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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

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Item 3 of the provisional agenda
Listing, classification and packing

Modifications concerning Salvage Pressure Receptacles

Transmitted by the expert from Germany*

Introduction

1. The Sub-Committee decided at its thirty-seventh session in June 2010 (ST/SG/AC.10/C.3/74) to incorporate provisions on the use and approval of salvage pressure receptacles.

2. The provisions were discussed intensively on the basis of document ST/SG/AC.10/C.3/2009/16/Rev.1 (Germany), of informal documents INF.21 (United Kingdom) and INF.42 (CGA) of the thirty-sixth session and of document ST/SG/AC.10/C.3/2010/9 (Germany and United Kingdom) considered in a working group which met in parallel to the Sub-Committee. The report of the working group was presented as informal document INF.81. Due to the comments from industry, the working group agreed to limit the water capacity of salvage pressure receptacles to 1 000 litres. This was a compromise to address some general concerns on the inclusion of provisions on salvage pressure receptacles.

3. Thus, the original intention in document ST/SG/AC.10/C.3/2009/16/Rev.1 (Germany) of placing pressure drums and tubes of up to 1 000 litres into salvage pressure receptacles could not be accomplished. Therefore, Germany raised this issue again at the forty-fifth session of the Sub-Committee of Experts on the Transport of Dangerous Goods held from 23 June to 2 July 2014 with document ST/SG/AC.10/C.3/2014/16.

4. This resulted in modifications enabling the storage of pressure receptacles of up to 1 000 litres in salvage pressure receptacles with a water capacity of up to 3 000 litres.

* 2020 (A/74/6 (Sect.20) and Supplementary, Subprogramme 2

Problem

5. In the meantime, composite tubes have been widely accepted for the transport of gases. Thus, the usage of tubes has evolved, and subsequently the average volume of tubes has increased. Simultaneously, the design pressure level of tubes has grown. The resulting pressure volume product is the key property for choosing an appropriate salvage pressure receptacle for compressed gases. Since the design and manufacture of salvage pressure receptacles with a significantly increased test pressure is difficult, the current limitation to 3 000 litres makes it increasingly difficult to find salvage pressure receptacles appropriate for tubes of close to 1 000 litres and a high pressure, i.e. with a high pressure volume product.

6. When focusing on composite pressure receptacles, a new aspect arises: as already discussed within the framework of the transport of fuel gas containment systems for motor and fuel cell vehicles (see SP 392), composite cylinders and tubes may be critically and irreversibly damaged in the case of a pressure drop to zero. Composite tubes for battery vehicles or road gas element vehicles and multiple-element gas containers (MEGCs) are very expensive and must be allowed to be transported under some pressure even if they are damaged and the damage cannot be assessed at the place of an accident etc. But transporting them without internal pressure often means irreversible damage.

7. There is also another development in parallel. Some standardisation projects for composite tubes (e.g. EN 17339: 2020 and ISO 11515: still under development) expressed their wish to increase the working pressure to up to 1 000 or 1 600 bar at a maximum volume of 3 000 litres. The subsequent discussions in both standardisation projects considered some analysis related to the maximum consequences in case of a sudden rupture. This resulted in a limitation of the maximum acceptable consequence based on a maximum pressure volume product of 1 million bar litres (referenced to WP) or 1.5 million bar litres when referenced to test pressure PH, respectively.

8. The combination of these two different aspects of the pressure volume product – a) limitation of consequences and b) key criteria for the selection of appropriate salvage pressure receptacles – provides an appropriate approach for the selection of appropriate salvage pressure receptacles: impose a limit on the pressure volume product that shall not be exceeded and remove the limit on the volume of salvage pressure receptacles designed for tubes of up to 3 000 litres.

Proposal 1

9. Introduce a maximum pressure volume product relevant for all pressure receptacles as follows (new text is underlined):

> *“1.2.1 "Pressure receptacle"* means a transportable receptacle intended for holding substances under pressure including its closure(s) and other service equipment and is a collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles, metal hydride storage systems, bundles of cylinders and salvage pressure receptacles with a test pressure volume product not exceeding 1.5 million bar litres;”

Proposal 2

10. Since the pV-limit is valid for all pressure receptacles, delete the volume limit in the definition of salvage pressure receptacles if proposal 1 has been accepted (deleted text is ~~struck through~~):

> *“1.2.1 "Salvage pressure receptacle"* means a pressure receptacle ~~with a water capacity not exceeding 3000 litres~~ into which are placed damaged, defective, leaking or non-conforming pressure receptacle(s) for the purpose of carriage e.g. for recovery or disposal;”

Proposal 3

11. Since tubes may have a volume of up to 3 000 litres, delete the 1 000 litres limit for pressure receptacles accepted for storage in a salvage pressure (deleted text is ~~struck through~~, new text is underlined):

> "4.1.1.19.2 Pressure receptacles shall be placed in salvage pressure receptacles of suitable size. ~~The maximum size of the placed pressure receptacle is limited to a water capacity of 1 000 litres.~~ More than one pressure receptacle may be placed in the same salvage pressure receptacle only if the contents are known and do not react dangerously with each other (see 4.1.1.6). In this case the total sum of water capacities of the placed pressure receptacles shall not exceed ~~1 000~~ 3 000 litres. Measures shall be taken to prevent movement of the pressure receptacles within the salvage pressure receptacle e.g. by partitioning, securing or cushioning."