



**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****Thirty-seventh session**

Geneva, 21–30 June 2010

Item 5 of the provisional agenda

**Miscellaneous proposals of amendments to the Model Regulations
on the Transport of Dangerous Goods****Revision of various specialist packing instructions in the
Model Regulations****Transmitted by the experts from the United Kingdom and Sweden and
by the International Air Transport Association¹**

1. During the thirty-fifth (ST/SG/AC.10/C.3/70) and thirty-sixth (ST/SG/AC.10/C.3/72) sessions of the Sub-Committee a number of papers (ST/SG/AC.10/C.3/2009/31, informal documents INF.22 and INF.31/Rev.1 and ST/SG/AC.10/C.3/2009/32) were submitted to amend various inconsistencies in the packing instructions. This was mainly related to the various battery technologies but during the debate at each meeting it became clear that many other packing instructions needed to be reviewed.

2. At present many of these packing instructions simply state that packagings must meet the packing group II or packing group III performance level and it is argued that this can be interpreted to indicate that:

- (a) As long as a consignor's package can meet the performance level it does not need a UN packaging mark; and
- (b) A bag could be used as an outer packaging.

3. Neither of these statements meets the intentions of the intent of the packing instructions and therefore the authors of this document propose that a number of packing instructions undergo clarification. This document presented by the experts of Sweden and

¹ In accordance with the programme of work of the Sub-Committee for 2009–2010 approved by the Committee at its fourth session (refer to ST/SG/AC.10/C.3/68, para. 118 (a) and ST/SG/AC.10/36, para. 14).

the United Kingdom and the representative of IATA has reviewed all the specialist packing instructions in the Model Regulations and proposes to introduce as much consistency as possible, taking account of the special purpose of some packing instructions by indicating package design types that are permitted to be used.

4. At the same time the opportunity has been taken to clarify some other parts of the packing instructions for the purposes of editorial consistency. In one or two instances such changes may appear to be more substantive and these have been explained more fully after the relevant packing instruction.

Explanation of the proposed changes

5. The outer packaging range for inner packagings and articles in the packing instructions is now aligned to the options in P001 and P002 using the same options in the same sequence (Note composite packagings are not the outers of combination packagings but a subset of single packagings and therefore are not included).

6. “Packagings shall conform to the packing group III performance level.” Phrases such as this have been moved to the end of any section dealing with the combination or outer packaging as the approval is given to the complete package as prepared for transport in accordance with 6.1.5.2.1.

7. [cells or batteries] Wherever this term appears in the packing instructions it has been placed in square brackets to await the decisions of the Lithium battery working group who are considering whether there should be a single term.

A table below lists all the packing instructions after P001 and P002 and shows which are included in this paper for change.

PI	Comment
P003	For goods not requiring tested packaging No changes required
P004	See proposal
P010	In line with P001/P002 structure
P100	ALL Class 1 have been developed specially and no changes are required
P200	Has a different structure appropriate for class 2
P201	See proposal
P203	Special packaging for cryogenic receptacles
P205	Special packaging for metal hydride storage systems
P300	The instruction already specifies UN packaging types
P301	This relates to special equipment and is probably moved in an unpackaged state
P302	See proposal
P400	The instruction already specifies UN packaging type*s
P401	See proposal
P402	See proposal
P403	In line with P001/P002 structure
P404	The instruction already specifies UN packaging types*
P405	The instruction already specifies UN packaging types*
P406	The instruction already specifies UN packaging types*
P407	See proposal
P408	See proposal
P409	The instruction already specifies UN packaging types*
P410	In line with P001/P002 structure
P411	See proposal
P500	See proposal

P501	Broadly in line with P001/P002 structure
P502	In line with P001/P002 structure
P503	In line with P001/P002 structure
P504	Broadly in line with P001/P002 structure
P520	The instruction already specifies UN packaging types*
P600	The instruction already specifies UN packaging types*
P601	The instruction already specifies UN packaging types*
P620	See proposal
P621	See proposal
P650	A free standing packing instruction with all details included therein
P800	The instruction already specifies UN packaging types*
P801	Wet and dry batteries
P802	The instruction already specifies UN packaging types*
P803	The instruction already specifies UN packaging types*
P804	The instruction already specifies UN packaging types*
P900	The instruction already specifies UN packaging types*
P901	See proposal
P902	See proposal
P903	See proposal
P904	For goods not requiring tested packaging. No changes required
P905	Lifesaving appliances with special arrangements
P906	The instruction already specifies UN packaging types*
P907	Dangerous goods in machinery

* Should the Sub-Committee agree in principle with the proposals in this document these packing instructions could be aligned with the structure for the December meeting, although some are for special substances with very detailed packing requirements e.g. P601, 602, 800, 804.

P004	PACKING INSTRUCTION	P004
This instruction applies to UN Nos. 3473, 3476, 3477, 3478 and 3479		
<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:</p> <p><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u> <u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</u> <u>Jerricans (3A2, 3B2, 3H2).</u></p> <p>Packagings shall conform to the packing group II performance level.</p> <p>(2) For fuel cell cartridges packed with equipment:</p> <p>(a) Packagings conforming to the requirements in paragraph (1) of this packing instruction, then placed with the equipment in an outer packaging; or</p> <p>(b) Packagings that completely enclose the fuel cell, then placed with equipment in a packaging conforming to the requirements in paragraph (1) of this packing instruction.</p> <p>The equipment shall be secured against movement within the outer packaging.</p> <p>For the purpose of this packing instruction, “equipment” means apparatus requiring the fuel cell cartridges with which it is packed for its operation.</p> <p>(3) Fuel cell cartridges contained in equipment:</p> <p>Strong outer packagings. Large robust equipment (see 4.1.3.8) containing fuel cell cartridges may be transported unpackaged. 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> <p>Packagings need not meet the requirements of 4.1.1.3.</p>		

The text in 2 above has been taken from P903 to align with other battery technologies

P201	PACKING INSTRUCTION	P201
This instruction applies to UN Nos. 3167, UN 3168 and UN 3169.		
<p>The following packagings are authorized:</p> <p>(1) Compressed gas cylinders and gas receptacles conforming to the construction, testing and filling requirements approved by the competent authority.</p> <p>(2) In addition, the following combination packagings are authorized provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>Outer packagings:</p> <p><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u></p> <p><u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</u></p> <p><u>Jerricans (3A2, 3B2, 3H2).</u></p> <p>Inner packagings:</p> <p>(a) For non-toxic gases, combination packagings with hermetically sealed inner packagings of glass or metal with a maximum capacity of 5 litres per package which meet the packing group III performance level</p> <p>(b) For toxic gases, combination packagings with hermetically sealed inner packagings of glass or metal with a maximum capacity of 1 litre per package which meet the packing group III performance level.</p> <p>Packagings shall conform to the packing group III performance level.</p>		

P302	PACKING INSTRUCTION	P302
This instruction applies to UN No. 3269.		
<p>The following combination packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>Outer packagings:</p> <p><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u></p> <p><u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1,4H2)</u></p> <p><u>Jerricans (3A2, 3B2, 3H2);</u></p> <p>Inner packagings:</p> <p>The activator (organic peroxide) shall have a maximum quantity of 125 ml per inner packaging if liquid, and 500 g per inner packaging if solid.</p> <p>Combination packagings which meet the packing group II or III performance level according to the criteria for Class 3, applied to the base material.</p> <p>The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of a leakage.</p> <p>The base material and the activator (organic peroxide) shall be each separately packed in inner packagings. Packagings shall conform to the packing group II or III performance level according to the criteria for Class 3 applied to the base material.</p>		

P401	PACKING INSTRUCTION	P401
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
<p>(1) Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be made of steel and subjected to an initial test and periodic tests every 10 years at a pressure of not less than 0.6 MPa (6 bar) (gauge pressure). During transport, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar).</p> <p>(2) Combination packagings:</p> <p>Outer packagings:</p> <p><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u></p> <p><u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1,4 H2);</u></p> <p><u>Jerricans (3A2, 3B2, 3H2).</u></p> <p>Inner packagings:</p> <p>Glass, metal or plastics which have threaded closures with a maximum capacity of 1 litre</p> <p>Each inner packaging shall be surrounded in inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents.</p> <p>The maximum net mass per outer packaging shall not exceed 30 kg.</p>		

P402	PACKING INSTRUCTION	P402				
<p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p>						
(1)	<p>Pressure receptacles, provided that the general provisions of 4.1.3.6 are met. They shall be made of steel and subjected to an initial test and periodic tests every 10 years at a pressure of not less than 0.6 MPa (6 bar) (gauge pressure). During transport, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar).</p>					
(2)	<p>Combination packagings:</p> <p>Outer packagings:</p> <p><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u></p> <p><u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</u></p> <p><u>Jerricans (3A2, 3B2, 3H2).</u></p> <p>Inner packagings with a maximum net mass as follows:</p> <table> <tr> <td>Glass</td> <td>10 kg</td> </tr> <tr> <td>Metal or plastics</td> <td>15 kg</td> </tr> </table> <p>Each inner packaging shall be fitted with threaded closures.</p> <p>Each inner packaging shall be surrounded in inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents.</p> <p>The maximum net mass per outer packaging shall not exceed 125 kg.</p>		Glass	10 kg	Metal or plastics	15 kg
Glass	10 kg					
Metal or plastics	15 kg					
(3)	<p>Steel drums (1A1) with a maximum capacity of 250 litres.</p>					
(4)	<p>Composite packagings consisting of plastics receptacle in a steel or aluminium drum (6HA1 or 6HB1) with a maximum capacity of 250 litres.</p>					

P407	PACKING INSTRUCTION	P407
This instruction applies to UN Nos. 1331, 1944, 1945 and 2254.		
<p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>Outer packagings:</p> <p><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u></p> <p><u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1,4 H2);</u></p> <p><u>Jerricans (3A2, 3B2, 3H2).</u></p> <p>Inner packagings:</p> <p>Matches shall be tightly packed in securely closed inner packagings to prevent accidental ignition under normal conditions of transport.</p> <p>The maximum gross mass of the package shall not exceed 45 kg except for fibreboard boxes which shall not exceed 30 kg.</p> <p>Packagings shall conform to the packing group III performance level.</p>		
<p>Special packing provision:</p> <p>PP27 UN 1331, Strike-anywhere matches shall not be packed in the same outer packaging with any other dangerous goods other than safety matches or wax Vesta matches, which shall be packed in separate inner packagings. Inner packagings shall not contain more than 700 strike-anywhere matches.</p>		

The current additional requirement is not unique to one single type of match and it should therefore be treated as an element of the packing method.

P408	PACKING INSTRUCTION	P408
This instruction applies to UN No. 3292.		
<p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:</p> <p>(1) For cells and batteries:</p> <p>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</p> <p>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p> <p>Jerricans (3A2, 3B2, 3H2).</p> <p>There shall be sufficient cushioning material to prevent contact between [cells or batteries] and between [cells or batteries] and the internal surfaces of the outer packaging and to ensure that no dangerous movement of the [cells or batteries] within the outer packaging occurs in transport.</p> <p>Packagings shall conform to the packing group II performance level.</p> <p>(2) In addition for [cells or batteries] with a gross mass of 12 kg or more employing a strong, impact resistant outer casing, and assemblies of such [cells or batteries]:</p> <p>(a) Strong outer packagings, in protective enclosures (e.g., in fully enclosed or wooden slatted crates); or</p> <p>(b) Pallets or other handling devices.</p> <p>[Cells or batteries] shall be secured to prevent inadvertent movement, and the terminals shall not support the weight of other superimposed elements.</p> <p>Packagings need not meet the requirements of 4.1.1.3.</p>		
<p>Additional requirement:</p> <p>Cells and batteries shall be protected against short circuit and shall be isolated in such a manner as to prevent short circuits.</p> <p>[This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit]</p>		

Paragraph 2 has been added as a number of sodium batteries in excess of 12 kg have been seen.

The last sentence of the additional requirement has been taken from P801 and should surely be applied to all batteries and cells.

P411	PACKING INSTRUCTION	P411
This instruction applies to UN No. 3270.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
<u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u>		
<u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4 H2);</u>		
<u>Jerricans (3A2, 3B2, 3H2)</u>		
provided that explosion is not possible by reason of increased internal pressure.		
The maximum net mass shall not exceed 30 kg.		

This phrase has been widened to incorporate all packaging types. Although it is unlikely that a fibreboard box could cause explosions in increased internal pressure it could happen with fibre drums

P500	PACKING INSTRUCTION	P500
This instruction applies to UN No. 3356.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
<u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u>		
<u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4 H2);</u>		
<u>Jerricans (3A2, 3B2, 3H2).</u>		
Packagings shall conform to the packing group II performance level.		
The generator(s) shall be transported in a package which meets the following requirements when one generator in the package is actuated:		
<ul style="list-style-type: none"> (a) Other generators in the package will not be actuated; (b) Packaging material will not ignite; and (c) The outside surface temperature of the completed package shall not exceed 100 °C. 		

P620	PACKING INSTRUCTION	P620
This instruction applies to UN Nos. 2814 and 2900.		
<p>The following packagings are authorized provided that the special packing provisions of 4.1.8 are met: Packagings meeting the requirements of Chapter 6.3 and approved accordingly consisting of:</p> <p>(a) Inner packagings comprising:</p> <ul style="list-style-type: none"> (i) leakproof primary receptacle(s); (ii) a leakproof 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 primary receptacles are placed in a single secondary packaging, they shall be either individually wrapped or separated so as to prevent contact between them; <p>(b) A rigid outer packaging:</p> <p><u>Drums (1A2U, 1B2U, 1N2U, 1H2U, 1DU, 1GU);</u></p> <p><u>Boxes (4AU, 4BU, 4C1U, 4C2U, 4DU, 4FU, 4GU, 4H1U, 4H2U);</u></p> <p><u>Jerricans (3A2U, 3B2U, 3H2U).</u></p> <p>The smallest external dimension shall be not less than 100 mm.</p>		
<p>Additional requirements: Existing text</p>		

The packaging codes include the letter “U” to make it clear that the test requirements are not the same as those for other packagings with similar codes (see 6.3.3.2.)

NO OTHER CHANGES ARE MADE TO THIS PI

P621	PACKING INSTRUCTION	P621
This instruction applies to UN No. 3291.		
<p>The following packagings are authorized provided that the general provisions of 4.1.1 except 4.1.1.15 and 4.1.3 are met:</p> <p>(1) Provided that there is sufficient absorbent material to absorb the entire amount of liquid present and the packaging is capable of retaining liquids:</p> <p style="margin-left: 20px;"><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u></p> <p style="margin-left: 20px;"><u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</u></p> <p style="margin-left: 20px;"><u>Jerricans (3A2, 3B2, 3H2).</u></p> <p style="margin-left: 20px;">Packagings shall conform to the packing group II performance level for solids.</p> <p>(2) For packages containing larger quantities of liquid:</p> <p style="margin-left: 20px;"><u>Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);</u></p> <p style="margin-left: 20px;"><u>Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2);</u></p> <p style="margin-left: 20px;"><u>Composites (6HA1, 6HB1, 6HG1, 6HH1, 6HD1, 6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2, 6PA1, 6PB1, 6PG1, 6PD1, 6PH1, 6PH2, 6PA2, 6PB2, 6PC, 6PG2 or 6PD2).</u></p> <p style="margin-left: 20px;">Packagings shall conform to the packing group II performance level for liquids.</p>		
<p>Additional requirement: Packagings intended to contain sharp objects such as broken glass and needles shall be resistant to puncture and retain liquids under the performance test conditions in Chapter 6.1.</p>		

P901	PACKING INSTRUCTION	P901
This instruction applies to UN 3316		
<p>The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:</p> <p style="margin-left: 20px;"><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u></p> <p style="margin-left: 20px;"><u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</u></p> <p style="margin-left: 20px;"><u>Jerricans (3A2, 3B2, 3H2).</u></p> <p>Packagings shall conform to the performance level consistent with the packing group assigned to the kit as a whole (see 3.3.1, special provision 251).</p> <p>Maximum quantity of dangerous goods per outer packaging: 10 kg excluding the mass of any carbon dioxide, solid (dry ice) used as a refrigerant.</p>		
<p>Additional requirement: Dangerous goods in kits shall be packed in inner packagings which shall not exceed either 250 ml or 250 g and shall be protected from other materials in the kit.</p>		

P902	PACKING INSTRUCTION	P902
This instruction applies to UN 3268		
<p>Packaged articles:</p> <p>The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:</p> <p><u>Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</u></p> <p><u>Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</u></p> <p><u>Jerricans (3A2, 3B2, 3H2).</u></p> <p>Packagings shall conform to the packing group III performance level.</p> <p>The packagings shall be designed and constructed to prevent movement of the articles and inadvertent operation during normal conditions of carriage.</p> <p>Unpackaged articles:</p> <p>The articles may also be carried unpackaged in dedicated handling devices, vehicles or containers when moved from where they are manufactured to an assembly plant.</p>		
<p>Additional requirement:</p> <p>Any pressure vessel shall be in accordance with the requirements of the competent authority for the substance(s) contained in the pressure vessel(s).</p>		

P903	PACKING INSTRUCTION	P903
This instruction applies to UN Nos. 3090, 3091, 3480 and 3481.		
<p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3, are met:</p> <p>(1) For [cells and batteries]: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2).</p> <p>[Cells or batteries] shall be packed in packagings so that the [cells or batteries] are protected against damage that may be caused by the movement or placement of the [cells or batteries] within the packaging. Packagings shall conform to the packing group II performance level.</p> <p>(2) In addition for [cells or batteries] with a gross mass of 12 kg or more employing a strong, impact resistant outer casing, and assemblies of such [cells or batteries]:</p> <p>(a) Strong outer packagings, in protective enclosures (e.g., in fully enclosed or wooden slatted crates); or (b) Pallets or other handling devices.</p> <p>[Cells or batteries] shall be secured to prevent inadvertent movement, and the terminals shall not support the weight of other superimposed elements. Packagings need not meet the requirements of 4.1.1.3.</p> <p>(3) For [cells or batteries] packed with equipment: Packagings conforming to the requirements in paragraph (1) of this packing instruction., then placed with the equipment in an outer packaging; or Packagings that completely enclose the [cells or battery] , then placed with equipment in a package conforming to the requirements in paragraph (1) of this packing instruction. The equipment shall be secured against movement within the outer packaging. For the purpose of this packing instruction, “equipment” means apparatus requiring the lithium and lithium ion batteries with which it is packed for its operation.</p> <p>(4) For [cells or batteries] contained in equipment: Strong outer packagings <u>constructed of suitable material of adequate strength and design, in relation to the packagings capacity and its intended use</u>. They shall be constructed in such a manner as to prevent accidental operation during transport. Packagings need not meet the requirements of 4.1.1.3.</p> <p>Large equipment can be offered for transport unpackaged or on pallets when the [cell or battery] is afforded equivalent protection by the equipment in which it is contained.</p> <p>Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active in strong outer packagings. When active, these devices shall meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems.*</p>		
<p>Additional requirement:</p> <p>[Cells or batteries] shall be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.</p>		

* For this last paragraph, refer to informal document INF.22 submitted at the last session.