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**COMMITTEE OF EXPERTS ON THE TRANSPORT  
OF DANGEROUS GOODS AND ON THE GLOBALLY  
HARMONIZED SYSTEM OF CLASSIFICATION  
AND LABELLING OF CHEMICALS**

Sub-Committee of Experts on the  
Transport of Dangerous Goods

REPORT OF THE SUB-COMMITTEE OF EXPERTS  
ON ITS TWENTY-NINTH SESSION  
(Geneva, 3-11 July 2006)

Addendum 1

Annex 1: Draft amendments to the UN Recommendations on the Transport of Dangerous Goods, Model Regulations (14th revised edition)

Annex 2: Draft amendments to the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria (4th revised edition, as amended)

**Annex 1****DRAFT AMENDMENTS TO THE UN RECOMMENDATIONS ON THE TRANSPORT  
OF DANGEROUS GOODS, MODEL REGULATIONS  
(14<sup>th</sup> revised edition)****PART 2****Chapter 2.1**

2.1.3.5.5 In the table, against "Shell, spherical or cylindrical / preloaded mortar, shell in mortar", insert new third entry as follows:

<b>Specification</b>	<b>Classification</b>
colour shell: > 25% flash composition as loose powder and/or report effects	1.1G

**Chapter 2.2**

2.2.2.1 (b) (ii) At the end after "does", add ". The oxidizing ability shall be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:1996 and ISO 10156-2:2005)".

2.2.2.3 Amend to read as follows:

"2.2.2.3 Gases of Division 2.2 are not subject to these Regulations if they are transported at a pressure of less than 200 kPa at 20 °C and are not liquefied or refrigerated liquefied gases."

2.2.3 (d) At the end, add "(see ISO 10156:1996 and ISO 10156-2:2005)".

**Chapter 2.4**

2.4.2.4.1 Replace "and UN 3380" with ", UN 3380 and UN 3474".

**Chapter 2.5**

2.5.3.2.4 In the table, amend the entries listed below as follows:

Organic peroxide		Column	Amendment
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE (Concentration $\leq 62$ as a stable dispersion in water)	(3 <sup>rd</sup> row)	Number	Replace "3117" with "3119"
DI-(2-ETHYLHEXYL) PEROXYDICARBONATE (Concentration $\leq 52$ as a stable dispersion in water)	(4 <sup>th</sup> row)	Delete	
tert-AMYLPEROXY-3,5,5-TRIMETHYLHEXANOATE		Packing method	Replace "OP5" with "OP7"
		Number	Replace "3101" with "3105"
DICUMYL PEROXIDE (Concentration $> 52-100$ )	(1 <sup>st</sup> row)	Inert solid	Delete " $\leq 57$ "

Insert the following new entries:

Organic peroxide	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
tert-AMYL PEROXYNEODECANOATE	$\leq 47$	$\geq 53$				OP8	0	+ 10	3119	
tert-BUTYL PEROXY 3,5,5-TRIMETHYLHEXANOATE	$\leq 42$			$\geq 58$		OP7			3106	
CUMYL PEROXYNEODECANOATE	$\leq 87$	$\geq 13$				OP7	- 10	0	3115	
2,2-DI-(tert-AMYLPEROXY)-BUTANE	$\leq 57$	$\geq 43$				OP7			3105	
1,1-DI-(tert-BUTYLPEROXY) CYCLOHEXANE	$\leq 72$		$\geq 28$			OP5			3103	30)
1,1-DI-(tert-BUTYLPEROXY) CYCLOHEXANE + tert-BUTYLPEROXY-2-ETHYLHEXANOATE	$\leq 43$ + $\leq 16$	$\geq 41$				OP 7			3105	
1,1-DI-(tert-BUTYLPEROXY)-3,3,5-TRIMETHYL-CYCLOHEXANE	$\leq 90$		$\geq 10$			OP5			3103	30)
DI-2,4-DICHLOROBENZOYL PEROXIDE	$\leq 52$ as a paste					OP8	+ 20	+ 25	3118	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	$\leq 77$	$\geq 23$				OP 7	- 5	+ 5	3115	
3-HYDROXY-1,1-DIMETHYLBUTYLPEROXYNEODECANOATE	$\leq 52$ as a stable dispersion in water					OP 8	- 5	+ 5	3119	
3-HYDROXY-1,1-DIMETHYLBUTYL PEROXYNEODECANOATE	$\leq 52$	$\geq 48$				OP 8	- 5	+ 5	3117	
METHYL ISOPROPYL KETONE PEROXIDE(S)	See remark 31)	$\geq 70$				OP8			3109	31)
3,3,5,7,7-PENTAMETHYL-1,2,4-TRIOXEPANE	$\leq 100$					OP8			3107	

After the table, add the following new notes:

"30) *Diluent type B with boiling point > 130 °C.*

31) *Active oxygen ≤ 6.7%.*".

## **Chapter 2.6**

2.6.3.2.3.1, 2.6.3.2.3.2 and 2.6.3.2.3.6 The text of the 14<sup>th</sup> revised edition of the UN Model Regulations remains unchanged. (The amendments adopted by the Sub-Committee at its 28th session - see ST/SG/AC.10/C.3/56/Add.1 - are cancelled.)

2.6.3.2.3.6 Renumber existing NOTE as NOTE 1.

In NOTE 1 (existing NOTE), add "*in the absence of any concern for infection (e.g. evaluation of vaccine induced immunity, diagnosis of autoimmune disease, etc.)*" after "*antibody detection in humans or animals*".

Add a new NOTE 2 to read as follows:

**"NOTE 2:** *For air transport, packagings for specimens exempted under this paragraph shall meet the conditions in (a) to (c).*".

2.6.3.5.2 Add at the end, before the note: "For the assignment, international, regional or national waste catalogues may be taken into account."

## **PART 3**

### **Chapter 3.2**

3.2.1 Amend the explanatory text for Column 7 to read as follows:

"Column 7 "Limited Quantities and Excepted Quantities" - above the horizontal line, this column provides the maximum quantity per inner packaging or article for transporting dangerous goods as limited quantities in accordance with Chapter 3.4. Below the horizontal line, this column provides an alphanumeric code described in section 3.5.1.2 and indicates the maximum quantity per inner and outer packaging for transporting dangerous goods as excepted quantities in accordance with Chapter 3.5. The word "None" above or below the horizontal line in this column means that the article or substance is not permitted to be transported as limited quantities or excepted quantities as applicable."

**Dangerous Goods List**

Amend the heading of Column (7) to read as follows:

"Limited quantities

\_\_\_\_\_  
 Excepted quantities"

In column (7), add a horizontal line in each cell and insert, at the bottom of the cell under the line, alphanumeric codes as indicated below:

	<b>Packing Group I</b>	<b>Packing Group II</b>	<b>Packing Group III</b>
<b>CLASS/ DIVISION</b>	<b>E-Code</b>	<b>E-Code</b>	<b>E-Code</b>
1	None		
2.1	None		
2.2 <sup>a</sup> without subsidiary risk	[E1]		
2.3	None		
3 without subsidiary risk <sup>b</sup>	E3	E2	E1
3 with subsidiary risk	None	E2	E1
4.1 <sup>c</sup>	None	E2	E1
4.2	None	E2	E1
4.3	None	E2	E1
5.1	None	E2	E1
5.2 <sup>d</sup>	E2	E2	E2
6.1	E5	E4	E1
6.2	None		
7	None		
8 <sup>e</sup>	None	E2	E1
9	Not applicable	E2	E1

<sup>a</sup> For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer package;

<sup>b</sup> Desensitized explosives shall not be transported as excepted quantities;

<sup>c</sup> Self-reactive substances and desensitized explosives shall not be transported as excepted quantities;

<sup>d</sup> Division 5.2 dangerous goods may ONLY be transported as excepted quantities if in UN No. 3316, Chemical Kit or First Aid Kit;

<sup>e</sup> UN Nos. 2803 and 2809 shall not be transported as excepted quantities.

For UN Nos. 1170, 1987 and 1993, delete "330" in column (6).

For UN Nos. 3077 and UN 3082, add "335" in column (6).

For UN Nos. 0504, 3354, 3355, 3356, 3357 and 3374, add "NONE" in column (7).

For UN Nos. 3129, 3130 and 3148, replace "g/kg" with "ml/l" in column (7).

For UN Nos. UN 1463, 1473, 1484, 1485, 1487, 1488, 1490, 1493, 1494, 1495, 1512, 1514, 1751, 2465, 2468, 2627 and 3247, add "B2" in column (9).

UN 1569            Replace "T3" with "T20" in column (10) and "TP33" with "TP2 TP13" in column (11).

UN 1017            Add "5.1" in column (4).

UN 1474            In column (6), add "332".

UN 1744            In column (8), replace "P601" with "P804" and in column (9), delete "PP82".

UN 2031, PG II (two entries) Add "B14" in column (9).

UN 2823            Add "B3" in column (9).

UN 2844            Delete "B2" in column (9).

UN 3432            Add "B2 B4" in column (9).

UN 3077            Add "BK2" in column (10).

UN 3468            The addition of special provision 332 in column (6) (see ST/SG/AC.10/C.3/56/Add.1) is cancelled.

UN 3473            In column (2), replace "FUEL CELL CARTRIDGES" with "FUEL CELL CARTRIDGE or FUEL CELL CARTRIDGE CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGE PACKED WITH EQUIPMENT". In column (8), replace "P003" with "P004" and in column (9), delete "PP88".

Add the following new entries:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
0505	SIGNALS DISTRESS, ship	1.4G				NONE	P135			
0506	SIGNALS DISTRESS, ship	1.4S				NONE	P135			
0507	SIGNALS, SMOKE	1.4S				NONE	P135			
0508	1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, dry or wetted with less than 20% water, by mass	1.3C				NONE	P114(b)			

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
3474	1-HYDROXYBENZOTRIAZOLE, ANHYDROUS, WETTED with not less than 20% water, by mass	4.1		I	28	NONE	P406			
3475	ETHANOL AND GASOLINE MIXTURE or ETHANOL AND MOTOR SPIRIT MIXTURE or ETHANOL AND PETROL MIXTURE, with more than 10% ethanol	3		II	333	1 L	P001 [IBC02]		T4	TP1
3476	FUEL CELL CARTRIDGE or FUEL CELL CARTRIDGE CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGE PACKED WITH EQUIPMENT, containing water-reactive substances	4.3			328 334	500 ml or 500 g	P004			
3477	FUEL CELL CARTRIDGE or FUEL CELL CARTRIDGE CONTAINED IN EQUIPMENT or FUEL CELL CARTRIDGE PACKED WITH EQUIPMENT, containing corrosive substances	8			328 334	1 L or 1 kg	P004			

### **Chapter 3.3**

3.3.1 **SP188** In (a), replace "lithium equivalent content is not more than 1.5 g" with "Watt-hour rating is not more than 20 Wh".

In (b), replace "aggregate lithium-equivalent content is not more than 8 g;" with "Watt-hour rating is not more than 100 Wh. Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case;".

In the last sentence, delete ", except in the case of a lithium ion cell the "lithium-equivalent content" in grams is calculated to be 0.3 times the rated capacity in ampere hours".

**SP198** Replace "UN 1210, UN 1263 and UN 3066" with "UN Nos. 1210, 1263, 3066, 3469 and 3470".

**SP328** Amend to read as follows:

**"328** This entry applies to fuel cell cartridges including when contained in equipment or packed with equipment. Fuel cell cartridges installed in or integral to a fuel cell system are regarded as contained in equipment. Fuel cell cartridge means an article that stores fuel for discharge into the fuel cell through a valve(s) that controls the discharge of fuel into the fuel cell. Fuel cell cartridges shall be designed and constructed to prevent fuel leakage under normal conditions of transport.

Fuel cell cartridge design types using liquids as fuels shall pass an internal pressure test at a pressure of 100 kPa (gauge) without leakage.

Each fuel cell cartridge design type shall be shown to pass a 1.2 meter drop test onto an unyielding surface in the orientation most likely to result in failure of the containment system with no loss of contents."

**SP330** Delete.

Add the following new special provisions:

**333** Ethanol and gasoline, motor spirit or petrol mixtures for use in spark-ignition engines (e.g. in automobiles, stationary engines and other engines) shall be assigned to this entry regardless of variations in volatility.

**334** A fuel cell cartridge may contain an activator provided it is fitted with two independent means of preventing unintended mixing with the fuel during transport.

**335** Mixtures of solids which are not subject to these Regulations and environmentally hazardous liquids or solids shall be classified as UN 3077 and may be transported under this entry, provided there is no free liquid visible at the time the substance is loaded or at the time the packaging or transport unit is closed. Each transport unit shall be leakproof when used as a bulk packaging. Sealed packets and articles containing less than 10 ml of an environmentally hazardous liquid, absorbed into a solid material but with no free liquid in the packet or article, or containing less than 10 g of an environmentally hazardous solid, are not subject to these Regulations."

### **Chapter 3.5**

Add a new Chapter 3.5 to read as follows:

#### **"CHAPTER 3.5 DANGEROUS GOODS PACKED IN EXCEPTED QUANTITIES**

##### **3.5.1 Excepted quantities**

3.5.1.1 Excepted quantities of dangerous goods of certain classes, other than articles, meeting the provisions of this section are not subject to any other provisions of these Regulations except for:

- (a) the training requirements in Chapter 1.3;
- (b) the classification procedures and packing group criteria in Part 2, Classification;

- (c) the packaging requirements of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.4.1 and 4.1.1.6 in Part 4.

**NOTE:** *In the case of radioactive material, the requirements for radioactive material in excepted packages in 2.7.7.1.2.1 and 2.7.9.1 apply.*

3.5.1.2 Dangerous goods that may be carried as excepted quantities in accordance with these provisions are shown in column 7 of the dangerous goods list by means of an alphanumeric code as follows:

Code	Inner packaging	Outer packaging
None	Not permitted as Excepted Quantity	
E1	30g/30ml	1kg/1L
E2	30g/30ml	500g/500ml
E3	30g/30ml	300g/300ml
E4	1g/1ml	500g/500ml
E5	1g/1ml	300g/300ml

Excepted quantities of dangerous goods shall be transported in accordance with the provisions of sections 3.5.1.3 to 3.5.1.6.

3.5.1.3 Packagings used for the transport of dangerous goods in excepted quantities shall be in compliance with the following:

- (a) There shall be an inner packaging and each inner packaging shall be constructed of plastic (when used for liquid dangerous goods it shall have a minimum thickness of not less than 0.2 mm), or of glass, porcelain, stoneware, earthenware or metal (see also 4.1.1.2) and the closure of each inner packaging shall be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads shall have a leak proof threaded type cap. The closure shall be resistant to the contents;
- (b) Each inner packaging shall be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents. The intermediate packaging shall completely contain the contents in case of breakage or leakage, regardless of package orientation. For liquid dangerous goods, the intermediate packaging shall contain sufficient absorbent material to absorb the entire contents of the inner packaging. In such cases, the absorbent material may be the cushioning material. Dangerous goods

shall not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials;

- (c) The intermediate packaging shall be securely packed in a strong, rigid outer packaging (wooden, fibreboard or other equally strong material);
- (d) Each package type shall be in compliance with the provisions in 3.5.1.4;
- (e) Each package shall be of such a size that there is adequate space to apply all necessary markings; and
- (f) Overpacks may be used and may also contain packages of dangerous goods or goods not subject to these Regulations.

#### **3.5.1.4**      *Package tests*

3.5.1.4.1      The complete package as prepared for transport, with inner packagings filled to not less than 95% of their capacity for solids or 98% for liquids, shall be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

- (a) Drops onto a rigid, non-resilient flat and horizontal surface from a height of 1.8 m:
  - (i) Where the sample is in the shape of a box, it shall be dropped in each of the following attitudes:
    - flat on the base;
    - flat on the top;
    - flat on the longest side;
    - flat on the shortest side;
    - on a corner;
  - (ii) Where the sample is in the shape of a drum, it shall be dropped in each of the following attitudes:
    - diagonally on the top chime, with the centre of gravity directly above the point of impact;
    - diagonally on the base chime;
    - flat on the side.

**NOTE:** *Each of the above drops may be performed on different but identical packages.*

- (b) a force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the drop sample).

3.5.1.4.2 For the purposes of testing, the substances to be transported in the packaging may be replaced by other substances except where this would invalidate the results of the tests. For solids, when another substance is used, it must have the same physical characteristics (mass, grain size, etc.) as the substance to be carried. In the drop tests for liquids, when another substance is used, its relative density (specific gravity) and viscosity should be similar to those of the substance to be transported.

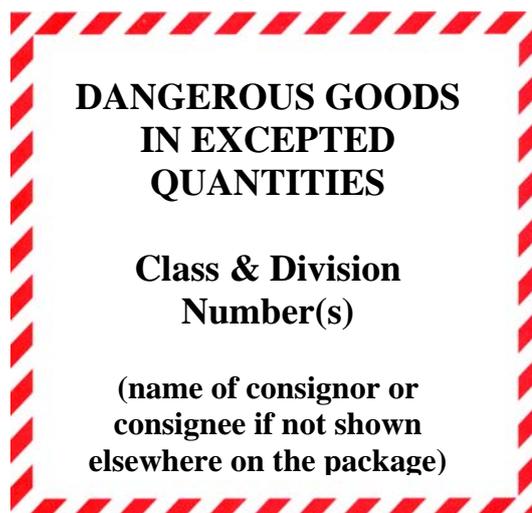
### **3.5.1.5 Marking of packages**

3.5.1.5.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this Chapter shall be durably and legibly marked with the mark shown in Figure 3.5.1. The Class or Class and Division numbers of each of the dangerous goods contained in the package shall be shown in the mark. Where the name of the consignor or consignee is not shown elsewhere on the package this information shall be included within the mark.

3.5.1.5.2 For packages the dimensions of the mark shall be a minimum of 100 mm × 100 mm.

3.5.1.5.3 An overpack containing dangerous goods in excepted quantities shall display the markings required by 3.5.1.5.1, unless such markings on packages within the overpack are clearly visible.

**Figure 3.5.1**



Excepted quantities mark

Black or red hatching on white or suitable contrasting background

**3.5.1.6**        *Maximum number of packages per transport unit*

The number of packages per transport unit shall not exceed 1 000.

**3.5.1.7**        *Documentation*

When a document is used it shall include the statement "Dangerous Goods in Excepted Quantities" and indicate the number of packages."

**PART 4**

**Chapter 4.1**

4.1.1.3        Add the following new paragraph at the end:

"However, IBCs manufactured before 1 January 2011 and conforming to a design type which have not passed the vibration test of 6.5.6.13 may still be used."

4.1.4.1 **P003**    Delete PP88.

**P114(b)** and **P406**        Add the following new special packing provision:

**"PP48**    For UN Nos 0508 and 3474, metal packagings shall not be used."

**P114(b)**        In special packing provision **PP50**, replace "For UN 0160 and UN 0161" with "For UN Nos. 0160, 0161 and 0508" and replace "required" with "necessary".

**P200**    In sub-paragraph (3) (b), amend the second sentence to read as follows:

"The use of test pressures and filling ratios other than those in the table is permitted, except where (4), special packing provision "o" applies, provided that

(a) the criterion of (4), special packing provision "r" is met when applicable; or

(b) the above criterion is met in all other cases."

In paragraph (4), insert a new special packing provision "r" to read as follows:

"r:        The filling ratio of this gas shall be limited such that, if complete decomposition occurs, the pressure does not exceed two thirds of the test pressure of the pressure receptacle."

In paragraph (4), add a new paragraph at the end of special packing provision "z" to read as follows:

"Mixtures containing UN 2192 germane, other than mixtures of up to 35% germane in hydrogen or nitrogen or up to 28% germane in helium or argon, shall be filled to a pressure such that, if complete decomposition of the germane occurs, two thirds of the test pressure of the pressure receptacle shall not be exceeded."

In Table 2, for UN 1017 add "5.1" in column "Subsidiary risk".

In Table 2, for UN 2192 replace "1.02" with "0.064" in the column "Filling ratio" and add ", r" in the column "Special packing provisions".

Modify the column "Filling ratio" of Table 2 as follows:

UN No.	Name	Test pressure, bar	Filling ratio
1011	Butane	10	0.52
1035	Ethane	120	0.30
1035	Ethane	300	0.40
1982	Tetrafluoromethane (R14)	200	0.71
2599	R503	31	0.12
3220	Pentafluoroethane (R125)	36	0.87

**P601** In (2), delete "or additionally, for UN 1744 only, in polyvinylidene fluoride (PVDF) inner packagings,".

Delete PP82.

**P620** The deletion of sub-paragraph (b) (see ST/SG/AC.10/C.3/56/Add.1) is cancelled.

Amend sub-paragraph (b) to read as follows:

"A rigid outer packaging. The smallest external dimension shall be not less than 100 mm."

Add new packing instructions P004 and P804 to read as follows:

<b>P004</b>	<b>PACKING INSTRUCTION</b>	<b>P004</b>
<p>This instruction applies to fuel cell cartridges, and fuel cell cartridges contained in equipment or packed with equipment.</p>		
<p>The following packagings are authorized provided the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.3, 4.1.1.6 and 4.1.3. are met:</p>		
<p>(1) For fuel cell cartridges, packagings conforming to the packing group II performance level; and</p>		
<p>(2) For fuel cell cartridges contained in equipment or packed with equipment, strong outer packaging. Large robust equipment (see 4.1.3.8) containing fuel cell cartridges may be transported unpackaged. When fuel cell cartridges are packed with equipment, they shall 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 shall be protected against short circuit and the entire system shall be protected against inadvertent operation.</p>		

<b>P804</b>	<b>PACKING INSTRUCTION</b>	<b>P804</b>
<p>This instruction applies to UN1744.</p>		
<p>The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met and the packagings are hermetically sealed:</p>		
<p>(1) Combination packagings with a maximum gross mass of 25 kg, consisting of one or more glass inner packaging(s) with a maximum capacity of 1.3 litres each and filled to not more than 90% of their capacity; the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during transport, together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings.</p>		
<p>(2) Combination packagings consisting of metal or polyvinylidene fluoride (PVDF) inner packagings, not exceeding 5 litres in capacity individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 75 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transport;</p>		
<p>(3) Packagings consisting of:</p>		
<p>Outer packagings:</p>		
<p>Steel or plastic drums, removable head (1A2 or 1H2) tested in accordance with the test requirements in 6.1.5 at a mass corresponding to the mass of the assembled package either as a packaging intended to contain inner packagings, or as a single packaging intended to contain solids or liquids, and marked accordingly;</p>		
<p>Inner packagings:</p>		
<p>Drums and composite packagings (1A1, 1B1, 1N1, 1H1 or 6HA1) meeting the requirements of Chapter 6.1 for single packagings, subject to the following conditions:</p>		

**P804****PACKING INSTRUCTION****P804**

- (a) The hydraulic pressure test shall be conducted at a pressure of at least 3 bar (gauge pressure);
  - (b) The design and production leakproofness tests shall be conducted at a test pressure of 0,3 bar;
  - (c) They shall be isolated from the outer drum by the use of inert shock-mitigating cushioning material which surrounds the inner packaging on all sides;
  - (d) Their capacity shall not exceed 125 litres;
  - (e) Closures shall be of a screw type that are:
    - (i) Physically held in place by any means capable of preventing back –off or loosening of the closure by impact or vibration during transport;
    - (ii) Provided with a cap seal;
  - (f) The outer and inner packagings shall be subjected periodically to an internal inspection and leakproofness test according to (b) at intervals of not more than two and a half years; and
  - (g) The outer and inner packaging shall bear in clearly legible and durable characters:
    - (i) the date (month, year) of the initial test and the latest periodic test and inspection of the inner packaging;
    - (ii) the name or authorized symbol of the expert performing the tests and inspections;
- (4) Pressure receptacles may be used provided that the general provisions of 4.1.3.6 are met.
- (a) They shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 10 bar (gauge pressure);
  - (b) They shall be subjected periodically to an internal inspection and leakproofness test at intervals of not more than two and a half years;
  - (c) Pressure receptacles may not be equipped with any pressure relief device;
  - (d) Each pressure receptacle shall be closed with a plug or valve(s) fitted with a secondary closure device; and
  - (e) The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting and gaskets shall be compatible with each other and with the contents.

4.1.4.2 **IBC02** Add a new special packing provision to read as follows:

**"B14** For UN 2031 with more than 55% nitric acid, the permitted use of rigid plastics IBC's and of composite IBC's with a rigid plastics inner receptacle, shall be two years from their date of manufacture."

**IBC05, IBC06, IBC07 and IBC08** In special packing provision **B2**, delete "packing group II".

**IBC520** For UN No 3109, in the entry for tert-Butyl peroxy-3,5,5-trimethylhexanoate, not more than 32% in diluent type A (third entry), replace "32%" with "37%".

For UN No 3119, in the entry for Di-(2-ethylhexyl) peroxydicarbonate, not more than 52%, stable dispersion, in water (ninth entry), replace "52%" with "62%".

Insert the following new entries:

UN No.	Organic peroxide	Type of IBC	Maximum quantity (litres)	Control temperature	Emergency temperature
3109	tert-Butyl peroxybenzoate, not more than 32% in diluent type A	31A	1250		
3109	1,1-Di-(tert-Butylperoxy)cyclohexane, not more than 37% in diluent type A	31A	1250		
3119	tert-Amyl peroxy-pivalate, not more than 32% in diluent type A	31A	1250	+10	+15
3119	tert-Butyl peroxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1250	-5	+5
3119	Di-(2-neodecanoylperoxyisopropyl)-benzene, not more than 42%, stable dispersion, in water	31A	1250	-15	-5
3119	3-Hydroxy-1,1-dimethylbutylperoxyneodecanoate, not more than 52%, stable dispersion, in water	31A	1250	-15	-5

4.1.6.1.2 Delete the third and fourth sentences ("Pressure receptacles for UN 1001 acetylene ... compatible with the pressure receptacles.").

## **Chapter 4.2**

Wherever it appears, replace the word "shipper" with "consignor" (*apply to 4.2.1.9.1 (twice), 4.2.2.7.1, 4.2.3.6.1 and 4.2.4.5.*).

4.2.5.2.6 **T23** For UN 3119, in the entry for Di-(3,5,5-trimethyl-hexanoyl)peroxide, not more than 38% in diluent type A, add "or type B" after "type A".

Insert the following new entry:

UN No	Substance	Min. test pressure (bar)	Min. shell thickness (mm-reference steel)	Bottom opening requirements	Pressure-relief requirements	Degree of filling	Control temp.	Emergency temp.
3119	tert-Amyl peroxyneodecanoate, not more than 47% in diluent type A						-10	-5

## PART 5

### Chapter 5.2

5.2.2.2.1.1 Replace "They shall have a line of the same colour as the symbol, 5 mm inside the edge and running parallel with it." with "They shall have a line 5 mm inside the edge and running parallel with it. In the upper half of a label the line shall have the same colour as the symbol and in the lower half it shall have the same colour as the figure in the bottom corner".

5.2.2.2.1.6 Insert new sub paragraph (c) to read as follows:

"(c) the Division 5.2 label, where the symbol may be shown in white; and".

*Consequential amendments:*

5.2.2.2.1.6 (b) Delete "and".

5.2.2.2.1.6 (c) Renumber as (d).

5.2.2.2.2 Under the labels for Division 2.1, replace "5.2.2.2.1.6 (c)" with "5.2.2.2.1.6 (d)".

### Chapter 5.5

5.5.2.2 Replace "When the fumigated unit has been ventilated to remove harmful concentrations of fumigant gas, the warning sign shall be removed." with "The marking, as required by this paragraph, shall remain on the unit until the following provisions are met:

- (a) The fumigated unit has been ventilated to remove harmful concentrations of fumigant gas; and
- (b) The fumigated goods or materials have been unloaded."

Figure 5.5.1 In the Fumigation warning sign, insert "VENTILATED ON (date)" before "DO NOT ENTER".

## PART 6

6.1.1.4, 6.3.2.2, 6.5.4.1 and 6.6.1.2 At the end, add a new note to read as follows:

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

## **Chapter 6.1**

6.1.5.3.4 Amend to read as follows:

"6.1.5.3.4 *Target*

The target shall be a non-resilient, horizontal and flat surface, massive enough to be immovable and rigid enough to be non-deformable under test conditions, and shall be:

- integral with a mass at least 50 times that of the heaviest package to be tested,
- flat, such that no two points on its surface differ in level by more than [2 mm],
- rigid, such that it will not be deformed by more than [0,1 mm] when an area of 100 mm<sup>2</sup> is loaded statically with 10 kg anywhere on the surface, and
- sufficiently large to ensure that the test package falls entirely upon the surface."

## **Chapter 6.2**

6.2.1.1 Insert a new paragraph 6.2.1.1.9 with the heading "*Additional requirements for the construction of pressure receptacles for acetylene*" and with the text of the third and fourth sentences of existing 4.1.6.1.2 ("Pressure receptacles for UN 1001 acetylene ... compatible with the pressure receptacles").

6.2.2.1.3 In the table, delete the last entry (ISO 11118:1999).

6.2.2.4 Amend the three first entries of the table to read as follows:

ISO 6406:2005	Seamless steel gas cylinders – Periodic inspection and testing
ISO 10461:2005	Seamless aluminium-alloy gas cylinders – Periodic inspection and testing
ISO 10462:2005	Transportable cylinders for dissolved acetylene – Periodic inspection and maintenance

**Chapter 6.3**

6.3.5.3.1 (existing 6.3.2.5 (a)) Amend the first sentence to read as follows: "Samples shall be subjected to free-fall drops from a height of 9 m onto a non-resilient, horizontal, flat, massive and rigid surface in conformity with 6.1.5.3.4."

**Chapter 6.5**

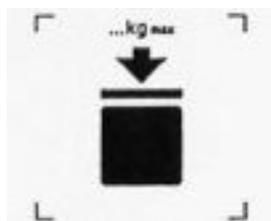
6.5.2.2.1 Add the following new entry to the table and the following new note b after the table:

Additional marking	Category of IBC				
	Metal	Rigid Plastics	Composite	Fibreboard	Wooden
Maximum permitted stacking load <sup>b</sup>	X	X	X	X	X

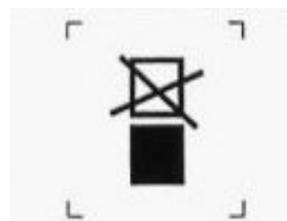
<sup>b</sup> See 6.5.2.2.2.

6.5.2.2.2 Add a new 6.5.2.2.2 to read as follows and renumber subsequent paragraphs accordingly:

"6.5.2.2.2 The maximum permitted stacking load applicable when the IBC is in use shall be displayed on a symbol as follows:



IBCs capable of being stacked



IBCs NOT capable of being stacked

The symbol shall be not less than 100 mm x 100 mm, be durable and clearly visible. The letters and numbers indicating the mass shall be at least 12 mm high.

The mass marked above the symbol shall not exceed the load imposed during the design type test (6.5.6.6.4) divided by 1.8.

**NOTE:** *The provisions of 6.5.2.2.2 shall apply to all IBCs manufactured, repaired or remanufactured on or after 1 January 2011."*

6.5.6.3.5 Amend the eight first columns of the table to read as follows (3 last columns unchanged):

Type of IBC	Vibration <sup>f</sup>	Bottom lift	Top lift <sup>a</sup>	Stacking <sup>b</sup>	Leak-proofness	Hydraulic pressure	Drop
Metal: 11A, 11B, 11N	-	1st <sup>a</sup>	2nd	3rd	-	-	4th <sup>e</sup>
21A, 21B, 21N	-	1st <sup>a</sup>	2nd	3rd	4th	5th	6th <sup>e</sup>
31A, 31B, 31N	1st	2nd <sup>a</sup>	3rd	4th	5th	6th	7th <sup>e</sup>
Flexible <sup>d</sup>	-	-	x <sup>c</sup>	x	-	-	x
Rigid plastics: 11H1, 11H2	-	1st <sup>a</sup>	2nd	3rd	-	-	4th
21H1, 21H2	-	1st <sup>a</sup>	2nd	3rd	4th	5th	6th
31H1, 31H2	1st	2nd <sup>a</sup>	3rd	4th	5th	6th	7th
Composite: 11HZ1, 11HZ2	-	1st <sup>a</sup>	2nd	3rd	-	-	4th <sup>e</sup>
21HZ1, 21HZ2	-	1st <sup>a</sup>	2nd	3rd	4th	5th	6th <sup>e</sup>
31HZ1, 31HZ2	1st	2nd <sup>a</sup>	3rd	4th	5th	6th	7th <sup>e</sup>
Fibreboard	-	1st	-	2nd	-	-	3rd
Wooden	-	1st	-	2nd	-	-	3rd

Insert a new note f after the table to read as follows:

<sup>f</sup> *Another IBC of the same design may be used for the vibration test."*

6.5.6.4.4 The text of the 14<sup>th</sup> revised edition of the UN Model Regulations remains unchanged. (The amendment adopted by the Sub-Committee at its 28th session - see ST/SG/AC.10/C.3/56/Add.1 - is cancelled.)

6.5.6.9.3 Amend the first sentence to read as follows: "The IBC shall be dropped on its base onto a non-resilient, horizontal, flat, massive and rigid surface in conformity with the requirements of 6.1.5.3.4, in such a manner as to ensure that the point of impact is that part of the base of the IBC considered to be the most vulnerable."

6.5.6.13 Add a new 6.5.6.13 to read as follows and renumber the subsequent paragraphs accordingly:

**"6.5.6.13      *Vibration test***

6.5.6.13.1      *Applicability*

For all IBCs used for liquids, as a design type test.

***NOTE:*** *This test applies to design types for IBCs manufactured after 31 December 2010.*

#### 6.5.6.13.2 *Preparation of the IBC for test*

A sample IBC shall be selected at random and shall be fitted and closed as for transport. IBCs shall be filled with water to not less than 98% of their maximum capacity.

#### 6.5.6.13.3 *Test method and duration*

6.5.6.13.3.1 The IBC shall be placed in the center of the test machine platform with a vertical sinusoidal, double amplitude (peak-to peak displacement) of 25 mm  $\pm$  5%. If necessary, restraining devices shall be attached to the platform to prevent the specimen from moving horizontally off the platform without restricting vertical movement.

6.5.6.13.3.2 The test shall be conducted for one hour at a frequency that causes the IBC to be raised from the vibrating platform to such a degree that a metal shim can be completely inserted [at a point between the IBC and the test platform]. The frequency may need to be adjusted after the initial set point to prevent the packaging from going into resonance. Nevertheless, the test frequency shall continue to allow placement of the metal shim under the IBC as described in this paragraph. The continuing ability to insert the metal shim is essential to passing the test. The metal shim used for this test shall be at least 1.6 mm thick, 50 mm wide, and be of sufficient length to be inserted between the IBC and the test platform a minimum of 100 mm to perform the test.

#### 6.5.6.13.4 *Criteria for passing the test*

No leakage or rupture shall be observed."

#### Consequential amendments:

6.5.6.2.1 *Replace "6.5.6.12" by "6.5.6.13".*

6.5.6.2.3 *Replace "6.5.6.13" by "6.5.6.14".*

## **Chapter 6.6**

6.6.5.3.4.3 Amend the first sentence to read as follows: "The large packaging shall be dropped onto a non resilient, horizontal, flat, massive and rigid surface in conformity with the requirements of 6.1.5.3.4, in such a manner as to ensure that the point of impact is that part of the base of the large packaging considered to be the most vulnerable."

**PART 7**

**Chapter 7.1**

7.1.3.2.3 Replace "and inorganic nitrates of Class 5.1 (UN Nos. 1942 and 2067)" with "(UN Nos. 1942 and 2067) and alkali metal nitrates (e.g. UN 1486) and alkaline metal nitrates (e.g. UN 1454)".

\* \* \* \* \*

**Annex 2****DRAFT AMENDMENTS TO THE UN RECOMMENDATIONS ON THE TRANSPORT  
OF DANGEROUS GOODS, MANUAL OF TESTS AND CRITERIA  
(4<sup>th</sup> revised edition, as amended)**

11.5.1.2.1, 12.5.1.2.1, 18.6.1.2.1 and 25.4.1.2.1 In the second sentence, replace "of suitable quality" with "with the specification DC04 (EN 10027-1), or equivalent A620 (AISI/SAE/ASTM), or equivalent SPCEN (JIS G 3141)" and delete the third sentence.

Insert the following text at the end:

"For quality control of the steel tubes, 1% of the tubes from each production lot shall be subjected to quality control and the following data shall be verified:

- (a) The mass of the tubes shall be  $26.5 \pm 1.5$  g, tubes to be used in one test sequence shall not differ in mass by more than 1 g;
- (b) The length of the tubes shall be  $75 \pm 0.5$  mm;
- (c) The wall thickness of the tubes measured 20 mm from the bottom of the tube shall be  $0.5 \pm 0.05$  mm;
- (d) The bursting pressure as determined by quasi-static load through an incompressible fluid shall be  $30 \pm 3$  MPa."

Section 18 In Table 18.1 against "8 (d)", replace "test" with "tests". In note b after the table, replace "This test is" with "These test are".

18.7.1 Replace "8 (d)" with "8 (d) (i)".

18.7.1.2 (a) Replace " $31 \pm 1$  cm" with " $310 \pm 10$  mm", " $61 \pm 1$  cm" with " $610 \pm 10$  mm" and "38 cm" with "380 mm" (twice).

Figure 18.7.1.1 Replace "1.2" with "10" (twice) and change the measurements to millimetres. Insert the following new sentence below the figure: "All measurements are in millimetres."

Add a new 18.7.2 to read as follows:

**18.7.2** *Test 8 (d) (ii): Modified Vented Pipe Test*

18.7.2.1 *Introduction*

This test is not intended for classification but is included in this Manual for evaluating the suitability of bulk substances to be transported in tanks.

The modified vented pipe test is used to assess the effect of exposure of a candidate for "ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives" to a large fire under confined, vented conditions.

#### 18.7.2.2 *Apparatus and materials*

The following items are needed:

- (a) A vented vessel consisting of mild drawn steel pipe with an inner diameter of  $265 \pm 10$  mm, a length of  $580 \pm 10$  mm and a wall thickness of  $5.0 \pm 0.5$  mm. Both the top and the base plates are made from 300 mm square,  $6.0 \pm 0.5$  mm thick mild steel plates. The top and base plates are fixed to the pipe with a fillet weld with a thickness of at least 5 mm. The top plate has a vent diameter of  $[85] \text{ mm} \pm 1.0$  mm. A further two small holes are drilled in the top plate to accommodate neatly thermocouple probes;
- (b) A concrete block about 400 mm square and 50 to 75 mm thick;
- (c) A metal stand for supporting the vessel at a height of 150 mm above the concrete block;
- (d) A gas burner capable of accommodating a propane flow rate of up to 60 g/min. This rests on the concrete block under the stand. A typical example of a suitable burner is a 32-jet Mongolian wok burner;
- (e) A sheet metal shield to protect the propane flame from side winds. This can be fabricated from approximately 0.5 mm thick galvanised sheet metal. The diameter of the wind shield is 600 mm and the height is 250 mm. Four adjustable vents 150 mm wide and 100 mm high are spaced equally around the shield to ensure adequate air reaches the gas flame;
- (f) Propane bottle(s) connected via a manifold and fed into a pressure regulator. Other fuel gases may be used providing the specified heating rate is obtained. The pressure regulator should reduce the propane bottle pressure from 600 kPa down to about 150 kPa. The gas then flows through a gas rotameter capable of measuring up to 60 g/min of propane and a needle valve. An electrical solenoid valve is used to switch the propane flow on and off remotely. Typically three 9 kg

propane bottles will achieve the desired gas flow rate for the duration of up to five tests. The gas pressure and flow are regulated to give a heating rate of  $3.3 \pm 0.3$  K/min when measured by the calibration procedure;

- (g) Three thermocouples with 500 (2) and 100 (1) mm long stainless steel probes and fiber-glass coated lead wires;
- (h) A data-logger capable of recording the output from the thermocouples;
- (i) Cine or video cameras, preferably high speed and normal speed, to record events in colour;
- (j) Pure water for calibration;
- (k) The ANE to be tested;
- (l) Blast gauges, radiometers and associated recording equipment may also be used.

#### 18.7.2.3 *Calibration*

18.7.2.3.1 The vessel is filled to the 75% level (i.e. to a depth of 435 mm) with the pure water, and heated using the procedure specified in Section 18.7.1.4. Water is heated from ambient temperature up to 90 °C, monitoring temperature by the thermocouple in the water. Temperature-time data must fit a straight line whose slope will be the “calibration heating rate” for the given combination of vessel and heat source.

18.7.2.3.2 The gas pressure and flow must be regulated to give a heating rate of  $3.3 \pm 0.3$  K/min.

18.7.2.3.3 This calibration must be performed prior to the testing of any ANE substance, though the same calibration can be applied to any test conducted within a day of the calibration provided no change is made to the vessel construction or gas supply. New calibration has to be made every time that the burner is changed.

#### 18.7.2.4 *Procedure*

18.7.2.4.1 The concrete block is placed on a sandy base and levelled using a spirit level. The propane burner is positioned in the centre of the concrete block and connected to the gas supply line. The metal stand is placed over the burner.

18.7.2.4.2 The vessel is placed vertically on the stand and secured from tipping over. The vessel is filled to 75 % of its volume (to a height of 435 mm) with the

ANE under test without tamping during loading. The initial temperature of the ANE must be recorded. The substance is carefully packed to prevent adding voids. The wind shield is positioned around the base of the assembly to protect the propane flame from heat dissipation due to side winds.

18.7.2.4.3 The thermocouple positions are as follows:

- the first 500 mm long probe (T1) in the gas flame;
- the second 500 mm long probe (T2) extending all the way into the vessel so that the tip is positioned 80 to 90 mm from the bottom of the vessel;
- the third 100 mm long probe (T3) in the headspace 20 mm into the vessel.

The thermocouples are connected to the data-logger and the thermocouple leads and data-logger are adequately protected from the test apparatus in case of explosion.

18.7.2.4.4 Propane pressure and flow is checked and adjusted to the values used during the water calibration described in Section 18.7.2.3. Video cameras and any other recording equipment are checked and started. Thermocouple functioning is checked and data logging is started, with a time set between thermocouple readings not exceeding 10 seconds, and preferably shorter. The test should not be performed under conditions where the wind speed exceeds 6 m/s. With higher wind speed, additional precautions against side winds are required to avoid dissipation of the heat.

18.7.2.4.5 The propane burner may be started locally or remotely and all workers immediately retreat to a safe location. Progress of the test is followed by monitoring thermocouple readings and closed circuit television images. The start time of the trial is defined by the time at which the flame thermocouple trace T1 first begins to rise.

18.7.2.4.6 The gas reservoir should be large enough to bring the substance to a possible reaction and provide a fire duration lasting beyond total consumption of the test sample. If the vessel does not rupture, the system should be allowed to cool down before carefully dismantling the test set-up.

18.7.2.4.7 The test outcome is determined by whether or not a rupture of the vessel is observed when the test reaches conclusion. Evidence of test conclusion is based on:

- The visual and aural observation of vessel rupture accompanied by loss of thermocouple traces, or

- The visual and aural observation of vigorous venting accompanied by peaking of both vessel thermocouple traces and no substance remains in the vessel, or
- The visual observation of decreased levels of fuming following the peaking of both vessel thermocouple traces at temperatures in excess of 300 °C and no substance remains in the vessel.

For the purposes of assessing results, the term "rupture" includes any failure of welds and any fracture of metal in the vessel.

18.7.2.4.8 The test is performed two times unless a positive result is observed.

18.7.2.5 *Test criteria and method of assessing results*

The test result is considered "+" and the substance should not be transported in tanks as a dangerous good of Class 5.1 if an explosion is observed in any trial. Explosion is evidenced by rupture of the vessel. Once the substance is consumed in both trials and no rupture of the vessel is observed, then the result is considered "-".

18.7.2.6 *Examples of results*

<b>Substances</b>	<b>Result</b>
76.0 ammonium nitrate / 17.0 water / 5.6 paraffin oil / 1.4 PIBSA emulsifier	-
84.0 ammonium nitrate / 9.0 water / 5.6 paraffin oil / 1.4 PIBSA emulsifier	+
67.7 ammonium nitrate / 12.2 sodium nitrate / 14.1 water / 4.8 paraffin oil / 1.2 PIBSA emulsifier	-
67.4 ammonium nitrate / 15.0 methylamine nitrate / 12.0 water / 5.0 glycol / 0.6 thickener	-
71.4 ammonium nitrate / 14.0 hexamine nitrate / 14.0 water / 0.6 thickener	-

".

38.3.2.2 In the definition of *Aggregate lithium content* delete "or lithium equivalent content".

Delete the definition of *Equivalent lithium content*.

In the definition of *Large battery*, insert the following phrase at the end ", or in the case of a lithium ion battery, means a battery with a Watt-hour rating of more than 6200 Wh."

In the definition of *Large cell*, insert the following phrase at the end ", or in the case of a lithium ion cell, means a cell with a Watt-hour rating of more than 150 Wh."

In the definition of *Small battery*, insert the following phrase at the end ", or in the case of a lithium ion battery, means a battery with a Watt-hour rating of not more than 6200 Wh".

In the definition of *Small cell*, insert the following phrase at the end ", or in the case of a lithium ion cell, means a cell with a Watt-hour rating of not more than 150 Wh".

Add a new definition to read as follows:

"*Watt-hour rating*, expressed in Watt-hours, is calculated by multiplying a cell's or battery's rated capacity, in ampere-hours, by its nominal voltage."

38.3.3

In the last sentence, replace "in which the aggregate lithium content of all anodes, when fully charged, is more than 500g" with "of a size comparable to a large battery".

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