International Civil Aviation Organization

DGP-WG/21-WP/19
30/4/21

WORKING PAPER

DANGEROUS GOODS PANEL (DGP)
WORKING GROUP MEETING (DGP-WG/21)

Virtual Meeting, 24 to 28 May 2021

Agenda Item 1: Harmonizing ICAO dangerous goods provisions with UN Recommendations on the Transport of Dangerous Goods

1.3: 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 2023-2024 Edition

DRAFT AMENDMENTS TO THE SUPPLEMENT TO THE TECHNICAL INSTRUCTIONS TO ALIGN WITH THE UN RECOMMENDATIONS

(Presented by the DGP Working Group on UN Harmonization)

SUMMARY

This working paper contains draft amendments to the Supplement to the Technical Instructions to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals at its ninth session (Geneva, 11 December 2020).

Action by the DGP-WG: The DGP-WG is invited to agree to the draft amendments in this working paper.

Part S-3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND QUANTITY LIMITATIONS

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Chapter 2

SUPPLEMENTARY DANGEROUS GOODS LIST

Name	UN No.	Class or division	Subsidiary hazard	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		6	7	8	9	10	11	12	13

UN Model Regulations, Chapter 3.2, dangerous goods list (see ST/SG/AC.10/48/Add.1)

DGP-WG/Harmonization noted that the existing maximum net quantity per package permitted on cargo aircraft would limit the article to 150 kg based on the definition of "net quantity", which is the net weight of the article rather than just the mass of the non-flammable, non-toxic gas contained in the article. Some articles, such as such as magnetic resonance imaging or transformers can potentially weigh more than 150 kg. Because these articles can only be transported with an approval, the weight limit would have to be taken into consideration through the approval process. DGP-WG/UN Harmonization therefore proposes replacing the existing quantity limit with "No limit".

Articles containing non-flammable, non toxic gas, n.o.s.*	3538	2.2	See 2;0.6			A2 A333 A335			FORBIDDEN		221	~~150 kg~~No limit

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Chapter 6

SPECIAL PROVISIONS

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Table S-3-4. Special Provisions

Supplementary special provisions

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UN Model Regulations, Chapter 3.3, SP 396 (see ST/SG/AC.10/48/Add.1)
A335 (396) Large and robust articles may be transported with connected gas cylinders with the valves open regardless of Part 4;4.1.1.5 of the Technical Instructions provided: a) the gas cylinders contain nitrogen of UN 1066 or compressed gas of UN 1956 or compressed air of UN 1002; b) the gas cylinders are connected with the article through pressure regulators and fixed piping in such a way that the pressure of the gas (gauge pressure) in the article does not exceed 35 kPa (0.35 bar); c) the gas cylinders are properly secured so that they cannot move in relation to the article and are fitted with strong and pressure resistant hoses and pipes; d) the gas cylinders, pressure regulators, piping and other components are protected from damage and impacts during transport by wooden crates or other suitable means; and e) the transport document includes a statement indicating that transport is in accordance with this special provision.

The text adopted in the UN Model Regulations relates to cargo transport units, i.e.

> cargo transport units containing articles transported with cylinders with open valves containing a gas presenting a risk of asphyxiation are well ventilated and are marked in accordance with 5.5.3.6.

DGP-WG/UN Harmonization considered this text to be irrelevant to air transport but agreed that operators needed to be alerted of the asphyxiation *hazard* from gas contained in cylinders with open valves. DGP-WG/UN Harmonization proposes the following text, which includes replacement of "risk" used in the UN text with "hazard":

f) operators must be made aware when the gas contained in the gas cylinder poses an asphyxiation hazard so that the appropriate precautions can be taken.

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Chapter 4

CLASS 2 — GASES

UN Model Regulations, 4.1.4.1, P200(5) (see ST/SG/AC.10/48/Add.1)

DGP-WG/UN Harmonization identified the need for a holistic review of Packing Instruction 200 contained in the Technical Instructions. Aligning the changes to the 21st revised edition of the UN Model Regulations was therefore deemed to be premature.

Packing Instruction 200

For cylinders, the general packing requirements of 4;1.1 and 4;4.1.1 must be met.

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6) "Special packing provisions":

Material compatibility

a) Aluminium alloy cylinders are forbidden.
b) Copper valves are forbidden.
c) Metal parts in contact with the contents must not contain more than 65 per cent copper.
d) When steel cylinders or composite cylinders with steel liners are used, only those bearing the "H" mark in accordance with 6;5.2.7.4 p) are permitted.

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z) The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.

The test pressure and filling ratio must be calculated in accordance with the relevant requirements of PI 200.

For cylinders containing pyrophoric gases or flammable mixtures of gases containing more than 1 per cent pyrophoric compounds, the requirements of special packing provision "q" shall be met.

The necessary steps must be taken to prevent dangerous reactions (i.e. polymerization or decomposition) during transport. If necessary, stabilization or addition of an inhibitor may be required.

Note.— For the carriage of oxygen to provide life support to aquatic animals, see Note 7 of the Introductory Notes to this Part.

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UN Model Regulations, 4.1.4.1, P208 (1)(a) and (11) (see ST/SG/AC.10/48/Add.1)

Packing Instruction 219

For cylinders, the general packing requirements of 4;1.1 and 4;4.1.1 must be met.

This Instruction applies to Class 2 adsorbed gases.

1) The following packagings are permitted provided the general packing requirements of 4.1.1 are met:

   Cylinders specified in 6;5 and in accordance with ISO 11513:2011, ISO 11513:2019, ~~or~~ ISO 9809-1:2010 or ISO 9809-1:2019.

2) The pressure of each filled cylinder must be less than 101.3 kPa at 20°C and less than 300 kPa at 50°C.

3) The minimum test pressure of the cylinder is 21 bar.

4) The minimum burst pressure of the cylinder is 94.5 bar.

5) The internal pressure at 65°C of the filled cylinder must not exceed the test pressure of the cylinder.

6) The adsorbent material must be compatible with the cylinder and must not form harmful or dangerous compounds with the gas to be adsorbed. The gas in combination with the adsorbent material must not affect or weaken the cylinder or cause a dangerous reaction (e.g. a catalyzing reaction).

7) The quality of the adsorbent material must be verified at the time of each fill to assure the pressure and chemical stability requirements of this packing instruction are met each time an adsorbed gas package is offered for transport.

8) The adsorbent material must not meet the criteria of any of the classes or divisions in these Instructions.

9) The filling procedure must be in accordance with Annex A of ISO 11513:2011 (applicable until 31 December 2024) or Annex A of ISO 11513:2019.

10) The maximum period for periodic inspections is five years.

11) The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.

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Chapter 8

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

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UN Model Regulations, 4.1.4.1, P622, Additional requirement (1) (see ST/SG/AC.10/48/Add.1)

Packing Instruction 622

Cargo aircraft only for UN 3549 only

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ADDITIONAL PACKING REQUIREMENTS

- Outer packaging must meet Packing Group I performance requirements for solids.
- Fragile articles must be contained in either a rigid inner packaging or a rigid intermediate packaging.
- Inner packagings containing sharp objects such as broken glass and needles must be rigid and resistant to puncture.
- The inner packaging, the intermediate packaging, and the outer packaging must be capable of retaining liquids. Outer packagings that are not capable of retaining liquids by design must be fitted with a liner or suitable measure of retaining liquids.
- The inner packaging and/or the intermediate packaging may be flexible. When flexible packagings are used, they must be capable of passing the impact resistance test ~~to~~ of at least 165 g according to ISO 7765-1:1988 *Plastics film and sheeting — Determination of impact resistance by the free-falling dart method — Part 1: Staircase methods* and the tear resistance test ~~to~~ of at least 480 g in both parallel and perpendicular planes with respect to the length of the bag in accordance with ISO 6383-2:1983 *Plastics — Film and sheeting — Determination of tear resistance — Part 2: Elmendorf method*. The maximum net mass of each flexible inner packaging must be 30 kg.
- Each flexible intermediate packaging must contain only one inner packaging.
- Inner packagings containing a small amount of free liquid may be included in intermediate packaging provided that there is sufficient absorbent or solidifying material in the inner or intermediate packaging to absorb or solidify all the liquid content present. Suitable absorbent material which withstands the temperatures and vibrations liable to occur under normal conditions of transport must be used.
- Intermediate packagings must be secured in outer packagings with suitable cushioning and/or absorbent material.

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Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

Packing Instruction 910

Cargo aircraft only

Introduction

This packing 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.

Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity unless a higher state of charge is specifically approved by the States of Origin and the State of the Operator.

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Packagings not subject to Part 6 of the Technical Instructions

The equipment or batteries may be packed in outer packagings or protective enclosures not subject to the requirements of Part 6 of the Technical 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 unit load devices and between unit load devices and warehouses as well as any removal from a pallet or unit load device 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.

UN Model Regulations, 4.1.4.1, P910 (3) (see ST/SG/AC.10/48/Add.1)

Note.— The packagings authorized may exceed a net mass of 400 kg (see 2.3).

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Packing Instruction 974

Cargo aircraft only

Introduction

This packing instruction applies to UN Nos. 3090, 3091, 3480 and 3481 where the lithium cell or battery has a mass exceeding 35 kg.

General requirements

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Packagings not subject to Part 6 of the Technical Instructions

Lithium cells or batteries employing a strong, impact resistant outer casing may be transported:

1) in strong outer packagings;

2) in protective enclosures (e.g. in fully enclosed or wooden slatted crates); or

3) on pallets or other handling devices.

Cells or batteries must be secured to prevent inadvertent movement and the terminals must not support the weight of other superimposed elements.

UN Model Regulations, 4.1.4.1, P903 (see ST/SG/AC.10/48/Add.1)

Note.— The packagings authorized may exceed a net mass of 400 kg (see 2.3).

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