



**WORKING PAPER**

**DANGEROUS GOODS PANEL (DGP)  
WORKING GROUP MEETING (DGP-WG/21)**

**Virtual Meeting, 24 to 28 May 2021**

- Agenda Item 1: Harmonizing ICAO dangerous goods provisions with UN Recommendations on the Transport of Dangerous Goods**  
**1.2: Develop proposals, if necessary, for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2023-2024 Edition**

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

(Presented by the DGP Working Group on UN Harmonization)

**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 ninth session (Geneva, 11 December 2020).

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

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The UN added notes to packing instructions in cases where exceptions from design type testing in Part 6 are provided to clarify that the packaging used can be larger than the 400 kg maximum net mass limit specified in 6.1.4 of the UN Model Regulations (Table 6-2 and Part 6;3 of the Technical Instructions). The provision was added to address the incorrect belief that large packaging meeting design test requirements of Part 6 was required when packaging larger than 400 kg was necessary.

This text added to packing instructions in the UN Model Regulations is proposed to be added only to associated packing instructions in the Technical Instructions where there is no limit to the quantities of dangerous goods permitted for transport by air. It was not added to Packing Instructions 215, 216, 217, or 965-970.

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## Part 4

### PACKING INSTRUCTIONS

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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, 6.1.1.2 (see ST/SG/AC.10/48/Add.1)

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DGP-WG/UN Harmonization questioned whether the following highlighted sentence should remain, recognizing the sentence in the UN Model Regulations appears in 6.1.1.4. The working group concluded that the provision should remain while proposing to add the text to 6;1.1.4 to harmonize with the UN (see DGP-WG/21-WP/16).

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

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UN Model Regulations, 6.1.1.2 (see ST/SG/AC.10/48/Add.1)

The following note is included in Part 6 of the UN Model Regulations, so it is moved to 6;1.1.3 and amended to align with the revisions to the UN document (i.e. "ISO 16106:2006 Packaging Transport" replaced with "ISO 16106:2020 Transport");

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

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1.1.20 For plastic drums and jerricans, rigid plastic IBCs and composite IBCs with plastic inner receptacles, unless otherwise approved by the appropriate national authority, the period of use permitted for the transport of dangerous goods must be not more than five years from the date of manufacture of the receptacles, except where a shorter period of use is prescribed because of the nature of the substance to be transported.

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UN Model Regulations, 4.1.1.15 (see ST/SG/AC.10/48/Add.1)

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*Note.— For composite IBCs the period of use refers to the date of manufacture of the inner receptacle.*

1.1.21 Where ice is used as a coolant it must not affect the integrity of the packaging.

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## Chapter 2

### GENERAL

2.1 Each of the succeeding Chapters of this Part is devoted to the specific packing instructions applicable to an individual class of dangerous goods. In some cases the Chapters start with general requirements which apply to all goods in that class.

2.2 The Dangerous Goods List (Table 3-1) shows for each article or substance, in columns 10 and 12, the number of the packing instruction that must be used.

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UN Model Regulations, 4.1.3.3 (see ST/SG/AC.10/48/Add.1)

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2.3 Each instruction shows, where applicable, the acceptable single and combination packagings. For combination packagings, tables show the acceptable outer packagings and associated inner packagings with the maximum net quantity permitted in each inner packaging. Where provisions for particular articles or substances apply, a table shows the inner packagings with associated quantity limitations, the permitted quantity per package and, where applicable, an indication if single packagings are permitted. Where appropriate, additional packing requirements are also indicated at the end of a packing instruction. These additional packing requirements may impose a higher standard of packaging than would normally apply to the packing group, or may require specific packaging considerations. Where packagings which need not meet the requirements of 1.1.2 (e.g. crates, pallets, etc.) are authorized in a packing instruction or the special provisions named in the dangerous goods list, these packages are not subject to the mass or volume limits generally applicable to packagings conforming to the requirements of Part 6, unless otherwise indicated in the relevant packing instruction or special provision.

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## Chapter 3

### CLASS 1 — EXPLOSIVES

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 UN Model Regulations, 4.1.4.1, P137 (see ST/SG/AC.10/48/Add.1)
 

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#### Packing Instruction 137

##### *Inner packagings*

Bags  
 plastics  
 Boxes  
 fibreboard  
 wood  
 Tubes  
 fibreboard  
 metal  
 plastics  
 Dividing partitions in the  
 outer packagings

##### *Intermediate packagings*

Not necessary

##### *Outer packagings*

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 REQUIREMENTS OR EXCEPTIONS:**

- For UN 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package must be marked ~~in accordance with 4.1.1.13~~ as illustrated in Figure 5-29. When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation.

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## Chapter 4

### CLASS 2 — GASES

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#### **4.1 SPECIAL PACKING PROVISIONS FOR DANGEROUS GOODS OF CLASS 2**

##### **4.1.1 General requirements**

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 UN Model Regulations, 4.1.6.1.6 (see ST/SG/AC.10/48/Add.1)
 

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4.1.1.6 Cylinders and closed cryogenic receptacles must be filled according to the working pressures, filling ratios and provisions specified in the appropriate packing instruction for the specific substance and taking into account the lowest pressure rating of any component. Service equipment having a pressure rating lower than other components must nevertheless comply with 6.5.1.3.1. Reactive gases and gas mixtures must be filled to a pressure such that if complete decomposition of the gas occurs, the working pressure of the cylinder must not be exceeded.

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UN Model Regulations, 4.1.6.1.8 (see ST/SG/AC.10/48/Add.1)

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

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

For cylinders and closed cryogenic receptacles with valves as described in b) and c), the requirements of ISO 11117:1998, [ISO 11117:2008 + Cor 1:2009](#) or [ISO 11117:2019](#) must be met; for valves with inherent protection, the requirements of Annex A of ISO 10297:2006, Annex A of ISO 10297:2014 or Annex A of ISO 10297 + A1:2017 must be met. For cylinders and closed cryogenic receptacles with self-closing valves with inherent protection, the requirements of Annex A of ISO 17879:2017 must be met. For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 [or ISO 16111:2018](#) must be met.

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UN Model Regulations, 4.1.6.1.10 (see ST/SG/AC.10/48/Add.1)

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4.1.1.10 Refillable cylinders, other than closed cryogenic receptacles, must be periodically inspected according to the provisions of 6;5.1.6 and Packing Instruction 200-~~or~~, 214, [218 or 219](#). Cylinders and closed cryogenic receptacles must not be filled after they become due for periodic inspection but may be transported after the expiry of the time limit.

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UN Model Regulations, 4.1.4.1, P200(5) (see ST/SG/AC.10/48/Add.1)

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**Packing Instruction 200**

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6) "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 [or composite cylinders with steel liners](#) are used, only those bearing the "H" mark in accordance with 6;5.2.7.4 p) are permitted.

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**UN Model Regulations, 4.1.4.1, P205 (see ST/SG/AC.10/48/Add.1)**

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**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.
- 2) 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 or ISO 16111:2018, 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 mark on the system as specified in ISO 16111:2008 or ISO 16111:2018.

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The following will be further reviewed to identify which standard applies. Should the second new sentence refer to the specific standard since only one standard is listed in 6;5.2.4.2?

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- 7) The periodic test requirements for a metal hydride storage system must be in accordance with ISO 16111:2008 or ISO 16111:2018 and carried out in accordance with 6;5.2.6, and the interval between periodic inspections must not exceed five years. See 6;5.2.4.2 to determine which standard is applicable at the time of periodic inspection and test.
- 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.

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UN Model Regulations, 4.1.4.1, P208 (1)(a) and (11) (see ST/SG/AC.10/48/Add.1)

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### Packing Instruction 219

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

This Instruction applies to Class 2 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 11513:2019](#), ISO 9809-1:2010 [or ISO 9809-1:2019](#); 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 quality 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 [\(applicable until 31 December 2024\)](#) [or Annex A of ISO 11513:2019](#).
- 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, 4.1.4.1, P005 (see ST/SG/AC.10/48/Add.1)

**Packing Instruction 220**

Cargo aircraft only for UN 3529 only

(See Packing Instruction 378 for flammable liquid-powered engines or machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles, 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**

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

<i>UN number and proper shipping name</i>	<i>Quantity — passenger</i>	<i>Quantity — cargo</i>
UN 3529 <b>Engine, internal combustion, flammable gas powered or Machinery, internal combustion, flammable gas powered or Engine, fuel cell, flammable gas powered or Machinery, fuel cell, flammable gas powered</b>	Forbidden	No limit

**ADDITIONAL PACKING REQUIREMENTS***General*

- 1) The engine or machinery, including the means of containment containing dangerous goods, must be in compliance with the construction requirements specified by the appropriate national authority;
- 2) The engines or machinery must be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during transport which would change the orientation or cause them to be damaged.

DGP-WG/Harmonization concluded that the following text should be added after identifying that it is contained in the UN Model Regulations (P005) and Packing Instruction 972. The “ADDITIONAL PACKIGN REQUIREMENTS” heading is moved here to align with the structure of Packing Instruction 972.

**ADDITIONAL PACKING REQUIREMENTS**

If the engine or machinery is constructed and designed so that the means of containment containing the dangerous goods affords adequate protection, an outer packaging is not required. Dangerous goods in engines or machinery must otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4.1.1.1, or they must be fixed in such a way that they will not become loose during normal conditions of transport, e.g. in cradles or crates or other handling devices.

*Flammable gas vessels*

- 1) for flammable gas-powered machines or equipment, pressurized vessels containing the flammable gas must be completely emptied of flammable gas. Lines from vessels to gas regulators, and gas regulators themselves, must also be drained of all trace of flammable gas. To ensure that these conditions are met, gas shut-off valves must be left open and connections of lines to gas regulators must be left disconnected upon delivery of the engine or machinery to the operator. Shut-off valves must be closed and lines reconnected at gas regulators before loading aboard the aircraft;
- or alternatively,
- 2) flammable gas-powered machines or equipment that have pressure receptacles (fuel tanks) equipped with electrically operated valves that close automatically in case the power is disconnected, or with manual shut-off valves, may be transported under the following conditions:
    - i) the tank shut-off valves must be in the closed position and in the case of electrically operated valves, power to those valves must be disconnected;



- ii) after closing the tank shut-off valves, the 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 machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

- 1) if spillable batteries are installed, and it is possible for the 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 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 machine or equipment, such as fire extinguishers, tire inflation canisters or safety devices, must be securely mounted in the machine or equipment.

**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 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

UN Model Regulations, 4.1.4.1, P005 (see ST/SG/AC.10/48/Add.1)

#### Packing Instruction 378

Passenger and cargo aircraft for UN 3528 only  
(See Packing Instruction 220 for flammable gas-powered engines or machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles, 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

- Substances must be compatible with their packagings as required by 4.1.1.3.

<i>UN number and proper shipping name</i>	<i>Quantity — passenger</i>	<i>Quantity — cargo</i>
UN 3528 <b>Engine, internal combustion, flammable liquid powered or Machinery, internal combustion, flammable liquid powered or Engine, fuel cell, flammable liquid powered or Machinery, fuel cell, flammable liquid powered</b>	No limit	No limit

#### ADDITIONAL PACKING REQUIREMENTS

##### General

- 1) The engine or machinery, including the means of containment containing dangerous goods, must be in compliance with the construction requirements specified by the appropriate national authority;
- 2) Any valves or openings (e.g. venting devices) must be closed during transport;
- 3) The engines or machinery must be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during transport which would change the orientation or cause them to be damaged.

DGP-WG/Harmonization concluded that the following text should be added after identifying that it is contained in the UN Model Regulations (P005) and Packing Instruction 972. The “ADDITIONAL PACKING REQUIREMENTS” heading is moved here to align with the structure of Packing Instruction 972.

#### ADDITIONAL PACKING REQUIREMENTS

If the engine or machinery is constructed and designed so that the means of containment containing the dangerous goods affords adequate protection, an outer packaging is not required. Dangerous goods in engines or machinery must otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of 4.1.1.1, or they must be fixed in such a way that they will not become loose during normal conditions of transport, e.g. in cradles or crates or other handling devices.

##### Flammable liquid fuel tanks

Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of machines or equipment incorporating internal combustion engines, such as lawn mowers and outboard motors, where such machines or equipment could possibly be handled in other than an upright position. When it is not possible to handle in other than an upright position, machinery must be drained of fuel as far as practicable, and if any fuel remains, it must not exceed one-quarter of the tank capacity.

*Batteries*

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

- 1) if spillable batteries are installed, and it is possible for the 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 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**

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.

**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 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 6

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

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UN Model Regulations, 4.1.4.1, P408 (2) (see ST/SG/AC.10/48/Add.1)

#### Packing Instruction 492

Passenger and cargo aircraft for UN 3292 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.

##### 2) Closure requirements

- Closures must meet the requirements of 4;1.1.4.

<i>UN number and proper shipping name</i>	<i>Packing conditions</i>	<i>Total quantity per package — passenger</i>	<i>Total quantity per package — cargo</i>
UN 3292 <b>Batteries, containing sodium</b>	Batteries may be offered for transport and transported unpacked or in protective enclosures such as fully enclosed or wooden slatted crates that are not subject to the requirements of Part 6 of these Instructions.	Forbidden	No limit
DGP-WG/UN Harmonization proposes the following amendment recognizing that UN specification packaging is required for <i>cells</i> containing sodium and would therefore be subject to this limit.			
UN 3292 <b>Cells, containing sodium</b>	There must be sufficient cushioning material to prevent contact between cells and between cells and the internal surfaces of the outer packaging and to ensure that no dangerous movement of the cells within the outer packaging occurs in transport.	25 kg	<del>No limit</del> 400 kg

##### ADDITIONAL PACKING REQUIREMENTS

- Packagings for cells must meet the Packing Group II performance requirements.
- Cells and batteries must be protected against short circuit and must be isolated in such a manner as to prevent short circuits.

**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)

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## Chapter 8

## CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

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UN Model Regulations, 4.1.4.1, P621 (1) (see ST/SG/AC.10/48/Add.1)

## Packing Instruction 621

DGP-WG/UN Harmonization proposed moving the list of authorized packagings into a table. The structure of this packing instructions is therefore revised to align with standard packing instructions. The only non-format change is the addition of packaging with non-removeable heads for drums and jerricans as shown in the outer packaging table.

**General requirements**

The general packing ~~Part 4, Chapter 1~~ requirements of 4.4 except 1.1.20 must be met.

**ADDITIONAL PACKING REQUIREMENTS**

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

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

Moved to end of list:

~~Packagings must meet Packing Group II requirements.~~

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

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

Moved from above with addition of "the" to align with other packing instructions:

— Packagings must meet the Packing Group II requirements.

Reformatted from list above:

**OUTER PACKAGINGS**

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

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## Chapter 10

### CLASS 8 — CORROSIVE SUBSTANCES

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UN Model Regulations, 4.1.4.1, P801 (see ST/SG/AC.10/48/Add.1)

#### Packing Instruction 870

Passenger and cargo aircraft for UN 2794 and 2795 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.

##### 2) Closure requirements

- Closures must meet the requirements of 4;1.1.4.

<i>UN number and proper shipping name</i>	<i>Packing conditions</i>	<i>Total quantity per package — passenger</i>	<i>Total quantity per package — cargo</i>
<p>DGP-WG/UN Harmonization proposes the following amendment recognizing that UN specification packaging is required and would therefore be subject to this limit.</p>			
UN 2794 <b>Batteries, wet, filled with acid</b> UN 2795 <b>Batteries, wet, filled with alkali</b>	<p>Batteries must be placed in an acid/alkali-proof liner of sufficient strength and adequately sealed to positively preclude leakage in the event of spillage. The batteries must be packed so that the fill openings and vents, if any, are upward; they must be incapable of short-circuiting and be securely cushioned in the packagings. The upright position of the package must be indicated on it by "Package orientation" labels (Figure 5-29) as required by 5;3. The words "This side up" or "This end up" may also be displayed on the top of the package.</p> <p><i>Batteries installed in equipment</i></p> <p>If batteries are shipped as an integral component of assembled equipment, they must be securely installed and fastened in an upright position and protected against contact with other articles so as to prevent short circuits. Batteries must be removed and packed according to this packing instruction if the assembled equipment is likely to be carried in other than an upright position.</p>	30 kg	No limit <del>400 kg</del>

**ADDITIONAL PACKING REQUIREMENTS**

- Packagings must meet the Packing Group II performance requirements.
- For batteries, electric storage, packed with battery fluid in the same outer packaging, see UN 2796 and UN 2797.

**PACKAGINGS**

<i>Boxes</i>	<i>Drums</i>	<i>Jerricans</i>
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	Steel (3A2)
Plastics (4H1, 4H2)	Plastics (1H2)	
Plywood (4D)	Plywood (1D)	
Reconstituted wood (4F)	Steel (1A2)	
Steel (4A)		

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**Chapter 11****CLASS 9 — MISCELLANEOUS DANGEROUS GOODS**

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**Packing Instruction 965**

Cargo aircraft only for UN 3480

**IA. SECTION IA**

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

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**IA.2 Additional requirements**

- Lithium ion cells and batteries must be protected against short circuits.
- Lithium ion cells and 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.
- Lithium ion cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).

**UN Model Regulations, 4.1.4.1, P903(2) (see ST/SG/AC.10/48/Add.1)**

- ~~A Lithium ion cell or batteries battery~~ 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 outside case.

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UN Model Regulations, 4.1.4.1, P903(2) (see ST/SG/AC.10/48/Add.1)

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### Packing Instruction 968

Cargo aircraft only for UN 3090

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#### IA.2 Additional requirements

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells and 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.
- Lithium metal cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
- A Lithium metal ~~cell or batteries~~ battery 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.

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— END —