

International Civil Aviation Organization

DGP/25-WP/14 17/8/15

## WORKING PAPER

## DANGEROUS GOODS PANEL (DGP)

## **TWENTY-FIFTH MEETING**

## Montréal, 19 to 30 October 2015

## 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 2017-2018 Edition

# 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 seventh session (Geneva, 12 December 2014). It also reflects amendments agreed by DGP-WG14 (Rio de Janeiro, 20 to 24 October 2014) and DGP-WG15 (Montréal, 27 April to 1 May 2015).

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

## Part 4

## **PACKING INSTRUCTIONS**

#### INTRODUCTORY NOTES

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DGP/25-WP/3 (see paragraph 3.2.3.1)

Note 7.— Carriage of oxygen and air with aquatic animals

With the approval of the appropriate authority of the State of Origin, of Destination and of the Operator, for the purpose of providing life support to aquatic animals during transport, cylinders containing Oxygen compressed (UN 1072) or Air, compressed (UN 1002) may be carried to oxygenate the water in accordance with the provisions of Table S-3-1 and Special Provision A302 (which appear in the Supplement).

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Note 10.— Carriage of flames

With the approval of the appropriate authority of the State of Origin, or transit (where applicable), of Destination and of the Operator, lamps fuelled by UN 1223 — **Kerosene** or UN 3295 — **Hydrocarbons, liquid, n.o.s.**, carried by a passenger to transport a symbolic flame (e.g. Olympic flame, Peace flame) may be carried in accordance with the provisions of Special Provision A324 (which appears in the Supplement to this document).

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## Chapter 1

## **GENERAL PACKING REQUIREMENTS**

Parts of this Chapter are affected by State Variations JP 24; see Table A-1

#### 1.1 GENERAL REQUIREMENTS APPLICABLE TO ALL CLASSES EXCEPT CLASS 7

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UN Model Regulations, paragraph 4.1.1.5, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

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 mark 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.

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#### UN Model Regulations, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

1.1.14 Except as provided in 5;3.5.1.1 a), a package must be of such size that there is adequate space to affix all necessary labels and markings marks.

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# UN Model Regulations, paragraph 4.1.1.12, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

1.1.18 Every packaging intended to contain liquids must successfully undergo a suitable leakproofness test. <u>This test</u> is part of a quality assurance programme as required by 4;1.1.2 which shows the capability and be capable of meeting the appropriate test level indicated in 6;4.4.2:

- a) before it is first used for transport;
- b) after remanufacturing or reconditioning, before it is reused for transport.

For this test, packagings need not have their own closures fixed.

The inner receptacle of composite packagings may be tested without the outer packaging provided the test results are not affected. This test is not necessary for inner packagings of combination packagings.

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## **Chapter 3**

## CLASS 1 — EXPLOSIVES

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UN Model Regulations, P112(c), PP48, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

Packing Instruction 114				
b) solid dry				
Inner packagings	Intermediate packagings	Outer packagings		
Bags paper, kraft plastics textile, siftproof woven plastics, siftproof Receptacles fibreboard metal paper plastics wood woven plastics, siftproof	Not necessary	Boxes fibreboard (4G) natural wood, ordinary (4C1) natural wood, with siftproof walls (4C2) plywood (4D) reconstituted wood (4F) Drums aluminium (1B1, 1B2) fibre (1G) other metal (1N1, 1N2) plastics (1H1, 1H2) plywood (1D) steel (1A1, 1A2)		
PARTICULAR PACKING REQUIREM	ENTS OR EXCEPTIONS:			
metal, for example metal closures packagings. — For UN 0160 and 0161, when meta	ckagings must not be used. <u>Pac</u> or other metal fittings such as t al drums (1A1, 1A2, 1B1, 1B2, 1N	d-free. <u>kagings of other material with a small amount of</u> <u>hose mentioned in 6;3, are not considered metal</u> 11 or 1N2) are used as the outer packaging, metal ason of increase in internal pressure from internal		
<ul> <li>For UN 0160 and 0161, inner pack</li> </ul>	agings are not required if drums a	are used as the outer packaging.		

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# UN Model Regulations, Chapter 4.1, 4.1.4.1, ST/SG/AC.10/42/Add.1/Corr.1

Packing Instruction 130
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PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:
— The following applies to UN 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0238, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0459-and, 0488, 0502 and 0510. Large and robust explosive articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged. When such articles have propelling charges or are self-propelled, their ignition systems must be protected against stimuli encountered during normal conditions of transport. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for transport unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling, storage or launching devices in such a way that they will not become loose during normal conditions of transport. Where such large explosive articles are as part of their operational safety and suitability tests subjected to test regimes that meet the intentions of these Instructions and such tests have been successfully undertaken, the appropriate national authority may approve such articles to be transported under these Instructions.
<ul> <li>For UN 0457, 0458, 0459 and 0460, whenever loose explosive substances or the explosive substance of an uncased or partly cased article may come into contact with the inner surface of metal packagings (1A2, 1B2, 4A, 4B and metal receptacles), the metal packaging must be provided with an inner liner or coating.</li> </ul>

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UN Model Regulations, packing instruction 137, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

	Packing Instruction	137
Inner packagings	Intermediate packagings	Outer packagings
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) + plastics, solid (4H2) plywood (4D) reconstituted wood (4F) steel (4A)
PARTICULAR PACKING REQUIREM	ENTS OR EXCEPTIONS:	
downwards and the package-ma	rked "THIS SIDE UP" <u>must be</u>	s are packed singly, the conical cavity must face <u>e marked in accordance with 4;1.1.13</u> . When the e inwards to minimize the jetting effect in the event

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### **Chapter 4**

## CLASS 2 — GASES

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# UN Model Regulations, paragraph 4.1.6.12, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

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 and ISO 11114-2:200013 must be met.

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UN Model Regulations, paragraph 4.1.6.8, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

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. 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.

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. For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 must be met.

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# UN Model Regulations, paragraphs 4.1.6.12 and 4.1.6.13, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

4.1.1.12 Cylinders and closed cryogenic receptacles must not be offered for filling:

- a) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;
- b) unless the cylinder and closed cryogenic receptacle and its service equipment have been examined and found to be in good working order; or
- c) unless the required certification, retest, and filling markings marks are legible.

4.1.1.13 Filled cylinders and closed cryogenic receptacles must not be offered for transport:

- a) when leaking;
- b) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;
- c) unless the cylinder and closed cryogenic receptacle and its service equipment have been examined and found to be in good working order; or

d) unless the required certification, retest, and filling-markings marks are legible.

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#### 4.2 PACKING INSTRUCTIONS

UN Model Regulations, packing instruction P200, ST/SG/AC.10/42/Add.1, DGP/25-WP/3 (see paragraph 3.2.4.1.1 a)) and alignment with UN efforts to introduce consistent use of terms "mark" and "marking")

### 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 <u>markings marks</u> 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:

 Pressure relief devices must be fitted on cylinders used for the transport of UN 1013 Carbon dioxide and UN 1070 Nitrous oxide. Other cylinders must be fitted with a pressure relief device if specified by the appropriate national authority of the country of use. The type of pressure relief device, the set to discharge pressure and relief capacity of pressure relief devices, if required, must be specified by the appropriate national authority of the country of use. Manifolding of cylinders is not permitted.

2) The following two tables cover compressed gases (Table 1) and liquefied and dissolved gases (Table 2). They provide: the UN number, name and description, and classification of the substance; a) the LC<sub>50</sub> for toxic substances; b) c) the types of cylinders authorized for the substance, shown by the letter "X"; the maximum test period for periodic inspection of the cylinders; Note.— For cylinders which make use of composite materials, the maximum test period must be five years. The test period may be extended to that specified in Tables 1 and 2 (i.e. up to ten years), if approved by the appropriate national authority of the country of use. the minimum test pressure of the cylinders; e) the maximum working pressure of the cylinders for compressed gases (where no value is given, the working f) pressure must not exceed two-thirds of the test pressure) or the maximum filling ratio(s) dependent on the test pressure(s) for liquefied and dissolved gases; special packing provisions that are specific to a substance. q) In no case must cylinders be filled in excess of the limit permitted in the following requirements: 3) a) For compressed gases, the working pressure must be not more than two-thirds of the test pressure of the cylinders. Restrictions to this upper limit on working pressure are imposed by special packing provision "o". In no case must the internal pressure at 65°C exceed the test pressure. For high pressure liquefied gases, the filling ratio must be such that the settled pressure at 65°C does not b) exceed the test pressure of the cylinders. The use of test pressures and filling ratios other than those in the table is permitted provided that the above criterion is met, except where special packing provision "o" applies. For high pressure liquefied gases and gas mixtures for which relevant data are not available, the maximum filling ratio (FR) must be determined as follows:  $FR = 8.5 \times 10^{-4} \times d_g \times P_h$ where FR = maximum filling ratio  $d_g$  = gas density (at 15°C, 1 bar)(in g/l)  $P_h$  = minimum test pressure (in bar). If the density of the gas is unknown, the maximum filling ratio must be determined as follows:  $FR = \frac{P_h \times MM \times 10^{-3}}{10^{-3}}$ R × 338 where FR = maximum filling ratio  $P_h$  = minimum test pressure (in bar) MM= molecular mass (in g/mol)  $R = 8.31451 \times 10^{-2} \text{ bar.l/mol.K} (\text{gas constant}).$ For gas mixtures, the average molecular mass is to be taken, taking into account the volumetric concentrations of the various components. 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). For low pressure liquefied gases for which filling data is not provided in the table, the maximum filling ratio must be determined as follows:  $FR = (0.0032 \times BP - 0.24) \times d_1$ where FR = maximum filling ratio BP = boiling point (in Kelvin)  $d_1$  = density of the liquid at boiling point (in kg/l). d) For UN 1001, Acetylene, dissolved, and UN 3374 Acetylene, solvent free, see p).

e) For liquefied gases charged with compressed gases, both components — the liquid phase and the compressed gas — have to be taken into consideration in the calculation of the internal pressure in the cylinder.
The maximum mass of contents per litre of water capacity must not exceed 0.95 times the density of the liquic phase at 50°C; in addition, the liquid phase must not completely fill the cylinder at any temperature up to 60°C.
When filled, the internal pressure at 65°C must not exceed the test pressure of the cylinders. The vapour pressures and volumetric expansions of all substances in the cylinders must be considered. When experimental data is not available, the following steps must be carried out:
i) Calculation of the vapour pressure of the liquid component 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 component at 65°C;
v) The total pressure is the sum of the vapour pressure of the liquid component 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 cylinder must not be less than the calculated total pressure minus 100 kPa (1bar).
If the solubility of the compressed gas in the liquid component is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph (vi)) into account.
4) Gas mixtures containing any of the following gases must not be offered for transport in aluminium alloy cylinders unless approved by the appropriate national authority of the State of Origin and the State of the Operator:
UN 1037 Ethyl chloride UN 1063 Methyl chloride UN 1063 Refrigerant gas R 40 UN 1085 Vinyl bromide, stabilized UN 1086 Vinyl chloride, stabilized UN 1860 Vinyl fluoride, stabilized UN 1912 Methyl chloride and methylene chloride mixture
5) The filling of cylinders must be carried out by qualified staff using appropriate equipment and procedures. The procedures should include checks of:
<ul> <li>The conformity of cylinders and accessories with these Instructions;</li> <li>Their compatibility with the product to be transported;</li> <li>The absence of damage which might affect safety;</li> <li>Compliance with the degree or pressure of filling, as appropriate;</li> <li>Marks and identification.</li> </ul>
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) —
ISO 11372: 2011         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
ISO 17750.2006       Cds cylinder       Control of compressed and inquerical gases (excluding acetylene) — Inspection at time of filling         ISO 13088: 2011       Gas cylinders — Acetylene cylinder bundles — Filling conditions and filling inspection         ISO 24431:2006       Gas cylinders — Cylinders for compressed and liquefied gases (excluding acetylene) — Inspection at time of filling

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56) "Special packing provisions":

Material compatibility

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

Gas specific provisions:

- I) UN 1040 Ethylene oxide may also be packed in hermetically sealed glass ampoules or metal inner packagings suitably cushioned in fibreboard, wooden or metal boxes meeting the Packing Group I performance level. The maximum quantity permitted in any glass inner packaging is 30 g, and the maximum quantity permitted in any metal inner packaging is 200 g. After filling, each inner packaging must be determined to be leak-tight by placing the inner packaging in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55°C is achieved. The maximum net mass in any outer packaging must not exceed 2.5 kg. When cylinders are used, they must be of the seamless or welded steel types that are equipped with suitable pressure relief devices. Each cylinder must be tested for leakage with an inert gas before each refilling and must be insulated with three coats of heat retardant paint or in any equally efficient manner. The maximum net quantity per cylinder must not exceed 25 kg.
- m) Cylinders must be filled to a working pressure not exceeding 5 bar.
- o) In no case must the working pressure or filling ratio shown in the table be exceeded.
- p) For UN 1001 Acetylene, dissolved, and UN 3374 Acetylene, solvent free: cylinders must be filled with a homogeneous monolithic porous mass; the working pressure and the quantity of acetylene must not exceed the values prescribed in the approval or in ISO 3807-1:2000-or, ISO 3807-2:2000 or ISO 3807:2013, as applicable.

For UN 1001 **Acetylene, dissolved**, cylinders must contain a quantity of acetone or suitable solvent as specified in the approval (see ISO 3807-1:2000-or, ISO 3807-2:2000 or ISO 3807:2013, as applicable); cylinders fitted with pressure relief devices must be transported vertically.

The test pressure of 52 bar applies only to cylinders conforming to ISO 3807-2:2000 fitted with a fusible plug.

- ra) Ethyl chloride may be carried in securely sealed glass ampoules (IP.8) containing not more than 5 g of ethyl chloride with a ullage of not less than 7.5 per cent at 21°C. Ampoules must be cushioned with efficient noncombustible material in partitioned cartons with not more than 12 ampoules per carton. The cartons must be tightly packed to prevent movement in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) that meet the performance testing requirements of 6;4 at the Packing Group II performance level. Not more than 300 g of ethyl chloride is permitted per package.
- s) Aluminium alloy cylinders must be:
  - Equipped only with brass or stainless steel valves; and
  - Cleaned in accordance with ISO 11621:1997 and not contaminated with oil.

Periodic inspection:

- u) The interval between periodic tests may be extended to 10 years for aluminium alloy cylinders when the alloy
  of the cylinder has been subjected to stress corrosion testing as specified in <u>ISO 7866:1999</u> <u>ISO 7866:2012 +</u>
  <u>Cor 1:2014</u>.
- v) The interval between periodic inspections for steel cylinders may be extended to 15 years if approved by the appropriate national authority of the country of use.

Requirements for N.O.S. descriptions and for mixtures:

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

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

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

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

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## Packing Instruction 202

#### Requirements for open cryogenic receptacles

Open cryogenic receptacles must be constructed to meet the following requirements:

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- 9. Open cryogenic receptacles must bear the following marks permanently affixed, e.g. by stamping, engraving or etching:
  - the manufacturer's name and address;
  - the model number or name;
  - the serial or batch number;
  - the UN number and proper shipping name of gases for which the receptacle is intended;
  - the capacity of the receptacle in litres.

Note.— The size of the marking mark must be as set out for cylinders in Part 6;5.2.7.1. Open cryogenic receptacles manufactured prior to 1 January 2012 are not required to be so marked.

10. Open cryogenic receptacles are permitted for nitrogen, argon, krypton, neon and xenon refrigerated liquids.

## DGP/25-WP/2 (see paragraph 3.2.4.1):

## Packing Instruction 203

Passenger and cargo aircraft for UN 1950 and 2037 only

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

For the purposes of this packing instruction, a receptacle is considered to be an inner packaging.

Note.— "Receptacle" has the same meaning as set out in 1;3. Any reference in this packing instruction to receptacle will include "aerosols" of UN 1950 and "receptacles, small, containing gas" and "gas cartridges" of UN 2037.

Metal aerosols (IP.7, IP.7A, IP.7B) and non-refillable receptacles containing gas (gas cartridges)

Non-refillable metal aerosols and non-refillable receptacles containing gas (gas cartridges) must not exceed 1 000 mL capacity.

The following conditions must be met:

- a) the pressure in the receptacle must not exceed 1 500 kPa at 55°C and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55°C;
- b) if the pressure in the receptacle exceeds 970 kPa at 55°C but does not exceed 1 105 kPa at 55°C, an IP.7, IP.7A or IP.7B metal receptacle must be used;
- c) if the pressure in the receptacle exceeds 1 105 kPa at 55°C but does not exceed 1 245 kPa at 55°C, an IP.7A or IP.7B metal receptacle must be used;
- d) if the pressure in the receptacle exceeds 1 245 kPa at 55°C, an IP.7B metal receptacle must be used;

- e) IP.7B metal receptacles having a minimum burst pressure of 1 800 kPa may be equipped with an inner capsule charged with a non-flammable, non-toxic compressed gas to provide the propellant function. In this case, the pressures indicated in a), b), c) or d) do not apply to the pressure within the capsule for an aerosol. The quantity of gas contained in the capsule must be so limited such that the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into the outer metal receptacle;
- f) the liquid content must not completely fill the closed receptacle at 55°C;
- g) each receptacle exceeding 120 mL capacity must have been heated until the pressure in the receptacle is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect. For aerosols, non-flammable (tear gas devices) this heat test applies to all aerosols regardless of their capacity.

#### Plastic aerosols (IP.7C)

Non-refillable plastic aerosols must not exceed 120 mL capacity, except when the propellant is a non-flammable, non- toxic gas and the contents are not dangerous goods in accordance with the provisions of the <u>se</u>-Technical Instructions, in which case the quantity must not exceed 500 mL.

The following conditions must be met:

- a) the contents must not completely fill the closed receptacle at 55°C;
- b) the pressure in the receptacle may not exceed 970 kPa at 55°C; and
- c) each receptacle must be leak tested in accordance with the provisions of 6;3.2.8.1.6.

Non-flammable aerosols containing medical preparations or biological products

Aerosols, non-flammable, containing only a non-toxic substance or substances and biological products or a medical preparation which will be deteriorated by a heat test, are acceptable in inner non-refillable receptacles not exceeding 575 mL capacity each, providing all the following conditions are met:

- a) the pressure in the aerosol must not exceed 970 kPa at 55°C;
- b) the liquid contents must not completely fill the closed receptacle at 55°C;
- c) one aerosol out of each lot of 500 or less must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect;
- d) the valves must be protected by a cap or other suitable means during transport.

		<u>Net quantity per package</u>	
	UN number and name	<u>Passenger</u>	<u>Cargo</u>
<u>UN 1950</u>	Aerosols, flammable	<u>75 kg</u>	<u>150 kg</u>
<u>UN 1950</u>	Aerosols, flammable (engine starting fluid)	Forbidden	<u>150 kg</u>
<u>UN 1950</u>	Aerosols, non-flammable	<u>75 kg</u>	<u>150 kg</u>
<u>UN 1950</u>	Aerosols, non-flammable (tear gas devices)	Forbidden	<u>50 kg</u>
<u>UN 2037</u>	Gas cartridges	<u>1 kg</u>	<u>15 kg</u>
UN 2037	Receptacles, small, containing gas	<u>1 kg</u>	<u>15 kg</u>

DGP/25-WP/2 (see paragraph 3.2.4.1) and DGP/25-WP/3 (see paragraph 3.2.4.1.1 b))

#### ADDITIONAL PACKING REQUIREMENTS

- Packagings must meet Packing Group II performance requirements.
- Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents during normal conditions of air transport.
- [Receptacles must be tightly packed, so as to prevent excessive movement and inadvertent discharge during normal conditions of transport.]

DGP/25-WP/2 (see paragraph 3.2.4.1)

#### UN 1950 Aerosols, non-flammable (tear gas devices) - Cargo Aircraft Only

 Only metal receptacles, IP.7, IP.7A, IP.7B are permitted. The aerosols must be individually placed into spiral wound tubes fitted with metal ends or a double-faced fibreboard box with suitable padding before being packed into the outer packaging.

#### OUTER PACKAGINGS (see 6;3.1)

#### Boxes

Drums

Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Other metal (4N) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A) Aluminium (1B2) Fibre (1G) Other metal (1N2) Plastics (1H2) Plywood (1D) Steel (1A2)

## Packing Instruction Y203

Passenger and cargo aircraft for UN 1950 and 2037 only

The requirements of 3;4 must be met.

For the purposes of this packing instruction, a receptacle is considered to be an inner packaging.

Note.— "Receptacle" has the same meaning as set out in 1;3. Any reference in this packing instruction to receptacle will include "aerosols" of UN 1950 and "receptacles, small, containing gas" and "gas cartridges" of UN 2037.

#### Metal aerosols (IP.7, IP.7A, IP.7B) and non-refillable receptacles containing gas (gas cartridges)

Non-refillable metal aerosols and non-refillable receptacles containing gas (gas cartridges) containing toxic substances must not exceed 120 mL capacity.

All other non-refillable metal aerosols and non-refillable receptacles containing gas (gas cartridges) must not exceed 1 000 mL capacity.

The following conditions must be met:

- a) the pressure in the receptacle must not exceed 1 500 kPa at 55°C and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55°C;
- b) if the pressure in the receptacle exceeds 970 kPa at 55°C but does not exceed 1 105 kPa at 55°C, an IP.7, IP.7A or IP.7B metal receptacle must be used;
- c) if the pressure in the receptacle exceeds 1 105 kPa at 55°C, an IP.7A or IP.7B metal receptacle must be used;
- d) if the pressure in the receptacle exceeds 1 245 kPa at 55°C, an IP.7B metal receptacle must be used;
- e) IP.7B metal receptacles having a minimum burst pressure of 1 800 kPa may be equipped with an inner capsule charged with a non-flammable, non-toxic compressed gas to provide the propellant function. In this case, the pressures indicated in a), b), c) or d) do not apply to the pressure within the capsule for an aerosol. The quantity of gas contained in the capsule must be so limited such that the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into the outer metal receptacle;
- the liquid content must not completely fill the closed receptacle at 55°C; f)
- each receptacle exceeding 120 mL capacity must have been heated until the pressure in the receptacle is equivalent to **g**) the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect.

#### Plastic aerosols (IP.7C)

Non-refillable plastic aerosols must not exceed 120 mL capacity, except when the propellant is a non-flammable, nontoxic gas and the contents are not dangerous goods in accordance with the provisions of the Technical these Instructions, in which case the quantity must not exceed 500 mL.

The following conditions must be met:

- a) the contents must not completely fill the closed receptacle at 55°C;
- b) the pressure in the receptacle may not exceed 970 kPa at 55°C; and
- each receptacle must be leak tested in accordance with the provisions of 6;3.2.8.1.6. c)

Non-flammable aerosols containing medical preparations or biological products

Aerosols, non-flammable, containing only a non-toxic substance or substances and biological products or a medical preparation which will be deteriorated by a heat test, are acceptable in inner non-refillable receptacles not exceeding 575 mL capacity each, providing all the following conditions are met:

- a) the pressure in the aerosol must not exceed 970 kPa at 55°C;
   b) the liquid contents must not completely fill the closed receptacle at 55°C;
- one aerosol out of each lot of 500 or less must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect; <u>c)</u>
- d) the valves must be protected by a cap or other suitable means during transport.

It was noted during review post DGP-WG/15 that the net quantities per package permitted were not provided as they were for Packing Instruction 203. They are added here for the sake of consistency:

	UN number and name	<u>Net quantity</u> per package
UN 1950	Aerosols, flammable	<u>30 kg G</u>
<u>UN 1950</u>	Aerosols, flammable (engine starting fluid)	<u>30 kg G</u>
<u>UN 1950</u>	Aerosols, non-flammable	<u>30 kg G</u>
<u>UN 1950</u>	Aerosols, non-flammable (tear gas devices)	<u>30 kg G</u>
<u>UN 2037</u>	Gas cartridges	<u>1 kg</u>
UN 2037	Receptacles, small, containing gas	<u>1 kg</u>

UN Model Regulations, packing instruction P207, ST/SG/AC.10/42/Add.1

The words "and inadvertent discharge during normal conditions of transport" is included in the 18th revised edition of the UN Model Regulations. DGP-WG/15 was invited to consider whether these words should be included in the Technical Instructions along with the word "excessive" introduced through ST/SG/AC.10/42/Add.1.

#### ADDITIONAL PACKING REQUIREMENTS

 Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents during normal conditions of air transport.

[Receptacles must be tightly packed, so as to prevent <u>excessive</u> movement <u>and inadvertent discharge during normal</u> <u>conditions of transport.</u>].

## OUTER PACKAGINGS (see 6;3.1)

Boxes

Aluminium Fibreboard Natural wood Other metal Plastics Plywood Reconstituted wood Steel Drums

Aluminium Fibre Other metal Plastics Plywood Steel

## Packing Instruction 204

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

Aerosols, non flammable, containing biological products or a medical preparation which will be deteriorated by a heat test, are acceptable in inner non refillable receptacles not exceeding 575 mL capacity each, providing all the following conditions are met:

b) the liquid contents must not completely fill the closed receptacle at 55°C;

- c) one aerosol out of each lot of 500 or less must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect;

- d) the valves must be protected by a cap or other suitable means during transport;

-e) acrosols must be tightly packed, so as to prevent movement, in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) of Packing Group II.

Packing Instruction Y204
The requirements of 3;1 must be met.
Single packagings are not permitted.
COMBINATION PACKAGINGS:
INNER:
Aerosols, non-flammable, containing only a non-toxic substance or substances and biological products or a medical preparation which will be deteriorated by a heat test, are acceptable in inner non-refillable receptacles not exceeding 575 mL capacity each, providing all the following conditions are met:
— a) the pressure in the aerosol must not exceed 970 kPa at 55°C;
b) the liquid contents must not completely fill the closed receptacle at 55°C;
<ul> <li></li></ul>
d) the valves must be protected by a cap or other suitable means during transport;
e) aerosols must be tightly packed, so as to prevent movement, in one of the following boxes:
OUTER:
Boxes — Fibreboard — Plastics — Plywood — Reconstituted wood — Wooden

Packing Instruction 212
The general packing requirements of 4;1 must be met.
Acrosols, non-flammable, which are tear gas devices are permitted in inner non-refillable metal receptacles not exceeding 1 000 mL capacity each providing all the following conditions are met:
<ul> <li>a) the pressure in the aerosol must not exceed 1 500 kPa at 55°C and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55°C;</li> </ul>
b) if the pressure in the aerosol does not exceed 1 105 kPa at 55°C, an IP.7, IP.7A or IP.7B metal receptacle must be used;
- e) IP.7B metal receptacles having a minimum burst pressure of 1 800 kPa may be equipped with an inner capsule charged with a non flammable, non toxic compressed gas to provide the propellant function. In this case, the pressures indicated in a), b), c) or d) do not apply to the pressure within the capsule. The quantity of gas contained in the capsule must be so limited such that the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into an aerosol;

-g) each acrosol must have been heated until the pressure in the acrosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect;

- h) the valves must be protected by a cap or other suitable means during transport;

 i) acrosols must be individually placed into spiral wound tubes fitted with metal ends or a double faced fibreboard box with suitable padding, which must be tightly packed in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) of Packing Group II. Maximum net quantity per package is 50 kg.

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UN Model Regulations, packing instruction P205, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

## Packing Instruction 214

Cargo aircraft only for UN 3468 only

This Instruction applies to storage systems containing hydrogen absorbed in a metal hydride (UN 3468) individually or when contained in equipment and apparatus when transported on cargo aircraft.

- 1) For metal hydride storage systems, the general packing requirements of 4;4.1 must be met.
- Only cylinders not exceeding 150 L in water capacity and having a maximum developed pressure not exceeding 25 MPa are covered by this packing instruction.
- 3) Metal hydride storage systems meeting the applicable requirements of 6;5 for the construction and testing of cylinders containing gas may be used for the transport of hydrogen only.
- 4) When steel cylinders or composite cylinders with steel liners are used, only those bearing the "H" mark, in accordance with 6;5.2.9.2 j) are permitted.
- 5) Metal hydride storage systems must meet the service conditions, design criteria, rated capacity, type tests, batch tests, routine tests, test pressure, rated charging pressure and provisions for pressure relief devices for transportable metal hydride storage systems specified in ISO 16111:2008, and their conformity and approval must be assessed in accordance with 6;5.2.5.
- 6) Metal hydride storage systems must be filled with hydrogen at a pressure not exceeding the rated charging pressure shown in the permanent-<u>markings\_mark</u> on the system as specified in ISO 16111:2008.
- 7) The periodic test requirements for a metal hydride storage system must be in accordance with ISO 16111:2008 and carried out in accordance with 6;5.2.6, and the interval between periodic inspections must not exceed five years.
- 8) Storage systems with a water capacity of less than 1 L must be packaged in rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use. They must be adequately secured or cushioned so as to prevent damage during normal conditions of transport.
- 9) Maximum net quantity per package for cargo aircraft is 100 kg of metal hydride storage systems, including when such storage systems are packed with equipment or contained in equipment.

# UN Model Regulations, packing instruction P206, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

## Packing Instruction 218

Passenger and cargo aircraft for UN 3500, 3501, 3502, 3503, 3504 and 3505 only

#### **General requirements**

The general requirements of 4;4.1 applicable to cylinders must be met. Cylinders, constructed as specified in 6;5 are authorized for the transport of UN 3500, UN 3501, UN 3502, UN 3503, UN 3504 and UN 3505. Cylinders other than UN marked and certified cylinders may be used if the design, construction, testing, approval and <u>markings marks</u> conform to the requirements of the appropriate national authority of the State 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.

#### Compatibility requirements

- The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.
- The necessary steps must be taken to prevent dangerous reactions (i.e. polymerization or decomposition) during transport. If necessary, stabilization or addition of an inhibitor may be required.

#### **Periodic inspection**

— The maximum test period for periodic inspection of the cylinders must be 5 years.

#### 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.
  - 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 phase 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:
  - 1) Calculation of the vapour pressure of the liquid component and of the partial pressure of the compressed gas at 15°C (filling temperature);
  - 2) 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;
  - 3) 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.
  - 4) Calculation of the vapour pressure of the liquid component at 65°C;
  - 5) The total pressure is the sum of the vapour pressure of the liquid component and the partial pressure of the compressed gas at 65°C;
  - 6) Consideration of the solubility of the compressed gas at 65°C in the liquid phase.

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

If the solubility of the compressed gas in the liquid component is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph f)) into account.

#### OUTER PACKAGINGS

Boxes

Jerricans

Strong outer packagings

Drums

UN Model Regulations, packing instruction P208, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

# Packing Instruction 219 For cylinders, the general packing requirements of 4;1.1 and 4;4.1.1 must be met. This Instruction applies to Class 2 adsorbed gases. 1) The following packagings are permitted provided the general packing requirements of 4.1.1 are met: a) Cylinders constructed as specified in 6;5.2 and in accordance with ISO 11513:2011 or ISO 9809-1:2010-; and b) Cylinders constructed before 1 January 2016 in accordance with 6;5.3 and a specification approved by the appropriate national authorities of the countries of transport and use. 2) The pressure of each filled cylinder must be less than 101.3 kPa at 20°C and less than 300 kPa at 50°C. 3) The minimum test pressure of the cylinder is 21 bar. 4) The minimum burst pressure of the cylinder is 94.5 bar. 5) The internal pressure at 65°C of the filled cylinder must not exceed the test pressure of the cylinder. 6) The adsorbent material must be compatible with the cylinder and must not form harmful or dangerous compounds with the gas to be adsorbed. The gas in combination with the adsorbent material must not affect or weaken the cylinder or cause a dangerous reaction (e.g. a catalyzing reaction). 7) The guality of the adsorbent material must be verified at the time of each fill to assure the pressure and chemical stability requirements of this packing instruction are met each time an adsorbed gas package is offered for transport. 8) The adsorbent material must not meet the criteria of any of the classes or divisions in these Instructions. 9) The filling procedure must be in accordance with Annex A of ISO 11513:2011. 10) The maximum period for periodic inspections is five years. 11) The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.

UN Model Regulations, packing instruction P005, ST/SG/AC.10/42/Add.1, DGP/25-WP/3 (see paragraph 3.2.3.2.1 d)) and DGP/25-WP/3 (see paragraph 3.2.4.1)

nstru	Cargo aircraft only for UN 3166 <u>3529</u> only See Packing Instruction 950- <u>378</u> for flammable liquid-powered vehicles and ction 950 for flammable liquid-powered vehicles, Packing Instruction 951 f acking Instruction 952 for battery-powered equipment and vehicles or Pac	or flammable gas	-powered vehicles,
	machinery containing only environmentally hazardo		_
ener	al requirements		
art 4,	, Chapter 1 requirements must be met, including:		
omp	atibility requirements		
_	Substances must be compatible with their packagings as required by 4;	1.1.3.	
		Quantity —	Quantity —
	UN number and proper shipping name	passenger	cargo
IN <del>3</del> 4	1663529 Engines, internal combustion, flammable gas powered. Machinery, internal combustion, flammable gas powered or Vehicle, flammable gas powered or Vehicle, fuel cell, flammable gas powered, or Engine, fuel cell, flammable gas powered or Machinery, fuel cell, flammable gas powered	Forbidden	No limit
corr appr	following general requirements are included in UN SP 363 esponding Special Provision A208 of the Technical Instruct opriate to include these requirements in this packing instruct vision A208 in DGP/25-WP/13).	ions. It was co	onsidered more
corre appr Prov	esponding Special Provision A208 of the Technical Instruct opriate to include these requirements in this packing instruct vision A208 in DGP/25-WP/13).	ions. It was co ions (see note ining dangerous	before Special goods, must be in
corry appr Prov Sener 1)	esponding Special Provision A208 of the Technical Instruct opriate to include these requirements in this packing instruct vision A208 in DGP/25-WP/13). <u>al</u> <u>The engine or machinery, including the means of containment conta</u>	ions. It was co tions (see note ining dangerous ate national autho age of dangerous	posidered more before Special goods, must be in prity: goods and secured
corre appr Prov ener 1) 2)	esponding Special Provision A208 of the Technical Instruct ropriate to include these requirements in this packing instruct vision A208 in DGP/25-WP/13). <u>al</u> <u>The engine or machinery, including the means of containment conta</u> <u>compliance with the construction requirements specified by the appropri</u> <u>The engines or machinery must be oriented to prevent inadvertent leaka</u> <u>by means capable of restraining the engines or machinery to prevent a</u>	ions. It was co tions (see note ining dangerous ate national autho age of dangerous	posidered more before Special goods, must be in prity: goods and secured
corre appr <u>Prov</u> <u>cener</u> <u>1)</u> <u>2)</u>	esponding Special Provision A208 of the Technical Instruct ropriate to include these requirements in this packing instruct vision A208 in DGP/25-WP/13). a/ The engine or machinery, including the means of containment conta compliance with the construction requirements specified by the appropri- The engines or machinery must be oriented to prevent inadvertent leaka by means capable of restraining the engines or machinery to prevent a would change the orientation or cause them to be damaged mable gas vessels	ions. It was co ions (see note ining dangerous ate national autho age of dangerous ny movement dur ed vessels contai to gas regulators, nsure that these of regulators must b -off valves must b	ning the flammable and gas regulators conditions are met, e left disconnected
corra approv <u>ener</u> <u>1)</u> 2) lamn 1)	esponding Special Provision A208 of the Technical Instruct ropriate to include these requirements in this packing instruct vision A208 in DGP/25-WP/13). al The engine or machinery, including the means of containment conta compliance with the construction requirements specified by the appropri The engines or machinery must be oriented to prevent inadvertent leaks by means capable of restraining the engines or machinery to prevent a would change the orientation or cause them to be damaged mable gas vessels for flammable gas-powered vehicles, machines or equipment, pressuriz gas must be completely emptied of flammable gas. Lines from vessels themselves, must also be drained of all trace of flammable gas. To en- gas shut-off valves must be left open and connections of lines to gas upon delivery of the vehicle engine or machinery to the operator. Shut	ions. It was co ions (see note ining dangerous ate national autho age of dangerous ny movement dur ed vessels contai to gas regulators, nsure that these of regulators must b -off valves must b	ning the flammable and gas regulators conditions are met, e left disconnected
corra appr Prov <u>eener</u> 1) 2) lamn 1)	esponding Special Provision A208 of the Technical Instruct ropriate to include these requirements in this packing instruct vision A208 in DGP/25-WP/13). al The engine or machinery, including the means of containment conta compliance with the construction requirements specified by the appropri The engines or machinery must be oriented to prevent inadvertent leaks by means capable of restraining the engines or machinery to prevent a would change the orientation or cause them to be damaged mable gas vessels for flammable gas-powered <del>vehicles,</del> machines or equipment, pressuriz gas must be completely emptied of flammable gas. Lines from vessels themselves, must also be drained of all trace of flammable gas. To e gas shut-off valves must be left open and connections of lines to gas upon delivery of the <del>vehicle engine or machinery</del> to the operator. Shut reconnected at gas regulators before loading the vehicle aboard the airc	ions. It was co ions (see note ining dangerous ate national author age of dangerous ny movement dur ed vessels contai to gas regulators, nsure that these of regulators must b -off valves must b coff valves must b craft;	goods, must be in prity: goods and secured ing transport which and gas regulators conditions are met, e left disconnected be closed and lines tacles (fuel tanks)

- after closing the tank shut-off valves, the vehicle, equipment or machinery must be operated until it stops from lack of fuel before being loaded aboard the aircraft;
- iii) in no part of the closed system must the remaining pressure of compressed gases exceed 5 per cent of the maximum allowable working pressure of the pressure receptacle (fuel tank) system, or more than 2 000 kPa (20 bar), whichever is the lower.

#### 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:

- 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 meet the provisions of Part 2;9.3, 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.

#### Other operational equipment

- 1) Dangerous goods required for the operation or safety of the<u>vehicle</u>, machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the<u>vehicle</u>, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.
- Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

#### Internal combustion or fuel cell engine shipped separately (not installed)

- When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.
- 2) This requirement also applies to vehicles, machines or equipment containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

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# Chapter 5

# CLASS 3 — FLAMMABLE LIQUIDS

Packing Instruction 950 378					
Passenger and cargo aircraft for UN <del>3166<u>3528</u> only</del> (See Packing Instruction- <del>951<u>220</u> for flammable gas-powered vehicles and</del> engines or machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles, <del>or</del> Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)					
General requirements					
Part 4, Chapter 1 requirements must be met, including:					
Compatibility requirements					
<ul> <li>Substances must be compatible with their packagings as required by 4;1</li> </ul>	.1.3.				
UN number and proper shipping name	Quantity — passenger	Quantity — cargo			
UN 3166 <u>3528</u> Engines, internal combustion, flammable liquid powered or Machinery, internal combustion, flammable liquid powered Vehicle, flammable liquid powered or Vehicle, fuel cell, flammable liquid powered or Engine, fuel cell, flammable powered or Machinery, fuel cell, flammable liquid powered	No limit	No limit			
ADDITIONAL PACKING REQUIREMENTS The following general requirements are included in UN SP 363 corresponding Special Provision A208 of the Technical Instructi appropriate to include these requirements in this packing instruct	ons. It was co	onsidered more			
The following general requirements are included in UN SP 363 corresponding Special Provision A208 of the Technical Instructi appropriate to include these requirements in this packing instruct Provision A208 in DGP/25-WP/13).	ons. It was co	onsidered more			
The following general requirements are included in UN SP 363 corresponding Special Provision A208 of the Technical Instructi appropriate to include these requirements in this packing instruct Provision A208 in DGP/25-WP/13).	ons. It was co ion (see note ning dangerous	ponsidered more before Special goods, must be ir			
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<ul> <li>The following general requirements are included in UN SP 363 corresponding Special Provision A208 of the Technical Instructi appropriate to include these requirements in this packing instruct Provision A208 in DGP/25-WP/13).</li> <li>General         <ol> <li>The engine or machinery, including the means of containment contai compliance with the construction requirements specified by the appropriate 2) Any valves or openings (e.g. venting devices) must be closed during trantage or machinery must be oriented to prevent inadvertent leakage by means capable of restraining the engines or machinery to prevent and the engines or machinery in the</li></ol></li></ul>	ons. It was co ion (see note hing dangerous ite national autho sport; ge of dangerous o	goods, must be in priver and secured goods and secured			
<ul> <li>The following general requirements are included in UN SP 363 corresponding Special Provision A208 of the Technical Instructi appropriate to include these requirements in this packing instruct Provision A208 in DGP/25-WP/13).</li> <li>General <ol> <li>The engine or machinery, including the means of containment contain compliance with the construction requirements specified by the appropriate</li> <li>Any valves or openings (e.g. venting devices) must be closed during trant</li> <li>The engines or machinery must be oriented to prevent inadvertent leakar by means capable of restraining the engines or machinery to prevent ar would change the orientation or cause them to be damaged.</li> </ol> </li> <li>Flammable liquid fuel tanks Except as otherwise provided for in this packing instruction, fuel tanks must be securely. Special precautions are necessary to ensure complete drainage of the or equipment incorporating internal combustion engines, such as lawn mowers machines or equipment could possibly be handled in other than an upright position, vehicles, except those with diecel engines,</li></ul>	ons. It was co ion (see note ining dangerous ite national autho sport; ge of dangerous y movement dur drained of fuel a fuel system of and outboard m on. When it is not must be drained	goods, must be in prity: goods and secured ing transport which whicles, machines notors, where such possible to handle			
<ul> <li>The following general requirements are included in UN SP 363 corresponding Special Provision A208 of the Technical Instructi appropriate to include these requirements in this packing instruct Provision A208 in DGP/25-WP/13).</li> <li><u>General</u> <ol> <li>The engine or machinery, including the means of containment contai compliance with the construction requirements specified by the appropriate 2) Any valves or openings (e.g. venting devices) must be closed during trans</li> <li>The engines or machinery must be oriented to prevent inadvertent leakar by means capable of restraining the engines or machinery to prevent ar would change the orientation or cause them to be damaged.</li> </ol> </li> </ul>	ons. It was co ion (see note ining dangerous ite national autho sport; ge of dangerous y movement dur drained of fuel a fuel system of and outboard m on. When it is not must be drained	goods, must be in prity: goods and secured ing transport which whicles, machines notors, where such possible to handle			

#### Batteries

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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:

- 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 meet the provisions of Part 2;9.3, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the vehicle, machine 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.

#### Other operational equipment

- 1) Dangerous goods required for the operation or safety of the vehicle, machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the vehicle, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3.1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.
- Vehicles equipped with theft protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

#### Internal combustion or fuel cell engine shipped separately (not installed)

- When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.
- 2) This requirement also applies to vehicles, machines or equipment containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

### Chapter 6

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

		Packing Inst	ruction 450			
Pa	ssenger and car	go aircraft for UN	<u>I 3527 (Packing</u>	Group II or III) o	only	
<u>General requirements</u>						
Part 4, Chapter 1 requiren	nents must be m	et, including:				
1) Compatibility require	ements					
<ul> <li>— Substances must</li> </ul>		ith their packadir	nas as required	by /1·1 1 3		
<u> — Metal packagings</u> <u> Class 8 subsidiary</u>	must be corro				<u>on for subs</u>	tances with a
2) Closure requirement	<u>:s</u>					
— Closures must me	et the requireme	ents of 4;1.1.4.				
	COMB	INATION PACK	AGINGS			
Packing conditions	<u>Inner</u> <u>packaging</u> (see 6;3.2)	Inner packaging quantity (per receptacle) — for base liquid material	Inner packaging quantity (per receptacle) — for liquid activator	<u>Inner</u> <u>packaging</u> <u>quantity (per</u> <u>receptacle) —</u> <u>for solid</u> activator	<u>Total</u> <u>quantity</u> <u>per</u> package	<u>SINGLE</u> PACKAGINGS
Activator (Organic	Plastics*	n/a	125 mL	500 g	раскаде	TACKAGINGS
peroxide)	Metal*	n/a	125 mL	500 g		
Base material	Glass	<u>1.0 kg</u>	<u>n/a</u>	<u>n/a</u>	<u>5 kg</u>	No
<u>Division 4.1 Packing</u> Group II	Plastics	<u>5.0 kg</u>	<u>n/a</u>	<u>n/a</u>		
	<u>Metal</u>	<u>5.0 kg</u>	<u>n/a</u>	<u>n/a</u>		
Activator (Organic	Plastics*	<u>n/a</u>	<u>125 mL</u>	<u>500 g</u>		
<u>peroxide)</u>	<u>Metal*</u>	<u>n/a</u>	<u>125 mL</u>	<u>500 g</u>		
Base material Division 4.1 Packing	<u>Glass</u>	<u>2.5 kg</u>	<u>n/a</u>	<u>n/a</u>	<u>10 kg</u>	No
Group III	Plastics	<u>10.0 kg</u>	<u>n/a</u>	<u>n/a</u>		
	<u>Metal</u>	<u>10.0 kg</u>	<u>n/a</u>	<u>n/a</u>		
*Including tubes. The total quantity of kits p ADDITIONAL PACKING The components may be event of leakage (see 4;1.	REQUIREMENT placed in the sa 1.7).	S FOR COMBIN	IATION PACKA	<u>GINGS</u>		
DUTER PACKAGINGS C Boxes	OF COMBINATIO	<u>Drums</u>	<u>S (see 6;3.1)</u>	Jerrican	\$	
			2)		_	
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, - Other metal (4N) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood Steel (4A)		Aluminium (1B: Fibre (1G) Other metal (11 Plastics (1H1) Plywood (1D) Steel (1A1)		Aluminiu Plastics Steel (3/	<u>(3H1)</u>	

#### Packing Instruction Y450 Limited quantities Passenger and cargo aircraft for UN 3527 (Packing Group II or III) only **General requirements** Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.9 c), 1.1.9 e), 1.1.16, 1.1.18 and 1.1.20 do not apply), including: Compatibility requirements 1) 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 for substances with a Class 8 subsidiary risk. 2) Closure requirements Closures must meet the requirements of 4:1.1.4. 3) Limited quantity requirements - Part 3, Chapter 4 requirements must be met, including: the capability of the package to pass a 1.2 m drop test; the capability of the package a 24-hour stacking test; and inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6). **COMBINATION PACKAGINGS** Inner Inner Inner packaging packaging packaging <u>Total</u> quantity (per quantity (per quantity (per Total gross <u>Inner</u> <u>receptacle) –</u> <u>receptacle) -</u> receptacle) quantity <u>mass</u> Packing packaging for base liquid for liquid for solid per SINGLE per conditions (see 6:3.2) <u>mate</u>rial package package activator activator Activator (Organic 1<u>00 g</u> Plastics\* <u>n/a</u> 30 mL peroxide) <u>30 mL</u> Metal\* <u>n/a</u> <u>100 g</u> 1.0 kg Base material <u>Glass</u> <u>n/a</u> <u>n/a</u> <u>1 kg</u> Division 4.1 **Plastics** 1.0 kg <u>n/a</u> n/a Packing Group II Metal 1.0 kg n/a n/a <u>30 kg</u> <u>No</u>

PACKAGINGS Activator (Organic Plastics' n/a 30 mL 100 g <u>peroxide)</u> Metal\* 30 mL <u>n/a</u> 100 g Base material Glass 2.5 kg n/a n/a 5 kg Division 4.1 5.<u>0 kg</u> Plastics n/a n/a Packing Group III Metal 5.0 kg <u>n/a</u> <u>n/a</u>

\*Including tubes.

The total quantity of kits per package is to be calculated on a one-to-one basis of their volume, i.e. 1 L equal to 1 kg.

## ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of leakage (see 4;1.1.7).

<u>Boxes</u>	<u>Drums</u>	<u>Jerricans</u>
Aluminium	Aluminium	Aluminium
Fibreboard	<u>Fibre</u>	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

UN Model Regulations, P406, PP48, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1.1 c))

	Packing Instruction 451	1
Passenger a	nd cargo aircraft — wetted explosive	es (Packing Group I)
• • •		
ADDITIONAL PACKING REQUIRE	IENTS FOR COMBINATION PACH	AGINGS
	nd constructed to prevent the loss	of water or alcohol content or the content of
<ul> <li>the phlegmatizer.</li> <li>Packagings must be so construct</li> </ul>	ted and closed so as to avoid an e	explosive over pressure or pressure build-up
of more than 300 kPa (3 bar).		
Part 2;1.5.2 and may be less that	n the limits shown above.	ackaging are limited by the provisions of
	er packagings must be packed with	ed metal or rigid plastic receptacles before h absorbent material in sufficient quantity to
For UN 3474		
Metal packagings must not be used.	Packagings of other material with	a small amount of metal, for example metal
closures or other metal fittings such a	as those mentioned in 6;3, are not c	onsidered metal packagings.
OUTER PACKAGINGS OF COMBIN	IATION PACKAGINGS (see 6;3.1)	
Boxes	Drums	Jerricans
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G) Natural wood (4C1, 4C2)	Fibre (1G) Other metal (1N2)	Other metal (3N2) Plastics (3H1, 3H2)
Other metal (4N)	Plastics (1H1, 1H2)	Steel (3A2)
Plastics (4H1, 4H2)	Plywood (1D)	
	Steel (1A2)	

## Packing Instruction 459

Passenger and cargo aircraft - self-reactive substances and polymerizing substances

#### **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.

		COMBINA	TION PACKA	GINGS			
sh	mber and proper ipping name	Inner packaging (see 6;3.2)	Inner packaging quantity (per receptacle) — passenger	Total quantity per package — passenger	Inner packaging quantity (per receptacle) — cargo	Total quantity per package — cargo	SINGLE PACKAGINGS
Liquids UN 3223	Self-reactive						
014 3223	liquid type C	Plastics	0.5 L	5 L	1.0 L	10 L	
UN 3225	Self-reactive liquid type D	Plastics	0.5 L	5 L	1.0 L	10 L	
UN 3227	Self-reactive liquid type E	Plastics	1.0 L	10 L	2.5 L	25 L	No
UN 3229	Self-reactive liquid type F	Plastics	1.0 L	10 L	2.5 L	25 L	
<u>UN 3532</u>	Polymerizing substance, liquid, stabilized, n.o.s.*	Plastics	<u>1.0 L</u>	<u>10 L</u>	<u>2.5 L</u>	<u>25 L</u>	
Solids							
UN 3224	Self-reactive	Plastics	0.5 kg	5 kg	1.0 kg	10 kg	
	solid type C	Plastic bag	0.5 kg	5 kg	1.0 kg	10 kg	
UN 3226	Self-reactive	Plastics	0.5 kg	5 kg	1.0 kg	10 kg	
	solid type D	Plastic bag	0.5 kg	5 kg	1.0 kg	10 kg	
UN 3228	Self-reactive	Plastics	1.0 kg	10 kg	2.5 kg	25 kg	
	solid type E	Plastic bag	1.0 kg	10 kg	2.5 kg	25 kg	No
UN 3230	Self-reactive	Plastics	1.0 kg	10 kg	2.5 kg	25 kg	
	solid type F	Plastic bag	1.0 kg	10 kg	2.5 kg	25 kg	
<u>UN 3531</u>	Polymerizing	Plastics	<u>1.0 kg</u>	<u>10 kg</u>	<u>2.5 kg</u>	<u>25 kg</u>	
	substance, solid, stabilized, n.o.s.*	Plastic bag	<u>1.0 kg</u>	<u>10 kg</u>	<u>2.5 kg</u>	<u>25 kg</u>	

## ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Cushioning materials must not be readily combustible.
 Packagings must meet the Packing Group II performance requirements.

## OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Fibreboard (4G) Natural wood (4C1, 4C2) Plastics (4H1, 4H2) Plywood (4D) Reconstituted wood (4F) Fibre (1G) Plastics (1H1, 1H2) Plywood (1D)

Drums

Jerricans

Plastics (3H1, 3H2)

## Chapter 7

## CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

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### Packing Instructions 553 – 555

Cargo aircraft 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.
- Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary risk.

#### 2) Closure requirements

Closures must meet the requirements of 4;1.1.4.

Packing instruction	Packing Group	Inner packaging (see 6;3.2)	Inner packaging quantity (per receptacle)	Total quantity per package	SINGLE PACKAGINGS
		Glass	1.0 L		
553	I	Plastics	1.0 L	2.5 L	No
		Metal	1.0 L		
		Glass	2.5 L		
554	Ш	Plastics	2.5 L	5 L	No
		Metal	2.5 L		
		Glass	5.0 L		
555	111	Plastics	5.0 L	30 L	30 L
		Metal	5.0 L	1	

UN Model Regulations, P502, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

#### ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

Packing Group I

 UN 1873 only glass inner packagings are permitted, parts of packagings which are in direct contact with perchloric acid must be constructed of glass or plastics.

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.

#### OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Drums

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) Steel (1A1, 1A2)

#### 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) Other metal (1N1) Plastics (1H1) Steel (1A1)	Aluminium (3B1) Plastics (3H1) Steel (3A1)	

## Chapter 8

## **CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES**

UN Model Regulations, P603, ST/SG/AC.10/42/Add.1, DGP/25-WP/3 (see paragraphs 3.2.2.1.2 and 3.2.4.1)

Move Packing Instruction 877 from Chapter 10 and renumber it 603

		Packing Instruction 877 <u>603</u>				
	Pa	ssenger and cargo aircraft for UN 3507 on	ly			
General requ	irements					
<ul><li>Part 4, Chapter 1 and Part 4;9.1.2, 9.1.4 and 9.1.7 requirements must be met, including:</li><li>1) Compatibility requirements</li></ul>						
2) Closure r	equirements					
— Closu	res must meet the requi	rements of 4;1.1.4.				
	UN num	ber and name	Quantity per package — passenger	Quantity per package — cargo		
ADDITIONAL Substance a rigid out	fissile-excepted	lioactive material, excepted package,	akproof rigid seco			
<ul> <li>ADDITIONAL</li> <li>Substance a rigid out</li> <li>Primary in transport, packaging multiple p wrapped</li> <li>The conte</li> <li>The provis</li> <li>In the case</li> </ul>	fissile-excepted <b>PACKING REQUIREM</b> es must be packed in a rest they packaging. Inter receptacles must be they cannot break, be gs must be secured in primary receptacles are or separated so as to pre- orts must comply with the sions of 6;7.3 must be me e of fissile-excepted marked fissile-excepted marked packaging. The secure of the sec	TENTS FOR COMBINATION PACKAGING metal or plastics primary receptacle in a lease pe packed in secondary packagings in a v e punctured or leak their contents into th outer packagings with suitable cushionin e placed in a single secondary packagin event contact between them. e provisions of 2;7.2.4.5.2. net. terial, limits specified in 2;7.2.3.5 and 6;7.1	0.1 kg SS akproof rigid seco vay that, under ne e secondary pac og material to pre og, they must be	0.1 kg ndary packaging ormal conditions kaging. Second		
<ul> <li>ADDITIONAL</li> <li>Substance a rigid out</li> <li>Primary in transport, packaging multiple p wrapped</li> <li>The conte</li> <li>The provis</li> <li>In the case</li> </ul>	fissile-excepted <b>PACKING REQUIREM</b> es must be packed in a rest they packaging. Inter receptacles must be they cannot break, be gs must be secured in primary receptacles are or separated so as to pre- orts must comply with the sions of 6;7.3 must be me e of fissile-excepted marked fissile-excepted marked packaging. The secure of the sec	ENTS FOR COMBINATION PACKAGING metal or plastics primary receptacle in a lease pe packed in secondary packagings in a v punctured or leak their contents into th outer packagings with suitable cushionin e placed in a single secondary packagin event contact between them. e provisions of 2;7.2.4.5.2. net.	0.1 kg SS akproof rigid seco vay that, under ne e secondary pac og material to pre og, they must be	0.1 kg ndary packaging ormal conditions kaging. Second		
<ul> <li>ADDITIONAL</li> <li>Substance a rigid out</li> <li>Primary in transport, packaging multiple p wrapped</li> <li>The conte</li> <li>The provis</li> <li>In the case</li> </ul>	fissile-excepted <b>PACKING REQUIREM</b> es must be packed in a rest they packaging. Inter receptacles must be they cannot break, be gs must be secured in primary receptacles are or separated so as to pre- orts must comply with the sions of 6;7.3 must be me e of fissile-excepted marked fissile-excepted marked packaging. The secure of the sec	TENTS FOR COMBINATION PACKAGING metal or plastics primary receptacle in a lease pe packed in secondary packagings in a v e punctured or leak their contents into th outer packagings with suitable cushionin e placed in a single secondary packagin event contact between them. e provisions of 2;7.2.4.5.2. net. terial, limits specified in 2;7.2.3.5 and 6;7.1	0.1 kg SS akproof rigid seco vay that, under ne e secondary pac og material to pre og, they must be	0.1 kg ndary packaging ormal conditions kaging. Second		

## Packing Instruction 620

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#### Special packing provisions

- a) Shippers of infectious substances must ensure that packages are prepared in such a manner that they arrive at their destination in good condition and present no hazard to persons or animals during transport.
- b) The definition in 1;3, and the general packing requirements of 4;1, apply to infectious substances packages.
- c) An itemized list of contents must be enclosed between the secondary packaging and the outer packaging. When the infectious substances to be transported are unknown, but suspected of meeting the criteria for inclusion in Category A, the words "suspected Category A infectious substance" must be shown in parentheses following the proper shipping name on the itemized list of contents inside the outer packaging.
- 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 <u>marking mark</u> indicating that it had contained an infectious substance must be removed or obliterated.

UN Model Regulations, P650, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

## Packing Instruction 650

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- 10) When packages are placed in an overpack, the package-<u>markings\_marks</u> required by this packing instruction must either be clearly visible or the<u>markings\_marks</u> must be reproduced on the outside of the overpack and the overpack must be marked with the word "Overpack".
- 11) Infectious substances assigned to UN 3373 which are packed and marked in accordance with this packing instruction are not subject to any other requirement in these Instructions except for the following:
  - a) the name and address of the shipper and of the consignee must be provided on each package;
  - b) the name and telephone number of a person responsible must be provided on a written document (such as an air waybill) or on the package;
  - c) classification must be in accordance with 2;6.3.2;
  - d) the incident reporting requirements in 7;4.4 must be met;
  - e) the inspection for damage or leakage requirements in 7;3.1.3 and 7;3.1.4; and
  - f) passengers and crew members are prohibited from transporting infectious substances either as, or in, carry-on baggage or checked baggage or on their person.

Note.— When the shipper or consignee is also the "person responsible" as referred to in b), the name and address need be marked only once in order to satisfy the name and marking provisions in both a) and b).

- 12) Clear instructions on filling and closing such packages must be provided to the shipper or to the person who prepares the package (e.g. patient) by packaging manufacturers and subsequent distributors to enable the package to be correctly prepared for transport.
- 13) Other dangerous goods must not be packed in the same packaging as Division 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Class 3, 8 or 9 may be packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 3;5. When these small quantities of dangerous goods are packed with infectious substances in accordance with this packing instruction no other requirements in these Instructions need be met.

#### Additional requirements:

1) Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4;2.8.

# Chapter 11

## CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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UN Model Regulations, packing instruction P005, ST/SG/AC.10/42/Add.1, DGP/25-WP/3 (see paragraphs 3.2.3.2.1 d) and 3.2.4.1)

flammable	Passenger and cargo aircraft for UN 3166 or Packing Instruction 220 for flammable gas-powered engines and mach a liquid-powered engines and machinery, Packing Instruction 951 for f	inery, Packing Instantion Instantiation Instantiatio Instantiatio Instantiatio Instant	wered vehicles a
enginee	s-or, Packing Instruction 952 for battery-powered equipment and vehic engines or machinery containing only environmentally ha		struction 972 for
General re	equirements		
Part 4, Cha	apter 1 requirements must be met, including:		
Compatib	ility requirements		
— Su	ubstances must be compatible with their packagings as required by 4;	1.1.3.	
	UN number and proper shipping name	Quantity — passenger	Quantity — cargo
UN 3166	Engines, internal combustion, flammable liquid powered or Vehicle, flammable liquid powered or Vehicle, fuel cell, flammable liquid powered or <del>Engine, fuel cell, flammable</del> <del>powered</del>	No limit	No limit
Flammable Except as securely. S or equipm	IAL PACKING REQUIREMENTS e liquid fuel tanks otherwise provided for in this packing instruction, fuel tanks must be Special precautions are necessary to ensure complete drainage of th ent incorporating internal combustion engines, such as lawn mower	ne fuel system of s-and-outboard-n	vehicles <del>, machir</del> <del>notors</del> , where su
Flammable Except as securely. S <del>or equipm machines</del> to handle i as practica	e liquid fuel tanks otherwise provided for in this packing instruction, fuel tanks must be Special precautions are necessary to ensure complete drainage of th ent incorporating internal combustion engines, such as lawn mower or equipment vehicles could possibly be handled in other than an up in other than an upright position, vehicles, except those with diesel er able, and if any fuel remains, it must not exceed one-quarter of the tar	ne fuel system of 's and outboard n right position. Who ngines, must be di	vehicles <del>, machir notors</del> , where su en it is not possi
Flammable Except as securely. S or equipm machines to handle i as practica Diesel eng	e liquid fuel tanks otherwise provided for in this packing instruction, fuel tanks must be Special precautions are necessary to ensure complete drainage of th ent incorporating internal combustion engines, such as lawn mower or equipment vehicles could possibly be handled in other than an up in other than an upright position, vehicles, except those with diesel er able, and if any fuel remains, it must not exceed one-quarter of the tan gines	ne fuel system of s <del>and outboard n</del> right position. Whi ngines, must be di k capacity.	vehicles <del>, machir totors</del> , where su en it is not possi rained of fuel as
Flammable Except as securely. S <del>or equipm machines</del> to handle i as practica Diesel eng Vehicles e sufficient u	e liquid fuel tanks otherwise provided for in this packing instruction, fuel tanks must be Special precautions are necessary to ensure complete drainage of th ent incorporating internal combustion engines, such as lawn mower or equipment vehicles could possibly be handled in other than an up in other than an upright position, vehicles, except those with diesel er able, and if any fuel remains, it must not exceed one-quarter of the tar	ne fuel system of s-and outboard n right position. Wh ngines, must be du k capacity. drain the fuel tan hout leakage, and	vehicles <del>, machir totors</del> , where su en it is not possi rained of fuel as ks, provided tha
Flammable Except as securely. S <del>or equipm machines</del> to handle i as practica Diesel eng Vehicles e sufficient u	e liquid fuel tanks otherwise provided for in this packing instruction, fuel tanks must be Special precautions are necessary to ensure complete drainage of th ent incorporating internal combustion engines, such as lawn mower or equipment vehicles could possibly be handled in other than an up in other than an upright position, vehicles, except those with diesel er able, and if any fuel remains, it must not exceed one-quarter of the tar gines equipped with diesel engines are excepted from the requirement to ullage space has been left inside the tank to allow fuel expansion wit	ne fuel system of s-and outboard n right position. Wh ngines, must be du k capacity. drain the fuel tan hout leakage, and	vehicles <del>, machir totors</del> , where su en it is not possi rained of fuel as ks, provided tha
Flammable Except as securely. S or equipm machines to handle i as practica Diesel eng Vehicles e sufficient u tightly clos Batteries All batterie	e liquid fuel tanks otherwise provided for in this packing instruction, fuel tanks must be Special precautions are necessary to ensure complete drainage of th ent incorporating internal combustion engines, such as lawn mower or equipment vehicles could possibly be handled in other than an up in other than an upright position, vehicles, except those with diesel er able, and if any fuel remains, it must not exceed one-quarter of the tar gines equipped with diesel engines are excepted from the requirement to ullage space has been left inside the tank to allow fuel expansion wit	ne fuel system of s-and outboard n right position. Whi ngines, must be di k capacity. drain the fuel tan hout leakage, and es.	vehicles <del>, machir hotors</del> , where su rained of fuel as ks, provided tha d the tank caps a
Flammable Except as securely. S or equipm machines- to handle i as practica Diesel eng Vehicles e sufficient u tightly clos Batteries All batterie must be pr 1) if s su	e liquid fuel tanks otherwise provided for in this packing instruction, fuel tanks must be Special precautions are necessary to ensure complete drainage of th ent incorporating internal combustion engines, such as lawn mower or equipment vehicles could possibly be handled in other than an up in other than an upright position, vehicles, except those with diesel er able, and if any fuel remains, it must not exceed one-quarter of the tar gines equipped with diesel engines are excepted from the requirement to ullage space has been left inside the tank to allow fuel expansion with ed. A careful check must be made to ensure there are no fuel leakage es must be installed and securely fastened in the battery holder of the	ne fuel system of s-and outboard n right position. Why ngines, must be do k capacity. drain the fuel tan hout leakage, and es. e vehicle, machine . In addition: chine or equipme	vehicles <del>, machir hotors</del> , where su en it is not possi rained of fuel as ks, provided tha d the tank caps a e or equipment a nt to be handled
Flammable Except as securely. S or equipm machines to handle i as practica Diesel eng Vehicles e sufficient u tightly clos Batteries All batteries must be pr 1) if s su ac 2) if l	e liquid fuel tanks otherwise provided for in this packing instruction, fuel tanks must be Special precautions are necessary to ensure complete drainage of th ent incorporating internal combustion engines, such as lawn mower or equipment vehicles could possibly be handled in other than an upright position, vehicles, except those with diesel er able, and if any fuel remains, it must not exceed one-quarter of the tar gines equipped with diesel engines are excepted from the requirement to ullage space has been left inside the tank to allow fuel expansion wit ed. A careful check must be made to ensure there are no fuel leakage es must be installed and securely fastened in the battery holder of the rotected in such a manner so as to prevent damage and short circuits. spillable batteries are installed, and it is possible for the vehicle <del>, ma</del> ch a way that batteries would not remain in their intended orientation	ne fuel system of s-and outboard n right position. Why right position. Why right position. Why right position. Why drain the fuel tan hout leakage, and e vehicle, machine the vehicle, machine a vehicle, machine chine or equipme a, they must be re 2;9.3, unless other astened in the ve	vehicles, machir notors, where su en it is not possi rained of fuel as ks, provided that d the tank caps a e or equipment a nt to be handled moved and pack erwise approved ehicle, machine

#### Other operational equipment

- 1) Dangerous goods required for the operation or safety of the vehicle, machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the vehicle, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.
- Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

#### Internal combustion or fuel cell engine shipped separately (not installed)

- 1) When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.
- 2) This requirement also applies to vehicles, machines or equipment containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

UN Model Regulations, packing instruction P005, ST/SG/AC.10/42/Add.1, DGP/25-WP/3 (see paragraphs 3.2.3.2.1 d) and 3.2.4.1)

	Packing Instruction 951		
(54	Cargo aircraft only for UN 3166 only be Packing Instruction 220 for flammable gas-powered engines and mac	hinery Packing Ins	struction 378 for
flamn	nable liquid-powered engines and machinery, Packing Instruction 950 fo	r flammable liquid-	powered vehicles
and e	ngines or Packing Instruction 952 for battery-powered equipment and ve engines or machinery containing only environmentally have	ehicles or Packing	Instruction 972 fo
		azardous rueis	
Gener	al requirements		
Part 4,	Chapter 1 requirements must be met, including:		
·			
omp	atibility requirements		
_	Substances must be compatible with their packagings as required by 4	;1.1.3.	
		Quantity —	Quantity —
	UN number and proper shipping name	passenger	cargo
UN 31			
	Vehicle, flammable gas powered or Vehicle, fuel cell, flammable gas powered <del>, or Engine, fuel cell, flammable gas</del>	Forbidden	No limit
	powered		
	IONAL PACKING REQUIREMENTS		
-lamr	able gas vessels		
1)	for flammable gas-powered vehicles, machines or equipment, pressuri	zad vassals contai	ning the flammal
1)	gas must be completely emptied of flammable gas. Lines from vessels		
	themselves, must also be drained of all trace of flammable gas. To e	ensure that these of	conditions are m
	gas shut-off valves must be left open and connections of lines to gas	regulators must b	e left disconnect
	upon delivery of the vehicle to the operator. Shut-off valves must be regulators before loading the vehicle aboard the aircraft;	closed and lines r	econnected at g
01	alternatively,		
2)			
	equipped with electrically operated valves that close automatically in ca manual shut-off valves, may be transported under the following condition		sconnected, or w
	i) the tank abut off values must be in the closed position and in the		
		case of electrical	ly operated valve
	<li>i) the tank shut-off valves must be in the closed position and in the power to those valves must be disconnected;</li>	case of electrical	ly operated valve
	power to those valves must be disconnected;		
	<ul><li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li></ul>	<del>chinery</del> must be op	erated until it sto
	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must the remaining pressure of contract of the closed system must be closed system must be</li></ul>	<del>chinery</del> must be op mpressed gases e:	erated until it sto xceed 5 per cent
	<ul><li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li></ul>	<del>chinery</del> must be op mpressed gases e:	erated until it sto xceed 5 per cent
Batteri	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepts 2 000 kPa (20 bar), whichever is the lower.</li> </ul>	<del>chinery</del> must be op mpressed gases e:	erated until it sto xceed 5 per cent
Batteri	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepts 2 000 kPa (20 bar), whichever is the lower.</li> </ul>	<del>chinery</del> must be op mpressed gases e: acle (fuel tank) sys	erated until it sto xceed 5 per cent stem, or more th
All bat	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepts 2 000 kPa (20 bar), whichever is the lower.</li> </ul>	<del>chinery</del> must be op mpressed gases e: acle (fuel tank) sys ne vehicle <del>, machine</del>	erated until it sto xceed 5 per cent stem, or more th
All bat	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepts 2 000 kPa (20 bar), whichever is the lower.</li> </ul>	<del>chinery</del> must be op mpressed gases e: acle (fuel tank) sys ne vehicle <del>, machine</del>	erated until it sto xceed 5 per cent stem, or more th
All bat nust b	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepts 2 000 kPa (20 bar), whichever is the lower.</li> <li>es</li> <li>teries must be installed and securely fastened in the battery holder of the protected in such a manner so as to prevent damage and short circuits if spillable batteries are installed, and it is possible for the vehicle, maximum and the secure of the pressure of the presence of the presence of the presence of the protected in such a manner so as to prevent damage and short circuits if spillable batteries are installed, and it is possible for the vehicle, maximum and the presence of the p</li></ul>	<del>chinery</del> must be op mpressed gases e: acle (fuel tank) sys acle vehicle <del>, machine</del> s. In addition: achine or equipme	erated until it sto xceed 5 per cent stem, or more th e or equipment a nt to be handled
All bat nust b	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepted 2 000 kPa (20 bar), whichever is the lower.</li> <li>es</li> <li>teries must be installed and securely fastened in the battery holder of the protected in such a manner so as to prevent damage and short circuits if spillable batteries are installed, and it is possible for the vehicle, may such a way that batteries would not remain in their intended orientation.</li> </ul>	<del>chinery</del> must be op mpressed gases e: acle (fuel tank) sys acle vehicle <del>, machine</del> s. In addition: achine or equipme	erated until it sto xceed 5 per cent stem, or more th e or equipment a nt to be handled
All bat nust b 1)	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepts 2 000 kPa (20 bar), whichever is the lower.</li> <li>es</li> <li>teries must be installed and securely fastened in the battery holder of the protected in such a manner so as to prevent damage and short circuits if spillable batteries are installed, and it is possible for the vehicle, may such a way that batteries would not remain in their intended orientatio according to Packing Instruction 492 or 870 as applicable;</li> </ul>	<del>chinery</del> must be op mpressed gases e: acle (fuel tank) sys te vehicle <del>, machine</del> s. In addition: <del>achine or equipme</del> n, they must be re	erated until it sto xceed 5 per cent stem, or more th e or equipment a nt to be handled moved and pack
All bat nust b 1)	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepts 2 000 kPa (20 bar), whichever is the lower.</li> <li>es</li> <li>teries must be installed and securely fastened in the battery holder of the protected in such a manner so as to prevent damage and short circuits if spillable batteries are installed, and it is possible for the vehicle, may such a way that batteries would not remain in their intended orientatio according to Packing Instruction 492 or 870 as applicable;</li> <li>if lithium batteries are installed, they must meet the provisions of Part</li> </ul>	chinory must be op mpressed gases e: acle (fuel tank) sys te vehicle <del>, machino</del> s. In addition: achine or equipme n, they must be re 2;9.3, unless othe	erated until it sto xceed 5 per cent stem, or more th e or equipment a mit to be handled moved and pack erwise approved
All bat nust b 1)	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepts 2 000 kPa (20 bar), whichever is the lower.</li> <li>es</li> <li>teries must be installed and securely fastened in the battery holder of the protected in such a manner so as to prevent damage and short circuits if spillable batteries are installed, and it is possible for the vehicle, may such a way that batteries would not remain in their intended orientatio according to Packing Instruction 492 or 870 as applicable;</li> <li>if lithium batteries are installed, they must meet the provisions of Part the appropriate authority of the State of Origin, must be securely fasteries of the state of Origin, must be securely fasteries of the state of Origin, must be securely fasteries and the state of Origin.</li> </ul>	chinory must be op mpressed gases e: acle (fuel tank) sys te vehicle <del>, machine</del> s. In addition: achine or equipme n, they must be re 2;9.3, unless othe astened in the veh	erated until it sto xceed 5 per cent stem, or more th or cquipment a nt to be handled moved and pack erwise approved nicle, machinery
All bat nust b 1) 2)	<ul> <li>power to those valves must be disconnected;</li> <li>ii) after closing the tank shut-off valves, the vehicle, equipment or may from lack of fuel before being loaded aboard the aircraft;</li> <li>iii) in no part of the closed system must the remaining pressure of conthe maximum allowable working pressure of the pressure recepts 2 000 kPa (20 bar), whichever is the lower.</li> <li>es</li> <li>teries must be installed and securely fastened in the battery holder of the protected in such a manner so as to prevent damage and short circuits if spillable batteries are installed, and it is possible for the vehicle, may such a way that batteries would not remain in their intended orientatio according to Packing Instruction 492 or 870 as applicable;</li> <li>if lithium batteries are installed, they must meet the provisions of Part</li> </ul>	chinery must be op mpressed gases e: acle (fuel tank) sys acle (fuel tank) sys achine or equipme n, they must be re 2;9.3, unless othe astened in the vel amage and short ci	erated until it sto xceed 5 per cent stem, or more th e or equipment a nt to be handled moved and pack erwise approved nicle, machinery- ircuits; and

3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

#### Other operational equipment

- 1) Dangerous goods required for the operation or safety of the vehicle, machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the vehicle, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.
- Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

#### Internal combustion or fuel cell engine shipped separately (not installed)

- 1) When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.
- 2) This requirement also applies to vehicles, machines or equipment containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

#### • • •

UN Model Regulations, packing instruction P005, ST/SG/AC.10/42/Add.1, DGP/25-WP/3 (see paragraphs 3.2.3.2.1 d) and 3.2.4.1)

## Packing Instruction 952 Passenger and cargo aircraft for UN 3171 only (See Packing Instruction 220 for flammable gas-powered engines and machinery, Packing Instruction 378 for flammable liquid-powered engines and machinery, Packing Instruction 950 for flammable liquid-powered vehicles and engines or Packing Instruction 951 for flammable gas-powered vehicles and engines or machinery containing only environmentally hazardous fuels) ...

• • •

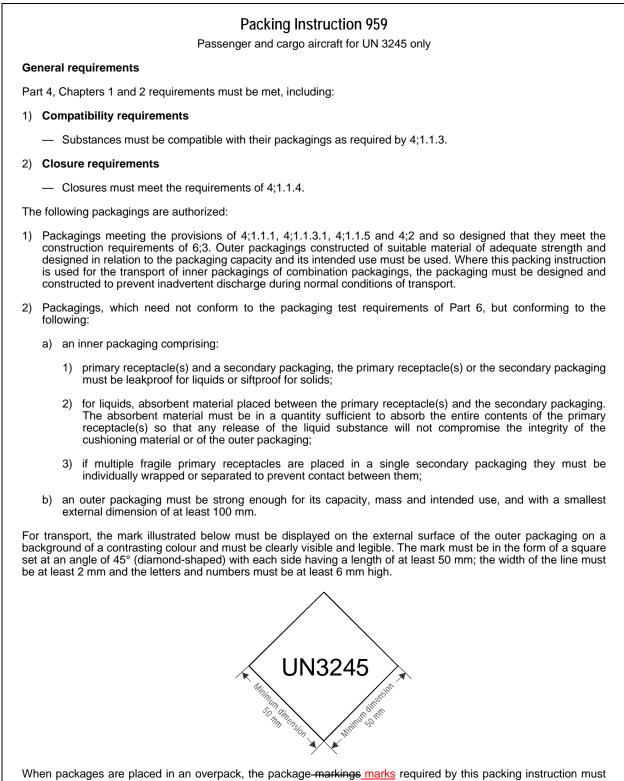
DGP/25-WP/2 (see paragraph 3.2.7.2) and DGP/25-WP/3 (see paragraph 3.2.7.4.1)

## Packing Instruction 954 Passenger and cargo aircraft for UN 1845 only Dry ice-used for other than dangerous goods may be shipped in a unit load device-or other type of pallet prepared by a single shipper provided that: a) the shipper has made prior arrangements with the operator; the unit load device does not contain dangerous goods other than UN 3373, Biological substance, Category B or ID 8000, Consumer commodity. Where the unit load device contains UN 3373 or ID 8000, the provisions of these Instructions that apply to those substances must be met in addition to the provisions set out in this packing instruction; b) the unit load device, or other type of pallet, must allow the venting of the carbon dioxide gas to prevent a dangerous build-up of pressure (the marking requirements of 5;2 and the labelling requirements of 5;3 do not apply to the unit load device); and the shipper must provide the operator with written documentation or, where agreed with the operator, C) information by EDP or EDI techniques, stating the total quantity of the dry ice contained in the unit load device or other type of pallet.

UN Model Regulations, P906, ST/SG/AC.10/42/Add. and DGP/25-WP/3 (see paragraph 3.2.4.1)

Passenger and cargo aircraft	101 UN 1841, UN	1931, UN 3432	, UN 2909, UN	i 30 <i>t t</i> , UN 31	oz anu UN 3.	SSS ONIY
(	COMBINATION PA				SING PACKAC	
		Inner	Total	Total	TACKA	
		packaging	quantity per	quantity per		
UN number and proper	Inner packaging	quantity (per	package —	package —	Quantity —	Quantity
shipping name	(see 6;3.2)	receptacle)	passenger	cargo	passenger	— cargo
UN 1841 Acetaldehyde	Glass	10.0 kg				
ammonia	Fibre	50.0 kg				
	Metal	50.0 kg	200 kg	200 kg	200 kg	200 kg
	Paper bag	50.0 kg	J	5	J	
	Plastics Plastic bag	50.0 kg				
UN 1931 Zinc dithionite or	Glass	50.0 kg 10.0 kg				
Zinc hydrosulphite	Fibre	50.0 kg	ł			
Line nyarosaipinte	Metal	50.0 kg				
	Paper bag	50.0 kg	100 kg	200 kg	100 kg	200 kg
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 2969 Castor beans or	Glass	10.0 kg				
Castor flake or	Fibre	50.0 kg	ĺ			
Castor meal or	Metal	50.0 kg	N In Line it	Nin lineit	N I a 1 i an i t	N a Line
Castor pomace	Paper bag	50.0 kg	No limit	No limit	No Limit	No Limi
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 3077 Environmentally	Glass	10.0 kg				
hazardous	Fibre	50.0 kg				
substance, solid,	Metal	50.0 kg	400 kg	400 kg	400 kg	400 kg
n.o.s.	Paper bag	50.0 kg	100 kg	400 kg	400 kg	100 kg
	Plastics	50.0 kg				
	Plastic bag	50.0 kg				
UN 3152 Polyhalogenated	Glass	10.0 kg				
biphenyls, solid or Polyhalogenated		50.0 kg				
terphenyls, solid or	Metal	50.0 kg				
Halogenated	Paper bag Plastics	50.0 kg 50.0 kg	100 kg	200 kg	100 kg	200 kg
monomethyl- diphenylmethanes,	Plastic bag	50.0 kg				
solid	Close	10.0 1/2				
UN 3335 Aviation regulated solid, n.o.s.	Glass Fibre	10.0 kg 50.0 kg	Į			
3011u, 11.0.3.		50.01	ł			
	Metal Paper bag	50.0 kg 50.0 kg	400 kg	400 kg	400 kg	400 kg
	Plastics	50.0 kg	{			
	Plastic bag	50.0 kg	ł			
UN 3432 Polychlorinated	Glass	10.0 kg				
biphenyls, solid	Fibre	50.0 kg	1			
• • • • • •	Metal	50.0 kg	100 1	0001	1001	0001
	Paper bag	50.0 kg	100 kg	200 kg	100 kg	200 kg
	Plastics	50.0 kg	1			
	Plastic bag	50.0 kg				

The following amendment is made in accordance with UN Model Regulations ST/SG/AC.10/42/Add.1, which introduced consistent use of the terms "mark" and "marking".



either clearly be visible or the markings marks must be reproduced on the outside of the overpack and the overpack must be marked with the word "Overpack".

¥

GMOs or GMMOs assigned to UN 3245 which are packed and marked in accordance with this packing instruction are not subject to any other requirement in these Instructions except for the following:

- the name and address of the shipper and of the consignee must be provided on each package; 1)
- 2) 3) classification must be in accordance with 2;9.2.1 c);
- the incident reporting requirements in 7;4.4 must be met;
- 4)́ the inspection for damage or leakage requirements in 7;3.1.3 and 7;3.1.4;
- 5) passengers and crew members are prohibited from transporting UN 3245 either as, or in, carry-on baggage or checked baggage or on their person.

#### ADDITIONAL PACKING REQUIREMENTS

- When dry ice or liquid nitrogen is used, all applicable requirements of these Instructions must be met. When used, ice or dry ice must be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports must be provided to secure the secondary packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack must be leakproof. If dry ice is used, the requirements in Packing Instruction 954 must be met.
- The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

. . .

DGP/25-WP/2 (see paragraph 3.2.7.2)

## 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.

. . .

k) Consumer commodities shipped according to these provisions may be shipped in a unit load device-or other type of pallet prepared by a single shipper provided they contain no other dangerous goods. The shipper must provide the operator with written documentation stating the number of packages of consumer commodities contained in each unit load device or other type of pallet.

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- 39 -

UN Model Regulations, P906, ST/SG/AC.10/42/Add. and DGP/25-WP/3 (see paragraph 3.2.4.1)

Passenger and cargo aircraft for	or UN 1941, I	JN 1990, UN	l 2315, UN 315 <sup>,</sup>	1, UN 3082 and	I UN 3334 or	nly
СОМВ		CKAGINGS			SING PACKAG	
UN number and	Inner packaging	Inner packaging quantity (per	Total quantity per package —	Total quantity per package —		
proper shipping name UN 1941 Dibromodifluoromethane	(see 6;3.2) Glass Plastics	receptacle) 10.0 L 30.0 L	passenger 100 L	cargo 220 L	<i>Passenger</i> 100 L	<u>Car</u> 220
UN 1990 Benzaldehyde	Metal Glass Plastics Metal	40.0 L 10.0 L 30.0 L 40.0 L	100 L	220 L	100 L	220
UN 2315 Polychlorinated biphenyls, liquid	Glass Plastics Metal	10.0 L 30.0 L 40.0 L	100 L	220 L	100 L	220
UN 3082 Environmentally hazardous substance, liquid, n.o.s.	Glass Plastics Metal	10.0 L 30.0 L 40.0 L	450 L	450 L	450 L	450
UN 3151 Polyhalogenated biphenyls, liquid or Polyhalogenated terphenyls, liquid <u>or</u> <u>Halogenated</u>	Glass Plastics Metal	10.0 L 30.0 L 40.0 L	100 L	220 L	100 L	220
monomethyldiphenyl- methanes, liquid UN 3334 Aviation regulated liquid, n.o.s.	Glass Plastics	10.0 L 30.0 L	450 L	450 L	450 L	450
	Metal	40.0 L				

		Pa	issenger and	cargo aircraft for l	JN 3480		
UN Mo (see parag		Regulations, 2.4.1.1 d))	SP 188,	ST/SG/AC.	10/42/Add.1	and	DGP/25-WP/3
. Introduc	ion						
This entry	applies	to lithium ion or lit	hium polymer	batteries. This pa	acking instructi	on is struc	tured as follows:
with a applid 	Watt-ho able rec n IB ap Watt-ho n II, Tal n II app Watt-ho n II, Tal watt-ho n II, Tal <u>cell batt</u> <u>d a "cel</u>	our rating in exces juirements of these plies to lithium ion our rating not exce ole 965-II; and our rating not exce ole 965-II. erry as defined in l" and must be tr	s of 100 Wh, e Instructions; cells with a V eeding 100 W cells with a V eding 100 W Part III, sub ansported ac	which must be as Watt-hour rating n Vatt-hour rating n packed in quant -section 38.3.2.3	signed to Clas not exceeding 2 ntities that exc ot exceeding 2 ities not excee	s 9 and ai 20 Wh and eed the al 20 Wh and ding the a danual of	d lithium ion batterie re subject to all of th d lithium ion batterie llowance permitted d lithium ion batterie llowance permitted i <u>Tests and Criteria</u> r the purpose of th
The follow	ing app	lies to all lithium ic	on cells and ba	atteries in this pac	king instruction	n:	
damaged for transp Waste lit	that ha ort (e.g. ium ba	we the potential or those being return tteries and lithium	f producing a red to the man n batteries be	dangerous evolu nufacturer for safe sing shipped for	tion of heat, fin ty reasons). recycling or d	re or short isposal ar	s, or that have bee t circuit are forbidde re forbidden from a and the State of th
	ΙΔ						
				60.0.0			
Each ceil	or batte	ry must meet all th	e provisions o	or 2;9.3.			
A.1 Gene	al requ	irements					
_		rements must be r	net.				
			Та	able 965-IA			
			number	Net qu	antity per pack	kage	
			number shipping nam	e Passen	ger Ca	rgo	
		UN 3480 Lith	ium ion batte	eries 5 kg	35	kg	
A.2 Addi	onal re	quirements					
— L — L b	hium io hium io ttery the	n cells and batterie n cells and batter	ies must be p uter packagin	placed in inner pa g. The completed	ackagings that		ly enclose the cell or batteries must me

Lithium ion batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates) not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment. Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the subject of the state of the state

outside case.

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	Packing Instruction 965	
A.3 Outer packagings		
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 (1B2) Fibre (1G) Other metal (1N2) Plastics (1H2) Plywood (1D) Steel (1A2)	Aluminium (3B2) Plastics (3H2) Steel (3A2)

Quantities of lithium ion cells or batteries that exceed the allowance permitted in Section II, Table 965-II are subject to all of the applicable provisions of these Instructions (including the requirements in paragraph 2 of this packing instruction and of this section) except for the the provisions of Part 6.

Lithium ion cells or batteries shipped in accordance with the provisions of Section IB must be described on a dangerous goods transport document as set in Part 5;4. The packing instruction number "965" required by 5;4.1.5.8.1 a) must be supplemented with "IB". All other applicable provisions of Part 5;4 apply.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;

2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 — the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009;

#### IB.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

#### Table 965-IB

	Net quantity p	per package
Contents	Passenger	Cargo
Lithium ion cells and batteries	10 kg	10 kg

	Packing Instruction 965
IB.2	Additional requirements
	<ul> <li>Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.</li> <li>Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.</li> <li>Each package must be capable of withstanding a 1.2 m drop test in any orientation without:         <ul> <li>damage to cells or batteries contained therein;</li> <li>shifting of the contents so as to allow battery to battery (or cell to cell) contact;</li> <li>release of contents.</li> </ul> </li> </ul>
UN (see	Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 paragraphs 3.2.5.1.1 b) and c))
UN	<ul> <li>Each package must be <u>labelled marked</u> with <u>a the appropriate</u> lithium battery <u>handling label mark</u> (Figure 5-32 <u>5-3</u>) in addition to the Class 9 hazard label.</li> <li><u>Note.</u> <u>Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018.</u></li> <li>Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 and DGP/25-WP/3</li> </ul>
	paragraph 3.2.4.1.1)
	<ul> <li>Each consignment must be accompanied with a document with an indication that:         <ul> <li>the package contains lithium ion cells or batteries;</li> <li>the package must be handled with care and that a flammability hazard exists if the package is damaged;</li> <li>special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and</li> <li>a telephone number for additional information.</li> </ul> </li> </ul>
	Note.— This information may be provided on the dangerous goods transport document.
IB.3	Outer packagings
l	Boxes Drums Jerricans
	Strong outer packagings

## Packing Instruction 965

#### DGP/25-WP/3 (see paragraphs 3.5.1.4.1 and paragraph 3.5.1.1.1)

#### II. SECTION II

With the exception of Part 1;2.3 (General — Transport of dangerous goods by post), 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents), 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium ion cells and batteries offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium ion cells and batteries, when complying with Section II of this Packing Instruction, are only subject to the following additional provisions of these Instructions:

- Part 1;2.3 (General Transport of dangerous goods by post);
- Part 5;1.1 g) and j) (Shipper's responsibilities General requirements);
- Part 7;4.4 (Operator's responsibilities Reporting of dangerous goods accidents and incidents);

 Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and

Paragraph 2 of this packing instruction.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
  - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009.

#### II.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

#### Table 965-II

Contents	Lithium ion cells and/or batteries with a Watt-hour rating not more than 2.7 Wh	Lithium ion cells with a Watt-hour rating more than 2.7 Wh, but not more than 20 Wh	Lithium ion batteries with a Watt-hour rating more than 2.7 Wh, but not more than 100 Wh
1	2	3	4
Maximum number of cells / batteries per package	No limit	8 cells	2 batteries
Maximum net quantity (mass) per package	2.5 kg	n/a	n/a

The limits specified in columns 2, 3 and 4 of Table 965-II must not be combined in the same package.

	ns, SP 188 f), ST/SG/AG		DGP/25-WP/3 (s
paragraphs 3.5.1.1.1, 3.2.	4.1, 3.2.5.1.1 b) and c)) and		
II.2 Additional requirements			
<ul> <li>Cells and batteries mu</li> </ul>	ust be packed in inner packagir	ngs that completely enclos	se the cell or battery t
with conductive materia	st be protected so as to prevent s als within the same packaging the	at could lead to a short circ	uit.
<ul> <li>damage to cells or</li> <li>shifting of the content</li> </ul>	capable of withstanding a 1.2 m batteries contained therein; ents so as to allow battery to batt		
<del>32<u>5-3</u>).</del>	-labelled marked with a the app		
<ul> <li><u>the package must l</u> mark being folded.</li> </ul>	be of such size that there is ade	quate space to affix the ma	ark on one side without
<u>Note.— Figure 5-3</u> Edition of these Instruc	2 and the provisions for a lithium tions may continue to be used u	<u>battery handling label as c</u> ntil 31 December 2018.	contained in the 2015-2
UN Model Regulation (see paragraph 3.2.4.1)	ons, SP 188 g), ST/	SG/AC.10/42/Add.1	and DGP/25-WP
repacking if necess	r for additional information. batteries, in compliance with Se		
DGP/25-WP/3 (see parag	graph 3.5.1.1.1)		
must be offered to the observed to the observed be loaded into a unit loaded into a unit loaded into a unit loaded be loaded into a unit loaded be loaded by the served be loaded by the served by the	cks of lithium ion batteries prep operator separately from cargo v ad device before being offered to or offering cells or batteries for t surate with their responsibilities.	<u>hich is not subject to these</u> the operator.	e Instructions and must
DGP/25-WP/3 (see parag	graph 3.5.1.1.1)		
II.3 Outer packagings			
Boxes	Drums	Jerrican	S
<u>Aluminium</u> <u>Fibreboard</u> Natural wood	<u>Aluminium</u> <u>Fibre</u> Other metal	<u>Aluminiu</u> <u>Plastics</u> Steel	
Other metal Plastics Plywood	Plastics Plywood Steel		
Reconstituted wood Steel			
	Strong outer p	ackagings	

## Packing Instruction 965

DGP/25-WP/3 (see paragraph 3.5.1.1.1) (pending outcome of working group on performance standards) and DGP/25-WP/3 (see paragraph 3.2.5.1.1 b))

#### II.4 Overpacks

[Not more than [four (4)] packages may be placed into an overpack and the overpack must not contain other packages containing dangerous goods]. When packages are placed in an overpack, the lithium battery-handling label mark required by this packing instruction must either be clearly visible or the label mark must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

		Packing Instru			at) and (	
	Passenger and cargo	aircrait for UN 34	81 (packed with e	equipmei	nt) only	
-	VN Model Regulations, SP see paragraph 3.2.4.1.1 d))	188, ST/	SG/AC.10/42/2	Add.1	and	DGP/25-WP/3
1.	Introduction					
	This entry applies to lithium ion or lithium	n polymer batterie	es packed with equ	uipment.		
	Section I of this packing instruction a assigned to Class 9. Certain lithium ion a the requirements of Section II of this pa additional requirements of these Instruct	and lithium polym cking instruction,	ner cells and batte	ries offe	red for tr	ansport and meeting
	<u>A single cell battery as defined in Par</u> <u>considered a "cell" and must be transp</u> <u>packing instruction.</u>					
2.	Lithium batteries forbidden from trans	sport				
	The following applies to all lithium ion ce	lls and batteries i	n this packing ins	truction:		
	Cells and batteries, identified by the m damaged, that have the potential of pro for transport (e.g. those being returned to	ducing a danger	ous evolution of h	eat, fire	reasons or short	s, or that have been circuit are forbidden
I.	SECTION I					
Ea	ch cell or battery must meet all the provisi	ons of 2;9.3.				
I.1	General requirements					
	Part 4;1 requirements must be met.					
			e quantity tion I)			
	UN number and proper shipping name	Passenger	Cargo			
	UN 3481 Lithium ion batteries packed with equipment	5 kg of lithium ion cells or batteries	35 kg of lithium ion cells or batteries			
1.2	Additional requirements					
	<ul> <li>Lithium ion cells and batteries must I</li> <li>Lithium ion cells or batteries must:</li> <li>be placed in inner packagings</li> </ul>			or batt	erv then	placed in an outer

- packaging. The completed package for the cells or batteries must meet the Packing Group II

- packaging. The completed package for the cells or batteries must meet the Packing Group if performance requirements; or
   be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a packaging that meets the Packing Group II performance requirements.
   The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
   The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
   For the purpose of this package instruction "conjumpent" means apparatus requiring the lithium ion batteries.
- For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium ion batteries with which it is packed for its operation.
- Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

	Packing Instruction 966	
.3 Outer packagings		
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 (1B2) Fibre (1G) Other metal (1N2) Plastics (1H2) Plywood (1D) Steel (1A2)	Aluminium (3B2) Plastics (3H2) Steel (3A2)
DGP/25-WP/3 (see paragraph 3	35141)	
and batteries packed with equipm to the following additional provisio — Part 1:2.3 (General — Transp — Part 7:4.4 (Operator's response	ent, when complying with Section II on ns of these Instructions: ort of dangerous goods by post); sibilities — Reporting of dangerous go rning passengers and crew — Dar	uirements of this section.Lithium ion cells of this packing instruction, are only subject oods accidents and incidents); ngerous goods carried by passengers o
Lithium ion cells and batteries n provisions of 2;9.3.1 a) and e) and	nay be offered for transport provide I the following:	ed that each cell and battery meets the
1) for lithium ion cells, the W 20 Wh;	/att-hour rating (see the Glossary of	Terms in Attachment 2) is not more than
<ol> <li>for lithium ion batteries, th</li> <li>the Watt-hour rating r</li> <li>manufactured before</li> </ol>		00 Wh; ne battery case except for those batteries
I.1 General requirements		
Cells and batteries must be pack (except 1.1.10.1).	ed in strong outer packagings that c	onform to Part 4;1.1.1, 1.1.3.1 and 1.1.1
	Package quantity (Section II)	

	(Section	
Contents	Passenger	Cargo
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

1

1

# Packing Instruction 966

.2 Additional requirements			
<ul> <li>Lithium ion cells and back</li> </ul>			
<ul> <li>be placed in inner outer packaging; o</li> </ul>		e the cell or battery, then placed in a str	ron <u>g rig</u>
— be placed in inne	er packagings that completely end	lose the cell or battery, then placed	with th
equipment in a stro	ong rigid outer packaging.		
<ul> <li>Cells and batteries mu with conductive materia</li> </ul>	st be protected so as to prevent sho als within the same packaging that c	t circuits. This includes protection agains	st conta
<ul> <li>— The equipment must b</li> </ul>	e secured against movement within	he outer packaging and must be equipped	ed with
an effective means of p	preventing accidental activation.		
<ul> <li>The number of cells or equipment's operation,</li> </ul>	batteries in each package must not	exceed the appropriate number for the	
<ul> <li>Each package of cells</li> </ul>	or batteries, or the completed packa	ge, must be capable of withstanding a 1.	2 m dro
test in any orientation v	without:		
<ul> <li>damage to cells or shifting of the cont</li> </ul>	batteries contained therein;	(or call to call) contact:	
<ul> <li>— similing of the contents</li> <li>— release of contents</li> </ul>	ents so as to allow battery to battery	(or cell to cell) contact,	
<ul> <li>Each package must be</li> </ul>		iate lithium battery handling label mark (	Figure-
<del>32<u>5-3</u>).</del>	bo of such size that there is adequa	e space to affix the mark on one side w	ithout t
mark being folded.		te space to anix the mark on one side w	
<u>Note.— Figure 5-3</u>	2 and the provisions for a lithium bai ctions may continue to be used until	tery handling label as contained in the 2 31 December 2018	015-20
	ons SP 188 g) ST/SG	$\Delta C = \frac{10}{42} \Delta dd = 1$ and DGP/25	-W/P/
UN Model Regulation	ons, SP 188 g), ST/SG	AC.10/42/Add.1 and DGP/25	-WP/3
UN Model Regulation (see paragraph 3.2.4.1)			-WP/2
UN Model Regulation (see paragraph 3.2.4.1) Each consignment must the package contain	st be accompanied with a document ins lithium ion cells or batteries;	with an indication that:	
UN Model Regulation (see paragraph 3.2.4.1) Each consignment must the package contain the package must	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam	with an indication that: mability hazard exists if the package is d	amage
UN Model Regulation (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedured	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam must be followed in the event the	with an indication that:	amage
UN Model Regulation (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedured repacking if necess a telephone number	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam must be followed in the event the cary; and or for additional information.	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe	amage ction ar
UN Model Regulation (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedures repacking if necess a telephone number — The words "lithium ion	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam s must be followed in the event the cary; and or for additional information. batteries, in compliance with Section	with an indication that: mability hazard exists if the package is d	amage ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedures repacking if necess a telephone number The words "lithium ion when an air waybill is u	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam be must be followed in the event the sary; and or for additional information. batteries, in compliance with Section used.	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the a	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedures repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam be must be followed in the event the sary; and or for additional information. batteries, in compliance with Section used.	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package contain the package mutain special procedures repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam s must be followed in the event the sary; and or for additional information. batteries, in compliance with Section ised. or offering cells or batteries for tran surate with their responsibilities.	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the a	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedures a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see parage	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam s must be followed in the event the sary; and or for additional information. batteries, in compliance with Section ised. or offering cells or batteries for tran surate with their responsibilities.	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the a	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package contain the package mutain special procedures repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam s must be followed in the event the sary; and or for additional information. batteries, in compliance with Section ised. or offering cells or batteries for tran surate with their responsibilities.	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the a	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedures repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see parage	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam s must be followed in the event the sary; and or for additional information. batteries, in compliance with Section ised. or offering cells or batteries for tran surate with their responsibilities.	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the a	amage ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedured repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see parage 3 Outer packagings	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam s must be followed in the event the sary; and batteries, in compliance with Section ised. or offering cells or batteries for tran surate with their responsibilities. graph 3.5.1.1.1):	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the ai sport must receive adequate instruction	amage ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package conta repacking if necess a telephone numbe The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see parag Boxes	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam or must be followed in the event the pary; and perfor additional information. batteries, in compliance with Section used. or offering cells or batteries for transurate with their responsibilities. graph 3.5.1.1.1): Drums	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the ai sport must receive adequate instruction <i>Jerricans</i>	amage ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedured repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see parage Boxes Aluminium Fibreboard Natural wood	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam s must be followed in the event the sary; and or offer additional information. batteries, in compliance with Section used. or offering cells or batteries for transurate with their responsibilities. graph 3.5.1.1.1): Drums Aluminium Fibre Other metal	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the ai sport must receive adequate instruction <i>Jerricans</i> <u>Aluminium</u>	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedured repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see parage Boxes Aluminium Fibreboard Natural wood Other metal	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam smust be followed in the event the sary; and or for additional information. batteries, in compliance with Section used. or offering cells or batteries for transurate with their responsibilities. graph 3.5.1.1.1): Drums Aluminium Fibre Other metal Plastics	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the ai sport must receive adequate instruction <i>Jerricans</i> <u>Aluminium</u> <u>Plastics</u>	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedured repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see paragents Boxes Aluminium Fibreboard Natural wood Other metal Plastics	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam is must be followed in the event the sary; and or for additional information. batteries, in compliance with Section used. or offering cells or batteries for transurate with their responsibilities. graph 3.5.1.1.1): Drums Aluminium Fibre Other metal Plastics Plywood	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the ai sport must receive adequate instruction <i>Jerricans</i> <u>Aluminium</u> <u>Plastics</u>	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedured repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see parage Boxes Aluminium Fibreboard Natural wood Other metal Plastics Plywood	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam smust be followed in the event the sary; and or for additional information. batteries, in compliance with Section used. or offering cells or batteries for transurate with their responsibilities. graph 3.5.1.1.1): Drums Aluminium Fibre Other metal Plastics	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the ai sport must receive adequate instruction <i>Jerricans</i> <u>Aluminium</u> <u>Plastics</u>	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedured repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see paragents Boxes Aluminium Fibreboard Natural wood Other metal Plastics	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam s must be followed in the event the sary; and or for additional information. batteries, in compliance with Section ised. or offering cells or batteries for tran surate with their responsibilities. graph 3.5.1.1.1): Drums Aluminium Fibre Other metal Plastics Plywood Steel	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the ai sport must receive adequate instruction <i>Jerricans</i> <u>Aluminium</u> <u>Plastics</u> <u>Steel</u>	<del>amage</del> ction ar
UN Model Regulatio (see paragraph 3.2.4.1) Each consignment mut the package const special procedured repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see parage Boxes Aluminium Fibreboard Natural wood Other metal Plastics Plywood Reconstituted wood Steel	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam is must be followed in the event the sary; and or for additional information. batteries, in compliance with Section ised. or offering cells or batteries for tran surate with their responsibilities. graph 3.5.1.1.1): Drums Aluminium Fibre Other metal Plastics Plywood Steel	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the ai sport must receive adequate instruction <i>Jerricans</i> <u>Aluminium</u> <u>Plastics</u> <u>Steel</u>	<del>amage</del> ction ar
UN Model Regulation (see paragraph 3.2.4.1) Each consignment mut the package conta the package must special procedured repacking if necess a telephone number The words "lithium ion when an air waybill is u Any person preparing requirements commen DGP/25-WP/3 (see parage <b>Boxes</b> Aluminium Fibreboard Natural wood Other metal Plastics Plywood Reconstituted wood	st be accompanied with a document ins lithium ion cells or batteries; be handled with care and that a flam is must be followed in the event the sary; and or for additional information. batteries, in compliance with Section ised. or offering cells or batteries for tran surate with their responsibilities. graph 3.5.1.1.1): Drums Aluminium Fibre Other metal Plastics Plywood Steel	with an indication that: mability hazard exists if the package is d package is damaged, to include inspe- on II of PI966" must be placed on the ai sport must receive adequate instruction <i>Jerricans</i> <u>Aluminium</u> <u>Plastics</u> <u>Steel</u>	<del>amage</del> ction ar

	Passenger and cargo	Packing Instru		quipmen	t) only	
	JN Model Regulations, SF see paragraph 3.2.4.1.1 d))	P 188, ST/	SG/AC.10/42/A	Add.1	and	DGP/25-WP/3
1.	Introduction					
	This entry applies to lithium ion or lithiu	m polymer batterie	es contained in equ	uipment.		
	Section I of this packing instruction a assigned to Class 9. Certain lithium ion the requirements of Section II of this p additional requirements of these Instruct	and lithium polym acking instruction,	er cells and batter	ries offer	ed for tra	ansport and meeting
	A single cell battery as defined in Pa considered a "cell" and must be trans packing instruction.	art III, sub-section ported according	38.3.2.3 of the to the to the requirement	<u>UN Man</u> hts for "c	<u>ual of 7</u> ells" for	ests and Criteria is the purpose of this
2.	Lithium batteries forbidden from tran	nsport				
	The following applies to all lithium ion c	ells and batteries i	n this packing inst	ruction:		
	Cells and batteries, identified by the damaged, that have the potential of pr for transport (e.g. those being returned	oducing a danger	ous evolution of he	eat, fire o		
-						
I.	SECTION I					
	SECTION I Each cell or battery must meet all the p General requirements	rovisions of 2;9.3.				
	Each cell or battery must meet all the p		hat conform to Pa	ırt 4;1.1.1	, 1.1.3.1	and 1.1.10 (except
	Each cell or battery must meet all the p General requirements Equipment must be packed in strong o	outer packagings t	hat conform to Pa	ırt 4;1.1.1	, 1.1.3.1	and 1.1.10 (except
	Each cell or battery must meet all the p General requirements Equipment must be packed in strong o	outer packagings t		ırt 4;1.1.1	, 1.1.3.1	and 1.1.10 (except
	Each cell or battery must meet all the p General requirements Equipment must be packed in strong o 1.1.10.1).	outer packagings t	ntity (Section I)	ırt 4;1.1.1	, 1.1.3.1	and 1.1.10 (except
I.1	Each cell or battery must meet all the p <b>General requirements</b> Equipment must be packed in strong of 1.1.10.1). <i>UN number and proper shipping name</i> UN 3481 Lithium ion batteries	Packagings t Package quar Passenger 5 kg of lithium ion cells or	ntity (Section I) Cargo 35 kg of lithium ion cells or	ırt 4;1.1.1	, 1.1.3.1	and 1.1.10 (except
I.1	Each cell or battery must meet all the p <b>General requirements</b> Equipment must be packed in strong of 1.1.10.1). <i>UN number and proper shipping name</i> UN 3481 Lithium ion batteries contained in equipment	Package quar Package quar Passenger 5 kg of lithium ion cells or batteries against movemen air transport. n strong outer pac o the packaging's e equipment in wh	tity (Section I) Cargo 35 kg of lithium ion cells or batteries t within the outer ckagings construct capacity and its nich it is contained.	packagin ted of su intended	ng and uitable n d use u	be packed so as to naterial of adequate nless the battery is
I.1 I.2	Each cell or battery must meet all the p General requirements Equipment must be packed in strong of 1.1.10.1). UN number and proper shipping name UN 3481 Lithium ion batteries contained in equipment Additional requirements — The equipment must be secured a prevent accidental operation during — The equipment must be packed in strength and design in relation to afforded equivalent protection by th — Batteries manufactured after 31 Do	Package quar Package quar Passenger 5 kg of lithium ion cells or batteries against movemen air transport. n strong outer pac o the packaging's e equipment in wh	tity (Section I) Cargo 35 kg of lithium ion cells or batteries t within the outer ckagings construct capacity and its nich it is contained.	packagin ted of su intended	ng and uitable n d use u	be packed so as to naterial of adequate nless the battery is
I.1 I.2	Each cell or battery must meet all the p General requirements Equipment must be packed in strong of 1.1.10.1). UN number and proper shipping name UN 3481 Lithium ion batteries contained in equipment Additional requirements — The equipment must be secured a prevent accidental operation during — The equipment must be packed in strength and design in relation to afforded equivalent protection by th — Batteries manufactured after 31 Dec case	Package quar Package quar Passenger 5 kg of lithium ion cells or batteries against movemen air transport. n strong outer pac o the packaging's e equipment in wh	tity (Section I) Cargo 35 kg of lithium ion cells or batteries t within the outer ckagings construct capacity and its nich it is contained.	packagin ted of su intended n the Wa	ng and uitable n d use u	be packed so as to naterial of adequate nless the battery is

#### DGP/25-WP/3 (see paragraph 3.5.1.4.1)

#### II. SECTION II

With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;1.4 (Reporting of dangerous goods accidents and incidents), 8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium ion cells and batteries contained in equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium ion cells and batteries contained in equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

- Part 1:2.3 (General Transport of dangerous goods by post); Part 7:4.4 (Operator's responsibilities Reporting of dangerous goods accidents and incidents); Part 8:1.1 (Provisions concerning passengers and crew Dangerous goods carried by passengers or crew); and
- Paragraph 2 of this packing instruction.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
  - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport.

#### II.1 General requirements

Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

	Package (Sectio	quantity on II)
Contents	Passenger	Cargo
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

ĺ

	Packing Instruction	967
		UN Model Regulations, SP 188 f), phs 3.2.4.1 and 3.2.5.1.1 b and c)):
II.2 Additional requirements		
an effective means of preve — Cells and batteries must be — The equipment must be para strength and design in re afforded equivalent protect — Each package containing labelled with a lithium batter (including circuit boards)) (Figure 5-3). The package without the mark being fold — this requirement does r — packages containing — packages containing	enting accidental activation. e protected so as to prevent short acked in strong <u>rigid</u> outer packag elation to the packaging's capac tion by the equipment in which it is more than four cells or more that ery handling label (Figure 5-32) (c )-Each package must be mark must be of such size that there ded. not apply to: ng only button cell batteries install ng no more than four cells or two	ings constructed of suitable material of adequate city and its intended use unless the battery is
	packages in the consignment.	
<u>Note.— Figure 5-32 an</u> Edition of these Instruction	nd the provisions for a lithium batt Is may continue to be used until 3	tery handling label as contained in the 2015-2016 31 December 2018.
UN Model Regulations, (see paragraph 3.2.4.1)	SP 188 g), ST/SG/2	AC.10/42/Add.1 and DGP/25-WP/3
<ul> <li>the package must be h</li> <li>special procedures must be h</li> <li>repacking if necessary;</li> <li>a telephone number for</li> <li>Where a consignment inclusion batteries, in compliance used.</li> <li>Any person preparing or o</li> </ul>	ithium ion cells or batteries; andled with care and that a flamm ust be followed in the event the ; and r additional information. udes packages bearing the lithiur e with Section II of PI967" must b	mability hazard exists if the package is damaged; package is damaged, to include inspection and m battery-handling label mark, the words "lithium be placed on the air waybill, when an air waybill is sport must receive adequate instruction on these
DGP/25-WP/3 (see paragrap	oh 3.5.1.1.1):	
II.3 Outer packagings Boxes	Drums	Jerricans
Aluminium Fibreboard Natural wood Other metal Plastics Plywood Reconstituted wood Steel	Aluminium Fibre Other metal Plastics Plywood Steel Strong outer packa	Aluminium Plastics Steel
DGP/25-WP/3 (see paragrap II.4 <b>Overpacks</b>	bh 3.2.5.1.1 b))	
	rly visible or the label <u>mark</u> must b	ry-handling label mark required by this packing be affixed on the outside of the overpack and the

				•	nstruction 968 Ift only for UN 3090			
UN (see ]	Model paragraph 3	Regulations, (.2.4.1.1 d))	SP	188,	ST/SG/AC.10/4	2/Add.1	and	DGP/25-WP/3
. Inti	roduction							
Thi	s entry applie	s to lithium metal	or lithiur	n alloy ba	atteries. This packing	instruction	is struct	ured as follows:
— — А s	batteries with all of the app Section IB a batteries wit permitted in Section II ap batteries with permitted in single cell ba	n a lithium metal of plicable requireme pplies to lithium h a lithium metal Section II, Table 9 pplies to lithium metal Section II, Table 9 ttery as defined	content i nts of th metal ce conten 068-II; an netal ce content 068-II. in Part	n excess lese Instr ells with a t not exc nd lls with a not exce III, sub-s	a lithium metal con of 2 g, which must b uctions; a lithium metal conte ceeding 2 g packed a lithium metal conte ceeding 2 g packed in section 38.3.2.3 of t ording to the require	e assigned ent not exc in quantitie nt not exc quantities ne UN <i>Ma</i>	I to Class eeeding 1 es that e: eeding 1 not exce nual of	9 and are subject t g and lithium meta xceed the allowand g and lithium meta seding the allowand Tests and Criteria
pac	cking instruction	<u>on.</u>	·					
		es forbidden fron						
The	e following ap	plies to all lithium	metal ce	ells and b	patteries in this packing	ng instructio	on:	
dar	naged, that h	ave the potential	of produ	ucing a d	er as being defective langerous evolution of lacturer for safety re	of heat, fire	reasons or short	s, or that have bee circuit are forbidde
trar					ng shipped for recyc tional authority of th			
A. <b>Se</b>	CTION IA							
Ead	ch cell or batte	ery must meet all	the prov	isions of	2;9.3.			
A.1	General req	uirements						
	Part 4;1 requ	uirements must be	met.					
				Tat	ole 968-IA			
					Not au o ptit		~~~	
			IN numb per shipi	ber bing nam	Net quantity e Passenger	Carg	0	
		UN 3090 L	ithium i atteries	metal	Forbidden	35 kç		
A.2	Additional r	equirements			•	•		
n.2	Additional	equitements						

Lithium metal cells and batteries must be placed in liner packagings that completely enclose the cell of battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements. Lithium metal batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates) not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.

		Packing Instru	uction 968		
A.3 Outer pac	kagings				
Boxes		Drums		Jerrio	cans
Aluminium (4 Fibreboard (4 Natural wood Other metal Plastics (4H1 Plywood (4D Reconstituted Steel (4A)	4Ĝ) I (4C1, 4C2) (4N) (, 4H2) )	Aluminium (1E Fibre (1G) Other metal (1 Plastics (1H2) Plywood (1D) Steel (1A2)	,	Plast	inium (3B2) ics (3H2) (3A2)
B. SECTION IB					
subject to all c packing instruct Lithium metal dangerous go 5;4.1.5.8.1 a) in Lithium metal meets the prov	of the applicable provision and of this section cells or batteries shipp ods transport docume must be supplemented or lithium alloy cells a <i>v</i> isions of 2;9.3.1 a) ar ium metal cells, the lith ium metal or lithium al	sions of these Instru- on) except for the pro ped in accordance w ent as set in Part 5 d with "IB". All other a nd batteries may be nd e) and the followir hium content is not n	ctions (including visions of Part 6. vith the provisions cith the provisions cither packing applicable provision offered for transpose offered for transpo	the requiremer s of Section IB instruction nu ons of Part 5;4 port provided t	hat each cell and batter
	equilemente				
Cells and	-	ucked in strong oute Table 96		at conform to F	Part 4;1.1.1, 1.1.3.1 an
Cells and	batteries must be pa	J			Part 4;1.1.1, 1.1.3.1 an
Cells and	batteries must be pa cept 1.1.10.1).	Table 96	8-IB Net quantity   Passenger	per package Cargo	Part 4;1.1.1, 1.1.3.1 an
Cells and 1.1.10 (ex	batteries must be pa cept 1.1.10.1).	Table 96	8-IB	per package	Part 4;1.1.1, 1.1.3.1 an
Cells and 1.1.10 (ex B.2 Additiona — Cells and placed in a — Cells and with condu — Each pack — damag — shifting	batteries must be pa cept 1.1.10.1).	Table 96 ontents ells and batteries acked in inner packa ng. ected so as to preve the same packaging of withstanding a 1.2 contained therein;	<b>8-IB</b> Net quantity         Passenger         Forbidden         agings that comp         nt short circuits.         that could lead to         end or p test in a	per package Cargo 2.5 kg Detely enclose This includes p o a short circui ny orientation v	the cell or battery the rotection against contact.
Cells and 1.1.10 (ex B.2 Additiona — Cells and placed in a — Cells and with condu — Each pack — damag — shifting — releas UN Model	batteries must be par cept 1.1.10.1). Lithium metal c I requirements batteries must be para a strong outer packagi batteries must be prot toctive materials within age must be capable ge to cells or batteries g of the contents so as	Table 96         contents         ells and batteries         acked in inner packang.         ected so as to preve         the same packaging         of withstanding a 1.2         contained therein;         s to allow battery to b         P       188         f), S	<b>8-IB</b> Net quantity         Passenger         Forbidden         agings that comp         nt short circuits.         that could lead to         end or p test in a	per package Cargo 2.5 kg Detely enclose This includes p o a short circui ny orientation v cell) contact;	the cell or battery the rotection against contact.
Cells and 1.1.10 (exc B.2 Additiona — Cells and placed in a — Cells and with condu — Each pack — damag — shifting — releas UN Model (see paragraph — Each pack <del>32</del> 5-3) in — <i>Note.</i> -	batteries must be parcept 1.1.10.1).	Table 96         ontents         ells and batteries         acked in inner packaging         ng.         ected so as to preve         the same packaging         of withstanding a 1.2         contained therein;         s to allow battery to b         P       188         P       188         P       188         anarked with a the a         a hazard label and th         the provisions for	Net quantity           Passenger         Forbidden         agings that comp         nt short circuits.         that could lead to         m drop test in a         pattery (or cell to of         T/SG/AC.10/4         ppropriate         lithium         battery	per package Cargo 2.5 kg oletely enclose This includes p o a short circui ny orientation v cell) contact; 2/Add.1 a: n battery-handling lab	the cell or battery the protection against contact, without: nd DGP/25-WP/3 ing label mark (Figure 5 re 5 265-28).

repacking if nece	es must be followed in essary; and ber for additional informa		is damaged, to inclue	ude inspection and	
Note. This information may be provided on the dangerous goods transport document.					
IB.3 Outer packagings					
Boxes	Drums		Jerricans		
	Stro	ng outer packagings			
DGP/25-WP/3 (see para	agraph 3.5.1.4.1)				
II. SECTION II					
deck and for passenge (Operator's responsibiliti concerning passengers a packing instruction, lithiu additional requirements lithium alloy cells and bat following additional provis	ies — Reporting of da and crew — Dangerous m metal or lithium alloy ( of these Instructions if tteries, when complying (	ingerous goods accid goods carried by passi cells and batteries offe- they meet the require with Section II of this pa	ents and incidents), engers or crew) and red for transport are i ements of this sectio	8;1.1 (Provisions paragraph 2 of this not subject to other m.Lithium metal or	
<ul> <li>Part 5;1.1 g) and j) (5</li> <li>Part 7;2.1 (Operator's</li> <li>Part 7;2.4.1 (Operator's</li> <li>Part 7;4.4 (Operator's</li> <li>Part 8;1.1 (Provision crew); and</li> <li>Paragraph 2 of this p</li> <li>Lithium metal or lithium a meets the provisions of 2</li> <li>1) for a lithium meta</li> <li>2) for a lithium meta</li> </ul>	alloy cells and batteries r	— General requirementing restrictions on the fading of cargo aircraft); orting of dangerous goors and crew — Dang nay be offered for transfollowing:	flight deck and for pas ods accidents and inc erous goods carried sport provided that ea	idents): by passengers or ach cell and battery	
<ul> <li>Part 5;1.1 g) and j) (5</li> <li>Part 7;2.1 (Operator's</li> <li>Part 7;2.4.1 (Operator's</li> <li>Part 7;4.4 (Operator's</li> <li>Part 8;1.1 (Provision crew); and</li> <li>Paragraph 2 of this p</li> <li>Lithium metal or lithium a meets the provisions of 2</li> <li>1) for a lithium meta</li> <li>2) for a lithium meta</li> <li>II.1 General requirements</li> </ul>	Shipper's responsibilities <u>s responsibilities</u> — Load <u>or's responsibilities</u> — Load <u>s responsibilities</u> — Reponsibilities <u>s concerning passenge</u> <u>backing instruction</u> . alloy cells and batteries r 2;9.3.1 a) and e) and the al cell, the lithium content al or lithium alloy battery,	— General requiremer ling restrictions on the l ading of cargo aircraft); orting of dangerous goo rs and crew — Dang nay be offered for trans following: is not more than 1 g; the aggregate lithium of	flight deck and for past ods accidents and inc erous goods carried sport provided that ea	idents): by passengers or ach cell and battery an 2 g.	
<ul> <li>Part 5;1.1 g) and j) (5</li> <li>Part 7;2.1 (Operator's</li> <li>Part 7;2.4.1 (Operator's</li> <li>Part 7;4.4 (Operator's</li> <li>Part 8;1.1 (Provision crew); and</li> <li>Paragraph 2 of this p</li> <li>Lithium metal or lithium a meets the provisions of 2</li> <li>1) for a lithium meta</li> <li>2) for a lithium meta</li> </ul>	Shipper's responsibilities <u>s responsibilities</u> — Load <u>or's responsibilities</u> — Load <u>s responsibilities</u> — Reponsibilities <u>s concerning passenge</u> <u>backing instruction</u> . alloy cells and batteries r 2;9.3.1 a) and e) and the al cell, the lithium content al or lithium alloy battery,	— General requiremer ling restrictions on the l ading of cargo aircraft); orting of dangerous goo rs and crew — Dang nay be offered for trans following: is not more than 1 g; the aggregate lithium of	flight deck and for past ods accidents and inc erous goods carried sport provided that ea	idents); by passengers or ach cell and battery an 2 g.	
<ul> <li>Part 5;1.1 g) and j) (5</li> <li>Part 7;2.1 (Operator's</li> <li>Part 7;2.4.1 (Operator's</li> <li>Part 7;4.4 (Operator's</li> <li>Part 8;1.1 (Provision crew); and</li> <li>Paragraph 2 of this p</li> <li>Lithium metal or lithium a meets the provisions of 2</li> <li>1) for a lithium meta</li> <li>2) for a lithium meta</li> <li>II.1 General requirements</li> <li>Cells and batteries must</li> </ul>	Shipper's responsibilities s responsibilities — Load or's responsibilities — Load or's responsibilities — Reponsibilities — Reponsibilities — Reponsibilities — Reponsion s concerning passenge packing instruction. alloy cells and batteries r 2;9.3.1 a) and e) and the al cell, the lithium content al cell, the lithium content al or lithium alloy battery, be packed in strong out	— General requiremer ling restrictions on the l ading of cargo aircraft); orting of dangerous goo rs and crew — Dang nay be offered for trans following: is not more than 1 g; the aggregate lithium of	flight deck and for past ods accidents and inc erous goods carried sport provided that ea	idents): by passengers or ach cell and battery an 2 g.	
<ul> <li>Part 5;1.1 g) and j) (5</li> <li>Part 7;2.1 (Operator's</li> <li>Part 7;2.4.1 (Operator's</li> <li>Part 7;4.4 (Operator's</li> <li>Part 8;1.1 (Provision crew); and</li> <li>Paragraph 2 of this p</li> <li>Lithium metal or lithium a meets the provisions of 2</li> <li>1) for a lithium meta</li> <li>2) for a lithium meta</li> <li>II.1 General requirements</li> <li>Cells and batteries must</li> </ul>	Shipper's responsibilities <u>s responsibilities</u> — Load <u>or's responsibilities</u> — Reponsibilities — Reponsibilities — Reponsibilities — Reponsibilities — Reponsion <u>s concerning passenge</u> <u>packing instruction.</u> alloy cells and batteries r 2;9.3.1 a) and e) and the al cell, the lithium content al or lithium alloy battery, be packed in strong out <b>T</b>	General requirement Ing restrictions on the lading of cargo aircraft); orting of dangerous good ors and crew — Dang nay be offered for transfollowing: is not more than 1 g; the aggregate lithium of rer packagings that cor	flight deck and for past ods accidents and inc erous goods carried sport provided that ea	idents): by passengers or ach cell and battery an 2 g. 1.1.3.1 and 1.1.10 Lithium metal batteries with a lithium content more than 0.3 g bi	
<ul> <li>Part 5;1.1 g) and j) (5</li> <li>Part 7;2.1 (Operator's</li> <li>Part 7;2.4.1 (Operator's</li> <li>Part 7;4.4 (Operator's</li> <li>Part 8;1.1 (Provision crew); and</li> <li>Paragraph 2 of this p</li> <li>Lithium metal or lithium at meets the provisions of 2</li> <li>1) for a lithium meta</li> <li>2) for a lithium meta</li> <li>II.1 General requirements</li> <li>Cells and batteries must (except 1.1.10.1).</li> </ul>	Shipper's responsibilities s responsibilities — Load or's responsibilities — Reponsibilities — Reponsibilities — Reponsibilities — Reponsibilities — Reponsion s concerning passenge packing instruction. alloy cells and batteries r 2;9.3.1 a) and e) and the al cell, the lithium content al or lithium alloy battery, be packed in strong out T	General requiremer Ing restrictions on the l ading of cargo aircraft); orting of dangerous goo ors and crew — Dang nay be offered for trans- following: is not more than 1 g; the aggregate lithium of the aggregate lithium of the aggregate lithium of able 968-II Lithium metal cells and/or batteries with a lithium content not	flight deck and for past ods accidents and inc erous goods carried sport provided that ea content is not more th nform to Part 4;1.1.1, <i>Lithium metal cells with a lithium</i> content more than 0.3 g but not more	idents): by passengers or ach cell and battery an 2 g. 1.1.3.1 and 1.1.10 <i>Lithium metal</i> <i>batteries with a</i>	

DGP/25-WP/3 paragraph 3.5.1.1.1) and UN Model Regulations, SP 188 f), (see ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraphs 3.2.4.1 and 3.2.5.1.1 b) and c)) II.2 Additional requirements Cells and batteries must be packed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging. Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit. Each package must be capable of withstanding a 1.2 m drop test in any orientation without: damage to cells or batteries contained therein; shifting of the contents so as to allow battery to battery (or cell to cell) contact; release of contents. — Each package must be labelled marked with a the appropriate lithium battery handling label mark (Figure 5-32 5-3) and the cargo aircraft only label (Figure 5-26 5-28). - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded the cargo aircraft only label must be located on the same surface of the package near the lithium battery handling-label mark, if the package dimensions are adequate. Note.— Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions may continue to be used until 31 December 2018. UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1) and DGP/25-WP/3 (see paragraph 3.5.1.1.1) Each consignment must be accompanied with a document with an indication that: the package contains lithium metal cells or batteries; the package must be handled with care and that a flammability hazard exists if the package is damaged; special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and a telephone number for additional information. The words "lithium metal batteries, in compliance with Section II of PI968 - cargo aircraft only" or "lithium metal batteries, in compliance with Section II of PI968 - CAO" must be placed on the air waybill, when an air waybill is used. Consignments Packages and overpacks of lithium metal batteries prepared in accordance with the provisions of Section II must not be consolidated with other shipments of dangerous goods or nondangerous goods be offered to the operator separately from cargo which is not subject to these Instructions and must not be loaded into a unit load device before being offered to the operator. Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities. DGP/25-WP/3 (see paragraph 3.5.1.1.1): II.3 Outer packagings Drums Boxes Jerricans Aluminium Aluminium Aluminium Fibreboard Fibre **Plastics** Natural wood Other metal Steel **Plastics** Other metal **Plastics** Plywood Plywood Steel Reconstituted wood Steel Strong outer packagings

DGP/25-WP/3 (see paragraph 3.5.1.1.1) (pending outcome of working group on performance standards) and DGP/25-WP/3 (see paragraph 3.2.5.1.1 b))

#### II.4 Overpacks

[Not more than [four (4)] packages may be placed into an overpack and the overpack must not contain other packages containing dangerous goods]. When packages are placed in an overpack, the lithium battery-handling label mark and the cargo aircraft only label (Figure 5-26-5-28) required by this packing instruction must either be clearly visible or the labels mark and label must be affixed on the outside of the overpack and the overpack must be marked with the word "Overpack".

Packing Instruction 969 Passenger and cargo aircraft for UN 3091 (packed with equipment) only							
UN (see p	Model baragraph	Regulations, 3.2.4.1.1 d))	SP	188,	ST/SG/AC.10/42/Add.1	and	DGP/25-WP/3
	oduction				atteries 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.

#### 2. Lithium batteries forbidden from transport

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

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).

#### I. SECTION I

Each cell or battery must meet all the provisions of 2;9.3.

#### **I.1 General requirements**

Part 4;1 requirements must be met.

UN number and proper shipping		Package (Sect	
	name		Cargo
UN 3091	Lithium metal batteries packed with equipment	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

#### **I.2 Additional requirements**

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells or batteries must:
  - be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a packaging that meets the Packing Group II performance requirements.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the
  equipment's operation, plus two spares.
- For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium batteries with which it is packed for its operation.
- For lithium metal cells and batteries prepared for transport on passenger aircraft as Class 9:
  - cells and batteries offered for transport on passenger aircraft must be packed in intermediate or outer rigid metal packaging surrounded by cushioning material that is non-combustible and non-conductive and placed inside an outer packaging.

## 1.3 Outer packagings

Boxes

Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Other metal (4N) 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)

## DGP/25-WP/3 (see paragraph 3.5.1.4.1)

#### II. SECTION II

With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;4.4 (Reporting of dangerous goods accidents and incidents),8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium metal cells and batteries packed with equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium metal or lithium alloy cells and batteries packed with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

- Part 1;2.3 (General Transport of dangerous goods by post);
- Part 7;4.4 (Operator's responsibilities Reporting of dangerous goods accidents and incidents);
- Part 8:1.1 (Provisions concerning passengers and crew Dangerous goods carried by passengers or
- crew); and
- Paragraph 2 of this packing instruction.

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for a lithium metal cell, the lithium content is not more than 1 g;
- 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

#### II.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

	Package (Sect	
Contents	Passenger	Cargo
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

# DGP/25-WP/3 (see paragraph 3.5.1.1.1) and UN Model Regulations, SP 188 f), ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraphs 3.2.4.1 and 3.2.5.1.1 e))

#### II.2 Additional requirements

Lithium metal cells or batteries must:

- be placed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging; or
- be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong<u>rigid</u> outer packaging.
- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact
  with conductive materials within the same packaging that could lead to a short circuit.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the
  equipment's operation, plus two spares.
- Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
  - damage to cells or batteries contained therein;
  - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  - release of contents.
  - Each package must be labelled <u>marked</u> with a <u>the appropriate</u> lithium battery handling label <u>mark</u> (Figure 5-32 5-3). ).
  - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.

<u>Note. — Figure 5-32 and the provisions for a lithium battery handling label as contained in the 2015-2016</u> Edition of these Instructions may continue to be used until 31 December 2018.

UN Model Regulations, SP 188 g), ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1)

- Each consignment must be accompanied with a document with an indication that:
  - —— the package contains lithium metal cells or batteries;
- the package must be handled with care and that a flammability hazard exists if the package is damaged; — special procedures must be followed in the event the package is damaged, to include inspection and repacking if necessary; and
- a telephone number for additional information.
- The words "lithium metal batteries, in compliance with Section II of PI969" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these
  requirements commensurate with their responsibilities.

DGP/25-WP/3 (see paragrag	ph 3.5.1.1.1):		
.3 Outer packagings Boxes	Drums	Jerricans	
DOXES	Drums	Jerncans	
Aluminium	Aluminium	Aluminium	
<u>Fibreboard</u>	<u>Fibre</u> Other metal	<u>Plastics</u> Steel	
<u>Natural wood</u> Other metal	Plastics	<u>01661</u>	
Plastics	Plywood		
Plywood	Steel		
Reconstituted wood			
<u>Steel</u>	Strong outer packad	ninge	
	Ottong outor publici	Jingo	
DGP/25-WP/3 (see paragrap	ph 3.2.5.1.1 b))		
.4 Overpacks			

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

UN Model Regulations, SP 188, ST/SG/AC.10/42/Add.1 and DGP/25-WP/3 (see paragraph 3.2.4.1.1 d))

#### 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.

#### 2. Lithium batteries forbidden from transport

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

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).

#### I. SECTION I

Each cell or battery must meet all the provisions of 2;9.3.

#### **I.1 General requirements**

Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

	Package quar	ntity (Section I)
UN number and proper shipping name	Passenger	Cargo
UN 3091 Lithium metal batteries contained in equipment	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

#### **I.2 Additional requirements**

- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The equipment must be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
- The quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g
  per battery.

#### 1.3 Outer packagings

**Boxes** 

Drums

Jerricans

Strong outer packagings

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## Packing Instruction 970

#### DGP/25-WP/3 (see paragraph 3.5.1.4.1)

#### II. SECTION II

With the exception of Part 1;2.3 (Transport of dangerous goods by post), 7;1.4 (Reporting of dangerous goods accidents and incidents), 8;1.1 (Dangerous goods carried by passengers or crew) and paragraph 2 of this packing instruction, lithium metal cells and batteries contained in equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section. Lithium metal or lithium alloy cells and batteries contained with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

- Part 1:2.3 (General Transport of dangerous goods by post); Part 7:4.4 (Operator's responsibilities Reporting of dangerous goods accidents and incidents); Part 8:1.1 (Provisions concerning passengers and crew Dangerous goods carried by passengers or crew); and
- Paragraph 2 of this packing instruction.

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for a lithium metal cell, the lithium content is not more than 1 g;
- 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport.

#### II.1 General requirements

Equipment containing batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

	Package (Sectio	
Contents	Passenger	Cargo
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

	Packing Instruction	n 970
DGP/25-WP/3 (see pa ST/SG/AC.10/42/Add.1 an		UN Model Regulations, SP 188 f), raphs 3.2.4.1 and 3.2.5.1.1 b) and c)):
II.2 Additional requirements		
an effective means of pre — Cells and batteries must — The equipment must be p strength and design in afforded equivalent prote — Each package containing labelled with a lithium ba (including circuit boards)	eventing accidental activation. be protected so as to prevent sho packed in strong <u>rigid</u> outer packa relation to the packaging's capa ction by the equipment in which it <del>g more than four cells or more that tory handling label (Figure 5-32) b)).Each package must be mar</del>	agings constructed of suitable material of adequate acity and its intended use unless the battery is t is contained. han two batteries installed in equipment must be (except button cell batteries installed in equipment rked with the appropriate lithium battery mark
<u>(Figure 5-3). The package</u> without the mark being for		e is adequate space to affix the mark on one side
— packages contair	ning only button cell batteries insta	alled in equipment (including circuit boards); and o batteries installed in equipment, where there are
		attery handling label as contained in the 2015-2016
Edition of these Instruction	ons may continue to be used until	<u>31 December 2018.</u>
UN Model Regulation (see paragraph 3.2.4.1)	s, SP 188 g), ST/SG	G/AC.10/42/Add.1 and DGP/25-WP/3
<ul> <li>the package must be</li> <li>special procedures r</li> <li>repacking if necessa</li> <li>a telephone number</li> <li>Where a consignment in</li> <li>ion batteries, in complian</li> <li>used.</li> <li>Any person preparing or</li> </ul>	Hithium metal cells or batteries; handled with care and that a flam nust be followed in the event the ry; and for additional information. cludes packages bearing the lithin ce with Section II of PI970" must	nmability hazard exists if the package is damaged; a package is damaged, to include inspection and um battery-handling label mark, the words "lithium be placed on the air waybill, when an air waybill is nsport must receive adequate instruction on these
DGP/25-WP/3 (see paragra	aph 3.5.1.1.1):	
II.3 Outer packagings		
Boxes	Drums	Jerricans
Aluminium Fibreboard Natural wood Other metal Plastics Plywood Reconstituted wood	<u>Aluminium</u> <u>Fibre</u> <u>Other metal</u> <u>Plastics</u> <u>Plywood</u> <u>Steel</u>	<u>Aluminium</u> <u>Plastics</u> <u>Steel</u>
Steel		
DGP/25-WP/3 (see paragra	Strong outer pack aph 3.2.5.1.1 b))	<del>(agings</del>
II.4 Overpacks	· · · · · · · · · · · · · · · · · · ·	
When packages are placed instruction must either be cle overpack must be marked wi	arly visible or the label mark must	ery-handling label mark required by this packing t be affixed on the outside of the overpack and the

UN Model Regulations, packing instruction P005, ST/SG/AC.10/42/Add.1, DGP/25-WP/3 (see paragraph 3.2.3.2.1 d)) and DGP/25-WP/3 (see paragraph 3.2.4.1n)

Packing Instruction 972		
Cargo aircraft only for UN 3530 only		
(See Packing Instruction 220 for flammable gas-powered engines and mach flammable liquid-powered engines and machinery, Packing Instruction 950 for		
Packing Instruction 951 for flammable gas-powered vehicles or Packing Ins equipment and vehicles		
General requirements		
Part 4, Chapter 1 requirements must be met, including:		
Compatibility requirements		
<ul> <li>Substances must be compatible with their packagings as required by 4;<sup>4</sup></li> </ul>	<u>.1.3.</u>	
	<u>Quantity</u>	<u>Quantity</u>
UN number and proper shipping name UN 3530 Engine, internal combustion or Machinery, internal combustion	<u>passenger</u> No limit	<u>cargo</u> No limit
The main of the main of the store of the sto		
General		
		nanda must ba in
<ol> <li>The engine or machinery, including the means of containment conta compliance with the construction requirements specified by the appropri</li> </ol>		
2) Any valves or openings (e.g. venting devices) must be closed during tran	isport;	
3) The engines or machinery must be oriented to prevent inadvertent leaka		
by means capable of restraining the engines or machinery to prevent a would change the orientation or cause them to be damaged.	ny movement duri	ng transport which
ADDITIONAL PACKING REQUIREMENTS		
If the engine or machinery is constructed and designed so that the means of co goods affords adequate protection, an outer packaging is not required. Dange		
must otherwise be packed in outer packagings constructed of suitable mate	rial, and of adeq	uate strength and
design in relation to the packaging capacity and its intended use, and mee 4.1.1.1, or they must be fixed in such a way that they will not become loose d		
e.g. in cradles or crates or other handling devices.	ining normal conc	inions of transport,
Liquid fuel tanks		
Except as otherwise provided for in this packing instruction, fuel tanks must be	drained of fuel a	nd tank caps fitted
securely. Special precautions are necessary to ensure complete drainage	of the fuel syster	m of machines or
equipment incorporating internal combustion engines, such as lawn mowers machines or equipment could possibly be handled in other than an upright positi		otors, where such
	<u>511.</u>	
Batteries		
All batteries must be installed and securely fastened in the battery holder of the protected in such a manner so as to prevent damage and short circuits. In additi		oment and must be
<ol> <li>if spillable batteries are installed, and it is possible for the machine or way that batteries would not remain in their intended orientation, the according to Packing Instruction 492 or 870 as applicable;</li> </ol>		
<ol> <li>if lithium batteries are installed, they must meet the provisions of Part</li> </ol>		
the appropriate authority of the State of Origin, must be securely fastened in the machinery or equipment and must be protected in such a manner so as to prevent damage and short circuits; and		
	ned in the machi	

## Other operational equipment

1) Dangerous goods required for the operation or safety of the machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the machine or equipment

— END —