



**WORKING PAPER**

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

**Memphis, 30 April to 4 May 2007**

**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 2009/2010 Edition**

**2.4: Part 4 — Packing Instructions**

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

(Presented by the Secretary)

**SUMMARY**

This working paper contains draft amendments to Part 4 of the Technical Instructions (Chapters 1, 4, 6, 8, 9, 10 and 11) 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 third session (Geneva, 15 December 2006).

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

**Part 4**

**PACKING INSTRUCTIONS**

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**Chapter 1**

**GENERAL PACKING REQUIREMENTS**

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

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1.1.2 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. 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 1.1.9.1 and 6;4.1.7. Before being filled and handed over for transport, every packaging must be inspected to ensure that it is free from corrosion, contamination or other damage. Any packaging which shows signs of reduced strength as compared with the approved design type must no longer be used or must be so reconditioned that it is able to withstand the design type tests.

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

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## Chapter 4

### CLASS 2 — GASES

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

##### 4.1.1 General requirements

- ≠ 4.1.1.1 This section provides general requirements applicable to the use of cylinders and closed cryogenic receptacles for the transport of Class 2 gases (e.g. UN 1072 **Oxygen, compressed**). Cylinders and closed cryogenic receptacles must be constructed and closed so as to prevent any loss of contents which might be caused under normal conditions of transport, including by vibration, or by changes in temperature, humidity or pressure (resulting from change in altitude, for example).

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*Editorial Note.—* Text in 4.1.1.2 below is moved to 6;5.1.1.9:

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- ≠ 4.1.1.2 Parts of cylinders and closed cryogenic receptacles that are in direct contact with dangerous goods must not be affected or weakened by those dangerous goods and must not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods). The provisions of ISO 11114-1:1997 and ISO 11114-2:2000 must be met as applicable. ~~Cylinders for UN 1001 **Acetylene, dissolved** and UN 3374 **Acetylene, solvent free** must be filled with a porous mass, uniformly distributed, of a type that conforms to the requirements and testing specified by the appropriate national authority and which:~~

- ~~— a) is compatible with the cylinder and does not form harmful or dangerous compounds either with the acetylene or with the solvent in the case of UN 1001; and~~
- ~~— b) is capable of preventing the spread of decomposition of the acetylene in the porous mass.~~

~~In the case of UN 1001, the solvent must be compatible with the cylinders.~~

- ≠ 4.1.1.3 Cylinders and closed cryogenic receptacles, including their closures, must be selected that are able to contain a gas or a mixture of gases according to the requirements of 6;5.1.2 and the requirements of the specific packing instructions of this Part.

4.1.1.4 Refillable cylinders must not be filled with a gas or gas mixture different from that previously contained unless the necessary operations for change of gas service have been performed. The change of service for compressed and liquefied gases must be in accordance with ISO 11621:1997, as applicable. In addition, a cylinder that previously contained a Class 8 corrosive substance or a substance of another class with a corrosive subsidiary risk must not be authorized for the transport of a Class 2 substance unless the necessary inspection and testing as specified in 6;5.1.6 have been performed.

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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;5.4.5.1.6 and Packing Instruction 200. 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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#### 4.2 PACKING INSTRUCTIONS

200	PACKING INSTRUCTION 200	200
<p>For cylinders, the general packing requirements of 4.1.1 must be met.</p> <p>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 markings 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:</p> <p>...</p> <p>≠ 3) In no case must cylinders be filled in excess of the limit permitted in the following requirements:</p> <p>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.</p> <p>b) For high pressure liquefied gases, the filling ratio must be such that the settled pressure at 65°C does not exceed the test pressure of the cylinders.</p> <p>The use of test pressures and filling ratios other than those in the table is permitted <del>provided that the above criterion is met</del>, except where special packing provision "o" applies. <u>provided that:</u></p> <p>i) <u>the criterion of 4), special packing provision "r" is met when applicable; or</u>  <u>ii) the above criterion is met in all other cases.</u></p> <p>...</p> <p>≠ 4) Keys for the column "Special packing provisions":</p> <p>...</p> <p>Gas specific provisions:</p> <p>...</p> <hr/> <p><i>Editorial Note.</i>— Paragraph r) below is re-numbered w) and moved after v) below:</p> <p>≠ r) <del>Ethyl chloride may be carried in securely sealed glass ampoules (IP-8) containing not more than 5 g of ethyl chloride and filled with a ullage of not less than 7.5 per cent at 21°C. Ampoules must be cushioned with efficient non-combustible material in partitioned cartons to the extent of 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</del></p>		

ethyl chloride is permitted per package.

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Periodic inspection:

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- ≠ 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.

*Editorial Note.*— Paragraph w) below is moved from r) above.

w) Ethyl chloride may be carried in securely sealed glass ampoules (IP.8) containing not more than 5 g of ethyl chloride and filled with a ullage of not less than 7.5 per cent at 21°C. Ampoules must be cushioned with efficient non-combustible material in partitioned cartons to the extent of 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.

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Table 2. LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1001	Acetylene, dissolved	2.1			X	10	60 52		c, p
1009	Bromotrifluoromethane (refrigerant gas R 13b1)	2.2			X	10	42 120 250	1.13 1.44 1.60	
1010	Butadienes, stabilized (1,2-butadiene)	2.1			X	10	10	0.59	
1010	Butadienes, stabilized (1,3-butadiene)	2.1			X	10	10	0.55	z
1010	Butadienes and hydrocarbon mixture, stabilized containing more than 40% butadienes	2.1			X	10			v z
1011	Butane	2.1			X	10	10	<del>0.51</del> 0.52	v
1012	Butylene (butylenes mixture)	2.1			X	10	10	0.50	z
1012	Butylene (1-butylene)	2.1			X	10	10	0.53	
1012	Butylene (cis-2-butylene)	2.1			X	10	10	0.55	
1012	Butylene (trans-2 butylene)	2.1			X	10	10	0.54	
1013	Carbon dioxide	2.2			X	10	190 250	<del>0.66</del> 0.68 <del>0.75</del> 0.76	
1018	Chlorodifluoromethane (refrigerant gas R 22)	2.2			X	10	<del>29</del> 27	1.03	
1020	Chloropentafluoroethane (refrigerant gas R 115)	2.2			X	10	25	<del>1.08</del> 1.05	
1021	1-Chloro-1,2,2,2-tetrafluoroethane (refrigerant gas R 124)	2.2			X	10	<del>42</del> 11	1.20	

UN No.	Name and description	Class or Division	Subsidiary risk	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1022	<b>Chlorotrifluoromethane (refrigerant gas R 13)</b>	2.2			X	10	100 120 190 250	0.83 0.90 1.04 <del>1.10</del> <u>1.11</u>	
1027	<b>Cyclopropane</b>	2.1			X	10	<del>20</del> <u>18</u>	<del>0.53</del> <u>0.55</u>	
1028	<b>Dichlorodifluoromethane (refrigerant gas R 12)</b>	2.2			X	10	<del>48</del> <u>16</u>	1.15	
1029	<b>Dichlorofluoromethane (refrigerant gas R 21)</b>	2.2			X	10	10	1.23	
1030	<b>1,1-Difluoroethane (Refrigerant gas R 152 a)</b>	2.1			X	10	<del>48</del> <u>16</u>	0.79	
1032	<b>Dimethylamine, anhydrous</b>	2.1			X	10	10	0.59	b
1033	<b>Dimethyl ether</b>	2.1			X	10	18	0.58	
1035	<b>Ethane</b>	2.1			X	10	95 120 300	0.25 <del>0.29</del> <u>0.30</u> <del>0.39</del> <u>0.40</u>	
1036	<b>Ethylamine</b>	2.1			X	10	10	0.61	b
1037	<b>Ethyl chloride</b>	2.1			X	10	10	0.80	a, <del>FW</del>
1039	<b>Ethyl methyl ether</b>	2.1			X	10	10	0.64	
1041	<b>Ethylene oxide and carbon dioxide mixture with more than 9% ethylene oxide but not more than 87%</b>	2.1			X	10	190 250	0.66 .75	
1043	<b>Fertilizer ammoniating solution with free ammonia</b>	2.2			X	5			b, z
1055	<b>Isobutylene</b>	2.1			X	10	10	0.52	
1058	<b>Liquefied gases, non-flammable, charged with nitrogen, carbon dioxide or air</b>	2.2			X	10	Test pressure = 1.5 × working pressure		
1060	<b>Methylacetylene and propadiene mixture, stabilized or</b>	2.1			X	10			c, z
1060	<b>Methylacetylene and propadiene mixture, stabilized (propadiene with 1% to 4% methylacetylene)</b>	2.1			X	10	22	0.52	c
1061	<b>Methylamine, anhydrous</b>	2.1			X	10	13	0.58	b
1063	<b>Methyl chloride (refrigerant gas R 40)</b>	2.1			X	10	17	0.81	a
1070	<b>Nitrous oxide</b>	2.2	5.1		X	10	180 225 250	0.68 0.74 0.75	
1075	<b>Petroleum gases, liquefied</b>	2.1			X	10			v, z

UN No.	Name and description	Class or Division	Subsidiary risk	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1077	Propylene	2.1			X	10	<del>30</del> 27	0.43	
1078	Refrigerant gas, n.o.s.	2.2			X	10			z
1080	Sulphur hexafluoride	2.2			X	10	70 140 160	<del>1.04</del> 1.06 <del>1.33</del> 1.34 <del>1.37</del> 1.38	
1081	Tetrafluoroethylene, stabilized	2.1			X	10	200		m, o
1083	Trimethylamine, anhydrous	2.1			X	10	10	0.56	b
1085	Vinyl bromide, stabilized	2.1			X	10	10	1.37	a
1086	Vinyl chloride, stabilized	2.1			X	10	12	0.81	a
1087	Vinyl methyl ether, stabilized	2.1			X	10	10	0.67	
1858	Hexafluoropropylene (refrigerant gas R 1216)	2.2			X	10	22	1.11	
1860	Vinyl fluoride, stabilized	2.1			X	10	250	0.64	a
1912	Methyl chloride and methylene chloride mixture	2.1			X	10	17	0.81	a
1952	Ethylene oxide and carbon dioxide mixture with not more than 9% ethylene oxide	2.2			X	10	190 250	0.66 0.75	
1958	1,2-dichloro-1,1,2,2-tetrafluoroethane (refrigerant gas R 114)	2.2			X	10	10	1.30	
1959	1,1-difluoroethylene (refrigerant gas R 1132a)	2.1			X	10	250	0.77	
1962	Ethylene	2.1			X	10	225 300	0.34 <del>0.37</del> 0.38	
1965	Hydrocarbon gas mixture, liquefied, n.o.s.	2.1			X	10			v, z
1968	Insecticide gas, n.o.s.	2.2			X	10			z
1969	Isobutane	2.1			X	10	10	0.49	v
1973	Chlorodifluoromethane and chloropentafluoroethane mixture with fixed boiling point, with approximately 49% chlorodifluoromethane (refrigerant gas R 502)	2.2			X	10	31	<del>1.05</del> 1.01	
1974	Chlorodifluorobromomethane (refrigerant gas R 12b1)	2.2			X	10	10	1.61	
1976	Octafluorocyclobutane (refrigerant gas R C318)	2.2			X	10	11	<del>1.34</del> 1.32	
1978	Propane	2.1			X	10	<del>25</del> 23	0.42 <del>0.42</del> 0.43	v
1982	Tetrafluoromethane (refrigerant gas R 14)	2.2			X	10	200 300	0.62 <del>0.62</del> 0.71 <del>0.94</del> 0.90	

UN No.	Name and description	Class or Division	Subsidiary risk	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1983	<b>1-chloro-2,2,2-trifluoroethane (refrigerant gas R 133a)</b>	2.2			X	10	10	1.18	
1984	<b>Trifluoromethane (refrigerant gas R 23)</b>	2.2			X	10	190 250	<del>0.87</del> <u>0.88</u> <del>0.95</del> <u>0.96</u>	
2035	<b>1,1,1-trifluoroethane (refrigerant gas R 143a)</b>	2.1			X	10	35	<del>0.75</del> <u>0.73</u>	
2036	<b>Xenon</b>	2.2			X	10	130	<del>1.24</del> <u>1.28</u>	
2044	<b>2,2-dimethylpropane</b>	2.1			X	10	10	0.53	
2073	<b>Ammonia solution</b> , relative density less than 0.880 at 15°C in water, with more than 35% but not more than 40% ammonia with more than 40% but not more than 50% ammonia	2.2			X	5	10	0.80	b
					X	5	12	0.77	b
> 2193	<b>Hexafluoroethane (refrigerant gas R 116)</b>	2.2			X	10	200	<del>1.10</del> <u>1.13</u>	
> 2200	<b>Propadiene, stabilized</b>	2.1			X	10	22	0.50	
2419	<b>Bromotrifluoroethylene</b>	2.1			X	10	10	1.19	
2422	<b>Octafluorobut-2-ene (refrigerant gas R 1318)</b>	2.2			X	10	12	1.34	
2424	<b>Octafluoropropane (refrigerant gas R 218)</b>	2.2			X	10	25	<del>1.09</del> <u>1.04</u>	
≠ 2451	<b>Nitrogen trifluoride</b>	2.2	5.1		X	10	200	0.50	
2452	<b>Ethylacetylene, stabilized</b>	2.1			X	10	10	0.57	c
2453	<b>Ethyl fluoride (refrigerant gas R 161)</b>	2.1			X	10	30	0.57	
2454	<b>Methyl fluoride (refrigerant gas R 41)</b>	2.1			X	10	300	<del>0.36</del> <u>0.63</u>	
2517	<b>1-chloro-1,1-difluoroethane (refrigerant gas R 142b)</b>	2.1			X	10	10	0.99	
2599	<b>Chlorotrifluoromethane and trifluoromethane azeotropic mixture</b> with approximately 60% chlorotrifluoromethane (refrigerant gas R 503)	2.2			X	10	31 42 100	<del>0.11</del> <u>0.12</u> <del>0.20</del> <u>0.17</u> <del>0.66</del> <u>0.64</u>	
2601	<b>Cyclobutane</b>	2.1			X	10	10	0.63	
2602	<b>Dichlorodifluoromethane and difluoroethane azeotropic mixture</b> with approximately 74% dichlorodifluoromethane (refrigerant gas R 500)	2.2			X	10	22	1.01	

UN No.	Name and description	Class or Division	Subsidiary risk	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
3070	<b>Ethylene oxide and dichlorodifluoromethane mixture</b> with not more than 12.5% ethylene oxide	2.2			X	10	18	1.09	
3153	<b>Perfluoro(methyl vinyl ether)</b>	2.1			X	10	20	0.75	
3154	<b>Perfluoro(ethyl vinyl ether)</b>	2.1			X	10	10	0.98	
≠ 3157	<b>Liquefied gas, oxidizing, n.o.s.</b>	2.2	5.1		X	10			z
3159	<b>1,1,1,2-tetrafluoroethane (refrigerant gas R 134a)</b>	2.2			X	10	<del>22</del> 18	<del>1.04</del> 1.05	
≠ 3161	<b>Liquefied gas, flammable, n.o.s.</b>	2.1			X	10			z
≠ 3163	<b>Liquefied gas, n.o.s.</b>	2.2			X	10			z
3220	<b>Pentafluoroethane (refrigerant gas R 125)</b>	2.2			X	10	49 <del>36</del> 35	0.95 <del>0.72</del> 0.87	
3252	<b>Difluoromethane (refrigerant gas R 32)</b>	2.1			X	10	48	0.78	
3296	<b>Heptafluoropropane (refrigerant gas R 227)</b>	2.2			X	10	<del>45</del> 13	<del>1.20</del> 1.21	
3297	<b>Ethylene oxide and chlorotetrafluoroethane mixture</b> with not more than 8.8% ethylene oxide	2.2			X	10	10	1.16	
3298	<b>Ethylene oxide and pentafluoroethane mixture</b> with not more than 7.9% ethylene oxide	2.2			X	10	26	1.02	
> 3299	<b>Ethylene oxide and tetrafluoroethane mixture</b> with not more than 5.6% ethylene oxide	2.2			X	10	17	1.03	
3337	<b>Refrigerant gas R 404a</b>	2.2			X	10	36	0.82	
3338	<b>Refrigerant gas R 407a</b>	2.2			X	10	<del>36</del> 32	0.94	
3339	<b>Refrigerant gas R 407b</b>	2.2			X	10	<del>38</del> 33	0.93	
3340	<b>Refrigerant gas R 407c</b>	2.2			X	10	<del>35</del> 30	0.95	
≠ 3354	<b>Insecticide gas, flammable, n.o.s.</b>	2.1			X	10			z
≠ 3374	<b>Acetylene, solvent free</b>	2.1			X	5	60 52		c, p

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**215**

**PACKING INSTRUCTION 215**

**215**

The requirements of 4:1.1.1, 4:1.1.2, 4:1.1.3, 4:1.1.7 and 4:2 must be met.

The following packagings are authorized:

- a) For fuel cell cartridges, packagings conforming to the packing group II performance level; and
- b) For fuel cell cartridges contained in equipment or packed with equipment, strong outer packagings. Large robust equipment (see 4:2.7.8) containing fuel cell cartridges may be transported unpackaged. When fuel cell cartridges are packed with equipment, they must be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the contents within the outer packaging. Fuel cell cartridges which are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation.

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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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**436**

**PACKING INSTRUCTION 436**

**436**

The requirements of 4:1.1.1, 4:1.1.2, 4:1.1.3, 4:1.1.7 and 4:2 must be met.

The following packagings are authorized:

- a) For fuel cell cartridges, packagings conforming to the packing group II performance level; and
- b) For fuel cell cartridges contained in equipment or packed with equipment, strong outer packagings. Large robust equipment (see 4:2.7.8) containing fuel cell cartridges may be transported unpackaged. When fuel cell cartridges are packed with equipment, they must be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the contents within the outer packaging. Fuel cell cartridges which are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation.

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## Chapter 8

## CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

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602	PACKING INSTRUCTION 602	602
<p>This packing instruction applies to UN 2814 and UN 2900.</p> <p>The following packagings are authorized provided the special packing provisions are met.</p> <p>Packagings meeting the requirements of 6;6 and approved accordingly consisting of:</p> <p>a) inner packagings comprising:</p> <ol style="list-style-type: none"> <li>1) <del>watertight</del> <u>leakproof</u> primary receptacle(s);</li> <li>2) a <del>watertight</del> <u>leakproof</u> secondary packaging;</li> <li>3) other than for solid infectious substances, an absorbent material in sufficient quantity to absorb the entire contents placed between the primary receptacle(s) and the secondary packaging; if multiple fragile primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them;</li> </ol> <p>b) a rigid outer packaging <del>of adequate strength for its capacity, mass and intended use</del>. The smallest external dimension must be not less than 100 mm.</p> <p>...</p> <p>d) Other than for exceptional consignments, e.g. whole organs, which require special packaging, the following additional requirements must apply:</p> <p>...</p> <ol style="list-style-type: none"> <li>2) Substances consigned refrigerated or frozen. Ice, dry ice or other refrigerant must be placed around the secondary packaging(s) or, alternatively, in an overpack with one or more complete packages marked in accordance with 6;2-2-26.3. Interior supports must be provided to secure secondary packaging(s) or packages in position after the ice or dry ice has dissipated. If ice is used, the outer packaging or overpack must be leakproof. If dry ice is used, the outer packaging or overpack must permit the release of carbon dioxide gas. The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the refrigerant used;</li> </ol> <p>≠ ...</p> <p><u>f) Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4;2.8.</u></p> <p><b>Special packing provisions</b></p> <p>...</p> <p>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 <del>and assignment to UN 2814 or UN 2900</del>, 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.</p> <p><u>d) Before an empty packaging is returned to the consignor, or sent elsewhere, it must be disinfected or sterilized to nullify any hazard and any label or marking indicating that it had contained an infectious substance must be removed or obliterated.</u></p>		

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650	PACKING INSTRUCTION 650	650
<p>This packing instruction applies to UN 3373.</p> <p>...</p> <p>6) The completed package must be capable of successfully passing the drop test in 6;6-2<u>6.5.3</u> as specified in 6;6-1-5<u>6.5.2</u> of the Instructions except that the height of the drop must not be less than 1.2 m. Following the appropriate drop sequence, there must be no leakage from the primary receptacle(s) which must remain protected by absorbent material, when required, in the secondary packaging.</p> <p>...</p> <p>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 1;2.4.2 and 1;2.4.3. 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.</p> <p><u>Additional requirements:</u></p> <p><u>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.</u></p>		

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## Chapter 9

### CLASS 7 — RADIOACTIVE MATERIAL

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

#### 9.1 GENERAL

*Insert new text beginning after the first sentence of existing 9.1.1 (moved from the definition for package in the case of radioactive material in current 1;7.2) as follows:*

9.1.1 Radioactive material, packagings and packages must meet the requirements of 6;7. The quantity of radioactive material in a package must not exceed the limits specified in 2;7.7.1. ~~Package in the case of radioactive material. The packaging with its radioactive contents as presented for transport.~~ The types of packages for radioactive materials covered by these Instructions, which are subject to the activity limits and material restrictions of 7.7 and meet the corresponding requirements, are:

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

h) Type C package.

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

~~Note.— For packages for other dangerous goods, see the definitions under 1;3.1.1.~~

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End of Inserted text

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...

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

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*Editorial Note.*— Paragraph 9.1.6 below is moved to 9.1.12:

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~~9.1.6 Radioactive material packages must be marked to indicate that the shipper has determined that the package meets the applicable air transport requirements as specified in 5;2.4.12.~~

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*Editorial Note.*— Paragraphs 9.1.7 and 9.1.8 below are moved from current 5;1.2.1:

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#### **4.2.1 Requirements before shipments**

##### **4.2.1.1 First shipment of a package**

9.1.6 Before the first shipment of any package, the following requirements must be fulfilled:

- a) If the design pressure of the containment system exceeds 35 kPa (gauge), it must be ensured that the containment system of each package conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure;
- b) For each Type B(U), Type B(M) and Type C package and for each package containing fissile material, it must be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the confinement system, are within the limits applicable to or specified for the approved design;
- c) For packages containing fissile material, where, in order to comply with the requirements of 6;7.10.1 neutron poisons are specifically included as components of the package, checks must be performed to confirm the presence and distribution of those neutron poisons.

##### **4.2.1.2 Each shipment**

9.1.7 Before each shipment of any package, the following requirements must be fulfilled:

- a) For any package it must be ensured that all the requirements specified in the relevant provisions of these Instructions have been satisfied;
- b) It must be ensured that lifting attachments which do not meet the requirements of 6;7.1.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6;7.1.3;
- ≠ c) For each package requiring competent authority approval, it must be ensured that all the requirements specified in the approval certificates have been satisfied;
- d) Each Type B(U), Type B(M) and Type C package must be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received unilateral approval;
- e) For each Type B(U), Type B(M) and Type C package, it must be ensured by inspection and/or appropriate tests that all closures, valves, and other openings of the containment system through which the radioactive contents might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of 6;7.7.7 and 6;7.9.3 were made;

- f) For each special form radioactive material, it must be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Instructions have been satisfied;
- g) For packages containing fissile material, the measurement specified in 6;7.10.4 b) and the tests to demonstrate closure of each package as specified in 6;7.10.7 must be performed where applicable;
- h) For each low dispersible radioactive material, it must be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Instructions have been satisfied.

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*Editorial Note.*— Paragraph 9.1.9 below is moved from 5;1.2.3.2:

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~~1.2.3.2~~9.1.8 The consignor must be in possession of a copy of each applicable certificate. The consignor must also have a copy of any instructions with regard to the proper closing of the package and any preparation for shipment before making any shipment under the terms of the certificates.

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*Editorial Note.*— Paragraph 9.1.10 below is moved from 2;7.8.1 to 2;7.8.3:

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~~7.8.1~~9.1.9 Except for consignments under exclusive use, the transport index of any package or overpack must not exceed 10, nor must the criticality safety index of any package or overpack exceed 50.

~~7.8.2~~9.1.10 Except for packages or overpacks transported under exclusive use and special arrangement under the conditions specified in 7;2.9.5.3, the maximum radiation level at any point on any external surface of a package or overpack must not exceed 2 mSv/h.

~~7.8.3~~9.1.11 The maximum radiation level at any point on any external surface of a package or overpack under exclusive use must not exceed 10 mSv/h.

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*Editorial Note.*— Paragraph 9.1.12 below moved from 9.1.6:

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[ ~~9.1.12~~ Radioactive material packages must be marked to indicate that the shipper has determined that the package meets the applicable air transport requirements as specified in 5;2.4.12. ]

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

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

9.2.2 LSA material and SCO which is or contains fissile material must meet the applicable requirements in 7;2.9.4.1, 7;2.9.4.2 and 6;7.10.1.

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

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

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*Editorial Note.*— Paragraph 9.3 below is moved from 2;7.7.1.7:

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### ~~7.7.1.7~~9.3 Packages containing fissile material

≠ Unless ~~excepted by 6;7.10.2~~ not classified as fissile in accordance with 2;7.2.3.5, packages containing fissile material must not contain:

- a) a mass of fissile material different from that authorized for the package design;
- b) any radionuclide or fissile material different from those authorized for the package design; or
- c) contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the package design;

as specified in their certificates of approval, where appropriate.

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## Chapter 10

### CLASS 8 — CORROSIVES

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<u>827</u>	<u>PACKING INSTRUCTION 827</u>	<u>827</u>
<p><u>The requirements of 4:1.1.1, 4:1.1.2, 4:1.1.3, 4:1.1.7 and 4:2 must be met.</u></p> <p><u>The following packagings are authorized:</u></p> <p><u>a) For fuel cell cartridges, packagings conforming to the packing group II performance level; and</u></p> <p><u>b) For fuel cell cartridges contained in equipment or packed with equipment, strong outer packagings. Large robust equipment (see 4:2.7.8) containing fuel cell cartridges may be transported unpackaged. When fuel cell cartridges are packed with equipment, they must be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the contents within the outer packaging. Fuel cell cartridges which are installed in equipment must be protected against short circuit and the entire system must be protected against inadvertent operation.</u></p>		

## Chapter 11

### CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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<b>903</b>	<b>PACKING INSTRUCTION 903</b>	<b>903</b>
<p>The general packing requirements of 4:1 must be met.</p> <p>This entry applies to cells and batteries containing lithium in any form, including lithium polymer and lithium ion cells and batteries.</p> <p><del>Lithium-c</del> Cells and batteries may only be transported under this packing instruction if they meet the following requirements:</p> <p>a) each cell or battery type has been determined to meet the criteria for assignment to Class 9 on the basis of tests carried out in accordance with the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3;</p> <p>...</p>		

...

918	PACKING INSTRUCTION 918	918
<p>This entry applies to cells and batteries containing lithium in any form, including lithium polymer and lithium ion cells and batteries, when packed with equipment.</p> <p><del>Lithium-c</del>Cells or batteries packed with equipment must meet the requirements of Packing Instruction 903 other than those related to packaging. Lithium cells and batteries must be packed in fibreboard boxes (4G) or fibre drums (1G) of Packing Group II and in such a manner as to effectively prevent movement which could lead to short circuits. Such packages must not exceed 5 kg gross mass for passenger aircraft or 35 kg gross mass for cargo aircraft.</p> <p>The equipment and the packages of <del>lithium-c</del>Cells or batteries must be overpacked.</p> <p>For the purpose of this packing instruction, "equipment" means apparatus requiring the lithium batteries with which it is packed for its operation.</p>		

