International Civil Aviation Organization

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DANGEROUS GOODS PANEL (DGP)

MEETING OF THE WORKING GROUP OF THE WHOLE

Montreal, 18 to 22 April 2005

Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions* for incorporation in the 2007/2008 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

Below are the draft amendments to Part 4 Chapters 1, 4 and 8 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 the second session (Geneva, 10 December 2004).

Chapter 1

GENERAL PACKING REQUIREMENTS

Parts of this Chapter are affected by State Variations IT 7, JP 20, JP 24; see Table A-1

1.1 GENERAL REQUIREMENTS APPLICABLE TO ALL CLASSES EXCEPT CLASS 7

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1.1.9 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 and so as to control their movement. 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, etc., 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.

Editorial Note.— The following new paragraph was moved from 6;4.1.6.

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

a) Inner packagings of equivalent or smaller size may be used provided:

1) the inner packagings are of similar design to the tested inner packagings (e.g. shape — round, rectangular, etc.);

2) the material of construction of the inner packagings (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;

3) the inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc.);

4) sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and

5) inner packagings are oriented within the outer packaging in the same manner as in the tested package.

b) A lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the inner packagings.

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Chapter 4

CLASS 2 — GASES

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200 PACKING INSTRUCTION 200 200

For cylinders, the general packing requirements of 4.1.1 must be met.

Cylinders, constructed as specified in Part 6, Chapter 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:

. . .

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

1) 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.

2) 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.

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 for which relevant data ~~is~~ are not available ~~provided in the table~~, 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)

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d) Keys for the column "Special packing provisions":

Material compatibility (for gases see ISO 11114-1:1997 and ISO 11114-2:2000)

1) Aluminium alloy cylinders are not authorized.
2) Copper valves must not be used.
3) Metal parts in contact with the contents must not contain more than 65 per cent copper.
4) When steel cylinders are used, only those bearing the "H" mark must be authorized.

Gas specific provisions:

~~e~~ 5) UN 1040 **Ethylene oxide** may also be packed in hermetically sealed glass ampoules (IP.8) or metal inner packagings (IP.3 and IP.3A) 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 ~~total quantity~~ 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.

~~f~~ 6) Cylinders must be filled to a working pressure not exceeding 5 bar.

~~g~~ 7) A cylinder must contain not more than 5 kg of ~~the gas~~ UN 1045 Fluorine compressed.

Editorial Note.— Replace e) to m) with 5) to 13) and *amend* Tables 1 and 2 accordingly.

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Table 1. COMPRESSED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m³	Cylinders	Test period, years	Test pressure, bar*	Maximum w~~W~~orking pressure, bar*	Special packing provisions*
. . .									
~~1014~~	~~**Carbon dioxide and oxygen mixture, compressed**~~	~~2.2~~	~~5.1~~		~~X~~	~~10~~			
. . .									
~~1979~~	~~**Rare gases mixture, compressed**~~	~~2.2~~			~~X~~	~~10~~			
~~1980~~	~~**Rare gases and oxygen mixture, compressed**~~	~~2.2~~			~~X~~	~~10~~			
~~1981~~	~~**Rare gases and nitrogen mixture, compressed**~~	~~2.2~~			~~X~~	~~10~~			
. . .									

Table 2. LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m³	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
. . .									
~~1015~~	~~**Carbon dioxide and nitrous oxide mixture**~~	~~2.2~~			~~X~~	~~10~~	~~250~~	~~0.75~~	
. . .									
2451	**Nitrogen trifluoride**	2.2	5.1		X	10	200 ~~300~~	0.50 ~~0.75~~	
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Chapter 8

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

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... **650** **PACKING INSTRUCTION 650** **650**

This packing instruction applies to UN 3373.

1) The packaging must be of good quality, strong enough to withstand the shocks and loadings normally encountered during transport, including transhipment between transport units and between transport units and warehouses as well as any removal from a pallet or overpack for subsequent manual or mechanical handling. Packagings must be constructed and closed to prevent any loss of contents that might be caused under normal conditions of transport by vibration or by changes in temperature, humidity or pressure.

2) The packaging must consist of three components:

   a) a primary receptacle;

   b) a secondary packaging; and

   c) an ~~rigid~~ outer packaging~~.~~

   of which either the secondary or the outer packaging must be rigid.

3) Primary receptacles must be packed in secondary packagings in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings must be secured in outer packagings with suitable cushioning material. Any leakage of the contents must not compromise the integrity of the cushioning material or of the outer packaging.

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

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