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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****Thirty-seventh session**

Geneva, 21–30 June 2010

Item 3 of the provisional agenda

**Listing, classification and packing****Proposal for classification criteria and packing requirements  
for chemicals under pressure****Transmitted by the International Council of Chemical Association  
(ICCA)<sup>1</sup>**

1. The classification and packaging requirements for chemicals under pressure issue was already discussed at the thirty-fifth and thirty-sixth sessions of the Sub-Committee (see informal document INF.18 (thirty-fifth session), ST/SG/AC.10/C.3/2009/41, informal documents INF.16 and INF.54 (thirty-sixth session). These chemicals are liquids or solids, e.g. an adhesive or paint, and a gas or gas-mixture in a pressure receptacle, which is under sufficient pressure to allow spray application or extrusion.
2. A summary of the discussions in the subsequent meetings can be found in Annex II of this document.
3. As a result from these discussions and the comments made, ICCA proposes the following amendments.

**Proposal**

4. Create six new entries (UN 3XXX, UN 3YYY, 3AAA, 3BBB, 3CCC, 3DDD) in Class 2:
  - (a) Add six new entries to the Dangerous Goods List, as follows:

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<sup>1</sup> 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).

UN No.	Name and description	Class or division	Subsidiary risk	UN Packing group	Special provisions	Limited and excepted quantities		Packagings and IBCs		Portable tanks and bulk containers	
								Packing instructions	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
3XXX	CHEMICAL UNDER PRESSURE, N.O.S.	2.2			274 XYZ	0	E0	P2YY		[T50	TPXX]
3YYY	CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.	2.1			274 XYZ	0	E0	P2YY	PPYY	[T50	TPXX]
3AAA	CHEMICAL UNDER PRESSURE, NON FLAMMABLE, TOXIC, N.O.S.	2.2	6.1		274 XYZ	0	E0	P2YY	PPYY	[T50	TPXX]
3BBB	CHEMICAL UNDER PRESSURE, NON FLAMMABLE, CORROSIVE, N.O.S.	2.2	8		274 XYZ	0	E0	P2YY	PPYY	[T50	TPXX]
3CCC	CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.	2.1	6.1		274 XYZ	0	E0	P2YY	PPYY	[T50	TPXX]
3DDD	CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.	2.1	8		274 XYZ	0	E0	P2YY	PPYY	[T50	TPXX]

- (b) Add a new Special Provision XYZ in Chapter 3.3:

XYZ: This entry applies to liquids, pastes or powders, pressurized [under pressure] with a compressed or liquefied gas or a mixture thereof, under sufficient pressure to eject the contents.

**Note:** Aerosol dispensers (UN 1950) do not fall under this definition. An example of a “chemical under pressure” is an adhesive or paint, and a gas or gas-mixture in a pressure receptacle, which is under sufficient pressure to allow spray application or extrusion.

The divisions 2.1 and 2.2 of Class 2 and the subsidiary risks depend on the nature of the contents of the chemical under pressure and the compressed or liquefied gas or gas mixture. The following provisions shall apply:

- (a) The dangerous goods shall be classified based on the hazard properties of the components in the different states:

- (i) The propellant (gas) or mixtures of the propellant with other gases,
- (ii) The liquid and mixtures of liquids; or
- (iii) The solid or mixtures of solids.

If one of these components, which can be a pure substance or a mixture, needs to be classified as flammable, the chemical under pressure shall be classified as flammable in division 2.1. Flammable components are flammable liquids and liquid mixtures, flammable solids and solid mixtures or flammable gases and gas mixtures meeting the following criteria:

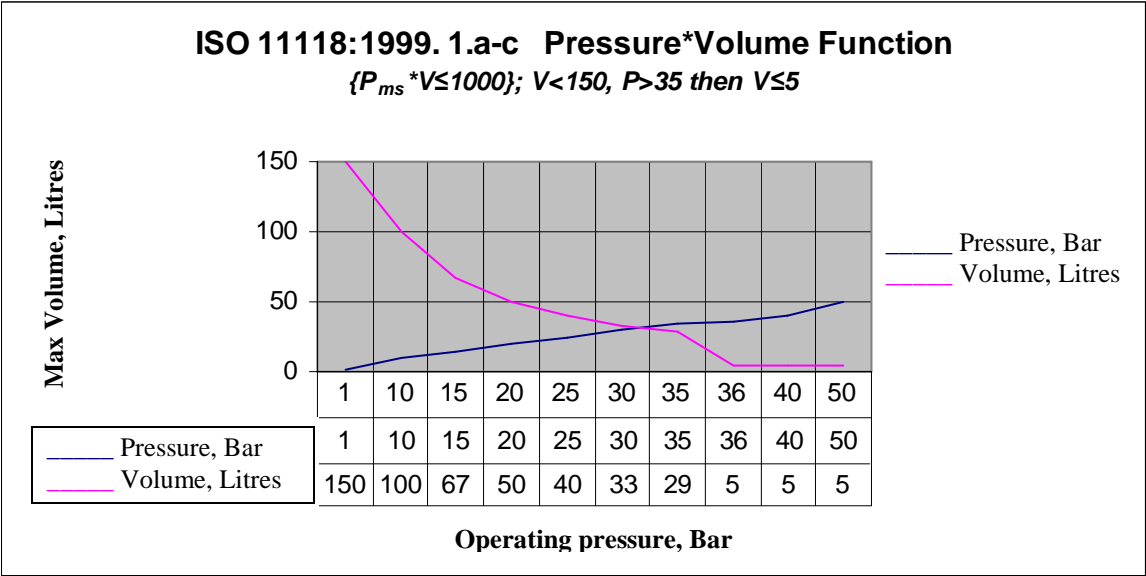
- (i) A flammable liquid means a liquid having a flashpoint of not more than 93°C. Test methods for determining the flash point are given in sub-section 32.4 of the *Manual of Tests and Criteria*;
  - (ii) For the definition of flammable solids, see paragraph 2.4.2.2 of these Regulations. Classification procedures, test methods and criteria relating to flammable solids of Division 4.1 are given in sub-section 33.2 of the *Manual of Tests and Criteria*;
  - (iii) A flammable gas is a gas having a flammable range within air at 20°C and a standard pressure of 101.3 kPa.
- (b) Gases of Division 2.3 shall not be used as a propellant in a chemical under pressure;
- (c) Where the components, other than the propellant of the chemical under pressure, are classified as Division 6.1, packing groups II or III, or Class 8, packing groups II or III, the chemical under pressure shall be assigned a subsidiary risk of Division 6.1 or Class 8 and the appropriate UN number shall be assigned. Components classified in Division 6.1, packing group I, or Class 8, packing group I, shall be prohibited for transport under this proper shipping name.
- (d) In addition, chemicals under pressure with components meeting the properties of : Class 1, Explosives; Class 3, liquid desensitized explosives; Division 4.1, self reactive substances and solid desensitized explosives; Division 4.2, Substances liable to spontaneous combustion; Division 4.3, substances which, in contact with water, emit flammable gases; Division 5.1 oxidizing substances and 5.2 organic peroxides; Division 6.2, Infectious substances and Class 7 Radioactive material, shall be prohibited for transport under this proper shipping name."
5. Amend 4.1.6.1.5 to read as follows:
- "Prior to filling, the filler shall perform an inspection of the pressure receptacle and ensure that the pressure receptacle is authorized for the gas or chemical under pressure to be transported and that the provisions of these Regulations have been met. Shut-off valves shall be closed after filling and remain closed during transport. The consignor shall verify that the closures and equipment are not leaking."
6. Amend 4.1.6.1.10 to read as follows:
- "Refillable pressure receptacles, other than cryogenic receptacles, shall be periodically inspected according to the provisions of 6.2.1.6 and packing instruction P200 or packing instruction P2YY as applicable. Pressure receptacles shall not be filled after they become due for periodic inspection but may be transported after the expiry of the time limit."

## 7. Add a new packing instruction P2YY as follows:

P2YY	PACKING INSTRUCTION	P2YY
This instruction applies to UN 3XXX, UN 3YYY, 3AAA, 3BBB, 3CCC and 3DDD		
<p>For cylinders, pressure drums and tubes, the general packing requirements of <b>4.1.6.1</b> shall be met. Unless otherwise indicated in these Regulations, cylinders, pressure drums and tubes conforming to the applicable requirements of Chapter 6.2 are authorized for transport dangerous goods under the UN numbers listed above.</p> <p>The maximum test period for periodic inspection shall be 10 years; for chemicals under pressure, with subsidiary risk of division 6.1 or class 8, the maximum test period for periodic inspection shall be 5 years.</p> <p>Material compatibility for the gaseous components shall be verified according to ISO-11114-1 :1997 and ISO 11114-2:2000.</p> <p>Pressure receptacles shall be so filled that at 50°C the non-gaseous phase does not exceed 95% of their water capacity and they are not completely filled at 60°C. When filled, the internal pressure at 65°C shall not exceed the test pressure of the pressure receptacle. The vapour pressures and volumetric expansion of all substances in the pressure receptacle shall be taken into account.</p> <p>The minimum test pressure for pressure receptacles shall be 20 bar.</p>		
<b>Additional requirement</b>		
Pressure receptacles shall not be offered for transport when connected with spray application equipment such as a hose and wand assembly.		
<b>Special packing provisions:</b>		
<p><b>PPYY:</b> For UN3YYY, 3AAA, 3BBB, 3CCC and 3DDD, notwithstanding 4.1.6.1.9 (b), non-refillable cylinders used may have a water capacity in litres not exceeding 1000 l divided by the test pressure expressed in bars provided capacity and pressure restrictions of the construction standard are also observed (e.g. see ISO 11118:1999. 1. a-c pressure x volume function).</p>		

Annex I

Graph based on the pressure x volume function of ISO 11118:1999,  
used for the Special Packing Instruction PPYY



## Annex II

### General information and overview of discussions held in previous meetings

#### I. Information on the products being considered

1. Manufacturers in the United Kingdom, the United States of America, Australia, Canada and other countries are supplying pressurized products contained and transported in gas cylinders. The products are liquids or solids such as adhesives, coatings and cleaners combined with a gas or gas mixtures in pressure receptacles under sufficient pressure to expel the contents. These mixtures are typically expelled from the pressurized cylinders as foams, streams or thick sprays. Application requires the attachment of auxiliary equipment such as hoses and applicators that are shipped separately from the pressurized containers and attached at the job site. A picture of a typical pressurized container and the separate equipment used to apply the contents is shown:



2. Today these types of products are, according to Part 2 of the Model Regulations, section 2.0.3, classified as liquefied gases. A typical product however is a combination of a propellant (gas phase) and a liquid or solid component, and therefore the term liquefied gas does not correctly describe the contents. As they are not filled in aerosol dispensers and as the receptacles used exceed the volume limitations for aerosols, it was decided at the June/session 2009 of the Sub-Committee to create new entries (UN numbers) for these products. The proposal for these new UN numbers, their classification criteria, and the packaging and labelling provisions are laid down in this document.

3. In this Annex II some considerations on why specific proposals have been made in this document are listed, to keep track of the discussions and proposal from the Sub-Committee meetings in June and December 2009 (see also ST/SG/AC.10/C.3/2009/41 and informal documents INF 18, INF 16 and INF 54 (December 2009)).

#### II. Consideration regarding the proper shipping name

4. There was a proposal from some delegations to follow the hazards and the physical state for the description of the new UN numbers. The most precise descriptions would be:

- (a) For a non flammable product:
  - (i) Liquefied gas, non-flammable with liquid under pressure, non-flammable;
  - (ii) Compressed gas, non-flammable with liquid under pressure, non-flammable;

- (iii) Liquefied gas, non-flammable with solid under pressure, non-flammable;
- (iv) Compressed gas, non-flammable with solid under pressure, non-flammable
- (b) For a flammable product with a subsidiary risk it would be:
  - (i) Liquefied gas, flammable with liquid under pressure, flammable, corrosive;
  - (ii) Liquefied gas, non-flammable with liquid under pressure, flammable, corrosive;
  - (iii) Liquefied gas, flammable with liquid under pressure, non-flammable, corrosive;
  - (iv) Compressed gas, flammable with liquid under pressure, flammable, corrosive.

5. For these kinds of products the concept of generic entries can be used, but if the existing generic entries were used in combination with the gaseous component, again a large number of new UN numbers would be needed, e.g.(but not limited to):

- Adhesive under pressure, non flammable;
- Coating solution under pressure, flammable;
- Flammable liquid under pressure;
- Flammable liquid under pressure, corrosive;
- Paint under pressure;
- Printing ink under pressure, corrosive;

For cleaning products, as there is no generic entry describing these kind of products it would be;

- Flammable liquid under pressure, corrosive.
- ...

6. This would draw the attention more to the liquid or solid component than on the gaseous component and the pressure. Therefore, ICCA is in favour of using the term “Chemical under pressure” in combination with the description of the hazards flammable, toxic or corrosive, as appropriate, which would result in six new UN numbers. This would highlight the main hazard of the products, which is the pressure. In our view this concept is already used for other products like aerosols; chemical kits etc. and, therefore, could be used here as well.

### III. Additional information regarding the classification

7. To give a better overview of the possible hazards of the products, the following table is provided and the following rules apply:

- (a) The gas used can be only flammable or non-flammable; no other or subsidiary risks are allowed;
- (b) The liquid or solid can be flammable or non flammable (Packing group I, II or III) and can have the subsidiary risks of Division 6.1 (packing group II or III) or Class 8 (packing group II or III); and

- (c) Subsidiary risks of Division 6.1, packing group I, or Class 8, packing group I are prohibited.

UN-number	Description	Gas component	Liquid / solid flammability			Assigned division and subsidiary hazards
			Flashpoint < 93°C	Division 6.1 PG II or PG III	Class 8 PG II or PG III	
3XXX	CHEMICAL UNDER PRESSURE, NON FLAMMABLE, N.O.S.	Non flammable	no	no	no	2.2
3YYY	CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.	Flammable	yes	no	no	2.1
		Flammable	no	no	no	
		Non Flammable	yes	no	no	
3AAA	CHEMICAL UNDER PRESSURE, NON FLAMMABLE, TOXIC, N.O.S.	Non flammable	no	yes	no	2.2 (6.1) <sup>1</sup>
3BBB	CHEMICAL UNDER PRESSURE, NON FLAMMABLE, CORROSIVE, N.O.S.	Non flammable	no	no	yes	2.2. (8) <sup>1</sup>
3CCC	CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.	Flammable	yes	yes	no	2.1 (6.1) <sup>1</sup>
		Flammable	no	yes		
		Non Flammable	yes	yes		
3DDD	CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.	Flammable	yes	no	yes	2.1. (8) <sup>1</sup>
		Flammable	No	no	yes	
		Non Flammable	yes	no	yes	

<sup>1</sup> Note: There is a discussion whether the sprayed liquid or solid could form a mist and therefore need to be classified as a gas. As a result the main class for those entries with subsidiary risk should be 2.3 instead of 2.1 (6.1), 2.1 (8) or 2.2 (6.1) and 2.2 (8). This would lead to the following classification:

- From 2.1 (6.1) to 2.3 (2.1);
- From 2.2 (6.1) to 2.3;
- From 2.1 (8) to 2.3 (2.1) (8);
- From 2.2 (8) to 2.3 (8).

Beside the combination 2.2 with subsidiary risk 3 is discussed, to make clear that the propellant is non flammable and the liquid or solid is the flammable component. This would lead to the combination of label 2.2 and 3, which we feel would cause confusion.

8. In the approach in this document, the main class is related to the gas component (flammable or non flammable) which is linked to divisions 2.1 and 2.2. This is translated as gases, flammable or non flammable, non toxic, non corrosive. This is correct for the above described products. A subsidiary risk of Division 6.1 or Class 8 is always related to the liquid or solid component. The non gaseous components used today do not form a mist, but



are expelled as liquids, when sprayed, or leaking out of a punctured pressure receptacle. (see below)

9. The same applies to the classification criteria for aerosols, but is solved in a different way, by assigning class 2 without any further hazards. These are defined in Special Provision 63.

However, for chemicals under pressure, as they are NOT packaged in aerosol dispensers, this approach does not seem to be appropriate: the pressure receptacles used are bigger and the need for proper emergency response, in ICCA's view, requires more detailed information linked to the UN number.

10. There was a question about a non-refillable container being punctured and the form in which the product would escape. The pictures below show a pressurized canister being punctured and the resultant stream of adhesive exiting the canister, which is clearly a stream and not a mist: There was also discussion as to whether the contents should be classified according to the properties of material that could escape during a puncture. Then, the contents would be classified as a gas if the escaping contents could form a mist. As a result the main classes for those entries with subsidiary risks would be 2.3 and would result in the following classification changes from the proposal in this document:

- From 2.1 (6.1) to 2.3 (2.1);
- From 2.2 (6.1) to 2.3;
- From 2.1 (8) to 2.3 (2.1) (8);
- From 2.2 (8) to 2.3 (8).



#### IV. Packing instruction

11. There were two different approaches regarding the packing instructions: add a new packing instruction or integrate the packing requirements for chemicals under pressure in the Packing Instruction P200. ICCA proposed a new Packing Instruction as this was the wish of the Sub-Committee in June 2009 (see proposal in this document), but ICCA would have no objection to integrating the packing requirements in Packing Instruction P200.

12. If this were the preferred solution, ICCA would propose the following changes:

- (a) Add under 4.1.6.1.13 a new line e) as follows:

"e) Unless all pressure spray application equipment such as a hose and wand assembly have been removed from the receptacle."

- (b) Amend P200 (2) to read as follows:
- "2) The following ~~three~~ four tables cover compressed gases (Table 1), liquefied and dissolved gases (Table 2), chemicals under pressure (Table 3) and substances not in Class 2 (~~Table 3~~) (Table 4)."
- (c) After (d), add (e) under P200 (3):
- (e) For chemicals under pressure (UN3XXX, 3YYY, 3AAA, 3BBB, 3CCC, 3DDD), pressure receptacles shall be so filled that at 50°C the non-gaseous phase does not exceed 95% of their water capacity and is not completely filled at 60°C. When filled, the internal pressure at 65°C shall not exceed the test pressure of the pressure receptacle. The vapour pressures and volumetric expansion of all substances in the pressure receptacle shall be taken into account."
- (d) In P200 (4), add a new gas specific provision rb after ra:
- "rb: For chemicals under pressure (UN3YYY, 3AAA, 3BBB, 3CCC and 3DDD), notwithstanding the provision of 4.1.6.1.9 (b), non-refillable cylinders used may have a water capacity not exceeding 1000 l divided by the test pressure expressed in bar provided the capacity and pressure restrictions of the construction standard are also observed (e.g. see ISO 11118:1999. 1. a-c pressure x volume function)."
- (e) Insert a new table (3) in P200:

P200		PACKING INSTRUCTION (cont'd)											P200	
Table 3: <del>SUBSTANCES NOT IN CLAS 2</del> <u>CHEMICALS UNDER PRESSURE</u>														
UN No.	Name and description	Class or Division	Subsidiary risk	LC <sub>50</sub> ml/m <sup>3</sup>	Cylinders	Tubes	Pressure drums	Bundles of cylinders	MEGCs	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions	
3XXX	<u>CHEMICAL UNDER PRESSURE</u> , NON FLAMMABLE, N.O.S.	2.2			X	X	X	X		10			z	
3YYY	<u>CHEMICAL UNDER PRESSURE</u> , FLAMMABLE, N.O.S.	2.1			X	X	X	X		10			rb,z	
3AAA	<u>CHEMICAL UNDER PRESSURE, NON FLAMMABLE, TOXIC, N.O.S.</u>	2.2	6.1		X	X	X	X		5			rb,z	
3BBB	<u>CHEMICAL UNDER PRESSURE, NON FLAMMABLE, CORROSIVE, N.O.S.</u>	2.2	8		X	X	X	X		5			rb,z	
3CCC	<u>CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.</u>	2.1	6.1		X	X	X	X		5			rb,z	
3DDD	<u>CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.</u>	2.1	8		X	X	X	X		5			rb,z	

- (f) Rename the heading of current Table 3 in P200 to: "Table 4: SUBSTANCES NOT IN CLASS 2".

*Note: This would mean that all substances in Class 2 are covered by tables 1 to 3, and substances not in Class 2 would be covered by Table 4.*

.../...

**V. Portable tanks**

13. The products are also transported in small portable tanks. The proposal regarding the portable tanks is provided in a separate document (ST/SG/AC.10/C.3/2010/37) as comments during the thirty-sixth session seemed to indicate a need for separate and further consideration.

