International Civil Aviation Organization

DGP-WG/19-WP/5
27/2/19

WORKING PAPER

DANGEROUS GOODS PANEL (DGP)
WORKING GROUP MEETING (DGP-WG/19)

Montréal, 1 to 5 April 2019

Agenda Item 2: Managing air-specific safety risks and identifying anomalies

2.2: Develop proposals, if necessary, for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2021-2022 Edition

2.3: Develop proposals, if necessary, for amendments to the *Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284SU) for incorporation in the 2021-2022 Edition

ALLOWANCE IN PACKING INSTRUCTION 910 FOR THE USE OF LARGE PACKAGINGS

(Presented by D. Brennan)

SUMMARY

This working paper proposes that consideration be given to making allowance in Packing Instruction 910 for large prototype and low production run lithium batteries that have not passed the UN 38.3 tests to be shipped in large packagings.

Action by the DGP-WG: The DGP-WG is invited to consider the amendment to Packing Instruction 910 of the Supplement and consequential changes to the Supplement and Technical Instructions as shown in Appendix A and Appendix B to this working paper.

1. INTRODUCTION

1.1 At the eighteenth working group meeting of the Dangerous Goods Panel (DGP-WG/18, Montréal, 1 to 5 October 2018), a proposal was presented to include an allowance for large packagings into Packing Instruction 910, which applies to pre-production prototype or low-production run lithium cells and batteries (DGP-WG/18-WP/14) refers. In the discussion of the working paper a number of inconsistencies between the proposed provisions and the provisions for large packagings in Part S-4;13 of the Supplement were noted. There was also question on the application of large packagings for large lithium batteries shipped under an approval per Special Provision A99. Consequently, the proposal was not agreed.

1.2 This working paper again proposes that large packagings be specifically permitted to be approved for use by the authority approving the transport of these lithium cells or batteries, and that large packagings be included into Packing Instruction 910. It also proposes to address the text in Part S-4;13 of the Supplement to remove the inconsistency, and to make allowance for large lithium ion and lithium metal batteries shipped under an approval in accordance with Special Provision A99 where the battery has a mass in excess of 400 kg.

1.3 As identified in the original working paper presented at DGP-WG/18, there are many large lithium ion batteries that are shipped under the provisions of Special Provision A88 where the mass of the battery exceeds the allowance for being shipped in a “packaging” and where instead they must be in a large packaging as the net mass of the battery may exceed 400 kg. This is particularly the case for prototype or low production automotive batteries.

1.4 An example of a large packaging that has been approved for use with large automotive prototype lithium ion batteries is shown in Appendix C to this working paper. This particular packaging includes an aerosol extinguishing system and cushioning material to provide additional protection against fire.

1.5 The UN Model Regulations, and by extension ADR and the IMDG Code, do provide for the use of large packagings for prototype and low production run lithium batteries through the assignment of LP 907 for these batteries. So, while large packagings are not referenced in P910 in the UN Model Regulations, this is because the UN Model Regulations includes a specific large packagings packing instruction, LP905.

1.6 In addition, while preparing this working paper it was identified that unlike the approvals under Special Provisions A1 and A2, which require approval of both the States of Origin and of the Operator, Special Provisions A88 and A99 only requires approval from the State of Origin. It is believed that this is not consistent with the philosophy of Annex 19 – *Safety Management Systems* where it is the operator that should undertake the appropriate safety risk assessment on the carriage of prototype lithium batteries. For this reason, it is also proposed to revise Special Provisions A88 and A99 to include a requirement for the approval of the State of the Operator in addition to that of the State of Origin.

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to considered revision of Packing Instruction 910 in the Supplement to make specific allowance for large packagings as shown in the appendix to this working paper. The DGP-WG is also invited to consider revision to the Supplement to include a new special provision to address large lithium batteries approved for transport under Special Provision A99 to reference the large packagings proposed to be permitted in Packing Instruction 910 and to revise Special Provisions A88 and A99 to include approval of the State of the Operator.

APPENDIX A

PROPOSED AMENDMENT TO PART 3 OF THE TECHNICAL INSTRUCTIONS

Part 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

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Chapter 3

SPECIAL PROVISIONS

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Table 3-2. Special provisions

TIs	*UN*	
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A88		Pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low production runs (i.e. annual production runs consisting of not more than 100 lithium batteries or cells) of lithium batteries or cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN Manual of Tests and Criteria may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the State of the Operator and the requirements in Packing Instruction 910 of the Supplement are met. A copy of the document of approval including the quantity limitations must accompany the consignment. Transport in accordance with this special provision must be noted on the dangerous goods transport document. Irrespective of the limit specified in column 13 of Table 3-1, the battery or battery assembly as prepared for transport may have a mass exceeding 35 kg.
. . .		
A99		Irrespective of the quantity limits for cargo aircraft specified in column 13 of Table 3-1, and in Section I of Packing Instructions 965, 966, 967, 968, 969 and 970, a lithium battery or battery assembly (i.e. UN 3090 or UN 3480), including when packed with equipment or contained in equipment (i.e. UN 3091 or UN 3481) that meets the other requirements of Section I of the applicable packing instruction, may have a mass exceeding 35 kg, if approved by the appropriate authority of the State of Origin and the State of the Operator. A copy of the document of approval must accompany the consignment.
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APPENDIX B

PROPOSED AMENDMENT TO PART S-3 OF THE SUPPLEMENT TO THE TECHNICAL INSTRUCTIONS

Part S-3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND QUANTITY LIMITATIONS

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Chapter 4

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SUPPLEMENTARY DANGEROUS GOODS LIST

Classes 3 to 9

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Table S-3-1. Supplementary Dangerous Goods List (Classes 3 to 9)

									Passenger aircraft		Cargo aircraft	
Name	*UN No.*	*Class or division*	*Subsidiary hazard*	*Labels*	*State variations*	*Special provisions*	*UN packing group*	*Excepted quantity*	*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*
. . .												
Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous — Lithium batteries	US 3	A88 A99 A154 A164 A183 A201 A206 A213 A331 A334 A3XX		E0	FORBIDDEN		See 965	
Lithium metal batteries (including lithium alloy batteries)	3090	9		Miscellaneous — Lithium batteries		A88 A99 A154 A164 A183 A201 A206 A213 A331 A334 A3XX		E0	FORBIDDEN		See 968	
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Chapter 6

SPECIAL PROVISIONS

Table S-3-4. Special Provisions

Supplementary special provisions

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A3XX	Large lithium batteries or battery assemblies approved in accordance with Special Provision A99 may be shipped in large packagings as shown in Packing Instruction 910 if approved by the appropriate authority of the States of Origin and of the Operator.

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Chapter 13

LARGE PACKAGINGS

Note.— This chapter has no corresponding chapter in the Technical Instructions.

13.1 GENERAL

Large packagings may be used for the transport of articles in accordance with the provisions of this chapter only when the following conditions are met:

a) transport is on cargo aircraft only;

b) approval of the appropriate authority of the State of Origin and the State of the Operator is obtained; and

c) there is a specific allowance for the use of large packagings provided for in Table S-3-4 or S-4 or the value indicated in column 13 of Table 3-1 of the Technical Instructions shows “no limit”.

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Part S-4

PACKING INSTRUCTIONS

(ADDITIONAL INFORMATION FOR PART 4 OF THE TECHNICAL INSTRUCTIONS)

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Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

Packing Instruction 910

Cargo aircraft only

Introduction

This instruction applies to UN Nos. 3090, 3091, 3480 and 3481 annual production runs consisting of not more than 100 cells or batteries and to pre-production prototypes of cells or batteries when these prototypes are transported for testing.

General requirements

Part 4, Chapter 1 requirements of the Technical Instructions must be met.

Unless specifically provided for lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity.

ADDITIONAL PACKING REQUIREMENTS

— Packagings, including large packagings, must meet the Packing Group I performance requirements.
— Cells and batteries must be protected against short circuit. Protection against short circuits includes, but is not limited to:

  — individual protection of the battery terminals;
  — inner packaging to prevent contact between cells and batteries;
  — batteries with recessed terminals designed to protect against short circuits; or
  — the use of an electrically non-conductive and non-combustible cushioning material to fill empty space between the cells or batteries in the packaging.

Cells and batteries, including when packed with equipment

1) Batteries and cells, including equipment, of different sizes, shapes or masses must be packaged in an outer packaging of a tested design type listed below provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested. Rigid large packagings, as shown below, are permitted for a single battery, including when packed with equipment;
2) Each cell or battery must be individually packed in an inner packaging and placed inside an outer packaging;
3) Each inner packaging must be completely surrounded by sufficient non-combustible and electrically non-conductive thermal insulation material to protect against a dangerous evolution of heat;
4) Appropriate measures must be taken to minimize the effects of vibration and shocks and prevent movement of the cells or batteries within the package that may lead to damage and a dangerous condition during transport. Cushioning material that is non-combustible and electrically non-conductive may be used to meet this requirement;
5) Non-combustibility must be assessed according to a standard recognized in the State where the packaging is designed or manufactured;
6) A cell or battery with a net mass of more than 30 kg must be limited to one cell or battery per outer packaging.

Cells and batteries contained in equipment

1) Equipment of different sizes, shapes or masses must be packed in an outer packaging of a tested design type listed below provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;
2) The equipment must be constructed or packaged in such a manner as to prevent accidental operation during transport;
3) Appropriate measures must be taken to minimize the effects of vibration and shocks and prevent movement of the equipment within the package that may lead to damage and a dangerous condition during transport. When cushioning material is used to meet this requirement it must be non-combustible and electrically non-conductive; and
4) Non-combustibility must be assessed according to a standard recognized in the State where the packaging is designed or manufactured.

Equipment or batteries not subject to Part 6 of these Instructions

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 packed in strong outer packagings or protective enclosures not subject to the requirements of Part 6 of these Instructions under conditions specified by the appropriate national authority. Additional conditions that may be considered in the approval process include, but are not limited to:

1) The equipment or the battery must be strong enough to withstand the shocks and loadings normally encountered during transport, including trans-shipment between cargo transport units and between cargo transport units and warehouses as well as any removal from a pallet for subsequent manual or mechanical handling; and

2) The equipment or the battery must be fixed in cradles or crates or other handling devices in such a way that it will not become loose during normal conditions of transport.

OUTER PACKAGINGS

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

RIGID LARGE PACKAGINGS

Aluminium (50B)
Fibreboard (50G)
Natural wood (50C)
Other metal (50N)
Plastics (50H)
Plywood (50D)
Reconstituted wood (50F)
Steel (50A)

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APPENDIX C

EXAMPLE OF A LARGE PACKAGING APPROVED FOR LARGE LITHIUM ION BATTERIES

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