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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

Twenty-sixth session, 29 November-3 December 2004
Item 3 (c) of the provisional agenda

**OUTSTANDING ISSUES OR PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS
ON THE TRANSPORT OF DANGEROUS GOODS**

Miscellaneous proposals

Revision of 4.1.3 to incorporate requirements for pressure receptacles
to containing liquid or solid dangerous goods other than of Class 2

Comments on ST/SG/AC.10/C.3/2004/55 (United Kingdom) and Information paper
UN/SCETDG/25/INF.64 (Belgium)

Transmitted by the International Council of Chemical Associations (ICCA)

1. Introduction

During last Sub-committee meeting, July 2004, the proposal of the United Kingdom on requirements for pressure receptacles containing liquid or solid dangerous goods other than of Class 2, as well as two information papers, from Belgium (Inf. 64) and ICCA (Inf. 51), were discussed. United Kingdom suggested to keep their proposal scheduled for the December 2004 meeting awaiting a formal proposal from ICCA.

ICCA agreed to submit an official document.

This official proposal is different from the earlier Inf. 51 paper. The current proposals are in the form of amendments to the United Kingdom proposal ST/SG/AC.10/C.3/2004/55.

2. Comments to ST/SG/AC.10/C.3/2004/55 and UN/SCETDG/25/INF.64 (Belgium)

As raised during the last Sub-committee meeting in information paper UN/SCETDG/25/INF.51, one of the main problems of the current requirements for pressure receptacles containing liquid or solid

dangerous goods other than of Class 2 is that their use is conditional upon meeting the requirements of packing instruction P200 and Chapter 6.2. The standards in Chapter 6.2 are primarily for gasses and are not fully or even partly applicable for liquids and solids.

Many cylinders currently used are built according to other standards and are not UN marked pressure receptacles. While the United Kingdom proposal may be generally acceptable when UN marked pressure receptacles are used, it does not adequately address the common use of pressure receptacles for liquids and solids. These substances are not transported under the same high pressures as gases. In principle the pressure receptacles used only have to be of sufficient strength to prohibit unintended leakage under normal conditions of transport and cope with overpressures imposed by a blanketing gas, if required or the pressures that are realized when the substances are filled or emptied using pressure. The pressure receptacles that are commonly used exceed the standards and are more robust than the other packagings that are authorized for these liquids and solid dangerous goods (e.g. drums, jerricans, combination packagings).

In the United Kingdom proposal a new part of chapter 4.1.3 is proposed (4.1.3.4 of ST/SG/AC.10/C.3/2004/55). In this new chapter, there remains a reference to chapter 6.2. Further, there is a requirement of 6 bar for the test pressure. However, in the current packaging instructions values for minimum **design** pressures of 10 bar (P400) or 4 bar (in P401/402) and minimum **test** pressures 10 bar (in P601, 602) are required (apart from the reference to the general requirements of P200 referred to in P800/802). *Note: design and test pressure are used both which seems to be inconsistent!*

The comments of Belgium, as addressed in UN/SCETDG/25/INF.64, are incorporated in the proposals.

3. Additions to proposal ST/SG/AC.10/C.3/2004/55

In view of the above-mentioned points, ICCA proposes to revise 4.1.3.6, and to incorporate consequential amendments in the relevant packing instructions to address our points.

The primary issues are:

- Particular requirements need to be included for substances assigned to P400/401/402 and P601/602
- Certain substances should not be authorized for transport in pressure receptacles;
- Construction, testing and inspection according to standards recognized by competent authorities should be authorized;
- Requirements on capacities, degree of filling, filling/refilling, pressure testing (general and specific for some packing instructions), periodic inspection, emergency relief devices, and more practical aspects like location of openings and foot ring, service equipment for mechanical handling should be specified;
- Marking of pressure receptacles should be addressed;

4. Proposal

Changes/additions to the United Kingdom proposal ST/SG/AC.10/C.3/2004/55 are **underlined** and **deleted text** is also indicated (**strikethrough**).

(Note: In original United Kingdom proposal 2004/55, section 4.1.3.6 was numbered as 4.1.3.4.)

Replace the existing 4.1.3.6 by the following text:

4.1.3.6 Pressure receptacles for liquids and solids

4.1.3.6.1 Unless otherwise indicated in these Regulations, pressure receptacles conforming to:

- a) the applicable requirements of Chapter 6.2 or
- b) the National or International standards on the design, construction, testing, manufacturing and inspection, as applied by the country in which the pressure receptacles are manufactured, provided that the provisions of 4.1.3.6 and 6.2.3.3 are met,

are authorized for the transport of any liquid or solid substance other than explosives, thermally unstable substances, organic peroxides, self reactive substances, substances where significant pressure may develop by evolution of chemical reaction and radioactive material ~~unless permitted in 4.1.9.~~

This sub-section is not applicable to the substances mentioned in 4.1.4.1, packing instruction P200, table 3.

4.1.3.6.2 Every design type of cylinder, tube, pressure drum or bundle of cylinders should be approved by the competent authority of the country of manufacture.

4.1.3.6.3 Unless otherwise indicated, pressure receptacles having a minimum test pressure of 0.6 MPa shall be used.

4.1.3.6.4 Parts of the pressure receptacles which are in direct contact with the dangerous goods shall not be affected or weakened by those dangerous goods and shall not cause dangerous effects (e.g. catalysing a reaction or reacting with dangerous goods).

4.1.3.6.5 ~~Valves shall be protected with valve protection caps or collars or the pressure receptacles, shall be packaged in strong rigid outer packagings. Where an outer packaging is used pressure receptacles shall be secured to prevent movement in the outer packaging.~~

Unless otherwise indicated, pressure receptacles may be provided with an emergency pressure relief device designed to avoid bursting in case of overfill or fire accidents.

Pressure receptacle valves shall be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or shall be protected from damage which could cause inadvertent release of the contents of the pressure receptacle, by one of the following methods:

- (a) Valves are placed inside the neck of the pressure receptacle and protected by a threaded plug or cap;
- (b) Valves are protected by caps. Caps shall possess vent-holes of sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;
- (c) Valves are protected by shrouds or guards;
- (d) Pressure receptacles are transported in frames, (e.g. bundles); or

- (e) Pressure receptacles are transported in an outer packaging. The packaging as prepared for transport shall be capable of meeting the drop test specified in 6.1.5.3 at the packing group I performance level.

4.1.3.6.6 The level of filling shall not exceed 90 95% of the capacity of the pressure receptacle at 50 °C. Sufficient ullage (outage) shall be left to ensure that the pressure receptacle will not be liquid full at a temperature of 55 °C.

4.1.3.6.7 Unless otherwise indicated pressure receptacles shall be subjected to a periodic inspection and test every 5 years. The periodic inspection shall include an external examination, a pressure test or equivalent effective non-destructive testing with the agreement of the competent authority including an inspection of all accessories (e.g. tightness of valves, emergency relief valves of fusible elements). Pressure receptacles shall not be filled after they become due for periodic inspection and test but may be transported after the expiry of the time limit. Pressure receptacle repairs shall meet the requirements of 4.1.6.1.11.

4.1.3.6.8 Prior to filling, the filler shall perform an inspection of the pressure receptacle and ensure that the pressure receptacle is authorized for the substances 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.

4.1.3.6.9 Refillable pressure receptacles shall not be filled with a substance different from that previously contained unless the necessary operations for change of service have been performed.

4.1.3.6.10 Pressure receptacles shall not be offered for filling:

- (a) when damaged to such an extent that the integrity of the pressure receptacle or its service equipment may be affected;
- (b) unless the pressure receptacle and its service equipment has been examined and found to be in good working order; or
- (c) unless the required certification, retest, and filling markings are legible.

4.1.3.6.11 Filled pressure receptacles shall not be offered for transport:

- (a) when leaking;
- (b) when damaged to such an extent that the integrity of the pressure receptacle or its service equipment may be affected;
- (c) unless the pressure receptacle and its service equipment has been examined and found to be in good working order; or
- (d) unless the required certification, retest, and filling markings are legible.

4.1.3.6.12 The pressure receptacle shall be transported in up-right position. All openings shall be above liquid level, in the vapor phase of the pressure receptacle, however this does not preclude internal dip tubes. Bottom openings are not allowed. Cylinders and pressure drums with a diameter larger than 150 mm shall have a foot ring or otherwise stable basis. Cylinders and pressure drums with a capacity above 200 l, should be provided with service equipment for mechanical handling (e.g. forklift pockets, lashing lugs).

4.1.3.6.13 Particular requirements applicable to liquid and solid substances assigned to packing instruction P400, P401, P402, P601, P602.

4.1.3.6.13.1 Pressure receptacles for liquid and solid substances of packing instruction P400

Pressure receptacles assigned to P400 shall be made of steel and shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1MPa (10 bar) (gauge pressure). During carriage, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar).

4.1.3.6.13.2 Pressure receptacles for liquid and solid substances assigned to packing instruction P401 and P402.

Pressure receptacles assigned to P401 and P402 shall be made of steel and subjected to an initial test and periodic tests every 10 years at a pressure of not less than 0.6MPa (6 bar, gauge pressure). During carriage, the liquid shall be under a layer of inert gas with a gauge pressure of not less than 20 kPa (0.2 bar).

4.1.3.6.13.3 Pressure receptacles for liquid and solid substances assigned to packing instruction P601 and P602.

Pressure receptacles assigned to P601 and P602 shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1MPa (10 bar) (gauge pressure). Pressure receptacles may not be equipped with any pressure relief device. Each pressure receptacle containing a toxic by inhalation liquid with an LC50 less than or equal to 200 ml/m³ (ppm) shall be closed with a plug or valve conforming to the following:

- (a) Each plug or valve shall have a taper-threaded connection directly to the pressure receptacle and be capable of withstanding the test pressure of the pressure receptacle without damage or leakage;
- (b) Each valve shall be of the packless type with non-perforated diaphragm, except that, for corrosive materials, a valve may be of the packed type with an assembly made gas-tight by means of a seal cap with gasketed joint attached to the valve body or the pressure receptacle to prevent loss of material through or past the packing;
- (c) Each valve outlet shall be sealed by a threaded cap or threaded solid plug and inert gasketing material;
- (d) The materials of construction for the pressure receptacle, valves, plugs, outlet caps, luting, and gaskets shall be compatible with each other and with the lading.

Each pressure receptacle with a wall thickness at any point of less than 2.0 mm and each pressure receptacle that does not have fitted valve protection shall be transported in an outer packaging. Pressure receptacles may not be manifolded or interconnected.

4.1.3.6.14 Marking of pressure receptacles for liquids and solids according to 4.1.3.6 (not conforming the requirements of 6.2)

Marking shall be in accordance with the requirements of the competent authority of the country of manufacturing.

Consequential amendments:

Add in P001 and P002 a new row reading:

Cylinders, tubes, pressure drums and bundles of cylinders may be used provided that they fulfil the requirements of 4.1.3.6.

Replace (1) in P400, P401 and P402 with the following sentences:

Cylinders, tubes, pressure drums and bundles of cylinders may be used provided that they fulfil the requirements of 4.1.3.6.

Add in P403, P404 and P410 the following sentence:

Cylinders, tubes, pressure drums and bundles of cylinders may be used provided that they fulfil the requirements of 4.1.3.6.

Replace (4) in P601 and P602 with the following sentences:

Cylinders, tubes, pressure drums and bundles of cylinders may be used provided that they fulfil the requirements of 4.1.3.6.

Replace (1) in P800 with the following sentences:

Cylinders, tubes, pressure drums and bundles of cylinders may be used provided that they fulfil the requirements of 4.1.3.6.

Replace (5) in P802 with the following sentences:

Cylinders, tubes, pressure drums and bundles of cylinders may be used provided that they fulfil the requirements of 4.1.3.6.
