

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-eighth session
Geneva, 28 November – 7 December 2005
Item 3 (c) of the provisional agenda

PACKAGINGS (INCLUDING IBC's AND LARGE PACKAGINGS)

Miscellaneous proposals

Packaging of bromine UN 1744 - P 601

Transmitted by the expert from the United Kingdom

1. The expert from the United Kingdom has identified possible problems in relation to UN 1744 Bromine with the new revisions of P601 which were incorporated in the 14th edition of the UN Model Regulations in particular paragraph 4 which deals with the requirements for transport in pressure vessels. It will be recalled that the Sub-Committee had recognised during the previous biennium that regulatory text needed to be developed to take account of the use of cylinders for both liquids and solids and these revisions were a result of the discussions that took place during the 26th session of the Sub-Committee.
2. Paragraph 4(a) of P601 requires that for the pressure vessel

“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 vessel without damage or leakage;”

The expert from the United Kingdom notes that the primary hazard for transport of this substance is its extremely corrosive nature on all materials, particularly in the presence of moisture. The only suitable metals are Tantalum (wet or dry bromine) and lead, nickel and some nickel alloys (dry bromine only). Some fluoropolymers are also resistant but they are all permeable.
3. The expert from the United kingdom believes that changing paragraph 4 of P601 will have the following consequences:

The existing design of vessels which have been in use for the last 15 years throughout all countries outside North America will no longer be acceptable due to the valve configuration and closure requirements.
4. All existing designs use flanged lined valves fitted to lined vessels sealed with a lined flange. If taper threaded valves must be used they would have to be made from one of the metals listed above. In addition the vessel cover would also have to be made from the same material.

5. One combination currently in use is PVDF-lined cover with PFA-lined valves, the base material being carbon steel. Connection to the valves during filling and discharge being by a bolted flange connection.
6. The cost difference between this and say a monel cover and valves would be of the order of \$5000 minimum (diaphragm valves in monel may not be currently available), against a current total vessel cost of \$8000 (i.e. vessel cost would be \$13000). In addition the need for new facilities at both the producers and users plants would incur considerable costs due to the change in valve connection from flanged to threaded.
7. The UK believes that the text adopted in December 2004 is appropriate for most chemicals but bromine is an exception to the rule. Bromine is a substance of Class 8 but the packing instruction has always been P601 because the packaging requirements were the same as a number of chemicals with toxic by inhalation properties. With the changes adopted in 2004 it would no longer appear appropriate to use this Packing Instruction but Bromine should have one of its own (see proposed packing instruction below). If this were to be adopted then there are two changes required to P601:

Delete (2) and PP82

In the dangerous goods list against Bromine UN1744

Column 8 replace P601 with P8XX and in column 9 delete PP82

8. The expert from the United Kingdom would welcome the views of the Sub-Committee on this issue and the draft proposal outlined below. If the Sub-Committee feel that this topic is worth pursuing further, the expert from the United Kingdom will produce a working paper for consideration at the July 2006 session

Our Proposed Packing Instruction for Bromine, P8XX is as follows:

P8XX	PACKING INSTRUCTION	P8XX
<p>The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met and the packagings are hermetically sealed:</p>		
(1)	<p>Combination packagings with a maximum gross mass of 25 kg, consisting of one or more glass inner packaging(s) with a maximum capacity of 1.3 litres each and filled to not more than 90% of their capacity; the closure(s) of which shall be physically held in place by any means capable of preventing back-off or loosening by impact or vibration during transport, together with cushioning and absorbent material sufficient to absorb the entire contents of the glass inner packaging(s), further packed in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings.</p>	
(2)	<p>Combination packagings consisting of metal or polyvinylidene fluoride (PVDF) inner packagings, not exceeding 5 litres in capacity individually packed with absorbent material sufficient to absorb the contents and inert cushioning material in 1A2, 1B2, 1N2, 1H2, 1D, 1G, 4A, 4B, 4C1, 4C2, 4D, 4F, 4G or 4H2 outer packagings with a maximum gross mass of 75 kg. Inner packagings shall not be filled to more than 90% of their capacity. The closure of each inner packaging shall be physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during carriage;</p>	

P8XX	PACKING INSTRUCTION	P8XX
(3)	<p>Packagings consisting of:</p> <p>Outer packagings: Steel or plastic drums, removable head (1A2 or 1H2) tested in accordance with the test requirements in 6.1.5 at a mass corresponding to the mass of the assembled package either as a packaging intended to contain inner packagings, or as a single packaging intended to contain solids or liquids, and marked accordingly.;</p> <p>Inner packagings:</p> <p>Drums and composite packagings (1A1, 1B1, 1N1, 1H1 or 6HA1) meeting the requirements of Chapter 6.1 f for single packagings, subject to the following conditions:</p> <ul style="list-style-type: none"> (a) The hydraulic pressure test shall be conducted at a pressure of at least 0.3 MPa (gauge pressure); (b) The design and production leakproofness tests shall be conducted at a test pressure of 250 kPa; (c) They shall be isolated from the outer drum by the use of inert shock-mitigating cushioning material which surrounds the inner packaging on all sides; (d) Their capacity shall not exceed 125 litres; and (e) Inner packagings shall be closed with a plug or valve(s) conforming to the following: <ul style="list-style-type: none"> (i) 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; (ii) Each valve outlet shall be sealed by a threaded cap or threaded solid plug and inert gasket material; (f) The inner packagings shall be subjected periodically to an internal inspection and leakproofness test according to (b) at intervals of not more than two and a half years; (g) The outer and inner packaging shall bear in clearly legible and durable characters: <ul style="list-style-type: none"> (i) the date (month, year) of the initial test and the latest periodic test and inspection of the inner packaging; (ii) the stamp of the expert who carried out the test and inspection; 	(4)
	<p>Pressure receptacles may be used provided that the general provisions of 4.1.3.6 are met.</p> <ul style="list-style-type: none"> (i) They shall be subjected to an initial test and periodic tests every 10 years at a pressure of not less than 1 MPa (10 bar) (gauge pressure). (ii) They shall be subjected periodically to an internal inspection and leakproofness test at intervals of not more than two and a half years; (iii) Pressure receptacles may not be equipped with any pressure relief device; (iv) Each pressure receptacle shall be closed with a plug or valve(s) fitted with a secondary closure device; (v) 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. 	