منظمة الطيران المدني الدولي

ورقة عمل

DGP/27-WP/14*
15/6/19

فريق خبراء البضائع الخطرة

الاجتماع السابع والعشرون

مونتريال، من ١٦ إلى ٢٠١٧/٩/٢٠

البند رقم ١ من جدول الأعمال: **مواءمة أحكام الإيكاو المتعلقة بالبضائع الخطرة مع توصيات الامم المتحدة بشان نقل البضائع الخطرة**

البند رقم ١-٢: **إعداد ما يلزم من اقتراحات لتعديل وثيقة التعليمات الفنية للنقل الآمن للبضائع الخطرة بطريق الجو (Doc 9284) لإدخالها في طبعة ٢٠٢١-٢٠٢٢**

مشروع التعديلات على التعليمات الفنية بحيث تتوافق مع توصيات الأمم المتحدة – الجزء الرابع

(مقدمة من الأمينة)

الملخص

تتضمن ورقة العمل هذه مشروع التعديلات على الجزء الرابع من التعليمات الفنية كي تعكس القرارات الصادرة عن لجنة الخبراء التابعة للأمم المتحدة والمعنية بنقل البضائع الخطرة وبالنظام المنسق عالمياً لتصنيف المواد الكيمائية ووسمها خلال دورتها التاسعة (جنيف، ٢٠١٨/١٢/٧).

ويُرجى من فريق الخبراء أن يوافق على مشروع التعديلات الوارد في ورقة العمل هذه

*تُرجم ملخص ورقة العمل فقط.

Part 4

PACKING INSTRUCTIONS

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Chapter 1

GENERAL PACKING REQUIREMENTS

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1.1 GENERAL REQUIREMENTS APPLICABLE TO ALL CLASSES EXCEPT CLASS 7

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UN Model Regulations, 4.1.1.3.1 (see ST/SG/AC.10/46/Add.1)

1.1.2 New, remanufactured, reused or reconditioned packagings which are listed in Tables 6-2 and 6-3, must meet the applicable requirements of Part 6 of these Instructions. Such packagings must be manufactured and tested under a quality assurance programme which satisfies the appropriate national authority, in order to ensure that such packagings meet those applicable requirements. Packagings may conform to one or more than one successfully tested design type and may bear more than one mark required by 6;2. Where packagings are required to be tested in accordance with 6;4, their subsequent use must be as specified in the applicable test report and conform in all respects with the design type which was tested, including the method of packing and size and type of any inner packagings, except as provided for in 1.1.10.1 or 6;4.1.7. Before being filled and handed over for transport, every packaging must be inspected to ensure that it is free from corrosion, contamination or other damage. Any packaging which shows signs of reduced strength as compared with the approved design type must no longer be used or must be so reconditioned that it is able to withstand the design type tests.

Note.— ISO 16106:2006 Packaging — Transport packages for dangerous goods — Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings — Guidelines for the application of ISO 9001 provides acceptable guidance on procedures which may be followed.

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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 (e.g. 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, 4.1.6.1.2 (see ST/SG/AC.10/46/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 (e.g. 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~~ ISO 11114-1:2012 + A1:2017 and ISO 11114-2:2013 must be met.

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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. 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;

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 at the Packing Group I performance level.

UN Model Regulations, 4.1.6.1.8 (see ST/SG/AC.10/46/Add.1)

For cylinders and closed cryogenic receptacles with valves as described in b) and c), the requirements of ISO 11117:1998 must be met; for valves with inherent protection, the requirements of ~~Annex A of ISO 10297:2006 or Annex A of ISO 10297:2014 must be met~~ Annex A of ISO 10297:2006, Annex A of ISO 10297:2014 or Annex A of ISO 10297 + A1:2017 must be met. For cylinders and closed cryogenic receptacles with self-closing valves with inherent protection, 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 must be met.

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4.2 PACKING INSTRUCTIONS

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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3) In no case must cylinders be filled in excess of the limit permitted in the following requirements:

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UN Model Regulations, P200, paragraph 3) c) (see ST/SG/AC.10/46/Add.1)

c) For low pressure liquefied gases, the maximum mass of contents per litre of water capacity ~~(filling factor)~~ must equal 0.95 times the density of the liquid phase at 50°C; in addition, the liquid phase must not fill the cylinder at any temperature up to 60°C. The test pressure of the cylinder must be at least equal to the vapour pressure (absolute) of the liquid at 65°C, minus 100 kPa (1 bar).

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

— the conformity of cylinders and accessories with these Instructions;
— their compatibility with the product to be transported;
— the absence of damage which might affect safety;
— compliance with the degree or pressure of filling, as appropriate;
— marks and identification.

UN Model Regulations, P200, paragraph 4) (see ST/SG/AC.10/46/Add.1)

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	Gas cylinders — Acetylene cylinder bundles — Filling conditions and filling inspection
ISO 24431:~~2006~~2016	Gas cylinders — Seamless, welded and composite ~~C~~cylinders for compressed and liquefied gases (excluding acetylene) — Inspection at time of filling

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Packing Instruction 218

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ADDITIONAL PACKING REQUIREMENTS

a) Cylinders must be so filled that at 50°C the non-gaseous phase does not exceed 95% of their water capacity, and they are not completely filled at 60°C. When filled, the internal pressure at 65°C must not exceed the test pressure of the cylinders. The vapour pressures and volumetric expansion of all substances in the cylinders must be taken into account.
b) Spray application equipment (such as a hose and wand assembly) must not be connected during transport.
c) The minimum test pressure must be in accordance with Packing Instruction 200 for the propellant but must not be less than 20 bar.
d) Non-refillable cylinders used may have a water capacity in litres not exceeding 1 000 litres divided by the test pressure expressed in bars provided capacity and pressure restrictions of the construction standard comply with ISO 11118:1999, which limits the maximum capacity to 50 litres.
e) For liquids charged with a compressed gas, both components — the liquid and the compressed gas — have to be taken into consideration in the calculation of the internal pressure in the cylinder. When experimental data is not available, the following steps must be carried out:

i) Calculation of the vapour pressure of the liquid and of the partial pressure of the compressed gas at 15°C (filling temperature);

ii) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15°C to 65°C and calculation of the remaining volume for the gaseous phase;

iii) Calculation of the partial pressure of the compressed gas at 65°C considering the volumetric expansion of the liquid phase;

Note.— The compressibility factor of the compressed gas at 15°C and 65°C must be considered.

iv) Calculation of the vapour pressure of the liquid at 65°C;

v) Calculation of the total pressure, which is the sum of the vapour pressure of the liquid and the partial pressure of the compressed gas at 65°C;

vi) Consideration of the solubility of the compressed gas at 65°C in the liquid phase.

The test pressure of the cylinders must not be less than the calculated total pressure minus 100 kPa (1 bar).

If the solubility of the compressed gas in the liquid phase is not known for the calculation, the test pressure can

be calculated without taking the gas solubility (sub-paragraph vi)) into account.

UN Model Regulations, P206 (PP97) (see ST/SG/AC.10/46/Add.1)

Secretariat Note.— The provision for tubes included in PP97 of the Model Regulations is not included since tubes are not permitted for transport of dangerous goods by air.

f) For fire extinguishing agents assigned to UN 3500, the maximum test period for periodic inspection must be ten years.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
	Strong outer packagings	

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Chapter 5

CLASS 3 — FLAMMABLE LIQUIDS

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Packing Instruction 372

Cargo aircraft only for UN 3165 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

ADDITIONAL PACKING REQUIREMENTS

UN 3165 **Aircraft hydraulic power unit fuel tank** (containing a mixture of anhydrous hydrazine and methyl hydrazine) (M86 fuel) and designed for installation as complete units in aircraft are acceptable, subject to either of the following conditions:

UN Model Regulations, P301 (see ST/SG/AC.10/46/Add.1)

a) the unit must consist of an aluminium pressure receptacle made from tubing and having welded heads. Primary containment of the fuel within this receptacle must consist of a welded aluminium bladder having a maximum internal volume of 46 L. The outer receptacle must have a minimum design gauge pressure of 1 275 kPa and a minimum burst gauge pressure of 2 755 kPa. Each receptacle must be leak-checked during manufacture and before shipment and must be found leakproof. The complete inner unit must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per ~~unit~~ primary containment and package is 42 L; or

b) the unit must consist of an aluminium pressure receptacle. Primary containment of the fuel within this receptacle must consist of a welded hermetically sealed fuel compartment with an elastomeric bladder having a maximum internal volume of 46 L. The pressure receptacle must have a minimum design gauge pressure of 2 860 kPa and a minimum burst gauge pressure of 5 170 kPa. Each receptacle must be leak-checked during manufacture and before shipment and must be found leakproof. The complete inner unit must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per ~~unit~~ primary containment and package is 42 L.

Note.— This packing instruction is the same as UN packing instruction P301.

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Chapter 6

CLASS 4 — FLAMMABLE SOLIDS; SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

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DGP-WG/19-WP/4 (see paragraph 3.1.2.2 of the DGP-WG/19 report):

Packing Instruction 457

Passenger and cargo aircraft for UN 3241 only

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ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS

Composites	*Drums*	*Jerricans*
Plastic receptacle with outer wooden box (6HC) Plastic receptacle with outer plywood drum (6HD1) Plastic receptacle with outer plywood box (6HD2) Plastic receptacle with outer fibre drum (6HG1) Plastic receptacle with outer fibreboard box (6HG2) Plastic receptacle with outer plastic drum (6HH1) Plastic receptacle with outer solid plastic box (6HH2)	Plastics (1H1, 1H2)	Plastics (3H1, 3H2)

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DGP-WG/19-WP/4 (see paragraph 3.1.2.2 the DGP-WG/19 report):

Packing Instructions 462 – 463

Passenger aircraft

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ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

Packagings must meet the Packing Group II performance requirements. —

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY (PI 463)

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

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DGP-WG/19-WP/4 (see paragraph 3.1.2.2 the DGP-WG/19 report):

Packing Instructions 464 – 465

Cargo aircraft only

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ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP III ONLY (PI 465)

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

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DGP-WG/19-WP/4 (see paragraph 3.1.2.2 the DGP-WG/19 report):

Packing Instructions 470 – 471

Cargo aircraft only

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ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.
— Fibreboard fibre, wood and plywood single packagings must be fitted with a suitable liner.

SINGLE PACKAGINGS

Boxes	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Fibre (1G) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

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DGP-WG/19-WP/4 (see paragraph 3.1.2.2 the DGP-WG/19 report):

Packing Instructions 478 – 479

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ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP III (PI 479 only)

Composites	*Cylinders*	*Drums*	*Jerricans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

DGP-WG/19-WP/4 (see paragraph 3.1.2.2 the DGP-WG/19 report):

Packing Instructions 480 – 482

Cargo aircraft only

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SINGLE PACKAGINGS FOR PACKING GROUP III ONLY (PI 482)

Composites	*Cylinders*	*Drums*	*Jericans*
All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

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DGP-WG/19-WP/4 (see paragraph 3.1.2.2 the DGP-WG/19 report):

Packing Instructions 487 – 491

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ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

— Fibreboard fibre, wood and plywood single packagings must be fitted with a suitable liner.

Packing Group III

— Packagings must meet the Packing Group II performance requirements

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SINGLE PACKAGINGS FOR PACKING GROUPS II AND III ONLY

Boxes	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Other metal (4N) Plastics (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

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Chapter 7

CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

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Packing Instructions 553 – 555

Cargo aircraft only

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ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

Packing Group III

— Packagings must meet the Packing Group II performance requirements.

SINGLE PACKAGINGS FOR PACKING GROUP III (PI 555)

Composites	*Drums*	*Jerricans*
All (see 6;3.1.18)	Aluminium (1B1, 1B2) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

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Chapter 8

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

DGP-WG/18-WP/4 (see paragraph 3.1.2.1 of the DGP-WG/18 report):

Packing Instruction 620

This packing instruction applies to UN 2814 and UN 2900.

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Special packing provisions

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d) Before an empty packaging is returned to the shipper, or sent elsewhere, it must be disinfected or sterilized to nullify any hazard, and any label or mark indicating that it had contained an infectious substance must be removed or obliterated.

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OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Other metal (4N) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastics (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastics (3H1, 3H2) Steel (3A1, 3A2)

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DGP-WG/19-WP/14 (see paragraph 3.1.2.6.1 d) of the DGP-WG/19 report):

Packing Instruction ~~622~~621

The general packing requirements of 4;1 except 1.1.20 must be met.

Consignments must be prepared in such a manner that they arrive at their destination in good condition and present no hazard to persons or animals during transport.

Consignments must be packed in steel drums (1A2), aluminium drums (1B2), other metal drums (1N2), plywood drums (1D), fibre drums (1G), plastic drums (1H2), steel jerricans (3A2), aluminium jerricans (3B2), plastic jerricans (3H2), steel boxes (4A), aluminium boxes (4B), wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F) or fibreboard boxes (4G), plastic boxes (4H1, 4H2), other metal boxes (4N). Packagings must meet Packing Group II requirements.

The packaging tests may be those appropriate for solids when there is sufficient absorbent material to absorb the entire amount of liquid present and the packaging is capable of retaining liquids.

In all other circumstances, the packaging tests must be those appropriate for liquids.

Packagings intended to contain sharp objects such as broken glass and needles must be resistant to puncture and retain liquids under the performance test conditions for the packaging.

Chapter 9

CLASS 7 — RADIOACTIVE MATERIAL

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9.1 GENERAL

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UN Model Regulations, 4.1.9.1.4 (see ST/SG/AC.10/46/Add.1)

9.1.4 Except as provided in 7;3.2.5, the level of non-fixed contamination on the external and internal surfaces of overpacks and freight containers, must not exceed the limits specified in 9.1.2. This requirement does not apply to the internal surfaces of freight containers being used as packagings, either loaded or empty.

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9.1.8 Before each shipment of any package, it must be ensured that all the requirements specified in the relevant provisions of these Instructions and in the applicable certificates of approval have been fulfilled. The following requirements must also be fulfilled, if applicable:

a) It must be ensured that lifting attachments which do not meet the requirements of 6;7.1.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6;7.1.3;

b) Each Type B(U), Type B(M) and Type C package must be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received unilateral approval;

c) For each Type B(U), Type B(M) and Type C package, it must be ensured by inspection and/or appropriate tests that all closures, valves, and other openings of the containment system through which the radioactive contents might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of 6;7.7.8 and 6;7.9.3 were made;

d) For packages containing fissile material, the measurement specified in 6;7.10.5 b) and the tests to demonstrate closure of each package as specified in 6;7.10.8 must be performed.

UN Model Regulations, 4.1.9.1.8 (see ST/SG/AC.10/46/Add.1)

e) For packages intended to be used for shipment after storage, it must be ensured that all packaging components and radioactive contents have been maintained during storage in a manner such that all the requirements specified in the relevant provisions of these Instructions and in the applicable certificates of approval have been fulfilled.

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9.2 REQUIREMENTS AND CONTROLS FOR TRANSPORT OF LSA MATERIAL AND SCO

9.2.1 The quantity of LSA material or SCO in a single Industrial package Type 1 (Type IP-1), Industrial package Type 2 (Type IP-2), or Industrial package Type 3 (Type IP-3), must be so restricted that the external radiation level at 3 m from the unshielded material does not exceed 10 mSv/h.

9.2.2 LSA material and SCO which are or contain fissile material, which is not excepted under 2;7.2.3.5, must meet the applicable requirements in 7;2.9.4.1 and 7;2.9.4.2.

9.2.3 LSA material and SCO which are or contain fissile material must meet the applicable requirements of 6;7.10.1.

9.2.4 LSA-I material, SCO-I and fissile material must not be transported unpackaged.

9.2.5 LSA material and SCO must be packaged in accordance with Table 4-2.

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Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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DGP-WG/19-WP/20 (Revised) (see paragraph 3.1.2.10 of the DGP-WG/19 report):

Packing Instruction 956

Passenger and cargo aircraft for UN 1841, UN 1931, UN 2216, UN 3432, UN 2969, UN 3077, UN 3152 and UN 3335 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					SINGLE PACKAGINGS	
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	Quantity — passenger	Quantity — cargo
UN 1841 **Acetaldehyde ammonia**	Glass	10.0 kg	200 kg	200 kg	200 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 1931 **Zinc dithionite** or **Zinc hydrosulphite**	Glass	10.0 kg	100 kg	200 kg	100 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 2216 **Fish meal, stabilized**	Glass	10.0 kg	100 kg	200 kg	100 kg	200 kg
	Fibre	50.0 kg				
	Metal	50.0 kg				
	Paper bag	50.0 kg				
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				

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DGP-WG/19-WP/3 (Revised) (see paragraph 3.1.2.1 of the DGP-WG/19 report):

Packing Instruction 957

Passenger and cargo aircraft for UN 2211 and UN 3314 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS					
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle)*	*Quantity — passenger*	*Quantity — cargo*	**SINGLE PACKAGINGS**
UN 2211 **Polymeric beads, expandable**, evolving flammable vapour UN 3314 **Plastics moulding compound** in dough, sheet or extruded rope form evolving flammable vapour	Glass	10 kg	100 kg	200 kg	Yes
	Fibre	50 kg			
	Metal	50 kg			
	Paper bag	50 kg			
	Plastics	50 kg			
	Plastic bag	50 kg			

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B1, 1B2)
Fibre (1G)
Other metal (1N1, 1N2)
Plastics (1H1, 1H2)
Plywood (1D)
Steel (1A1, 1A2)

Jerricans

Aluminium (3B1, 3B2)
Plastics (3H1, 3H2)
Steel (3A1, 3A2)

ADDITIONAL PACKING REQUIREMENTS FOR SINGLE PACKAGINGS

For other than metal and plastics packagings, a sealed plastic liner must be used.

SINGLE PACKAGINGS

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural Wood (4C1, 4C2)
Other metal (4N)
Plastics (4H2)
Plywood (4D)
Reconstituted wood (4F)
~~Wooden (4C1, 4C2)~~ Steel (4A)

Drums

Aluminium (1B1, 1B2)
Fibre (1G)
Other metal (1N1, 1N2)
Plastics (1H1, 1H2)
Plywood (1D)
Steel (1A1, 1A2)

Jerricans

Aluminium (3B1, 3B2)
Plastics (3H1, 3H2)
Steel (3A1, 3A2)

. . .

Packing Instruction 962

Passenger and cargo aircraft for UN 3363 only

General requirements

Part 4, Chapter 1 requirements must be met (except that the requirements of 4;1.1.2, 1.1.9, 1.1.13 and 1.1.16 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

UN Model Regulations, 4.1.4.1, P907 (see ST/SG/AC.10/46/Add.1)

This entry only applies to articles, such as machinery, apparatus or ~~machinery~~ devices containing dangerous goods as a residue or as an integral element of the ~~machinery or apparatus~~ article. It must not be used for ~~apparatus or machinery~~ an article for which a proper shipping name exists in Table 3-1. For other than fuel system components, ~~apparatus or machinery~~ articles may only contain one or more of the following: dangerous goods permitted under 3;4.1.2 or UN 2807 or gases of Division 2.2 without subsidiary hazard but excluding refrigerated liquefied gases.

UN Model Regulations, 4.1.4.1, P907 and 3.2, dangerous goods list (see ST/SG/AC.10/46/Add.1)

UN number and proper shipping name		*State*	*Total net quantity of dangerous goods in one package (excluding magnetic material)*
UN 3363	**Dangerous goods in apparatus** or **Dangerous goods in machinery** or **Dangerous goods in articles**	Liquid	0.5 L
		Solid	1 kg
		Gas (Division 2.2 only)	0.5 kg

ADDITIONAL PACKING REQUIREMENTS

— If the ~~machinery or apparatus~~ article contains more than one item of dangerous goods, the individual dangerous goods must be enclosed to prevent them reacting dangerously with one another during transport (see 4;1.1.3).
— Receptacles containing dangerous goods must be so secured or cushioned so as to prevent their breakage or leakage and so as to control their movement within the ~~machinery or apparatus~~ article during normal conditions of transport. Cushioning material must not react dangerously with the contents of the receptacles. Any leakage of the contents must not substantially impair the protective properties of the cushioning material.
— "Package orientation" labels (Figure 5-29), or preprinted orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780-1997 must be affixed on at least two opposite vertical sides with the arrows pointing in the correct direction only when required to ensure liquid dangerous goods remain in their intended orientation.
— Irrespective of 5;3.2.10, ~~machinery or apparatus~~ articles containing magnetized material meeting the requirements of Packing Instruction 953 must also bear the "Magnetized material" label (Figure 5-27).
— For Division 2.2 gases, cylinders for gases, their contents and filling ratios must conform to the requirements of Packing Instruction 200.
— Dangerous goods in ~~apparatus or machinery~~ articles must be packed in strong outer packagings unless the receptacles containing the dangerous goods are afforded adequate protection by the construction of the ~~apparatus or machinery~~ articles.

Fuel system components

— Fuel system components must be emptied of fuel as far as practicable and all openings must be sealed securely. They must be packed:

1) in sufficient absorbent material to absorb the maximum amount of liquid which may possibly remain after emptying. Where the outer packaging is not liquid tight, a means of containing the liquid in the event of leakage must be provided in the form of a leakproof liner, plastic bag or other equally efficient means of containment; and

2) in strong outer packagings.

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DGP-WG/19-WP/21 (see paragraph 3.1.2.11 of the DGP-WG/19 report):

Packing Instruction 964

Passenger and cargo aircraft for UN 1941, UN 1990, UN 2315, UN 3151, UN 3082 and UN 3334 only

General requirements

~~Except for UN 3082 when the requirements of 4;1.1.6 do not apply,~~ Part 4, Chapter 1 requirements must be met~~,~~ ~~including~~ (with the exception that for UN 3082 the requirements of 4;1.1.6 do not apply). These requirements include:

. . .

DGP-WG/19-WP/21 (see paragraph 3.1.2.11 of the DGP-WG/19 report):

Packing Instruction Y964

Limited quantities
Passenger and cargo aircraft for UN 1941, UN 1990, UN 3082 and UN 3334 only

General requirements

~~Except for UN 3082 when the requirements of 4;1.1.6 do not apply,~~ Part 4, Chapter 1 requirements must be met (with the exception that the requirements of 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18, ~~and~~ 1.1.20 and in addition for UN 3082 the requirements of 4;1.1.6 do not apply)~~, including~~ These requirements include:

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Packing Instruction 965

Cargo aircraft only for UN 3480

1. **Introduction**

This entry applies to lithium ion or lithium polymer batteries. This packing instruction is structured as follows:

— Section IA applies to lithium ion cells with a Watt-hour rating in excess of 20 Wh and lithium ion batteries with a Watt-hour rating in excess of 100 Wh, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions;
— Section IB applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section II, Table 965-II; and
— Section II applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities not exceeding the allowance permitted in Section II, Table 965-II.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium ion cells and batteries in this packing instruction:

UN Model Regulations, Chapter 3.3, SP 376 and Instructions, Special Provision A154 (see DGP-WG/19-WP/13), (see ST/SG/AC.10/46/Add.1) and DGP-WG/19-WP/14 (see paragraph 3.1.2.6.1 f) of the DGP-WG/19 report:

[~~Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.]

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

. . .

Packing Instruction 966

Passenger and cargo aircraft for UN 3481 (packed with equipment) only

1. **Introduction**

This entry applies to lithium ion or lithium polymer batteries packed with equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium ion cells and batteries in this packing instruction:

UN Model Regulations, Chapter 3.3, SP 376 and Instructions, Special Provision A154 (see DGP-WG/19-WP/13), (see ST/SG/AC.10/46/Add.1) and DGP-WG/19-WP/14 (see paragraph 3.1.2.6.1 f) of the DGP-WG/19 report:

[~~Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.]

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Packing Instruction 967

Passenger and cargo aircraft for UN 3481 (contained in equipment) only

1. **Introduction**

This entry applies to lithium ion or lithium polymer batteries contained in equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium ion cells and batteries in this packing instruction:

UN Model Regulations, Chapter 3.3, SP 376 and Instructions, Special Provision A154 (see DGP-WG/19-WP/13), (see ST/SG/AC.10/46/Add.1) and DGP-WG/19-WP/14 (see paragraph 3.1.2.6.1 f) of the DGP-WG/19 report:

[~~Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~ Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.]

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Packing Instruction 968

Cargo aircraft only for UN 3090

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries. This packing instruction is structured as follows:

— Section IA applies to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with a lithium metal content in excess of 2 g, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions;
— Section IB applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities that exceed the allowance permitted in Section II, Table 968-II; and
— Section II applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities not exceeding the allowance permitted in Section II, Table 968-II.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

UN Model Regulations, Chapter 3.3, SP 376 and Instructions, Special Provision A154 (see DGP-WG/19-WP/13), (see ST/SG/AC.10/46/Add.1) and DGP-WG/19-WP/14 (see paragraph 3.1.2.6.1 f) of the DGP-WG/19 report:

[~~Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~ Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.]

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

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Packing Instruction 969

Passenger and cargo aircraft for UN 3091 (packed with equipment) only

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries packed with equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

UN Model Regulations, Chapter 3.3, SP 376 and Instructions, Special Provision A154 (see DGP-WG/19-WP/13), (see ST/SG/AC.10/46/Add.1) and DGP-WG/19-WP/14 (see paragraph 3.1.2.6.1 f) of the DGP-WG/19 report:

[~~Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.]

. . .

Packing Instruction 970

Passenger and cargo aircraft for UN 3091 (contained in equipment) only

1. **Introduction**

This entry applies to lithium metal or lithium alloy batteries contained in equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. **Lithium batteries forbidden from transport**

The following applies to all lithium metal cells and batteries in this packing instruction:

UN Model Regulations, Chapter 3.3, SP 376 and Instructions, Special Provision A154 (see DGP-WG/19-WP/13), (see ST/SG/AC.10/46/Add.1) and DGP-WG/19-WP/14 (see paragraph 3.1.2.6.1 f) of the DGP-WG/19 report:

[~~Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport.]

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