

## **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

1 December 2010

### **Thirty-eighth session**

Geneva, 29 November –7 December 2010

Item 4 of the provisional agenda

### **Listing, classification and packing**

## **Portable tank provisions for chemicals under pressure**

### **Revision of document ST/SG/AC.10/C.3/2010/54**

### **Transmitted by the International Council of Chemical Associations (ICCA)**

## **Background**

1. Manufacturers in the United Kingdom, the United States of America and other countries are supplying chemicals under pressure contained and transported in portable tanks. Portable tanks are sometimes used to provide the most economical method for transporting large quantities of these pressurized products.
2. As a specific example, polyurethane foams are manufactured as described by mixing the propellant and the concentrate in a pressure mixer; the desired product properties can only be obtained by this prior mixing. Portable tanks, checked prior to filling for proper operation of the pressure relief valves, are then filled from the mixer for shipment to job sites. It is not possible to charge the propellants at the work site because of the mixing requirement and because operations at the site are not set up for safe charging of propellants. Empty portable tanks contain some residual pressure and are shipped back to the filling facility as pressurized product, as would full tanks be shipped back for any reason. For example, full portable tanks might need to be shipped back to the supplier, if there are quality problems or wrong orders involved.
3. This document is linked to document ST/SG/AC.10/C.3/2010/38 for the classification and packing of “Chemicals under pressure” which has been adopted at the thirty-seventh session of the Sub-Committee of Experts on the Transport of Dangerous Goods in June 2010. These products are classified currently as liquefied gases (flammable or non-flammable, UN 3161 or UN 3163). The UN numbers 3161 and 3163 are listed in portable tank instruction T50. With the new UN numbers in the UN Model Regulations, the same packagings and tanks used today should be allowed. Therefore portable tank instruction T50 should be linked to the new UN numbers.
4. During the discussion of the tank provision for chemicals under pressure at the thirty-seventh session of the Sub-Committee, the concern was raised that dried contents may influence the pressure relief devices of the portable tanks. Our experience shows that this is not the case. Tanks are kept closed after the initial filling and any residual product remaining in the tank re-dissolves in new product as it is added. This precludes residual

product from interfering with the proper operation of the pressure relief valve. As long as the portable tank is pressurized, the non gaseous component cannot dry out, so that even in the case of a transport of a partly emptied portable tank, the pressure relief valve is not affected. **Whenever the pressure relief device opens for whatever reason, during carriage or storage, the consequential pressure drop will result in the poor application of it's contents, and hence the quality of the product. Therefore it must in all cases be returned to the filler.**

5. In addition, the pressure relief devices are checked prior to each reuse and replaced if worn or not operating properly. Tanks have very reduced contents and pressure when sent back for cleaning and refilling.

## Proposal

6. It is proposed to amend the first sentence in the introduction to portable tank instruction T50 to read as follows:

“This portable tank instruction applies to non-refrigerated liquefied gases and chemicals under pressure (UN Nos. 3500, 3501, 3502, 3503, 3504 and 3505).”.

7. Add UN Nos. 3500, 3501, 3502, 3503, 3504, and 3505 to portable tank instruction T50 as follows:

| UN No       | Non-refrigerated liquefied gases                             | Max. allowable working pressure (bar) | Openings below liquid level | Pressure-relief requirements (see 6.7.3.7) | Maximum filling ratio |
|-------------|--|---------------------------------------|-----------------------------|--|-----------------------|
| <u>3500</u> | <u>Chemical under pressure, n.o.s.</u>                       | <u>See MAWP definition in 6.7.3.1</u> | <u>Allowed</u>              | <u>Normal</u><br><u>[See TPXX]</u>         | <u>See 4.2.2.7</u>    |
| <u>3501</u> | <u>Chemical under pressure, flammable, n.o.s.</u>            | <u>See MAWP definition in 6.7.3.1</u> | <u>Allowed</u>              | <u>Normal</u><br><u>[See TPXX]</u>         | <u>See 4.2.2.7</u>    |
| <u>3502</u> | <u>Chemical under pressure, toxic, n.o.s.</u>                | <u>See MAWP definition in 6.7.3.1</u> | <u>Allowed</u>              | <u>Normal</u><br><u>[See TPXX]</u>         | <u>See 4.2.2.7</u>    |
| <u>3503</u> | <u>Chemical under pressure, corrosive, n.o.s.</u>            | <u>See MAWP definition in 6.7.3.1</u> | <u>Allowed</u>              | <u>Normal</u><br><u>[See TPXX]</u>         | <u>See 4.2.2.7</u>    |
| <u>3504</u> | <u>Chemical under pressure, flammable, toxic, n.o.s.</u>     | <u>See MAWP definition in 6.7.3.1</u> | <u>Allowed</u>              | <u>Normal</u><br><u>[See TPXX]</u>         | <u>See 4.2.2.7</u>    |
| <u>3505</u> | <u>Chemical under pressure, flammable, corrosive, n.o.s.</u> | <u>See MAWP definition in 6.7.3.1</u> | <u>Allowed</u>              | <u>Normal</u><br><u>[See TPXX]</u>         | <u>See 4.2.2.7</u>    |

8. Add a new portable tank special provision in 4.2.5.3 to read as follows:
- “TPXX [Tanks shall be fitted with pressure relief devices as prescribed in 6.7.3.7.] The filler must ensure that the chemical under pressure does not interfere with the proper operation of the pressure relief devices. **The pressure relief device must be so constructed and maintained that repeated use does not interfere with its proper operation. A spring loaded pressure release device should be combined in parallel with a frangible disk; if this is more suitable for the product (e.g. product does not easily re-dissolve).** Portable tanks shall not be offered for transport when ~~transported when~~ connected with spray application equipment such as a ~~hose and wand assembly~~.”
9. Amend the heading of section 4.2.2 and the relevant paragraphs 4.2.2.1, 4.2.2.2 and 4.2.2.7.1 to read as follows:
- “4.2.2 General provisions for the use of portable tanks for the transport of non-refrigerated liquefied gases and chemicals under pressure”;
- “4.2.2.1 This section provides general requirements applicable to the use of portable tanks for the transport of non-refrigerated liquefied gases and chemicals under pressure.”;
- “ 4.2.2.2 ... Non-refrigerated liquefied gases and chemicals under pressure shall be transported in portable tanks ...”;
- “4.2.2.7.1 Prior to filling the consignor shall ensure that the portable tank is approved for the non-refrigerated liquefied gas or the propellant of the chemical under pressure to be transported and that the portable tank is not loaded with non-refrigerated liquefied gases, **or with Chemicals under pressure**, ~~or with chemical under pressure, propellant of the chemical under pressure or with chemical under pressure~~ which in contact with the materials of the shell (...). During filling, the temperature of the non-refrigerated liquefied gas or propellant of chemicals under pressure shall fall within the limits of the design temperature range.”
10. Amend 4.2.2.7.2 as follows:
- (1) Add “(a)” before the existing text
- (2) Add a new sub-paragraph (b):
- “(b) Portable tanks for chemicals under pressure (UN Nos. 3500, 3501, 3502, 3503, 3504 and 3505) shall be so filled that at 50°C the non-gaseous phase does not exceed 95% of their water capacity and that they are not completely filled at 60°C. The vapour pressures and volumetric expansion of all substances in the **portable tank pressure receptacle** shall be taken into account.”
11. Amend the heading of section 6.7.3, the definitions 6.7.3.1 and the relevant paragraphs 6.7.3.2.2 (a) , 6.7.3.2.3 , 6.7.3.2.5, 6.7.3.2.12, 6.7.3.2.13, 6.7.3.3.2, 6.7.3.15.3, 6.7.3.15.5 (only first sentence) and 6.7.3.16.2 (including the note) therein, to include “and/or chemicals under pressure” in addition to the current wording “non-refrigerated liquefied gas”.
- 12. Add a note under 6.7.3: These requirements also apply to portable tanks intended for the transport of chemicals under pressure, (UN30500 – UN 3505).**

13. In 6.7.3.1, amend the definition of design reference temperature to read as follows: “*Design reference temperature* means the temperature at which the vapour pressure of the contents is determined for the purpose of calculating the MAWP. The design reference temperature shall be less than the critical temperature of the non-refrigerated liquefied gas or liquefied gas propellants of chemicals under pressure intended to be transported to ensure that the gas at all the times is liquefied (...)”.

14. In 6.7.3.1, in the definition of maximum allowable working pressure, add “(b) (iii) for chemicals under pressure, the MAWP (in bar) given in T50 portable tank instruction for the liquefied gas portion of the propellants listed in T50 in 4.2.5.2.6.”.

15. Amend 6.7.3.5.4 to read as follows “... intended for the transport of flammable and/or toxic non-refrigerated gases or chemicals under pressure...” (remark: toxic propellants are not allowed for chemicals under pressure, see SP362).

16. Amend Chapter 3.2, dangerous goods list as follows (add the tank instruction and the portable tank special provision to UN numbers 3500, 3501, 3502, 3503, 3504 and 3505).

| (1)  | (2)   | (3) | (4) | (5) | (6)        | (7a) | (7b) | (8)       | (9) | (10) | (11) |
|------|---|-----|-----|-----|------------|------|------|-----------|-----|------|------|
| 3500 | CHEMICAL UNDER PRESSURE, N.O.S.                       | 2.2 |     |     | 274<br>362 | 0    | E0   | P206      |     | T50  | TPXX |
| 3501 | CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.            | 2.1 |     |     | 274<br>362 | 0    | E0   | P206 PP89 |     | T50  | TPXX |
| 3502 | CHEMICAL UNDER PRESSURE, TOXIC, N.O.S.                | 2.2 | 6.1 |     | 274<br>362 | 0    | E0   | P206 PP89 |     | T50  | TPXX |
| 3503 | CHEMICAL UNDER PRESSURE, CORROSIVE, N.O.S.            | 2.2 | 8   |     | 274<br>362 | 0    | E0   | P206 PP89 |     | T50  | TPXX |
| 3504 | CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.     | 2.1 | 6.1 |     | 274<br>362 | 0    | E0   | P206 PP89 |     | T50  | TPXX |
| 3505 | CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S. | 2.1 | 8   |     | 274<br>362 | 0    | E0   | P206 PP89 |     | T50  | TPXX |

## Additional considerations

17. If the Sub-Committee of Experts on the Transport of Dangerous Goods desires, the definition of a chemical under pressure could be included for user friendliness in 1.2 or 6.7.3.1 as follows (see SP362):

“~~Pressurized chemical~~ **Chemical under Pressure** means any refillable or non-refillable cylinder or pressure drum meeting the requirements of 6.2.1 and 6.2.2 or 6.2.3, and any portable tanks meeting the requirements of 6.7.3, containing a liquid, paste or powder, pressurized with a compressed or liquefied gas or a mixture thereof, under sufficient pressure to eject the contents. Chemical pressurized for the purpose of eliminating air and aerosols do not fall under this definition”.

**Alternative proposal for the definition (changed sequence of the text elements)**

**Chemical under pressure: a liquid, paste or powder, pressurized with a compressed or liquefied gas or a mixture thereof, under sufficient pressure to eject the contents, not meeting the definition of an aerosol. Chemicals under pressure can be packaged in any refillable or non-refillable cylinder or pressure drum meeting the requirements of 6.2.1 and 6.2.2 or 6.2.3, and any portable tanks meeting the requirements of 6.7.3. Chemical pressurized for the purpose of eliminating air and aerosols do not fall under this definition”.**

**Figure: Example of a portable tank for chemicals under pressure**

