International Civil Aviation Organization

DGP-WG/25-WP/20
14/3/25

WORKING PAPER

DANGEROUS GOODS PANEL (DGP) WORKING GROUP MEETING (DGP-WG/25)

Delhi, India, 21 to 25 April 2025

Agenda Item 1: Harmonizing ICAO dangerous goods provisions with UN Recommendations on the Transport of Dangerous Goods (REC-A-DGS-2027)

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 2027-2028 Edition

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

(Presented by the Secretary)

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 twelfth session (Geneva, 6 December 2024).

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 3
SUPPLEMENTARY DANGEROUS GOODS LIST
Class 2

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Table S-3-1. Supplementary Dangerous Goods List (Class 2)

Name	*UN No.*	*Class or division*	*Sub-sidiary hazard*	*Labels*	*State varia-tions*	*Special provi-sions*	*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.10/52/Add.1)												
Ethylene oxide	1040	2.3	2.1 8	Gas toxic & Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2 A131			See 210		See 210	
Ethylene oxide with nitrogen up to a total pressure of 1 MPa at 50ºC	1040	2.3	2.1 8	Gas toxic & Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2			FORBIDDEN		FORBIDDEN	
Ethylene oxide and carbon dioxide mixture with more than 9% but not more than 87% ethylene oxide	1041	2.1	8	Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1		E0	(200)	(5 kg)	200	25 kg
Ethylene oxide and carbon dioxide mixture, with more than 87% ethylene oxide	3300	2.3	2.1 8	Gas toxic & Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3 US 4	A2			See 210		See 210	
Petroleum gases, liquefied	1075	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A237		E0	(200)	(5 kg)	200	150 kg
Hydrocarbon gas mixture, liquefied, n.o.s.*	1965	2.1		Gas flammable	AU 1 CA 7 IR 3 NL 1 US 3	A1 A237		E0	(200)	(5 kg)	200	150 kg
Heating machines containing flammable, non-toxic, liquefied gas	3358	2.1		Gas flammable		A103			FORBIDDEN		FORBIDDEN	
Refrigerating machines containing flammable, non-toxic, liquefied gas	3358	2.1		Gas flammable		A103			FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Sub-sidiary hazard	Labels	State varia-tions	Special provi-sions	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*
Articles containing non-flammable, non toxic gas, n.o.s.*	3538	2.2	See 2;0.6	Gas non-flammable		A2 A88 A225 A236			FORBIDDEN		FORBIDDEN	

Chapter 4

SUPPLEMENTARY DANGEROUS GOODS LIST

Classes 3 to 9

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

Name	*UN No.*	*Class or division*	*Sub-sidiary hazard*	*Labels*	*State varia-tions*	*Special provi-sions*	*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.10/52/Add.1)												
Hydrazine, anhydrous	2029	8	3 6.1	Corrosive & Liquid flammable & Toxic	US 4	[A20]	I	E0	FORBIDDEN		854	2.5 L
5-tert-Butyl-2,4,6-trinitro-m-xylene	2956	4.1		Solid flammable			III		FORBIDDEN		FORBIDDEN	
Musk xylene	2956	4.1		Solid flammable		A300 A315	III		FORBIDDEN		FORBIDDEN	
Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous — Lithium or sodium ion batteries	US 3	A88 A99 A154 A183 A201 A213 A235		E0	FORBIDDEN		See 965	
Sodium ion batteries with organic electrolyte	3551	9		Miscellaneous — Lithium or sodium ion batteries		A88 A99 A154 A183 A201 A228 A235		E0	FORBIDDEN		See 976	
Lithium ion batteries installed in cargo transport unit lithium ion batteries or lithium metal batteries	3536	9		Miscellaneous — Lithium or sodium ion batteries		[A235]			FORBIDDEN		FORBIDDEN	
Lithium metal batteries installed in cargo transport unit	3563	9		Miscellaneous — Lithium or sodium ion batteries		[A235]			FORBIDDEN		FORBIDDEN	
Sodium ion batteries installed in cargo transport unit	3564	9		Miscellaneous — Lithium or sodium ion batteries		[A235]			FORBIDDEN		FORBIDDEN	

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Chapter 6

SPECIAL PROVISIONS

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UN Model Regulations, Chapter 3.3, SP 379 (see ST/SG/AC.10/52/Add.1):

A329 (379) Anhydrous ammonia adsorbed or absorbed on a solid contained in ammonia dispensing systems or cylinders intended to form part of such systems 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 in addition to the following:

a) the adsorption or absorption presents the following properties:

1) the pressure at a temperature of 20°C in the cylinder is less than 0.6 bar;

2) the pressure at a temperature of 35°C in the cylinder is less than 1 bar;

3) the pressure at a temperature of 85°C in the cylinder is less than 12 bar;

b) the adsorbent or absorbent material must not have dangerous properties listed in Classes 1 to 8;

c) the maximum contents of a cylinder must be 10 kg of ammonia; and

d) cylinders containing adsorbed or absorbed ammonia must meet the following conditions:

1) cylinders must be made of a material compatible with ammonia as specified in ISO 11114-1:~~2012 + A1:2017~~ 2020 + Amd 1:2023;

2) cylinders and their means of closure must be hermetically sealed and able to contain the generated ammonia;

3) each cylinder must be able to withstand the pressure generated at 85°C with a volumetric expansion no greater than 0.1%;

4) each cylinder must be fitted with a device that allows for gas evacuation once pressure exceeds 15 bar without violent rupture, explosion or projection; and

5) each cylinder must be able to withstand a pressure of 20 bar without leakage when the pressure relief device is deactivated.

When offered for transport in an ammonia dispenser, the cylinders must be connected to the dispenser in such a way that the assembly is guaranteed to have the same strength as a single cylinder.

The properties of mechanical strength mentioned in this special provision must be tested using a prototype of a cylinder and/or dispenser filled to nominal capacity, by increasing the temperature until the specified pressures are reached.

The test results must be documented, must be traceable and must be communicated to the relevant authorities upon request.

Part S-4

PACKING INSTRUCTIONS

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Chapter 4

CLASS 2 – GASES

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4.1 SPECIAL PACKING PROVISIONS FOR DANGEROUS GOODS OF CLASS 2

4.1.1 General requirements

4.1.1.1 This section provides general requirements applicable to the use of cylinders and closed cryogenic receptacles for the transport of Class 2 gases (such as UN 1072 **Oxygen, compressed**). Cylinders and closed cryogenic receptacles must be constructed and closed so as to prevent any loss of contents which might be caused under normal conditions of transport, including by vibration, or by changes in temperature, humidity or pressure (resulting from change in altitude, for example).

UN Model Regulations, Chapter 4.1, 4.1.6.1.2 (see ST/SG/AC.10/52/Add.1)

4.1.1.2 Parts of cylinders and closed cryogenic receptacles that are in direct contact with dangerous goods must not be affected or weakened by those dangerous goods and must not cause a dangerous effect (such as catalysing a reaction or reacting with the dangerous goods). In addition to the requirements specified in the relevant packing instruction, which take precedence, the applicable provisions of ~~ISO 11114-1:2012 + A1:2017 and ISO 11114-2:2013~~ ISO 11114-1:2020 + Amd 1:2023 and ISO 11114-2:2021 must be met.

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Packing Instruction 200

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

Cylinders, constructed as specified in 6;5 are authorized for the transport of a specific substance when specified in the following tables (Table 1 and Table 2). Cylinders other than UN marked and certified cylinders may be used if the design, construction, testing, approval and marks conform to the requirements of the appropriate national authority in which they are approved and filled. The substances contained must be permitted in cylinders and permitted for air transport according to these Instructions. Cylinders for which prescribed periodic tests have become due must not be charged and offered for transport until such retests have been successfully completed. Valves must be suitably protected or must be designed and constructed in such a manner that they are able to withstand damage without leakage as specified in Annex B of ISO 10297:1999. Cylinders with capacities of one litre or less must be packaged in outer packaging constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use, and secured or cushioned so as to prevent significant movement within the outer packaging during normal conditions of transport. For some substances, the special packing provisions may prohibit a particular type of cylinder. The following requirements must be met:

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UN Model Regulations, Chapter 4.1, 4.1.4.1, P200 (see ST/SG/AC.10/52/Add.1)

5) The filling of cylinders must be carried out by qualified staff using appropriate equipment and procedures. The procedures should include checks of:

a) the conformity of cylinders and accessories with these Instructions;
b) their compatibility with the product to be transported;
c) the absence of damage which might affect safety;
d) compliance with the ~~degree or pressure of filling~~ filling ratio or pressure of filling, as appropriate;
e) marks and identification.

These requirements are deemed to be met if the following standards are applied:

ISO 10691: 2004	Gas cylinders – Refillable welded steel cylinders for liquefied petroleum gas (LPG) – Procedures for checking before, during and after filling.
ISO 11372: 2011	Gas cylinders – Acetylene cylinders – Filling conditions and filling inspection
ISO 11755: 2005	Gas cylinders – Cylinder bundles for compressed and liquefied gases (excluding acetylene) – Inspection at time of filling
ISO 13088: 2011 + Amd 1:2020	Gas cylinders – Acetylene cylinder bundles – Filling conditions and filling inspection
ISO 24431:2016	Gas cylinders – Seamless, welded and composite cylinders for compressed and liquefied gases (excluding acetylene) – Inspection at time of filling

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Packing Instructions 854 – 856

Cargo aircraft only

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

— Inner packagings must be packed with sufficient absorbent material to absorb the entire contents of the inner packagings and placed in a rigid leakproof receptacle before packing in outer packagings.

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

UN Model Regulations, Chapter 4.1, 4.1.4.1, P001 (see ST/SG/AC.10/52/Add.1)

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

For UN 2029

When a cylinder is used, the internal pressure at 65°C must not exceed the test pressure.

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Part S-5

STATE'S RESPONSIBILITIES WITH RESPECT TO SHIPPERS

(ADDITIONAL INFORMATION FOR PART 5 OF THE TECHNICAL INSTRUCTIONS)

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Chapter 2

LABELLING

2.1 LABELS FOR ARTICLES CONTAINING DANGEROUS GOODS TRANSPORTED AS UN Nos. 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547 and 3548

UN Model Regulations, Chapter 5.2, 5.2.2.1.13.1 (see ST/SG/AC.10/52/Add.1):

2.1.1 Packages containing dangerous goods in articles and dangerous goods in articles transported unpackaged must bear labels according to 5;3.1.1 of the Technical Instructions reflecting the hazards established according to Part 2, Introductory Chapter, paragraph 6 of the Technical Instructions. If the article contains one or more lithium batteries or sodium ion batteries with, for lithium metal batteries, an aggregate lithium content of 2 g or less, and for lithium ion batteries or sodium ion batteries, a Watt-hour rating of 100 Wh or less, the ~~lithium~~ battery mark (Figure 5-3 of the Technical Instructions) must be affixed to the package or unpackaged article. If the article contains one or more lithium batteries or sodium ion batteries with, for lithium metal batteries, an aggregate lithium content of more than 2 g, and for lithium ion batteries or sodium ion batteries, a Watt-hour rating of more than 100 Wh, the Class 9 label for lithium batteries or sodium ion batteries (Figure 5-26 of the Technical Instructions) must be affixed to the package or unpackaged article.

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