



**WORKING PAPER**

**DANGEROUS GOODS PANEL (DGP)  
MEETING OF THE WORKING GROUP OF THE WHOLE**

**Montréal, 15 to 19 April 2013**

**Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2015-2016 Edition**

**2.4 : Part 4 — Packing Instructions**

**DRAFT AMENDMENTS TO THE TECHNICAL INSTRUCTIONS TO ALIGN WITH THE UN  
RECOMMENDATIONS — PART 4**

(Presented by the Secretary)

**SUMMARY**

This working paper contains draft amendments to Part 4 of 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 sixth session (Geneva, 14 December 2012). It also reflects amendments agreed by DGP-WG12 (Montreal, 15 to 19 October 2012).

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

## 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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1.1.10 Inner packagings must be so packed, secured or cushioned in an outer packaging in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the outer packaging. Inner packagings containing liquids must be packaged with their closures upward and placed within outer packagings consistent with the orientation markings prescribed in 5;3.2.12 b) of these Instructions. Inner packagings that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastic material, must be secured in outer packagings with suitable cushioning material. Any leakage of the contents must not substantially impair the protective properties of the cushioning material or of the outer packaging.

1.1.10.1 Where an outer packaging of a combination packaging has been successfully tested with different types of inner packagings, a variety of such different inner packagings may also be assembled in this outer packaging or large packaging. In addition, provided an equivalent level of performance is maintained, the following variations in inner packagings are allowed without further testing of the package:

- a) inner packagings of equivalent or smaller size may be used provided:
  - 1) the inner packagings are of similar design to the tested inner packagings (e.g. shape — round, rectangular);
  - 2) the material of construction of the inner packagings (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;
  - 3) the inner packagings have the same or smaller openings and the closure is of similar design (screw cap, friction lid, etc.);
  - 4) sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and
  - 5) inner packagings are oriented within the outer packaging in the same manner as in the tested package; and
- b) a lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the inner packagings.

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UN Model Regulations, 4.1.1.5.2, ST/SG/AC.10/40/Add.1

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1.1.10.2 Use of supplementary packagings within an outer packaging (e.g. an intermediate packaging or a receptacle inside a required inner packaging) additional to what is required by the packing instructions is authorized provided all relevant requirements are met, including those of 4:1.1.2, and, if appropriate, suitable cushioning is used to prevent movement within the packaging.

### Chapter 3

## CLASS 1 — EXPLOSIVES

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UN Model Regulations, P131, ST/SG/AC.10/40/Add.1

Packing Instruction 131			1.
<i>Inner packagings</i>	<i>Intermediate packagings</i>	<i>Outer packagings</i>	
Bags paper plastics Receptacles fibreboard metal plastics wood Reels	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) <u>plastics, solid (4H2)</u> plywood (4D) reconstituted wood (4F) steel (4A)  Drums ≠ aluminium (1B1, 1B2) fibre (1G) ≠ plastics (1H1, 1H2) + other metal (1N1, 1N2) plywood (1D) ≠ steel (1A1, 1A2)	
<b>PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:</b>			
— For UN 0029, 0267 and 0455, bags and reels must not be used as inner packagings.			

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UN Model Regulations, P137, ST/SG/AC.10/40/Add.1

Packing Instruction 137			2.
<i>Inner packagings</i>	<i>Intermediate packagings</i>	<i>Outer packagings</i>	
Bags plastics Boxes fibreboard wood Tubes fibreboard metal plastics Dividing partitions in the outer packagings	Not necessary	Boxes aluminium (4B) fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) other metal (4N) <u>plastics, solid (4H2)</u> plywood (4D) reconstituted wood (4F) steel (4A)	
<b>PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:</b>			
— For UN 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package marked "THIS SIDE UP". When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation.			

## 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).

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UN Model Regulations, paragraph 4.1.6.1.2, ST/SG/AC.10/40/Add.1

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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 11114-1:1997~~2012~~ and ISO 11114-2:2000 must be met.

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UN Model Regulations, P003, PP91 for UN 1044, ST/SG/AC.10/40/Add.1

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#### Packing Instruction 213

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

Fire extinguishers with compressed or liquefied gas must be packed in strong outer packagings so that they cannot be accidentally activated.

Fire extinguishers may include installed actuating cartridges (cartridges, power device of Division 1.4C or 1.4S), without changing the classification of Division 2.2, provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per extinguishing unit.

##### Supplement?

~~Large fire extinguishers may also be transported unpackaged provided that the requirements of S 4:3.1 a) to e) are met, the valves are protected by one of the methods in accordance with 4:4.1.1.8 a) to c) and and other equipment mounted on the fire extinguisher is protected to prevent accidental activation. For the purpose of this packing instruction, "large fire extinguishers" means fire extinguishers as described in sub-paragraphs c) to e) of Special Provision A19.~~

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DGP-WG/12-WP/13 and its Addendum:

*Note.— This amendment will be considered by the Council for incorporation in the 2013-2014 Edition of the Technical Instructions by way of an addendum.*

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## Packing Instruction 216

Passenger and cargo aircraft for UN 3478 and 3479 (contained in equipment) only

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### ADDITIONAL PACKING REQUIREMENTS

- Fuel cell cartridges that are contained in equipment must be protected against short circuit and the equipment must be protected against inadvertent operation.
- Equipment must be securely cushioned in the outer packagings.
- Fuel cell systems must not charge batteries during transport.
- On passenger aircraft, each fuel cell system and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, including Amendment 1, or a standard approved by the appropriate authority of the State of Origin.

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UN Model Regulations, P208, ST/SG/AC.10/40/Add.1

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## 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 absorbed gases.

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

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

2) The pressure of each filled cylinder must be less than 101.3 kPa at 20°C and must not exceed 300 kPa at 50°C.

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

4) The minimum burst pressure of the cylinder must be 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 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) Requirements for cylinders and closures containing toxic gases with an LC<sub>50</sub> less than or equal to 200 ml/m<sup>3</sup> (ppm) (see Table 1) must be as follows:

a) Valve outlets must be fitted with pressure retaining gas-tight plugs or caps having threads matching those of the valve outlets.

b) Each valve must either be of the packless type with non-perforated diaphragm, or be of a type which prevents leakage through or past the packing.

c) Each cylinder and closure must be tested for leakage after filling.

d) Each valve must be capable of withstanding the test pressure of the cylinder and be directly connected to the cylinder by either a taper-thread or other means which meets the requirements of ISO 10692-2:2001.

e) Cylinders and valves must not be fitted with a pressure relief device.

10) Valve outlets for cylinders containing pyrophoric gases must be fitted with gas-tight plugs or caps having threads matching those of the valve outlets.

11) The filling procedure must be in accordance with Annex A of ISO 11513:2011.

12) The maximum period for periodic inspections must be five years.

13) Special packing provisions that are specific to a substance (see Table 1):

Material compatibility

a: Aluminium alloy cylinders must not be used.

b: When steel cylinders are used, only those bearing the "H" mark in accordance with 6.5.2.7.4 p) are permitted.

Gas specific provisions

r: The filling of this gas must be limited such that, if complete decomposition occurs, the pressure does not exceed two thirds of the test pressure of the cylinder.

Material compatibility for n.o.s adsorbed gas entries

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.

**Table 1. ABSORBED GASES**

<u>UN No.</u>	<u>Name and description</u>	<u>Class or Division</u>	<u>Subsidiary risk</u>	<u>LC<sub>50</sub> ml/m<sup>3</sup></u>	<u>Special packing provisions*</u>
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
<u>3510</u>	<u>Adsorbed gas, flammable, n.o.s.</u>	<u>2.1</u>			<u>z</u>
<u>3511</u>	<u>Adsorbed gas, n.o.s.*</u>	<u>2.2</u>			<u>z</u>
<u>3512</u>	<u>Adsorbed gas, toxic, n.o.s.*</u>	<u>2.3</u>		<u>≤ 5000</u>	<u>z</u>
<u>3513</u>	<u>Adsorbed gas, oxidizing, n.o.s.*</u>	<u>2.2</u>	<u>5.1</u>		<u>z</u>
<u>3514</u>	<u>Adsorbed gas, toxic, flammable, n.o.s.*</u>	<u>2.3</u>	<u>2.1</u>	<u>≤ 5000</u>	<u>z</u>
<u>3515</u>	<u>Adsorbed gas, toxic, oxidizing, n.o.s.*</u>	<u>2.3</u>	<u>5.1</u>	<u>≤ 5000</u>	<u>z</u>
<u>3516</u>	<u>Adsorbed gas, toxic, corrosive, n.o.s.*</u>	<u>2.3</u>	<u>8</u>	<u>≤ 5000</u>	<u>z</u>
<u>3517</u>	<u>Adsorbed gas, toxic, flammable, corrosive, n.o.s.*</u>	<u>2.3</u>	<u>2.1</u> <u>8</u>	<u>≤ 5000</u>	<u>z</u>
<u>3518</u>	<u>Adsorbed gas, toxic, oxidizing, corrosive, n.o.s.*</u>	<u>2.3</u>	<u>5.1</u> <u>8</u>	<u>≤ 5000</u>	<u>z</u>
<u>3519</u>	<u>Boron trifluoride, adsorbed</u>	<u>2.3</u>	<u>8</u>	<u>387</u>	<u>a</u>
<u>3520</u>	<u>Chlorine, adsorbed</u>	<u>2.3</u>	<u>5.1</u> <u>8</u>	<u>293</u>	<u>a</u>
<u>3521</u>	<u>Silicon tetrafluoride, adsorbed</u>	<u>2.3</u>	<u>8</u>	<u>450</u>	<u>a</u>
<u>3522</u>	<u>Arsine, adsorbed</u>	<u>2.3</u>	<u>2.1</u>	<u>20</u>	<u>d</u>
<u>3523</u>	<u>Germane, adsorbed</u>	<u>2.3</u>	<u>2.1</u>	<u>620</u>	<u>d, r</u>
<u>3524</u>	<u>Phosphorus pentafluoride, adsorbed</u>	<u>2.3</u>	<u>8</u>	<u>190</u>	
<u>3525</u>	<u>Phosphine, adsorbed</u>	<u>2.3</u>	<u>2.1</u>	<u>20</u>	<u>d</u>
<u>3526</u>	<u>Hydrogen selenide, adsorbed</u>	<u>2.3</u>	<u>2.1</u>	<u>2</u>	

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## Chapter 5

### CLASS 3 — FLAMMABLE LIQUIDS

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DGP-WG/12-WP/13 and its Addendum:

*Note.— This amendment will be considered by the Council for incorporation in the 2013-2014 Edition of the Technical Instructions by way of an addendum.*

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#### Packing Instruction 375

Passenger and cargo aircraft for UN 3473 (contained in equipment) only

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##### ADDITIONAL PACKING REQUIREMENTS

- Fuel cell cartridges that are contained in equipment must be protected against short circuit and the equipment must be protected against inadvertent operation.
- Equipment must be securely cushioned in the outer packagings.
- Fuel cell systems must not charge batteries during transport.
- On passenger aircraft, each fuel cell system and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, [including Amendment 1](#), or a standard approved by the appropriate authority of the State of Origin.

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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/12-WP/11:

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#### Packing Instruction 473

Passenger and cargo aircraft for UN 1378 and UN 2881 only

##### General requirements

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

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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.

##### SINGLE PACKAGINGS FOR PACKING GROUP III ONLY

*Cylinders*

*Drums*

*Jerricans*

[See 4:2.7](#)

Steel (1A1, 1A2)

Steel (3A1, 3A2)

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DGP-WG/12-WP/13 and its Addendum:

*Note.— This amendment will be considered by the Council for incorporation in the 2013-2014 Edition of the Technical Instructions by way of an addendum.*

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#### Packing Instruction 496

Passenger and cargo aircraft for UN 3476 (contained in equipment) only

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##### ADDITIONAL PACKING REQUIREMENTS

- Fuel cell cartridges that are contained in equipment must be protected against short circuit and the equipment must be protected against inadvertent operation.
- Equipment must be securely cushioned in the outer packagings.
- The mass of each fuel cell cartridge must not exceed 1 kg.
- Fuel cell systems must not charge batteries during transport.
- On passenger aircraft, each fuel cell system and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, [including Amendment 1](#), or a standard approved by the appropriate authority of the State of Origin.

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## Chapter 8

### CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

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#### Packing Instruction 650

- 4) For transport, the mark illustrated below must be displayed on the external surface of the outer packaging on a background of a contrasting colour and must be clearly visible and legible. The mark must be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm, the width of the line must be at least 2 mm, and the letters and numbers must be at least 6 mm high. The proper shipping name "Biological substance, Category B" in letters at least 6 mm high must be marked on the outer packaging adjacent to the diamond-shaped mark.

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UN Model Regulations, P650, ST/SG/AC.10/40/Add.1

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*Replace mark for Biological substance, Category B with the following:*

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*Note.— The mark shown in paragraph 4) of Packing Instruction 650 of the 2013-2014 Edition of these Instructions may continue to be applied until 31 December 2016.*

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## Chapter 9

### CLASS 7 — RADIOACTIVE MATERIAL

*Parts of this Chapter are affected by State Variations CA 1, CA 2, CA 4, IR 4, JP 2, JP 17; see Table A-1*

#### 9.1 GENERAL

9.1.1 Radioactive material, packagings and packages must meet the requirements of 6;7. The quantity of radioactive material in a package must not exceed the limits specified in 2;7.2.4. The types of packages for radioactive materials covered by these Instructions are:

- a) Excepted package (see 1;6.1.5);
- b) Industrial package Type 1 (Type IP-1 package);
- c) Industrial package Type 2 (Type IP-2 package);
- d) Industrial package Type 3 (Type IP-3 package);
- e) Type A package;
- f) Type B(U) package;
- g) Type B(M) package;
- h) Type C package.

Packages containing fissile material or uranium hexafluoride are subject to additional requirements.

9.1.2 The non-fixed contamination on the external surfaces of any package must be kept as low as practicable and, under routine conditions of transport, must not exceed the following limits:

- a) 4 Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters; and
- b) 0.4 Bq/cm<sup>2</sup> for all other alpha emitters.

These limits are applicable when averaged over any area of 300 cm<sup>2</sup> of any part of the surface.

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#### UN Model Regulations, paragraph 4.1.9.1.3, ST/SG/AC.10/40/Add.1

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9.1.3 A package, ~~other than an excepted package,~~ must not contain any other items except such articles and documents as are necessary for the use of the radioactive material. This requirement must not preclude the transport of low specific activity material or surface contaminated objects with other items. The transport of such articles and documents in a package, or of low specific activity material or surface contaminated objects with other items may be permitted provided that there is no interaction between them and the packaging or its radioactive contents that would reduce the safety of the package.

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.

9.1.5 Radioactive material meeting the criteria of other Classes or Divisions as defined in Part 2 must be allocated to Packing Group I, II or III, as appropriate, by the application of the grouping criteria provided in Part 2 corresponding to the nature of the predominant subsidiary risk. It must also be capable of meeting the appropriate packaging performance criteria for the subsidiary risk.

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#### UN Model Regulations, paragraphs 4.1.9.1.6 to 4.1.9.1.11, ST/SG/AC.10/40/Add.1

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9.1.6 ~~Before the first shipment of any package, the following requirements must be fulfilled~~ Before a packaging is first used to transport radioactive material, it must be confirmed that it has been manufactured in conformity with the design specifications to ensure compliance with the relevant provisions of these Instructions and any applicable certificate of approval. The following requirements must also be fulfilled, if applicable:

- a) If the design pressure of the containment system exceeds 35 kPa (gauge), it must be ensured that the containment system of each package ing conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure;

- b) For each packaging intended for use as a Type B(U), Type B(M) and Type C package and for each package intended to containing fissile material, it must be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the confinement system, are within the limits applicable to or specified for the approved design;
- c) For packages intended to containing fissile material, it must be ensured that the effectiveness of the criticality safety features is within the limits applicable to or specified for the design and in particular where, in order to comply with the requirements of 6;7.10.1 neutron poisons are specifically included ~~as components of the package~~, checks must be performed to confirm the presence and distribution of those neutron poisons.

9.1.7 Before each shipment of any package, it must be ensured that the package contains neither:

- a) radionuclides different from those specified for the package design; nor
- b) contents in a form, or physical or chemical state different from those specified for the package design.

9.1.7.8 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) For any package it must be ensured that all the requirements specified in the relevant provisions of these Instructions have been satisfied;~~
- ba) 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;
- ~~c) For each package requiring competent authority approval, it must be ensured that all the requirements specified in the approval certificates have been satisfied;~~
- eb) 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;
- ec) 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;7.7.7 7.7.8 and 6;7.9.3 were made;
- ~~f) For each special form radioactive material, it must be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Instructions have been satisfied;~~
- gd) For packages containing fissile material, the measurement specified in 6;7.10.4 5 b) and the tests to demonstrate closure of each package as specified in 6;7.10.7 8 must be performed ~~where applicable~~;
- ~~h) For each low dispersible radioactive material, it must be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Instructions have been satisfied.~~

~~9.1.8.9~~ 9 The shipper must also have a copy of any instructions with regard to the proper closing of the package and any preparation for shipment before making any shipment under the terms of the certificates.

~~9.1.9.10~~ 10 Except for consignments under exclusive use, the transport index of any package or overpack must not exceed 10, nor must the criticality safety index of any package or overpack exceed 50.

~~9.1.10.11~~ 11 Except for packages or overpacks transported under exclusive use and special arrangement under the conditions specified in 7;2.10.5.3, the maximum radiation level at any point on any external surface of a package or overpack must not exceed 2 mSv/h.

~~9.1.11.12~~ 12 The maximum radiation level at any point on any external surface of a package or overpack under exclusive use must not exceed 10 mSv/h.

## 9.2 REQUIREMENTS AND CONTROLS FOR TRANSPORT OF LSA MATERIAL AND SCO

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UN Model Regulations, paragraph 4.1.9.2, ST/SG/AC.10/40/Add.1

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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 ~~is~~ are or contains fissile material, which is not excepted under 2;7.2.3.5, must meet the applicable requirements in 7;2.10.4.1, and 7;2.10.4.2 ~~and~~ 6;7.10.4.

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

9.2.3~~4~~ LSA material and SCO in groups LSA-I and SCO-I must not be transported unpackaged.

9.2.4~~5~~ LSA material and SCO must be packaged in accordance with Table 4-2.

**9.3 PACKAGES CONTAINING FISSILE MATERIAL**

~~Unless not classified as fissile in accordance with 2;7.2.3.5,~~ The contents of packages containing fissile material must not contain:

- ~~— a) a mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) different from that authorized for the package design;~~
- ~~— b) any radionuclide or fissile material different from those authorized for the package design; or~~
- ~~— c) contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the package design;~~

be as specified for the package design either directly in these Instructions or in their certificates of approval, ~~where appropriate.~~

**Table 4-2. Industrial package requirements for LSA material and SCO**

<i>Radioactive contents</i>	<i>Industrial package type</i>	
	<i>Exclusive use</i>	<i>Not under exclusive use</i>
LSA-I Solid Liquid	Type IP-1 Type IP-1	Type IP-1 Type IP-2
LSA-II Solid Liquid and gas	Type IP-2 Type IP-2	Type IP-2 Type IP-3
LSA-III	Type IP-2	Type IP-3
SCO-I	Type IP-1	Type IP-1
SCO-II	Type IP-2	Type IP-2

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## Chapter 10

### CLASS 8 — CORROSIVE SUBSTANCES

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DGP-WG/12-WP/13 and its Addendum:

*Note.— This amendment will be considered by the Council for incorporation in the 2013-2014 Edition of the Technical Instructions by way of an addendum.*

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#### Packing Instruction 874

Passenger and cargo aircraft for UN 3477 (contained in equipment) only

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##### ADDITIONAL PACKING REQUIREMENTS

- Fuel cell cartridges that are contained in equipment must be protected against short circuit and the equipment must be protected against inadvertent operation.
- Equipment must be securely cushioned in the outer packagings.
- The mass of each fuel cell cartridge must not exceed 1 kg.
- Fuel cell systems must not charge batteries during transport.
- On passenger aircraft, each fuel cell system and each fuel cell cartridge must conform to IEC 62282-6-100 Ed. 1, including Amendment 1, or a standard approved by the appropriate authority of the State of Origin.

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UN Model Regulations, P805, ST/SG/AC.10/40/Add.1

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#### Packing Instruction 877

Passenger and cargo aircraft for UN 3507 only

##### General requirements

Part 4, Chapter 1 and Part 4;9.1.2, 9.1.4 and 9.1.7 requirements must be met, including:

##### 1) Compatibility requirements

- Substances must be compatible with their packagings as required by 4;1.1.3.
- Metal packagings must be corrosion resistant or be protected against corrosion.
- Substances of Class 8 are permitted in glass or earthenware inner packagings only if the substance is free from hydrofluoric acid.

##### 2) Closure requirements

- Closures must meet the requirements of 4;1.1.4.

**ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS**

- Substances must be packed in a metal or plastic primary receptacle in a leakproof rigid secondary packaging in a rigid outer packaging.
- Primary inner receptacles must be packed in secondary packagings in a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings must be secured in outer packagings with suitable cushioning material to prevent movement. If multiple primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated so as to prevent contact between them;
- The contents must comply with the provisions of 2;7.2.4.5.2.
- The provisions of 6;7.3 must be met.
- In the case of fissile-excepted material, limits specified in 2;7.2.3.5 and 6;7.10.2

**OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)**Boxes

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

Drums

Aluminium (1B2)  
Fibre (1G)  
Other metal (1N2)  
Plastics (1H2)  
Plywood (1D)  
Steel (1A2)

Jerricans

Aluminium (3B2)  
Plastics (3H2)  
Steel (3A2)

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## Chapter 11

### CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

*Parts of this Chapter are affected by State Variation US 2; see Table A-1*

#### Packing Instruction 950

Passenger and cargo aircraft for UN 3166 only  
(See Packing Instruction 951 for flammable gas-powered vehicles and engines or  
Packing Instruction 952 for battery-powered equipment and vehicles)

...

#### ADDITIONAL PACKING REQUIREMENTS

...

##### *Batteries*

All batteries must be installed and securely fastened in the battery holder of the vehicle, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

- 1) if spillable batteries are installed, and it is possible for the vehicle, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;
- 2) if lithium batteries are installed, they must be of a type that has successfully passed the tests specified in the ~~UN Manual of Tests and Criteria, Part III, subsection 38.3~~ meet the provisions of Part 2:9.3.1, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the vehicle, machinery or equipment and must be protected in such a manner so as to prevent damage and short circuits; and
- 3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

...

### Packing Instruction 951

Cargo aircraft only for UN 3166 only  
(See Packing Instruction 950 for flammable liquid-powered vehicles and engines or  
Packing Instruction 952 for battery-powered equipment and vehicles)

...

#### ADDITIONAL PACKING REQUIREMENTS

...

##### *Batteries*

All batteries must be installed and securely fastened in the battery holder of the vehicle, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

- 1) if spillable batteries are installed, and it is possible for the vehicle, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;
- 2) if lithium batteries are installed, they must be of a type that has successfully passed the tests specified in the ~~UN Manual of Tests and Criteria, Part III, subsection 38.3~~ meet the provisions of Part 2:9.3.1, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the vehicle, machinery or equipment and must be protected in such a manner so as to prevent damage and short circuits; and
- 3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

...

### Packing Instruction 952

Passenger and cargo aircraft for UN 3171 only  
(See Packing Instruction 950 for flammable liquid-powered vehicles and engines or  
Packing Instruction 951 for flammable gas-powered vehicles and engines)

...

##### *Batteries*

All batteries must be installed and securely fastened in the battery holder of the vehicle, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

- 1) if spillable batteries are installed, and it is possible for the vehicle, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;
- 2) if lithium batteries are installed in a vehicle, they must be of a type that has successfully passed the tests specified in the ~~UN Manual of Tests and Criteria, Part III, subsection 38.3~~ meet the provisions of Part 2:9.3.1, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the vehicle, machinery or equipment and must be protected in such a manner so as to prevent damage and short circuits; and
- 3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

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### Packing Instruction 959

Passenger and cargo aircraft for UN 3245 only

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The following packagings are authorized:

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2) Packagings, which need not conform to the packaging test requirements of Part 6, but conforming to the following:

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For transport, the mark illustrated below must be displayed on the external surface of the outer packaging on a background of a contrasting colour and must be clearly visible and legible. The mark must be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm; the width of the line must be at least 2 mm and the letters and numbers must be at least 6 mm high.

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UN Model Regulations, P904, ST/SG/AC.10/40/Add.1

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Replace mark for GMO/GMMOs with the following:

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Note.— The mark shown in paragraph 2) of Packing Instruction 959 of the 2013-2014 Edition of these Instructions may continue to be applied until 31 December 2016.

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### Packing Instruction Y963

Passenger and cargo aircraft for ID 8000 only

Consumer commodities are materials that are packaged and distributed in a form intended or suitable for retail sale for the purposes of personal care or household use. These include items administered or sold to patients by doctors or medical administrations. Except as otherwise provided below, dangerous goods packed in accordance with this packing instruction do not need to comply with 4;1 or Part 6 of these Instructions; they must, however, comply with all other applicable requirements.

- a) Each packaging must be designed and constructed to prevent leakage that may be caused by changes in altitude and temperature during air transport.
- b) Inner packagings that are breakable (such as earthenware, glass or brittle plastic) must be packed to prevent breakage and leakage under conditions normally incident to transport. ~~These completed packagings~~ Each package offered for transport must be capable of withstanding a 1.2 m drop on solid concrete in the position most likely to cause damage. The criteria for passing the test is that the outer packaging must not exhibit any damage liable to affect safety during transport and there must be no leakage from the inner packaging(s). Each package offered for transport must be capable of withstanding, without breakage or leakage of any inner packaging and without significant reduction of effectiveness, a force applied to the top surface for a duration of 24 hours equivalent to the total weight of identical packages if stacked to a height of 3 m (including the test sample).

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See DGP-WG/13-IP/1 for UN Model Regulations, P908 and P909 (in addition to SP 376 and SP377), ST/SG/AC.10/40/Add.1

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