium ion batteries because cargo fire suppression systems (including Halon) could not control a lithium metal fire.

1.1.2 Since that time, additional testing at the Federal Aviation Administration (FAA) William J. Hughes Technical Center has identified that current cargo compartment fire protection systems are unable to suppress or extinguish a fire involving significant quantities of lithium ion batteries. This has led two major airframe manufacturers (Airbus SAS and the Boeing Company) to issue notices to operators warning them of these risks. Both manufacturers support prohibiting the carriage of high-density packages of lithium ion batteries on passenger aircraft until such time as safer methods of transport are implemented. They recommend that operators who choose to carry lithium batteries by air conduct a safety risk assessment.

1.1.3 A third International Multidisciplinary Lithium Battery Transport Coordination meeting was held in Montréal from 28 to 30 July 2015. The meeting developed high-level criteria as a basis for the development of detailed performance-based packaging standards. The meeting recommended that an external group develop the detailed performance standards. Accordingly, SAE is being requested to address the issue. Recognizing that the development of performance standards would take time to develop, the multidisciplinary meeting made interim recommendations including a recommendation for operators to perform safety risk assessments to establish if they could manage the risks associated with the transport of lithium batteries on aircraft to an acceptable level of safety, transporting lithium ion batteries at a reduced state of charge, and instituting cargo loading controls such as limiting the number of batteries loaded in one place and segregating them from other dangerous goods.

1.1.4 Formal proposals to ban the transport of lithium ion batteries as cargo on passenger aircraft and to eliminate provisions for excepted batteries were submitted to DGP/25. The Second Meeting of the Flight Operations Panel (FLTOPSP/2, Montréal, 12 to 16 October 2015) was informed of the outcome of the three International Multidisciplinary Lithium Battery Transport Coordination meetings and provided background information on the DGP/25 proposals. FLTOPSP/2 developed a position stating that lithium batteries should not be transported as cargo unless acceptable criteria were identified to carry out appropriate safety risk management activities to ensure their safe carriage. The statement was reached by consensus with a number of members forming the opinion that an outright ban on the transport of lithium batteries as cargo on passenger aircraft should be imposed until a safe method of transport was established.

1.2 DGP/25 recommendation

1.2.1 A number of panel members supported the proposal to ban the transport of lithium ion batteries as cargo on passenger aircraft as a temporary measure until appropriate performance-based standards were developed and implemented. In the absence of such standards, these members believed a ban was the only way to achieve an acceptable level of safety. The majority of members believed that additional mitigation measures developed at DGP/25 would allow for the continued and safe transport of lithium batteries until performance standards were developed. They believed that a ban would result in an increase in undeclared shipments and that this would be a risk to safety. They also believed it should be up to each operator to determine whether they could mitigate the risks to an acceptable level based on their own unique assessment.

1.2.2 A number of panel members also supported the elimination of provisions for “excepted” batteries. They believed that the exceptions from the requirements provided by Section II of Packing Instructions 965 and 968 — including from the requirements to provide a dangerous goods transport document, perform an operator acceptance check, and notify the pilot in command of the shipment — made it impossible for operators to perform an effective safety risk analysis. Information related to the types and quantities of lithium batteries and cells being transported as cargo in accordance with Section II were considered to be essential components of an effective safety risk assessment. Operators who chose to transport lithium batteries would be unable to apply effective risk mitigation measures without this information. The majority opposed eliminating Section II as they recognized a need for individuals and retailers to transport “one or two” batteries through e-commerce and believed these small quantities posed minimal risk and should therefore not be subject to full regulation. While they agreed a method needed to be established to ensure shippers could not abuse the benefits of the exceptions from full regulation, they feared that removing the exceptions would result in an increase in undeclared shipments. They thought an alternate approach to preventing high-density shipments would be more appropriate.

1.2.3 As an alternate approach, the panel developed mitigation measures which would apply to all batteries, fully regulated and excepted, on both passenger and cargo aircraft. These were:

- a) requiring all batteries to be shipped at a 30 per cent state of charge;
- b) limiting the number of packages of “excepted” batteries that a shipper could send per consignment to one; and
- c) limiting the number of packages containing “excepted” batteries placed in an overpack to one.

1.2.4 It was reported that some batteries needed to be shipped at higher states of charge to remain functionally viable. Provisions to allow for shipping batteries at a higher state of charge under an approval issued by the State of the Operator and the State of Origin were therefore developed.

1.2.5 The battery industry indicated that reducing the state of charge for all batteries would be a complicated logistical process that would take some time to implement. However, there was consensus among panel members that the benefits to safety these measures would provide warranted an early implementation date. The panel recommended that ninety days after Council approval but not earlier than 1 April 2016 would be appropriate.

1.2.6 All panel members agreed that these measures would provide a significant improvement to safety on both passenger and cargo aircraft, although several did not believe they would provide an acceptable level of safety.

2. **FORBIDDING THE TRANSPORT OF
CATECHOLBORANE BY AIR**

2.1 DGP/25 was informed of an incident involving Catecholborane (also known as 1, 3, 2-Benzodioxaborole) which resulted in an industry recommendation to forbid transport of the substance by air unless transported in pressure receptacles and under cooled conditions. The incident occurred after transport of the substance from Asia to Europe was delayed for nine days as the result of extreme weather conditions with temperatures consistently above 33°C. After being stored for approximately two weeks at a low temperature at the destination, several bottles containing the substance exploded and caught fire. It was concluded that moist air entered the bottles during the long transit time under high temperatures causing a chemical reaction and pressure build up. Panel members suspected a classification problem, but whether this was due to shipper error or a limitation in the classification criteria in the regulations remained to be determined. It was reported that several manufacturers had classified the substance the same way and that these were highly experienced, conscientious manufacturers. Recognizing the potential threat to safety, the panel recommended that an amendment forbidding transport of the substance by air without State-issued approvals be incorporated in the 2015-2016 Edition of the Technical Instructions by way of an addendum.

ATTACHMENT B

PROPOSED AMENDMENTS TO PROVISIONS RELATED TO LITHIUM BATTERIES IN THE TECHNICAL INSTRUCTIONS

Packing Instruction 965

Passenger and cargo aircraft for UN 3480

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IA. SECTION IA

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

4IA.1 General requirements

— Part 4;1 requirements must be met.

— Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity. Cells and/or batteries at a state of charge greater than 30 per cent of their rated capacity may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.

Note.— Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria.

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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).

— Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity. Cells and/or batteries at a state of charge greater than 30 per cent of their rated capacity may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.

Note.— Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria.

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II. SECTION II

With the exception of Part 1;2.3 (General — Transport of dangerous goods by post), 5;1.1 g) and j) (Shipper's responsibilities — General requirements), 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents), 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium ion cells and batteries offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

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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).

— Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity.

Note.— Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria.

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Packing Instruction 965

II.2 Additional requirements

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- A shipper is not permitted to offer for transport more than one package prepared according to this section in any single consignment.
- The words "lithium ion batteries, in compliance with Section II of PI965" must be placed on the air waybill, when an air waybill is used.
- Packages and overpacks of lithium ion batteries prepared in accordance with the provisions of Section II must be offered to the operator separately from cargo which is not subject to these Instructions 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.

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II.4 Overpacks

Not more than one package prepared in accordance with this section may be placed into an overpack. When the packages ~~are~~ is 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".

Note.— For the purpose of Section II, an overpack is an enclosure used by a single shipper that contains no more than one package prepared in accordance with this section. For shipments prepared in accordance with Section IA and/or IB, this limit of one package of Section II batteries per overpack still applies.

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Packing Instruction 968

Cargo aircraft only for UN 3090

II. SECTION II

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II.2 Additional requirements

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- A shipper is not permitted to offer for transport more than one package prepared according to this section in any single consignment.
- The words "lithium metal batteries, in compliance with Section II of PI968 — cargo aircraft only" or "lithium metal batteries, in compliance with Section II of PI968 — CAO" must be placed on the air waybill, when an air waybill is used.
- ~~Consignments~~ Packages and overpacks 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~~ be offered to the operator separately from cargo which is not subject to these Instructions 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.

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II.4 Overpacks

Not more than one package prepared in accordance with this section may be placed into an overpack. When ~~the packages are~~ is 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".

Note.— For the purpose of Section II, an overpack is an enclosure used by a single shipper that contains no more than one package prepared in accordance with this section. For shipments prepared in accordance with Section IA and/or IB, this limit of one package of Section II batteries per overpack still applies.

ATTACHMENT C

PROPOSED AMENDMENTS TO THE TECHNICAL INSTRUCTIONS TO FORBID THE TRANSPORT OF CATECHOLBORANE BY AIR

Part 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

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Chapter 2

ARRANGEMENT OF THE DANGEROUS GOODS LIST (TABLE 3-1)

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Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
<u>Catecholborane</u>						<u>A210</u>						
<u>1.3.2-Benzodioxaborole</u>						<u>A210</u>						

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Chapter 3

SPECIAL PROVISIONS

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Table 3-2. Special provisions

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A210 This substance is forbidden for transport by air. It may be transported on cargo 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.

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