



WORKING PAPER

DANGEROUS GOODS PANEL (DGP)

THIRTIETH MEETING

Montréal, 6 to 10 October 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

**AMENDMENTS TO THE SUPPLEMENT TO THE TECHNICAL INSTRUCTIONS
DEVELOPED BY DGP-WG/24 AND DGP-WG/25**

(Presented by DGP-WG/UN Harmonization)

SUMMARY

This working paper contains consolidated draft amendments to the Supplement to the Technical Instructions developed by the Working Group of the DGP in 2024 (DGP-WG/2024) and 2025 (DGP-WG/2025). The amendments:

- a) 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 to amend the 23rd revised edition of the UN Model Regulations (Geneva, 6 December 2024); and
- b) facilitate transport or state oversight; and
- c) manage aviation specific risks and address anomalies.

The DGP Working Group on UN Harmonization (DGP-WG/UN Harmonization) conducted an extensive review of the amendments to Part 3 proposed for the sake of harmonization with the UN Recommendations by DGP-WG/2025. It identified a need for the following revisions:

- a) revisions to S-4;4.1.1.8 for the sake of alignment with 4;4.1.1.8 of the Technical Instructions and the UN Model Regulations; and
- b) the addition of a provision to Chapter S-4;13 (Large Packagings) forbidding the use of specific types of large packagings when the substances being transported are liable to become liquid during transport (see S-4;13.1).

Action by the DGP: The DGP 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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See Appendices A (alphabetical order) and B (UN number order) for proposed amendments to Table 3-1.

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Chapter 6

SPECIAL PROVISIONS

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UN harmonization amendments

Paragraph 4.1.3.1 of DGP-WG/25 report:

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 harmonization amendments

Paragraph 4.1.3.1 of DGP-WG/25 report:

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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UN harmonization amendments

DGP-WG/UN Harmonization identified the need for further revisions to S-4;4.1.1.8 for the sake of alignment with 4;4.1.1.8 of the Technical Instructions and the UN Model Regulations.

UN Model Regulations, Chapter 4.1, 4.1.6.1.8 (see ST/SG/AC.10/52/Add.1)

4.1.1.8 Valves must be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or must be protected from damage, which could cause inadvertent release of the contents of the cylinder and closed cryogenic receptacle, by one of the following methods:

- a) Valves are placed inside the neck of the cylinder and closed cryogenic receptacle and protected by a threaded plug or cap;
- b) Valves are protected by caps or guards. Caps must possess vent holes of a sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;
- c) Valves are protected by shrouds or guards permanent protective attachments;
- d) Not used; or
- e) Cylinders and closed cryogenic receptacles are transported in an outer packaging. The packaging as prepared for transport must be capable of meeting the drop test specified in 6;4.3 of the Technical Instructions at the Packing Group I performance level.

For cylinders and closed cryogenic receptacles with valves as described in b) ~~and c)~~, the requirements of ISO 11117:1998, ISO 11117:2008 + Cor 1:2009 or ISO 11117:2019 must be met. ~~Requirements for valves with inherent protection, shrouds and permanent protective attachments used as valve protection under c) are given in the relevant pressure receptacle shell design standards, see 6.5.2.1. Valves with inherent protection used for refillable cylinders must meet the requirements of Annex A clause 4.6.2 of ISO 10297:2006, Annex A clause 5.5.2 of ISO 10297:2014 or Annex A, clause 5.5.2 of ISO 10297 +2014 + Amd 1-A1:2017 must be met. For cylinders and closed cryogenic receptacles with or clause 5.4.2 of ISO 10297:2024 or, in the case of self-closing valves, of clause 5.4.2 of ISO 17879:2017. For valves with inherent protection used for non-refillable cylinders, the requirements of Annex A of ISO 17879:2017 must be met. For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 or ISO 16111:2018 clause 9.2.5 of ISO 11118:2015 or of clause 9.2.5 of ISO 11118:2015 + Amd 1:2019 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 harmonization amendments

Paragraph 4.1.3.1 of DGP-WG/25 report:

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 of 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 Instruction 221

Cargo aircraft only for UN 3537 and UN 3538 only

General requirements

Part 4;1.1.1, 4;1.1.3, 4;1.1.12 and 4;2 requirements must be met.

Amendments to facilitate transport or State oversight

Paragraph 4.3.6 of DGP-WG/24 report:

This entry applies to articles which do not have an existing proper shipping name and ~~which contain only dangerous goods permitted under Part 3;4.1.2 of the Technical Instructions, and exceed both the quantity limits for UN 3363 as prescribed in Special Provision A107 and the quantity limits permitted by Special Provision 301 of the UN Model Regulations~~ which do not comply with the conditions as prescribed either in Part 2; 6.0.a) or in Part 2;6.0 b).

Amendments to facilitate transport or State oversight

Paragraph 4.2.3.2 of DGP-WG/25 report:

The following table provides the recommended maximum quantities of individual substances contained in a ~~single package or in an unpackaged~~ article.

<i>UN number and name</i>	<i>Net quantity-per package</i>
UN 3537 Articles containing flammable gas, n.o.s.*	150 kg
UN 3538 Articles containing non-flammable, non toxic gas, n.o.s.*	150 kg

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Packing Instruction 379

Cargo aircraft only for UN 3540 only

General requirements

Part 4;1.1.1, 4;1.1.3, 4;1.1.12 and 4;2 requirements must be met.

Amendments to facilitate transport or State oversight

Paragraph 4.3.6 of DGP-WG/24 report:

This entry applies to articles which do not have an existing proper shipping name and ~~which contain only dangerous goods permitted under Part 3;4.1.2 of the Technical Instructions, and exceed both the quantity limits for UN 3363 as prescribed in Special Provision A107 and the quantity limits permitted by Special Provision 301 of the UN Model Regulations~~ which do not comply with the conditions as prescribed either in Part 2; 6.0.a) or in Part 2;6.0 b).

Amendments to facilitate transport or State oversight

Paragraph 4.2.3.2 of DGP-WG/25 report:

The following table provides the recommended maximum quantities of individual substances contained in a ~~single package or in an unpackaged~~ article.

<i>UN number and name</i>	<i>Net quantity-per package</i>
UN 3540 Articles containing flammable liquid, n.o.s.*	60 L

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Packing Instruction 400

Cargo aircraft only for UN 3541 only

General requirements

Part 4;1.1.1, 4;1.1.3, 4;1.1.12 and 4;2 requirements must be met.

Amendments to facilitate transport or State oversight

Paragraph 4.3.6 of DGP-WG/24 report:

This entry applies to articles which do not have an existing proper shipping name and ~~which contain only dangerous goods permitted under Part 3;4.1.2 of the Technical Instructions, and exceed both the quantity limits for UN 3363 as prescribed in Special Provision A107 and the quantity limits permitted by Special Provision 301 of the UN Model Regulations~~ which do not comply with the conditions as prescribed either in Part 2; 6.0.a) or in Part 2;6.0 b).

Amendments to facilitate transport or State oversight

Paragraph 4.2.3.2 of DGP-WG/25 report:

The following table provides the recommended maximum quantities of individual substances contained in a ~~single package or in an unpackaged~~ article.

<i>UN number and name</i>	<i>Net quantity-per package</i>
UN 3541 Articles containing flammable solid, n.o.s.*	50 kg

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Packing Instruction 600

Cargo aircraft only for UN 3546 only

General requirements

Part 4;1.1.1, 4;1.1.3, 4;1.1.12 and 4;2 requirements must be met.

Amendments to facilitate transport or State oversight

Paragraph 4.3.6 of DGP-WG/24 report:

This entry applies to articles which do not have an existing proper shipping name and ~~which contain only dangerous goods permitted under Part 3;4.1.2 of the Technical Instructions, and exceed both the quantity limits for UN 3363 as prescribed in Special Provision A107 and the quantity limits permitted by Special Provision 301 of the UN Model Regulations~~ which do not comply with the conditions as prescribed either in Part 2; 6.0.a) or in Part 2;6.0 b).

Amendments to facilitate transport or State oversight

Paragraph 4.2.3.2 of DGP-WG/25 report:

The following table provides the recommended maximum quantities of individual substances contained in a ~~single package or in an unpackaged~~ article.

UN number and name	Net quantity per package	
	Liquid	Solid
UN 3546 Articles containing toxic substance, n.o.s.*	60 L	100 kg

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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 harmonization amendments

Paragraph 4.1.3.1 of DGP-WG/25 report:

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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Packing Instruction 877

Cargo aircraft only for UN 3547 only

General requirements

Part 4;1.1.1, 4;1.1.3, 4;1.1.12 and 4;2 requirements must be met.

Amendments to facilitate transport or State oversight

Paragraph 4.3.6 of DGP-WG/24 report:

This entry applies to articles which do not have an existing proper shipping name and ~~which contain only dangerous goods permitted under Part 3;4.1.2 of the Technical Instructions, and exceed both the quantity limits for UN 3363 as prescribed in Special Provision A107 and the quantity limits permitted by Special Provision 301 of the UN Model Regulations which do not comply with the conditions as prescribed either in Part 2; 6.0.a) or in Part 2;6.0 b).~~

Amendments to facilitate transport or State oversight

Paragraph 4.2.3.2 of DGP-WG/25 report:

The following table provides the recommended maximum quantities of individual substances contained in a ~~single package or in an unpackaged~~ article.

<i>UN number and name</i>	<i>Net quantity-per package</i>	
	<i>Liquid</i>	<i>Solid</i>
UN 3547 Articles containing corrosive substance, n.o.s.*	30 L	50 kg

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Packing Instruction 973

Cargo aircraft only for UN 3548 only

General requirements

Part 4;1.1.1, 4;1.1.3, 4;1.1.12 and 4;2 requirements must be met.

Amendments to facilitate transport or State oversight

Paragraph 4.3.6 of of DGP-WG/24 report:

This entry applies to articles which do not have an existing proper shipping name and ~~which contain only dangerous goods permitted under Part 3;4.1.2 of the Technical Instructions, and exceed both the quantity limits for UN 3363 as prescribed in Special Provision A107 and the quantity limits permitted by Special Provision 301 of the UN Model Regulations which do not comply with the conditions as prescribed either in Part 2; 6.0.a) or in Part 2;6.0 b).~~

Amendments to facilitate transport or State oversight

Paragraph 4.2.3.2 of DGP-WG/25 report:

The following table provides the recommended maximum quantities of individual substances contained in a ~~single package or in an unpackaged~~ article.

<i>UN number and name</i>	<i>Net quantity per package</i>
UN 3548 Articles containing miscellaneous dangerous goods, n.o.s.*	As indicated for the substance in Table 3-1 of the Technical Instructions

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Chapter 13

LARGE PACKAGINGS

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

13.1 GENERAL

UN harmonization amendments

DGP-WG/UN Harmonization recommends adding the following provision for the sake of alignment with the UN Model Regulations and to address a potential safety risk.

UN Model Regulations, Chapter 4.1, 4.1.3.4 and 4;2.5 of the Technical Instructions:

13.1.1 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 Part S-4 or the value indicated in column 13 of Table 3-1 of the Technical Instructions shows “no limit”.

13.1.2 The following large packagings must not be used when the substances being transported are liable to become liquid during transport:

Flexible plastics: 51H (outer packaging)

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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 harmonization amendments

Paragraph 4.1.3.1 of DGP-WG/25 report:

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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Amendments to manage aviation specific risks and address anomalies

Paragraph 4.2.2.5 of DGP-WG/25 report:

ATTACHMENT II TO CHAPTER 8

DANGEROUS GOODS MANUAL AND TRAINING PROGRAMME CHECKLISTS

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Attachment B

Dangerous Goods Training Programme – Approval Checklist

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Limitations	Applicable citations	Yes	No	N/A
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3. Dangerous goods carried by passengers or <u>and</u> crew	8;1.1			
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APPENDIX A

PROPOSED AMENDMENTS TO TABLE S-3-1 — UN NUMBER ORDER

APPENDIX B

PROPOSED AMENDMENTS TO TABLE S-3-1 — ALPHABETICAL ORDER