



**WORKING PAPER**

**DANGEROUS GOODS PANEL (DGP)  
WORKING GROUP MEETING (DGP-WG/15)**

**Montreal, 27 April to 1 May 2015**

**Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284)* for incorporation in the 2017-2018 Edition**

**2.6: Part 6 — Packaging Nomenclature, Marking, Requirements and Tests**

**DRAFT AMENDMENTS TO THE TECHNICAL INSTRUCTIONS TO ALIGN WITH THE UN  
RECOMMENDATIONS — PART 6**

(Presented by the Secretary)

**SUMMARY**

This working paper contains draft amendments to Part 6 of the Technical Instructions to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals at its seventh session (Geneva, 12 December 2014).

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

## Part 6

# PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

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## Chapter 2

### MARKING OF PACKAGINGS OTHER THAN INNER PACKAGINGS

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UN Model Regulations, paragraph 6.1.3, ST/SG/AC.10/42/Add.1

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#### Introductory Notes

Note 1.— ~~The marking marks indicates~~ **indicate** that the packaging which bears ~~it~~ **them** ~~corresponds~~ **correspond** to a successfully tested design type and that it complies with the provisions of Chapters 3 and 4 which are related to the manufacture, but not to the use, of the packaging. In itself, therefore, the marks ~~does~~ **do** not necessarily confirm that the packaging may be used for any particular substance.

Note 2.— ~~The marking marks is~~ **are** intended to be of assistance to packaging manufacturers, reconditioners, packaging users, operators and appropriate authorities. In relation to the use of a new packaging, the original ~~marking marks is~~ **are** a means for its manufacturer(s) to identify the type and to indicate those performance test regulations that have been met.

Note 3.— ~~The marking marks does~~ **do** not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, test reports or register of successfully tested packagings. For example, a packaging having an X or Y ~~marking mark~~ **mark** may be used for substances to which a packing group having a lesser degree of danger has been assigned with the relevant maximum permissible value of the relative density, determined by taking into account the factor 1.5 or 2.25 indicated in the test requirements for packagings in Chapter 4 as appropriate, i.e. a Packing Group I packaging tested for products with a relative density of 1.2 could be used as a Packing Group II packaging for products with a relative density of 1.8 or a Packing Group III packaging for products with a relative density of 2.7, provided of course that all the performance criteria can still be met with the higher relative density.


#### 2.1 MARKING REQUIREMENTS FOR PACKAGINGS OTHER THAN INNER PACKAGINGS

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UN Model Regulations, paragraph 6.1.3.1, ST/SG/AC.10/42/Add.1

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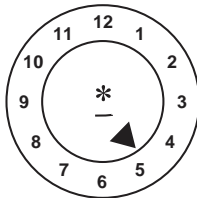
2.1.1 Each packaging intended for use according to these Instructions must bear ~~markings~~ **marks** which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. For packages with a gross mass of more than 30 kg the ~~markings~~ **marks**, or a duplicate thereof, must appear on the top or on a side of the packaging. Letters, numerals and symbols must be at least 12 mm high, except for packagings of 30 L or 30 kg capacity or less, when they must be at least 6 mm in height and for packagings of 5 L or 5 kg or less when they must be of an appropriate size. The ~~markings~~ **marks** must show:

- a) the United Nations packaging symbol 

This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapters 1 to 6. For embossed metal packagings the capital letters "UN" may be applied as the symbol;

- b) the code designating the type of packaging according to 1.2;  
c) a code in two parts:

- 1) a letter designating the packing group(s) for which the design type has been successfully tested:
  - X for Packing Groups I, II and III
  - Y for Packing Groups II and III
  - Z for Packing Group III only;
- 2) A) for single packagings intended to contain liquids: the relative density, rounded off to the first decimal, for which the design type has been tested; this may be omitted when the relative density does not exceed 1.2;
- B) for packagings intended to contain solids or inner packagings: the maximum gross mass, in kilograms, at which the design type has been tested;
- d) 1) for single packagings intended to contain liquids: the hydraulic test pressure which the packaging was shown to withstand, in kPa rounded down to the nearest 10 kPa;
- 2) for packagings intended to contain solids or inner packagings: the letter "S";
- e) the last two digits of the year during which the packaging was manufactured. Packagings of types 1H1, 1H2, 3H1 and 3H2 must also be appropriately marked with the month of manufacture; this may be marked on the packaging in a different place from the remainder of the marking mark. An appropriate method is:



- \* The last two digits of the year of manufacture may be displayed at that place. In such a case, the two digits of the year in the type approval marking mark and in the inner circle of the clock must be identical.
 

*Note.— Other methods that provide the minimum required information in a durable, visible and legible form are also acceptable.*
- f) the State authorizing the allocation of the mark, indicated by the distinguishing sign for motor vehicles in international traffic;
- g) the name of the manufacturer or other identification of the packaging specified by the appropriate national authority.

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UN Model Regulations, paragraph 6.1.3.2 to 6.1.3.11, ST/SG/AC.10/42/Add.1

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2.1.2 In addition to the durable markings marks prescribed in 2.1.1, every new metal drum of a capacity greater than 100 L must bear the marks described in 2.1.1. a) to e) on the bottom, with an indication of the nominal thickness of at least the metal used in the body (in mm, to 0.1 mm), in a permanent form (e.g. embossed). When the nominal thickness of either head of a metal drum is thinner than that of the body, the nominal thicknesses of the top head, body and bottom head must be marked on the bottom in a permanent form (e.g. embossed), for example "1.0-1.2-1.0" or "0.9-1.0-1.0". Nominal thicknesses of metal must be determined according to the appropriate ISO Standard, for example ISO 3574:1999 for steel. The marks indicated in 2.1.1 f) and g) must not be applied in a permanent form (e.g. embossed) except as provided for in 2.1.5.

2.1.3 Every packaging liable to undergo a reconditioning process other than those referred to in 2.1.2 must bear the marks indicated in 2.1.1 a) to e) in a permanent form. Marks are permanent if they are able to withstand the reconditioning process (e.g. embossed). For packagings other than metal drums of a capacity greater than 100 L, these permanent marks may replace the corresponding durable markings marks prescribed in 2.1.1.

2.1.4 For re-manufactured metal drums, if there is no change to the packaging type and no replacement or removal of integral structural components, the required markings marks need not be permanent (e.g. embossed). Every other re-manufactured metal drum must bear the markings marks indicated in 2.1.1 a) to e) in a permanent form (e.g. embossed) on the top head or side.

2.1.5 Metal drums made from materials (e.g. stainless steel) designed to be reused repeatedly may bear the markings marks indicated in 2.1.1 f) and g) in a permanent form (e.g. embossed).

2.1.6 Packagings manufactured with recycled plastic material as defined in 1;3 must be marked "REC". This mark must be placed near the marking marks prescribed in 2.1.1.

2.1.7 MarkingMarks must be applied in the sequence of the sub-paragraphs in 2.1.1; each element of the marking mark required in these sub-paragraphs and when appropriate sub-paragraphs h) to j) of 2.1.8 must be clearly separated, e.g. by a slash or space, so as to be easily identified; for examples see 2.1.10; 2.2.3; and 2.3. Any additional markings

marks authorized by the appropriate national authority must still enable the ~~parts of the marking~~ other marks required in 2.1.1 to be correctly identified ~~with reference to 2.1.1~~.

2.1.8 After reconditioning a packaging, the reconditioner must apply to it, in sequence, ~~a durable marking~~ marks showing:

- h) the State in which the reconditioning was carried out, indicated by the distinguishing sign for motor vehicles in international traffic;
- i) the name of the reconditioner or other identification of the packaging specified by the appropriate national authority;
- j) the year of reconditioning; the letter "R"; and for every packaging successfully passing the leakproofness test in 4.4, the additional letter "L".

2.1.9 When, after reconditioning, the ~~markings~~ marks required by 2.1.1 a) to d) no longer appear on the top head or the side of a metal drum, the reconditioner must apply them in a durable form followed by those required by 2.1.8. ~~The markings~~ These marks must not identify a greater performance capability than that for which the original design type had been tested and marked.

2.1.10 Examples of for markings for NEW packagings:

*for a new fibreboard box*

(u n)	4G/Y145/S/02 NL/VL823	as in 2.1.1 a), b), c)1), c)2)B), d)2) and e) as in 2.1.1 f) and g)
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*for a new steel drum to contain liquids*

(u n)	1A1/Y1.4/150/98 NL/VL824	as in 2.1.1 a), b), c)1), c)2)A), d)1) and e) as in 2.1.1 f) and g)
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*for a new steel drum to contain solids, or inner packagings*

(u n)	1A2/Y150/S/01 NL/VL825	as in 2.1.1 a), b), c)1), c)2)B), d)2) and e) as in 2.1.1 f) and g)
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*for a new plastic box of equivalent specification*

(u n)	4HW/Y136/S/98 NL/VL826	as in 2.1.1 a), b), c)1), c)2)B), d)2) and e) as in 2.1.1 f) and g)
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*for a remanufactured steel drum to contain liquids*

(u n)	1A2/Y/100/01 USA/MM5	as in 2.1.1 a), b), c)1), c)2)A), d)1) and e) as in 2.1.1 f) and g)
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2.1.11 Examples of for markings for RECONDITIONED packagings:

(u n)	1A1/Y1.4/150/97 NL/RB/01 RL	as in 2.1.1 a), b), c)1), c)2)A), d)1) and e) as in 2.1.8 h), i) and j)
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(u n)	1A2/Y150/S/99 USA/RB/00 R	as in 2.1.1 a), b), c)1), c)2)B), d)2) and e) as in 2.1.8 h), i) and j)
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
UN Model Regulations, paragraph 6.1.3.12, ST/SG/AC.10/42/Add.1

DGP-WG/15 is invited to consider whether in addition to the replacement of “markings” with “marking”, the Note under 2.3 should be aligned with the UN Model Regulations. In particular, the Model Regulations does not have the optional provision for the “/” symbol.

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**2.3 PACKAGING MARKINGS FOR SALVAGE PACKAGINGS**

Example of ~~for~~ marking for SALVAGE packagings:

 1A2T/Y300/S/01      as in 2.1.1 a), b), c)2)B), d)2) and e)  
USA/abc                      as in 2.1.1 f) and g)

*Note.— ~~In the~~ The marking, for which examples are given in 2.1.10, 2.2.3 and 2.3, ~~the markings are shown, for convenience, in two lines; however, the markings can,~~ may be applied in a single line or in multiple lines provided they are given in the correct sequence is respected. ~~Additionally, the inclusion in the specification marking of the “/” symbol is optional.~~*

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**Chapter 4**

**PACKAGING PERFORMANCE TESTS**

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**4.1 PERFORMANCE AND FREQUENCY OF TESTS**

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UN Model Regulations, paragraph 6.1.5.1.6, ST/SG/AC.10/42/Add.1

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4.1.6 Reserved.

*Note.— For the conditions for ~~assembling~~ using different inner packagings in an outer packaging and permissible variations in inner packagings, see 4;1.1.10.1. These conditions do not limit the use of inner packagings when applying 4.1.7.*

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**4.5 INTERNAL PRESSURE (HYDRAULIC) TEST**

4.5.1 Packagings to be tested: the internal pressure (hydraulic) test must be carried out on all design types of metal, plastic and composite packagings intended to contain liquids. This test is not required for the inner packagings of combination packagings. For the internal pressure requirements for inner packagings see 4;1.1.6.

4.5.2 Number of test samples: three test samples per design type and manufacturer.

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UN Model Regulations, paragraph 6.1.5.5.4, ST/SG/AC.10/42/Add.1

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4.5.3 Test method and pressure to be applied: metal packagings including their closures must be subjected to the test pressure for 5 minutes. Plastic packagings and composite packagings (plastic material) including their closures must be subjected to the test pressure for 30 minutes. This pressure is the one to be included in the ~~marking~~ mark required by 2.1.1 d). The manner in which the packagings are supported must not invalidate the test. The test pressure must be applied continuously and evenly: it must be kept constant throughout the test period. The hydraulic pressure (gauge) applied, as determined by any one of the following methods, must be:

- a) not less than the total gauge pressure measured in the packaging (i.e. the vapour pressure of the filling liquid and the partial pressure of the air or other inert gases minus 100 kPa) at 55°C, multiplied by a safety factor of 1.5. This total gauge pressure must be determined on the basis of a maximum degree of filling in accordance with Part 4;1.1.5 and a filling temperature of 15°C. The test pressure must be not less than 95 kPa (not less than 75 kPa for liquids in Packing Group III of Class 3 or Division 6.1); or

- b) not less than 1.75 times the vapour pressure at 50°C of the liquid to be transported, minus 100 kPa but with a minimum test pressure of 100 kPa; or
- c) not less than 1.5 times the vapour pressure at 55°C of the liquid to be transported, minus 100 kPa but with a minimum test pressure of 100 kPa.

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## Chapter 5

### REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF CYLINDERS AND CLOSED CRYOGENIC RECEPTACLES, AEROSOL DISPENSERS AND SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES) AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS

*Note 1.— Aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas are not subject to the requirements of 6;5.1 to 6;5.3.*

*Note 2.— For open cryogenic receptacles the requirements of Packing Instruction 202 must be met.*

#### 5.1 GENERAL REQUIREMENTS

##### 5.1.1 Design and construction

5.1.1.1 Cylinders and closed cryogenic receptacles and their closures must be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during normal conditions of transport.

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UN Model Regulations, paragraph 6.2.1.1.2, ST/SG/AC.10/42/Add.1

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5.1.1.2 In recognition of scientific and technological advances, and recognizing that cylinders and closed cryogenic receptacles other than those that ~~are marked with a bear~~ "UN" certification ~~marking marks~~ may be used on a national or regional basis, cylinders and closed cryogenic receptacles conforming to requirements other than those specified in these Instructions may be used if approved by the appropriate national authorities in the countries of transport and use.

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UN Model Regulations, paragraph 6.2.1.1.9, ST/SG/AC.10/42/Add.1

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5.1.1.9 Additional requirements for the construction of pressure receptacles for acetylene

Cylinders for UN 1001— **Acetylene, dissolved** and UN 3374 — **Acetylene, solvent free** must be filled with a porous mass, uniformly distributed, of a type that conforms to the requirements and testing specified by a standard or technical code recognized 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.

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UN Model Regulations, paragraph 6.2.1.5.1, ST/SG/AC.10/42/Add.1

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**5.1.5 Initial inspection and testing**

5.1.5.1 New cylinders, other than closed cryogenic receptacles and metal hydride storage systems, must be subjected to inspection and testing during and after manufacture in accordance with the applicable design standards including the following:

On an adequate sample of cylinders:

- a) testing of the mechanical characteristics of the material of construction;
- b) verification of the minimum wall thickness;
- c) verification of the homogeneity of the material for each manufacturing batch;
- d) inspection of the external and internal conditions of the cylinders;
- e) inspection of the neck threads;
- f) verification of the conformance with the design standard;

For all cylinders:

- g) a hydraulic pressure test. Cylinders must ~~withstand the test pressure without expansion greater than that allowed in the design specifications~~ **meet the acceptance criteria specified in the design and construction technical standard or technical code;**

*Note.— With the agreement of the appropriate national authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.*

- h) inspection and assessment of manufacturing defects and either repairing them or rendering the cylinders unserviceable. In the case of welded cylinders, particular attention must be paid to the quality of the welds;
- i) an inspection of the ~~markings~~ **marks** on the cylinders;
- j) in addition, cylinders intended for the transport of UN 1001 — **Acetylene, dissolved**, and UN 3374 — **Acetylene, solvent free**, must be inspected to ensure proper installation and condition of the porous mass and, if applicable, the quantity of solvent.

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UN Model Regulations, paragraph 6.2.1.6.1, ST/SG/AC.10/42/Add.1

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**5.1.6 Periodic inspection and testing**

5.1.6.1 Refillable cylinders must be subjected to periodic inspections and tests by a body authorized by the appropriate national authority, in accordance with the following:

- a) check of the external conditions of the cylinder and verification of the equipment and the external ~~markings~~ **marks;**
- b) check of the internal conditions of the cylinder (e.g. internal inspection, verification of minimum wall thickness);
- c) check of the threads if there is evidence of corrosion or if the fittings are removed;
- d) a hydraulic pressure test and, if necessary, verification of the characteristics of the material by suitable tests;

*Note 1.— With the agreement of the appropriate national authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.*

*Note 2.— With the agreement of the appropriate national authority, the hydraulic pressure test of cylinders may be replaced by an equivalent method based on acoustic emission testing or a combination of acoustic emission testing and ultrasound examination. ISO 16148:2006 may be used as a guide for acoustic emission testing procedures.*

*Note 3.— The hydraulic pressure test may be replaced by ultrasonic examination carried out in accordance with ISO 10461:2005 + A1:2006 for seamless aluminium alloy gas cylinders and in accordance with ISO 6406:2005 for seamless steel gas cylinders.*

- e) check of service equipment, other accessories and pressure-relief devices, if to be reintroduced into service.

*Note.— For the periodic inspection and test frequencies, see Packing Instruction 200 or, for a chemical under pressure, Packing Instruction 218.*

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UN Model Regulations, paragraph 6.2.2.1, ST/SG/AC.10/42/Add.1

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### 5.2.1 Design, construction and initial inspection and testing

5.2.1.1 The following standards apply for the design, construction and initial inspection and test of UN cylinders, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5:

<i>Reference</i>	<i>Title</i>	<i>Applicable for manufacture</i>
ISO 9809-1:1999	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa.  <i>Note.— The note concerning the F factor in section 7.3 of this standard must not be applied for UN cylinders.</i>	Until 31 December 2018
ISO 9809-1:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa.	Until further notice
ISO 9809-2:2000	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa.	Until 31 December 2018
ISO 9809-2:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa.	Until further notice
ISO 9809-3:2000	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders.	Until 31 December 2018
ISO 9809-3:2010	Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 3: Normalized steel cylinders.	Until further notice
<a href="#">ISO 9809-4:2014</a>	<a href="#">Gas cylinders — Refillable seamless steel gas cylinders — Design, construction and testing — Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa</a>	<a href="#">Until further notice</a>
ISO 7866:1999	Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing.  <i>Note.— The note concerning the F factor in section 7.2 of this standard must not be applied for UN cylinders. Aluminium alloy 6351A — T6 or equivalent must not be authorized.</i>	<del>Until further notice</del> <a href="#">Until 31 December 2020</a>
<a href="#">ISO ISO 7866: 2012+ Cor 1:2014</a>	<a href="#">Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing</a>  <a href="#">Note.— Aluminium alloy 6351A or equivalent must not be used.</a>	<a href="#">Until further notice</a>
ISO 4706:2008	Gas cylinders — Refillable welded steel cylinders — Test pressure 60 bar and below.	Until further notice
ISO 18172-1:2007	Gas cylinders — Refillable welded stainless steel cylinders — Part 1: Test pressure 6 MPa and below.	Until further notice
ISO 20703:2006	Gas cylinders — Refillable welded aluminium-alloy cylinders — Design, construction and testing.	Until further notice
ISO 11118:1999	Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods.	Until further notice
ISO 11119-1:2002	Gas cylinders of composite construction — Specification and test methods — Part 1: Hoop wrapped composite gas cylinders.	<del>Until further notice</del> <a href="#">Until 31 December 2020</a>
<a href="#">ISO 11119-1:2012</a>	<a href="#">Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 L</a>	<a href="#">Until further notice</a>
ISO 11119-2:2002	Gas cylinders of composite construction — Specification and test methods — Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners.	<del>Until further notice</del> <a href="#">Until 31 December 2020</a>



<a href="#">ISO 11119-2:2012 + Amd 1:2014</a>	<a href="#">Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 L with load-sharing metal liners</a>	<a href="#">Until further notice</a>
ISO 11119-3:2002	Gas cylinders of composite construction — Specification and test methods — Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners.	<del>Until further notice</del> <a href="#">Until 31 December 2020</a>
<a href="#">ISO 11119-3:2013</a>	<a href="#">Gas cylinders — Refillable composite gas cylinders and tubes — Design, construction and testing — Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 L with non-load-sharing metallic or non-metallic liners</a>	<a href="#">Until further notice</a>

Note 1.— ~~In the above-referenced standards, composite cylinders must be designed for unlimited service life~~ [a design life of not less than fifteen years.](#)

Note 2.— ~~After the first 15 years of service, composite cylinders manufactured according to these standards, may be approved for extended service by the appropriate national authority which was responsible for the original approval of the cylinders and which will base its decision on the test information supplied by the manufacturer or owner or user.~~ [Composite cylinders with a design life longer than fifteen years must not be filled after fifteen years from the date of manufacture, unless the design has successfully passed a service life test programme. The programme must be part of the initial design type approval and must specify inspections and tests to demonstrate that cylinders manufactured accordingly remain safe to the end of their design life. The service life test programme and the results must be approved by the competent authority of the country of approval that is responsible for the initial approval of the cylinder design. The service life of a composite cylinder must not be extended beyond its initial approved design life.](#)

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5.2.1.3 The following standards apply for the design, construction and initial inspection and test of UN acetylene cylinders except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5.

Note.— *The maximum of 1 000 L volume as mentioned in the ISO standard ISO 21029-1:2004 Cryogenic vessels, does not apply for refrigerated liquefied gases in closed cryogenic receptacles installed in apparatus ( e.g. MRI or cooling machines).*

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UN Model Regulations, paragraph 6.2.2.1.3, ST/SG/AC.10/42/Add.1

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For the porous mass in the cylinder:

	Reference	Title	Applicable for manufacture
+	ISO 3807-1:2000	Cylinders for acetylene — Basic requirements — Part 1: Cylinders without fusible plugs.	<del>Until further notice</del> <a href="#">Until 31 December 2020</a>
≠	ISO 3807-2:2000	Cylinders for acetylene — Basic requirements — Part 2: Cylinders with fusible plugs.	<del>Until further notice</del> <a href="#">Until 31 December 2020</a>
	<a href="#">ISO 3807:2013</a>	<a href="#">Gas cylinders — Acetylene cylinders — Basic requirements and type testing</a>	<a href="#">Until further notice</a>

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UN Model Regulations, paragraph 6.2.2.2, ST/SG/AC.10/42/Add.1

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**5.2.2 Materials**

In addition to the material requirements specified in the cylinder and closed cryogenic receptacle design and construction standards, and any restrictions specified in the applicable Packing Instruction for the gas(es) to be transported (e.g. Packing Instruction 200, Packing Instruction 202 or Packing Instruction 214), the following standards apply to material compatibility:

	Reference	Title	Applicable for manufacture
+	ISO 11114-1:2012	Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials.	Until further notice
≠	ISO 11114-2:2000	<del>Transportable gas</del> Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials.	Until further notice
	<a href="#">2013</a>		

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 UN Model Regulations, paragraph 6.2.2.3, ST/SG/AC.10/42/Add.1
 

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**5.2.3 Service equipment**

The following standards apply to closures and their protection:

	<i>Reference</i>	<i>Title</i>	<i>Applicable for manufacture</i>
+	ISO 11117:1998	Gas cylinders — Valve protection caps and valve guards for industrial and medical gas cylinders — Design, construction and tests.	Until 31 December 2014
≠	ISO 11117:2008+ Cor 1:2009	Gas cylinders — Valve protection caps and valve guards — Design, construction and tests.	Until further notice
+	ISO 10297:1999	Gas cylinders – Refillable gas cylinder valves – Specification and type testing.	Until 31 December 2008
≠	ISO 10297:2006	Gas cylinders — Refillable gas cylinder valves — Specification and type testing.	Until further notice <b>Until 31 December 2020</b>
	<b>ISO 10297:2014</b>	<b>Gas cylinders — Cylinder valves — Specification and type testing</b>	<b>Until further notice</b>
≠	ISO 13340:2001	Transportable gas cylinders — Cylinder valves for non-refillable cylinders — Specification and prototype testing.	Until further notice

For UN metal hydride storage systems, the requirements specified in the following standard apply to closures and their protection:

	<i>Reference</i>	<i>Title</i>	<i>Applicable for manufacture</i>
≠	ISO 16111:2008	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.	Until further notice

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 UN Model Regulations, paragraph 6.2.2.4, ST/SG/AC.10/42/Add.1
 

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**5.2.4 Periodic inspection and test**

The following standards apply to the periodic inspection and testing of UN cylinders and UN metal hydride storage systems:

	<i>Reference</i>	<i>Title</i>	<i>Applicable for manufacture</i>
+	ISO 6406:2005	Seamless steel gas cylinders — Periodic inspection and testing.	Until further notice
≠	ISO 10460:2005	Gas cylinders – Welded carbon-steel gas cylinders – Periodic inspection and testing.  <i>Note.— The repair of welds described in clause 12.1 of this standard must not be permitted. Repairs described in clause 12.2 require the approval of the appropriate national authority which approved the periodic inspection and test body in accordance with 5.2.6.</i>	Until further notice
≠	ISO 10461:2005/A1:2006	Seamless aluminium-alloy gas cylinders — Periodic inspection and testing.	Until further notice
≠	ISO 10462:2005	Transportable cylinders for dissolved acetylene — Periodic inspection and maintenance.	Until further notice <b>Until 31 December 2018</b>
	<b>ISO 10462:2013</b>	<b>Gas cylinders — Acetylene cylinders — Periodic inspection and maintenance.</b>	<b>Until further notice</b>
+	ISO 11513:2011	Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection.	Until further notice
≠	ISO 11623:2002	Transportable gas cylinders — Periodic inspection and testing of composite gas cylinders.	Until further notice
≠	ISO 16111:2008	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.	Until further notice

*Note.— The repair of welds described in clause 12.1 of this standard must not be permitted. Repairs described in clause 12.2 require the approval of the appropriate national authority which approved the periodic inspection and test body in accordance with 5.2.6.*

### 5.2.5 Conformity assessment system and approval for manufacture of cylinders and closed cryogenic receptacles

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UN Model Regulations, paragraph 6.2.2.5.2.1, ST/SG/AC.10/42/Add.1

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#### 5.2.5.2 General requirements

##### 5.2.5.2.1 Appropriate national authority

5.2.5.2.1.1 The appropriate national authority that approves the cylinder and closed cryogenic receptacle must approve the conformity assessment system for the purpose of ensuring that cylinders and closed cryogenic receptacles conform to the requirements of these Instructions. In instances where the appropriate national authority that approves a cylinder and closed cryogenic receptacle is not the appropriate national authority in the country of manufacture, the marks of the approval country and the country of manufacture must be indicated in the cylinder and closed cryogenic receptacle ~~marking marks~~ (see 5.2.7 and 5.2.8). The appropriate national authority of the country of approval must supply to its counterpart in a country of use, upon request, evidence demonstrating compliance to this conformity assessment system.

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#### 5.2.5.5 Production inspection and certification

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UN Model Regulations, paragraph 6.2.2.5.5, ST/SG/AC.10/42/Add.1

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5.2.5.5.4 The manufacturer must, after approval by the inspection body, make a declaration of conformity with the certified design type. The application of the cylinder and closed cryogenic receptacle certification ~~marking marks~~ must be considered a declaration that the cylinder and closed cryogenic receptacle comply with the applicable cylinder and closed cryogenic receptacle standards, the requirements of this conformity assessment system and these Instructions. The inspection body must affix or delegate the manufacturer to affix the cylinder and closed cryogenic receptacle certification ~~marking marks~~ and the registered mark of the inspection body to each approved cylinder or closed cryogenic receptacle.

5.2.5.5.5 A certificate of compliance, signed by the inspection body and the manufacturer, must be issued before the cylinders and closed cryogenic receptacles are filled.

#### 5.2.5.6 Records

Design type approval and certificate of compliance records must be retained by the manufacturer and the inspection body for not less than 20 years.

### 5.2.6 Approval system for periodic inspection and test of cylinders and closed cryogenic receptacles

#### 5.2.6.1 Definitions

For the purposes of this section:

**Approval system:** means a system for the appropriate national authority approval of a body performing the periodic inspection and test of cylinders and closed cryogenic receptacles (hereinafter referred to as "periodic inspection and test body"), including approval of that body's quality system.

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UN Model Regulations, paragraph 6.2.2.6.2.1, ST/SG/AC.10/42/Add.1

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#### 5.2.6.2 General requirements

##### 5.2.6.2.1 Appropriate national authority

5.2.6.2.1.1 The appropriate national authority must establish an approval system for the purpose of ensuring that the periodic inspection and test of cylinders and closed cryogenic receptacles conform to the requirements of these Instructions. In instances where the appropriate national authority that approves the body performing periodic inspection and test of a cylinder and closed cryogenic receptacle is not the appropriate national authority of the country approving the manufacture of the cylinder, the marks of the approval country of periodic inspection and test must be indicated in the cylinder and closed cryogenic receptacle ~~marking marks~~ (see 5.2.7).

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 UN Model Regulations, paragraph 6.2.2.6.5, ST/SG/AC.10/42/Add.1
 

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5.2.6.5 *Periodic inspection and test and certification*

5.2.6.5.1 The application of the periodic inspection and test ~~marking marks~~ to a cylinder and closed cryogenic receptacle must be considered a declaration that the cylinder and closed cryogenic receptacle complies with the applicable cylinder and closed cryogenic receptacle standards and the requirements of these Instructions. The periodic inspection and test body must affix the periodic inspection and test ~~marking marks~~, including its registered mark, to each approved cylinder and closed cryogenic receptacle (see 5.2.7.8).

5.2.6.5.2 A record certifying that a cylinder and closed cryogenic receptacle have passed the periodic inspection and test must be issued by the periodic inspection and test body before the cylinder and closed cryogenic receptacle are filled.

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 UN Model Regulations, paragraph 6.2.2.7.4, ST/SG/AC.10/42/Add.1
 

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5.2.7.4 The following manufacturing marks must be applied:

- m) Identification of the cylinder thread (e.g. 25E). (This mark is not required for closed cryogenic receptacles);
- n) The manufacturer's mark registered by the appropriate national authority. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark must be preceded by the character(s) identifying the country of manufacture, as indicated by the distinguishing signs of motor vehicles in international traffic. The country mark and the manufacturer's mark must be separated by a space or slash;
- o) The serial number assigned by the manufacturer;
- ≠ p) In the case of steel cylinders and closed cryogenic receptacles and composite cylinders and closed cryogenic receptacles with steel liner intended for the transport of gases with a risk of hydrogen embrittlement, the letter "H" showing compatibility of the steel (see ISO 11114-1:2012);
- q) For composite cylinders having a limited design life, the letters "FINAL" followed by the design life shown as the year (four digits) followed by the month (two digits) separated by a slash (i.e. "///");
- r) For composite cylinders having a limited design life greater than fifteen years and for composite cylinders and tubes having non-limited design life, the letters "SERVICE" followed by the date fifteen years from the date of manufacture (initial inspection) shown as the year (four digits) followed by the month (two digits) separated by a slash (i.e. "///").

Note.— Once the initial design type has passed the service life test programme requirements in accordance with 5.2.1.1 Note 2, future production no longer requires this initial service life mark. The initial service life mark must be made unreadable on cylinders of a design type that has met the service life test programme requirements.

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
 UN Model Regulations, paragraph 6.2.2.7.5, ST/SG/AC.10/42/Add.1
 

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5.2.7.5 The above marks must be placed in three groups:

- a) Manufacturing marks must be the top grouping and must appear consecutively in the sequence given in 5.2.7.4 except for the marks described in 5.2.7.4 q) and r) which must be adjacent to the periodic inspection and test marks of 5.2.7.8;
- b) The operational marks in 5.2.7.3 must be the middle grouping and the test pressure f) which must be immediately preceded by the working pressure (i) when the latter is required;
- c) Certification marks must be the bottom grouping and must appear in the sequence given in 5.2.7.2.

The following is an example of ~~the markings applied to~~ a cylinder:

m) 25E	n) D MF	o) 765432	p) H	
i) PW200PH	f) 300BAR	g) 62.1KG	j) 50L	h) 5.8MM
 a)	b) ISO 9809-1	c) F	d) IB	e) 2000/12

5.2.7.6 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. In the case of closed cryogenic receptacles, such marks may be on a separate plate attached to the outer jacket. Such marks must not conflict with required marks.

5.2.7.7 Cylinders of composite construction with limited life must be marked with the letters "FINAL" followed by the expiry date, the year (four digits) and the month (two digits).

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UN Model Regulations, paragraph 6.2.2.7.7, ST/SG/AC.10/42/Add.1

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5.2.7.8 In addition to the preceding marks, each refillable cylinder and closed cryogenic receptacle that meets the periodic inspection and test requirements of 5.2.4 must be marked indicating:

- a) the character(s) identifying the country authorizing the body performing the periodic inspection and test. This ~~marking mark~~ **mark** is not required if this body is approved by the appropriate national authority of the country approving manufacture;
- b) the registered mark of the body authorized by the appropriate national authority for performing the periodic inspection and test;
- c) the date of the periodic inspection and test, the year (two digits) followed by the month (two digits) separated by a slash (i.e. "/"). Four digits may be used to indicate the year.

The above marks must appear consecutively in the sequence given.

5.2.7.9 For acetylene cylinders, with the agreement of the national authority, the date of the most recent periodic inspection and the stamp of the body performing the periodic inspection and test may be engraved on a ring held on the cylinder by the valve. The ring must be configured so that it can be removed only by disconnecting the valve from the cylinder.

### 5.2.8 Marking of non-refillable UN cylinders and closed cryogenic receptacles

5.2.8.1 Non-refillable UN cylinders and closed cryogenic receptacles must be marked clearly and legibly with certification and gas or cylinder and closed cryogenic receptacle specific marks. These marks must be permanently affixed (e.g. stencilled, stamped, engraved or etched) on the cylinder. Except when stencilled, the marks must be on the shoulder, top end or neck of the cylinder and closed cryogenic receptacle or on a permanently affixed component of the cylinder and closed cryogenic receptacle (e.g. welded collar). Except for the "UN" mark and the "DO NOT REFILL" mark, the minimum size of the marks must be 5 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to 140 mm and 2.5 mm and closed cryogenic receptacles for cylinders with a diameter less than 140 mm. The minimum size of the "UN" mark must be 10 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to 140 mm and 5 mm for cylinders and closed cryogenic receptacles with a diameter less than 140 mm. The minimum size of the "DO NOT REFILL" mark must be 5 mm.

5.2.8.2 The marks listed in 5.2.7.2 to 5.2.7.4 must be applied with the exception of g), h) and m). The serial number o) may be replaced by the batch number. In addition, the words "DO NOT REFILL" in letters of at least 5 mm in height are required.

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UN Model Regulations, paragraph 6.2.2.8.3, ST/SG/AC.10/42/Add.1

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5.2.8.3 The requirements of 5.2.7.5 must apply.

*Note.— Non-refillable cylinders and closed cryogenic receptacles may, on account of their size, substitute ~~this marking by a label~~ **substitute a label for these permanent marks.***

5.2.8.4 Other marks are allowed provided they are made in low stress areas other than the side wall and are not of a size and depth that will create harmful stress concentrations. Such marks must not conflict with required marks.

### 5.2.9 Marking of UN metal hydride storage systems

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5.2.9.3 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. Such marks must not conflict with required marks.

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 UN Model Regulations, paragraph 6.2.2.9.4, ST/SG/AC.10/42/Add.1
 

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5.2.9.4 In addition to the preceding marks, each metal hydride storage system that meets the periodic inspection and test requirements of 5.2.4 must be marked indicating:

- a) the character(s) identifying the country authorizing the body performing the periodic inspection and test, as indicated by the distinguishing sign of motor vehicles in international traffic. This ~~marking~~ **mark** is not required if this body is approved by the appropriate national authority of the country approving manufacture;
- b) the registered mark of the body authorized by the appropriate national authority for performing periodic inspection and test;
- c) the date of the periodic inspection and test, the year (two digits), followed by the month (two digits) and separated by a slash (i.e. “/”). Four digits may be used to indicate the year.

The above marks must appear consecutively in the sequence given.

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## Chapter 6

### PACKAGINGS FOR INFECTIOUS SUBSTANCES OF CATEGORY A

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#### 6.4 MARKING

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 UN Model Regulations, paragraph 6.3.4, ST/SG/AC.10/42/Add.1
 

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*Note 1.— The ~~marking~~ **marks** indicates that the packaging which bears ~~it~~ **them** corresponds to a successfully tested design type and that it complies with the provisions of this chapter which are related to the manufacture, but not to the use, of the packaging.*

*Note 2.— The ~~marking is~~ **marks are** intended to be of assistance to packaging manufacturers, reconditioners, packaging users, operators and appropriate authorities.*

*Note 3.— The ~~marking does~~ **marks do** not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, test reports or register of successfully tested packagings.*

6.4.1 Each packaging intended for use according to these Instructions must bear ~~markings~~ **marks** which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. For packages with a gross mass of more than 30 kg the ~~markings~~ **marks**, or a duplicate thereof, must appear on the top or on a side of the packaging. Letters, numerals and symbols must be at least 12 mm high, except for packagings of 30 L or 30 kg capacity or less, when they must be at least 6 mm in height and for packagings of 5 L or 5 kg or less, when they must be of an appropriate size.

6.4.2 A packaging that meets the requirements of this section and of 6.5 shall be marked with:

- a) the United Nations packaging symbol; 

This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapters 1 to 6;

- b) the code designating the type of packaging according to the requirements of 6;1.2;
- c) the text “CLASS 6.2”;
- d) the last two digits of the year of manufacture of the packaging;
- e) the State authorizing the allocation of the mark, indicated by the distinguishing sign for motor vehicles in international traffic;
- f) the name of the manufacturer or other identification of the packaging specified by the competent authority; and

- g) for packagings meeting the requirements of 6.5.1.6, the letter “U”, inserted immediately following the ~~marking~~ mark required in b) above.

6.4.3 ~~Markings~~ Marks must be applied in the sequence of the sub-paragraphs in 6.4.2; each ~~element of the marking~~ mark required in these sub-paragraphs must be clearly separated, e.g. by a slash or space, so as to be easily identified. For an example see 6.4.4. Any additional markings authorized by a competent authority must still enable the ~~parts of the marking~~ marks required in 6.4.1 to be correctly identified ~~with reference to 6.4.1.~~

6.4.4 Example of a marking:

(U)	4G/CLASS 6.2/06	as in 6.4.2 a), b), c) and d)
n	S/SP-9989-ERIKSSON	as in 6.4.2 e) and f)

UN Model Regulations, paragraph 6.3.5, ST/SG/AC.10/42/Add.1

**6.5 TEST REQUIREMENTS FOR PACKAGINGS**

**6.5.1 Performance and frequency of tests**

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6.5.1.6 Primary receptacles of any type may be assembled within a secondary packaging and transported without testing in the rigid outer packaging under the following conditions:

- a) The rigid outer packaging combination must have been successfully tested in accordance with 6.5.2.2 with fragile (e.g. glass) primary receptacles.
- b) The total combined gross mass of primary receptacles must not exceed one-half the gross mass of primary receptacles used for the drop test in a) above.
- c) The thickness of cushioning between primary receptacles and between primary receptacles and the outside of the secondary packaging must not be reduced below the corresponding thicknesses in the originally tested packaging; and if a single primary receptacle was used in the original test, the thickness of cushioning between primary receptacles must not be less than the thickness of cushioning between the outside of the secondary packaging and the primary receptacle in the original test. When either fewer or smaller primary receptacles are used (as compared to the primary receptacles used in the drop test), sufficient additional cushioning material must be used to take up the void spaces.
- d) The rigid outer packaging must have successfully passed the stacking test in 4.6 while empty. The total mass of identical packages must be based on the combined mass of packagings used in the drop test in a) above.
- e) For primary receptacles containing liquids, an adequate quantity of absorbent material to absorb the entire liquid content of the primary receptacles must be present.
- f) If the rigid outer packaging is intended to contain primary receptacles for liquids and is not leakproof, or is intended to contain primary receptacles for solids and is not siftproof, a means of containing any liquid or solid contents in the event of leakage must be provided in the form of a leakproof liner, plastic bag or other equally effective means of containment.
- g) In addition to the ~~markings~~ marks prescribed in 6.4.2 a) to f), packagings must be marked in accordance with 6.4.2 g).

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— END —