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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 6 (d) of the provisional agenda
Miscellaneous proposals for amendments to the Model Regulations on the Transport of Dangerous Goods: portable tanks (other than FRP)

Use of titanium for the construction of UN portable tank shells

Transmitted by the expert from the United Kingdom

Introduction

1. Chapter 6.7 of the Model Regulations requires the shells of portable tanks to be constructed of metallic materials suitable for forming, and sets out the minimum material properties that are required for steels, aluminium and aluminium alloys.

2. Paragraph 6.7.2.3.3.3 sets out the minimum properties for these materials in order to prevent the use of steels, aluminium and aluminium alloys in the construction of shells which might be of a brittle nature. Chapter 6.7 allows vessels to be constructed from other metals but no material properties are specified for such metals.

3. To reflect scientific and technical progress, and in particular the manufacture of UN portable tanks with shells constructed of titanium so as to be more compatible with certain dangerous goods to be carried in transport operations, the United Kingdom is of the view that minimum properties for titanium should be included in paragraph 6.7.2.3.3.3.

4. Given that it may be possible to select a grade of titanium that could be considered brittle, the United Kingdom is of the opinion that it would be appropriate to apply the ductility requirements currently applying to other steels in paragraph 6.7.2.3.3.3 to titanium when this material is selected for the construction of portable tank shells.

Proposal

5. Introduce new text to paragraph 6.7.2.3.3.3 to read (new wording in **bold** and underlined):

"6.7.2.3.3.3 Steels used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/Rm with an absolute minimum of 16% for fine grain steels and 20% for other steels. Aluminium and aluminium alloys used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/6Rm with an absolute minimum of 12%.

Titanium and titanium alloys used in the construction of shells shall have an elongation at fracture, in %, of not less than 10 000/Rm with an absolute minimum of 20%, based on the requirements of the specification in the material standard referenced in the material inspection certificate(s).".

Justification

6. The current requirements of Chapter 6.7 do not preclude the shells of portable tanks from being constructed of titanium and therefore, adding the proposed text to paragraph 6.7.2.3.3.3 ensures that only titanium with the appropriate material properties can be used in the construction of such vessels.

7. The absence of specific ductility requirements for titanium could create a potential safety risk if a material is used that does not have suitable mechanical properties. Placing a lower limit on elongation, equivalent to the ductility required for 'other steels', will reduce the risk of a brittle fracture of any titanium that may be used for the construction of portable tank shells.

8. The inclusion of these requirements will help to ensure that the regulations reflect scientific and technical progress by setting out the requirements for a different metallic material that may be used for the construction of portable tank shells which would be more compatible with certain dangerous goods to be carried in transport operations.