

## 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

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### LISTING, CLASSIFICATION AND PACKING

#### Pressurized Adhesives in gas cylinders

Transmitted by ICCA (International Council of Chemical Associations)

### Background

1. Adhesives manufacturers in the United Kingdom, the United States of America, Australia, Canada and other countries, are supplying pressurized adhesive products packed in gas cylinders. The currently most used classification entries are either UN3161, Liquefied flammable gas, n.o.s. for flammable mixtures, or UN3163, Liquefied Gas, n.o.s. for non flammable mixtures.
2. The propellants used add sufficient vapour pressure that the formulated product as packed indeed meets the definition of a gas in 2.2.1.1(a). The Precedence of hazard characteristics provisions in Section 2.0.3, require for these pressurized adhesives to be assigned to Division 2.1 or 2.2 dependent on flammability of either the adhesive or the propellant.
3. Current examples are supplied in refillable cylinders, but also in non-refillable cylinders up to 22.4 L capacity, conforming to ISO 11118:1999, European EN 12205, Canadian specification TC-39M or USA specification DOT 39. The spraying equipment itself (connection, hose, spray gun...) is shipped separately. A picture of such a device is shown in Annex 1.
4. Paragraph 4.1.6.1.9(b) states:  
  
“Non refillable pressure receptacles shall:  
  
(b) Be of a water capacity less than or equal to 1.25 litres when filled with flammable or toxic gas; ...”
5. This limitation effectively prohibits the use of >1.25 L non refillable gas cylinders for flammable gases. However, some countries provide exceptions to this rule. E.g. the USA DOT effectively allows carriage of liquefied flammable gases in DOT specification 39 (49 CFR 178.65) cylinders ,for sizes up to 55 pounds (1526 cubic inches, 25L ) and service pressures of

500 psig or less. DOT did not adopt the capacity limitation, as this would have a negative impact on companies using Specification 39 cylinders larger than 75 cubic inches in aerosol applications. A 1.25 litres limit is considered by the industry as too restrictive for flammable industrial spray applications, effectively preventing the use of non-refillable cylinders. In contrast, e.g. adhesives or paints of Class 3 (without propellant) are permitted by 4.1.3.6 in cylinders and other pressure receptacles without specific size or type restrictions. Flammable liquids assigned to packing instruction P001 are authorized by UN to be safely shipped in ISO 11118:1999 cylinders in capacities up to 150 liters.

6. The application of 4.1.6.1.9(b) to non refillable gas cylinders containing a gas/liquid type mixture is seen as questionable. Even though some of these products use a flammable propellant, the propellant usually comprises less than 50% of the contents of the cylinder. They are not technically *filled* with a flammable gas. The total potential energy stored in a cylinder of mostly incompressible liquid under pressure, presents significantly less hazard than that of a purely compressed or liquefied gas, yet greater hazard than a purely flammable liquid. It therefore warrants a maximum size larger than 1.25 liters for a flammable gas, but smaller than 150 liters, for a flammable pressurized liquid when packed in non-refillable cylinders.

7. Different entries in the Dangerous Goods list can be considered to describe these pressurized chemicals:

- (a) Liquefied gases (UN3161, UN3163, currently used by adhesive manufacturers or distributors in the USA, UK, Canada): these entries do not accurately describe the aerosol-like properties of the mixtures. In addition, the limitation posed in 4.1.6.1.9(b) effectively prohibits the transport of the flammable mixtures in non-refillable cylinders of capacity >1.25L.
- (b) Aerosols (UN1950): this entry accurately describes the properties of the pressurized mixture. The non-refillable gas cylinders currently used however do not match the technical requirements of an aerosol dispenser, as described in 6.2.4.2.
- (c) Adhesives (UN1133): this entry takes correctly into account the liquid part of the mixture. It does however not take into account the gaseous component(s). In addition, classification as e.g. UN 1133, class 3 for an adhesive/gas mixture is in conflict with the precedence of hazards provisions in section 2.0.3.

8. In conclusion, there is currently no entry in the Dangerous Goods List that suitably describes Pressurized Adhesives in gas cylinders. Other industries (Paints, Coatings, Lubricants) may be faced with the same problem and therefore it may be appropriate broadening the scope to other chemicals/gas mixtures.

9. The Sub-Committee is invited to comment on the following proposal and to advise on the best way forward to address classification and packaging of such chemicals under pressure.

**Proposal**

10. Add a new definition in 1.2.1:

*Pressurized Chemical Spray* : any metal refillable or non-refillable cylinder or pressure drum meeting the requirements of 6.2.1 or 6.2.2, made of metal, containing a gas, compressed, liquefied or dissolved under pressure, with a liquid, paste or powder.

11. Create a new entry UN 3XYZ in Class 2:

- a) Add a new entry UN 3XYZ to the Dangerous Goods List, as follows:

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	
						(7a)	(7b)	Packing instructions	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
3XYZ	PRESSURIZED CHEMICAL SPRAY	2			XXX	0	E0	P200			

- b) Add a new Special Provision XXX:

XXX The division of Class 2 and the subsidiary risks depend on the nature of the contents of the cylinder or pressure drum and must be determined in accordance with Special Provision 63(a), (b), (d), (e), (f) and (g). Despite 4.1.6.1.9(b), there is no restriction on the capacity of non-refillable cylinders with contents of Division 2.1.

- c) Add a new entry to Table 2 in Packing Instruction P200:

P200		PACKING INSTRUCTION (cont'd)										P200	
Table 2: LIQUEFIED GASES AND DISSOLVED GASES													
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
3xyz	PRESSURIZED CHEMICAL SPRAY	2			X		X			5	Test Pressure = 1.5 x working pressure		z

- d) Add the following to Packing instruction P200, (3), (c):

For low pressure liquefied gases and pressurized chemical sprays, the maximum mass of contents per liter of water capacity...

- e) Add a new entry in the Alphabetical index of Substances and Articles as follows:

PRESSURIZED CHEMICAL SPRAY, 2, 3XYZ

Annex I



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