

DANGEROUS GOODS PANEL

Dubai, 31 March to 4 April 2003

**Agenda Item 2 Development of recommendations for amendments to the Technical
: Instructions for incorporation in the 2005/2006 edition**

**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, 2, 8 and 11 and 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 first session (Geneva, 11 to 13 December 2002)

Secretarial note. - Reformatted packing instructions are presented in separate working papers. However, packing instructions for refrigerated liquified gases in closed cryogenic receptacles (P2XXX) and for infectious substances (P620, P650) as agreed by the UNCOE are presented for information.

Chapter 1

GENERAL PACKING REQUIREMENTS

1.1 GENERAL REQUIREMENTS APPLICABLE TO ALL CLASSES EXCEPT CLASS 7

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1.1.21 For plastic drums and jerricans, unless otherwise approved by the appropriate national authority, the period of use permitted for the transport of dangerous substances 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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Chapter 2

GENERAL

2.4 Where the packing instructions in this part authorize the use of a particular type of ~~outer~~ packaging ~~in a combination packaging~~ (e.g. 4G, 1A2), packagings bearing the same packaging identification code followed by the letter "V" marked in accordance with the requirements of 6.4.1.7 h) (e.g. 4GV; 1A2V) may also be used under the same conditions and limitations applicable to the use of that type of ~~outer~~ packaging according to the relevant packing instruction. For example, a combination packaging marked with the packaging code "4GV" may be used whenever a combination packaging marked "4G" is authorized, provided the requirements in the relevant packing instruction regarding types of inner packagings and quantity limitations are respected.

Chapter 4

CLASS 2 --- GASES

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 for the transport of Class 2 gases (e.g. UN 1051 **Hydrogen cyanide, stabilized**). Cylinders 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).

4.1.1.2 Parts of cylinders which 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 ~~material~~ **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.~~

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

4.1.1.3 Cylinders, including their closures, must be selected 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;5.1.5 have been performed.

4.1.1.5 Prior to filling, the filler must perform an inspection of the cylinder and ensure that the cylinder is authorized for the gas to be transported and that the provisions of these Instructions have been met. **Shut-off** valves must be closed after filling and remain closed during transport. ~~The consignor~~ shipper must verify that the closures and equipment are not leaking.

4.1.1.56 Cylinders must be filled according to the working pressures, filling ratios and provisions specified in the appropriate packing instruction for the specific substance being filled. 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.

4.1.1.67 Cylinders, including their closures, must conform to the design, construction, inspection and testing requirements detailed in Part 6, Chapter 5. When outer packagings are prescribed, the cylinders must be firmly secured therein. Unless otherwise specified in the detailed packing instructions, one or more inner packagings may be enclosed in an outer packaging.

4.1.1.78 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, by one of the following methods:

- (a) Valves are placed inside the neck of the cylinder and protected by a threaded plug or cap;
- (b) Valves are protected by caps. Caps must possess vent-holes of sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;
- (c) Valves are protected by shrouds or guards;
- ~~(d) Valves are designed and constructed in such a way that they are inherently able to withstand damage without leakage of product;~~
- (e)d Not used; or
- (f)e Cylinders are transported in an outer packaging. The packaging as prepared for transport must be capable of meeting the drop test specified in 6;5.5.3 at the packing group I performance level.

For cylinders with valves as described in (b) and (c), the requirements of ISO11117:1998 must be met; for ~~unprotected~~ valves **with inherent protection** ~~as described in (d)~~, the requirements of annex B of ISO 10297:1999 must be met.

4.1.1.89 Non-refillable cylinders must:

- (a) be transported in an outer packaging, such as a box, or crate, or in shrink-wrapped trays or stretch- wrapped trays;
- (b) be of a water capacity less than or equal to 1.25 litres when filled with flammable or toxic gas;
- (c) not be repaired after being put into service.

4.1.1.9 ~~10~~ Refillable cylinders, ~~other than cryogenic receptacles~~, must be periodically inspected according to the provisions of ~~6; 5.1.5 and~~ packing instructions PI 200 ~~or P202 as applicable~~. Cylinders must not be ~~charged or~~ filled after they become due for periodic inspection but may be transported after the expiry of the time limit.

4.1.1.10 ~~11~~ Repairs ~~must be consistent with the fabrication and testing requirements of the applicable design and construction standards and~~ are only permitted as indicated in the ~~relevant~~ periodic inspection standards specified in 6;5.2.4, ~~consistent with the applicable design and construction standards~~. Cylinders, ~~other than the jacket of closed cryogenic receptacles~~, must not be subjected to repairs of any of the following;

- (a) weld cracks or other weld defects;
- (b) cracks in walls;
- (c) leaks or defects in the material of the wall, head or bottom.

4.1.1.11 ~~12~~ Cylinders must not be offered for filling:

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

4.1.1.12 ~~13~~ ~~Charged~~ Filled cylinders must not be offered for transport;

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

200	PACKING INSTRUCTION 200	200
...		
Gas specific provisions:		
...		
k) Aluminium alloy cylinders must be:		
<ul style="list-style-type: none"> — Equipped only with brass or stainless steel valves; and — Cleaned in accordance with ISO 11621:1997 and not contaminated with oil. 		
l) (i) The wall thickness of cylinders must be not less than 3mm. (ii) Prior to transport it must be ensured that the pressure has not risen due to potential hydrogen generation.		
Periodic inspection:		
m) 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 ISO 7866:1999.		
n) 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:		
o) 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 must be required.		
<i>Note.— For the carriage of oxygen to provide life support to aquatic animals, see Note 7 of the Introductory Notes to this Part.</i>		
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Table 2. LIQUEFIED GASES AND DISSOLVED GASES		

UN No.	Name and description	Class or Division	Subsidiary risk	LC ₅₀ ml/m ³	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
1010	Butadienes and hydrocarbon mixture, stabilized (mixtures of 1,3-butadiene and hydrocarbons) containing more than 40% butadienes	2.1			X	10	10	0.50	v z

P2XX	PACKING INSTRUCTION	P2XX
<p>This instruction applies to Class 2 refrigerated liquefied gases in closed cryogenic receptacles. Refrigerated liquefied gases in open cryogenic receptacles must conform to the construction, testing and filling requirements approved by the appropriate national authority.</p> <p>For closed cryogenic receptacles, the general requirements of Part 4, Chapter 1 must be met.</p> <p>Closed cryogenic receptacles constructed as specified in Part 6, Chapter 5 are authorized for the transport of refrigerated liquefied gases.</p> <p>The closed cryogenic receptacles must be so insulated that they do not become coated with frost.</p> <p>1. <u>Test pressure</u></p> <p>Refrigerated liquids must be filled in closed cryogenic receptacles with the following minimum test pressures:</p> <p>(a) For closed cryogenic receptacles with vacuum insulation, the test pressure must not be less than 1.3 times the sum of the maximum internal pressure of the filled receptacle, including during filling and discharge, plus 100 kPa (1 bar);</p> <p>(b) For other closed cryogenic receptacles, the test pressure must be not less than 1.3 times the maximum internal pressure of the filled receptacle taking into account the pressure developed during filling and discharge.</p> <p>2. <u>Degree of filling</u></p> <p>For non-flammable, non-toxic refrigerated liquefied gases the volume of liquid phase at the filling temperature and at a pressure of 100 kPa (1 bar) must not exceed 98 per cent of the water capacity.</p> <p>For flammable refrigerated liquefied gases the degree of filling must remain below the level at which, the volume of the liquid phase would reach 98 per cent of the water capacity at that temperature, if the contents were raised to the temperature at which the vapour pressure equalled the opening pressure of the relief valve.</p> <p>3. <u>Pressure-relief devices</u></p> <p>Closed cryogenic receptacles must be fitted with at least one pressure-relief device.</p> <p>4. <u>Compatibility</u></p>		

Materials used to ensure the leakproofness of the joints or for the maintenance of the closures must be compatible with the contents. In the case of receptacles intended for the transport of oxidizing gases, (i.e. with a subsidiary risk of 5.1) these materials must not react with these gases in a dangerous manner.

Chapter 8

P620	PACKING INSTRUCTION	P620
This instruction applies to UN Nos. 2814 and 2900.		
The following packagings are authorized provided the special packing provisions are met:		
Packagings meeting the requirements of Part 6, Chapter 6 and approved accordingly consisting of:		
<ul style="list-style-type: none"> (a) Inner packagings comprising: <ul style="list-style-type: none"> (i) watertight primary receptacle(s); (ii) a watertight secondary packaging; (iii) 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; (b) A rigid packaging of adequate strength for its capacity, mass and intended use. The smallest external dimension must be not less than 100 mm. 		
Additional requirements:		
<ol style="list-style-type: none"> 1. Inner packagings containing infectious substances must not be consolidated with inner packagings containing unrelated types of goods. [Complete packages may be overpacked in accordance with the provisions of 1.2.1 and 5.1.2: such an overpack may contain dry ice.] 2. Other than for exceptional consignments, e.g. whole organs which require special packaging, the following additional requirements must apply: <ul style="list-style-type: none"> (a) <i>Substances consigned at ambient temperatures or at a higher temperature.</i> Primary receptacles must be of glass, metal or plastics. Positive means of ensuring a leakproof seal must be provided, e.g. a heat seal, a skirted stopper or a metal crimp seal. If screw caps are used, they must be secured by positive means, e.g., tape, paraffin sealing tape or manufactured locking closure; (b) <i>Substances consigned refrigerated or frozen.</i> 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;2.2.2. 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; (c) <i>Substances consigned in liquid nitrogen.</i> Plastics primary receptacles capable of withstanding very low temperature must be used. The secondary packaging must also be capable of withstanding very low temperatures, and in most cases will need to be fitted over the primary receptacle individually. Provisions for the consignment of liquid nitrogen must also be fulfilled. The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the liquid nitrogen. (d) <i>Lyophilized substances</i> may also be transported in primary receptacles that are flame-sealed glass ampoules or rubber-stoppered glass vials fitted with metal seals; 3. Whatever the intended temperature of the consignment, the primary receptacle or the secondary packaging must be capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95 kPa and temperatures in the range -40 °C to +55 °C. 		

Special packing provisions

1) 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.

The definition in Part 1, Chapter 3 and the general packing provision of Part 4, Chapter 1, apply to infectious substances packages. [However, liquids must be filled into packagings, which have an appropriate resistance to the internal pressure that may develop under normal conditions of transport.]

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 and assignment to UN 2814 or UN 2900, the words “suspected category A infectious substance” must be shown, in parentheses following the proper shipping name on the document inside the outer packaging.

Before an empty packaging is returned to the consignor, or sent elsewhere, it must be thoroughly disinfected or sterilized and any label or marking indicating that it had contained an infectious substance must be removed or obliterated.

P650	PACKING INSTRUCTION	P650
This packing instruction applies to UN 3373		
<p>(1) The packaging must be of good quality, strong enough to withstand the shocks and loadings normally encountered during transport, including transshipment 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.</p> <p>(2) The packaging must consist of three components:</p> <ul style="list-style-type: none">(a) a primary receptacle;(b) a secondary packaging; and(c) an outer packaging. <p>(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.</p> <p>(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 width of the line must be at least 2 mm; the letters and numbers must be at least 6 mm high.</p> <div data-bbox="625 1060 998 1417" style="text-align: center;"></div> <p>(5) The completed package must be capable of successfully passing the drop test in 6;6.2 as specified in 6;6.1.5 of the Instructions except that the height of the drop must not be less than 1.2 m.</p> <p>(6) For liquid substances</p> <ul style="list-style-type: none">(a) The primary receptacle(s) must be leakproof;(b) The secondary packaging must be leakproof;(c) If multiple fragile primary receptacles are placed in a single secondary packaging, they must be either		

P650	PACKING INSTRUCTION	P650
	<p>individually wrapped or separated to prevent contact between them;</p> <p>(d) Absorbent material must be placed between the primary receptacle(s) and the secondary packaging. The absorbent material must be in quantity sufficient to absorb the entire contents of the primary receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;</p> <p>(e) The primary receptacle or the secondary packaging must be capable of withstanding, without leakage, an internal pressure of 95 kPa (0.95 bar).</p>	
	<p>(7) For solid substances</p> <p>(a) The primary receptacle(s) must be siftproof;</p> <p>(b) The secondary packaging must be siftproof;</p> <p>(c) If multiple fragile primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated to prevent contact between them.</p>	
	<p>(8) Refrigerated or frozen specimens: Ice, dry ice and liquid nitrogen</p> <p>(a) When dry ice or liquid nitrogen is used to keep specimens cold, 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 carbon dioxide, solid (dry ice) is used, the packaging must be designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packagings and must be marked "Carbon dioxide, solid" or "Dry ice".</p> <p>(b) 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.</p>	
	<p>(9) 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.</p>	
	<p>(10) Clear instructions on filling and closing such packages must be provided by packaging manufacturers and subsequent distributors to the consignor or to the person who prepares the package (e.g. patient) to enable the package to be correctly prepared for transport.</p>	

Chapter 9

CLASS 7 — RADIOACTIVE MATERIAL

9.1 GENERAL

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**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 Type IP-1** package ~~Type 1 (Type IP-1)~~, **Industrial Type IP-2** package ~~Type 2 (Type IP-2)~~, or **Industrial Type IP-3** 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.

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

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

— END —