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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

#### Fifty-ninth session

Geneva, 29 November-8 December 2021

Item 6 (c) of the provisional agenda

#### Miscellaneous proposals for amendments to the Model Regulations on the Transport of Dangerous Goods: portable tanks

## Amendments to Chapter 6.7 of the Model Regulations

### Submitted by the International Dangerous Goods and Containers Association (IDGCA)\*

#### Foreword

1. IDGCA proposed the following amendments to Chapter 6.7 of the UN Model Regulations at the fifty-eighth session of the Sub-Committee of Experts on the Transport of Dangerous Goods (document ST/SG/AC.10/C.3/2021/9). By decision of the Sub-Committee as stated in the report of the Sub-Committee of Experts on the Transport of Dangerous Goods on its fifty-eighth session (ST/SG/AC.10/C.3/116, para. 73), IDGCA prepared a more detailed proposal for consideration at the fifty-ninth session. This is an updated proposal with detailed justification.

#### Introduction

2. According to 6.7.2.18.1 of Chapter 6.7 of the UN Model Regulations “The competent authority or its authorized body shall issue a design approval certificate for any new design of a portable tank. ... The certificate shall refer to the prototype test report, ...”.

3. According to 6.7.2.18.2

“The prototype test report for the design approval shall include at least the following:

- (a) the results of the applicable framework test specified in ISO 1496-3:1995;
- (b) the results of the initial inspection and test in 6.7.2.19.3; and
- (c) the results of the impact test in 6.7.2.19.1, when applicable.”

4. As stated in sub-item (a) of 6.7.2.18.2, the framework of a portable tank shall be tested in accordance with ISO 1496-3. However, this ISO standard only applies to tank containers, which are just one type of a portable tank. A tank container strictly meets the requirements

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\* A/75/6 (Sect.20), para. 20.51

for outer dimensions specified in ISO 668 (see picture 2 below) and stacking test requirements (e.g. the force of 848 kN must be applied to each pair of corner fittings during test). These requirements do not apply for other types of portable tanks.

## Proposals

5. IDGCA invites the Sub-Committee to consider the following proposals to the UN Model Regulations (new text is underlined, deleted text is strikethrough).

### Option 1

6. Amend the sub-item (a) of 6.7.2.18.2 to read as follows:

“The results of the applicable framework test specified in ~~ISO 1496-3:1995~~ the Annex II of the International Convention for Safe Containers (CSC) and/or other applicable standards”.

### Option 2

7. Amend the sub-item (a) of 6.7.2.18.2 to read as follows:

“The results of the applicable framework test specified in ~~ISO 1496-3:1995~~ the Annex II of the International Convention for Safe Containers (CSC) and/or other applicable standards”.

8. Add the definition of a tank container to 6.7.2.1 to read as follows:

“*Tank container* means a portable tank which includes two basic elements, the tank or tanks and the framework, and complies with the requirements of ISO 1496-3:2019. No part of the tank container, its associated fittings and service equipment shall project beyond the overall external dimensions specified in ISO 668:2020.”

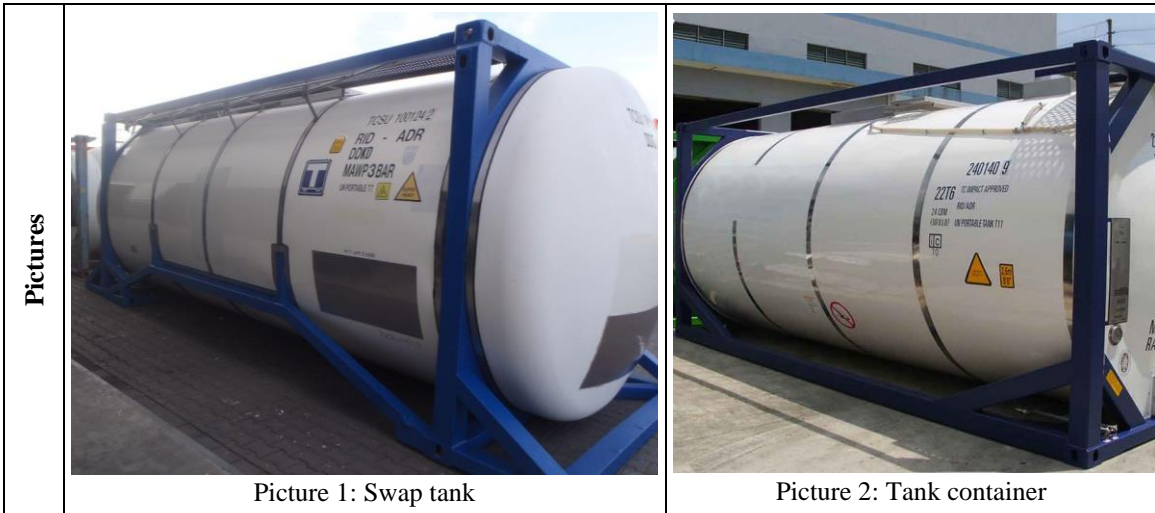
## Justification

9. According to ISO 1496-3, the force of 848 kN must be applied to each pair of corner fittings of a tank container in the stacking test. If the maximum mass of the tank container is 30,480 kg, the bottom tank container should have a load capacity of 192,000 kg. Thus, the frame of the tank container must be able to withstand stacking of at least six rows. This requirement may not be met by other types of portable tanks (e.g. swap tanks). ISO 1496-3 does not allow stacking of less than six rows while the CSC convention does not limit the minimum number of stacks. For example, swap tanks cannot be stacked or some of them can be stacked in only two rows. Swap tanks also extend beyond the dimension of the corner fittings unlike tank containers (see picture 1 below).

10. As an example, the comparison table below lists the definitions and shows details of two types of a portable tank – a swap tank and a tank container:

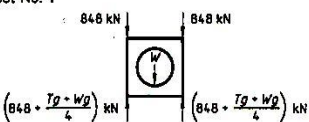
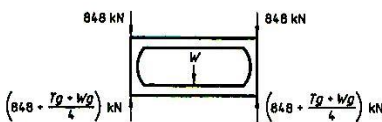
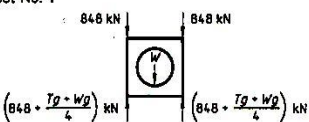
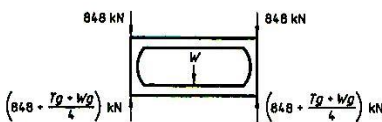
<b>Definitions</b>	<p><i>Definition of a portable tank in the UN Model Regulations:</i></p> <p><b>Portable tank</b> means a multimodal tank used for the transportation of substances of Class 1 and Classes 3 to 9. The portable tank includes a shell fitted with service equipment necessary for the transport of dangerous substances. The portable tank shall be capable of being filled and discharged without the removal of its structural equipment. It shall possess stabilizing members external to the shell, and shall be capable of being lifted when full. It shall be designed primarily to be located onto a transport vehicle or ship and shall be equipped with skids, mountings or accessories to facilitate mechanical handling. Road tank-vehicles, rail tank-wagons, non-metallic tanks and intermediate bulk containers (IBCs) are not considered to fall within the definition for portable tanks.</p>	
	<p><b>Portable tanks</b></p>	
	<p><i>Definition of a swap body (swap tank) in CTU Code<sup>†</sup>:</i></p> <p><b>6.4 Swap bodies</b></p> <p>6.4.1 A swap body is a regional transport containment of a permanent character designed for road and rail transport within Europe and complying with European standards. Swap bodies are generally 2.5 m or 2.55 m wide and are subdivided into three length categories:</p> <ul style="list-style-type: none"> <li>• Class A: 12.2 to 13.6 m long (maximum gross mass 34 tons);</li> <li>• Class B: 30ft (9.125 m long);</li> <li>• Class C: 7.15, 7.45 or 7.82 m long (maximum gross mass 16 tons).</li> </ul> <p>6.4.2 Swap bodies are fixed and secured to the vehicles with the same devices as freight containers, but owing to the size difference, these fittings are not always located at the swap body corners.</p> <p>6.4.3 Stackable swap bodies have top fittings enabling the handling with standard freight container handling equipment. &lt;...&gt;</p> <p><i>EN 283. 6 CSC Testing</i></p> <p>When requested by the customer, CSC testing can be carried out in addition to the test requirements according to clause 5. In this case, Annex A shall be followed. However, if swap bodies are equipped with top fittings, the complete CSC testing is mandatory.</p>	<p><i>ISO 830:1999. 4 Container types. 4.2 Terms and definitions</i></p> <p><b>4.2.2.2 tank container</b></p> <p>Freight container which includes two basic elements, the tank or tanks and the framework, and complies with the requirements of ISO 1496-3.</p> <p><i>ISO 1496-3. 4 Dimensions and ratings.</i></p> <p><b>4.1 External dimensions</b></p> <p>The overall external dimensions and tolerances of tank containers covered by this part of ISO 1496 shall be those established in ISO 668, except that tank containers may be of reduced height, in which case they shall be designated 1AX, 1BX, 1CX and 1DX. No part of the tank container, its associated fittings and/or equipment shall project beyond these specified overall external dimensions.</p>
<b>Some applicable standards</b>	<ul style="list-style-type: none"> <li>• CSC Convention (if stacking is allowed)</li> <li>• RID/ADR/ADN</li> <li>• UN Model Regulations</li> <li>• IMDG Code</li> <li>• CTU Code</li> <li>• EN 283</li> </ul>	<ul style="list-style-type: none"> <li>• CSC Convention</li> <li>• RID/ADR/ADN</li> <li>• UN Model Regulations</li> <li>• IMDG Code</li> <li>• CTU Code</li> <li>• ISO 1496-3</li> <li>• ISO 668</li> </ul>

<sup>†</sup> IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units



<p>CSC SAFETY APPROVAL [F/BV/7269/01]</p>		<p>CSC SAFETY APPROVAL RU/01-473/17-06/02</p>	
DATE MANUFACTURED		DATE MANUFACTURED	07/2002
IDENTIFICATION No.		IDENTIFICATION No.	011256
MAXIMUM GROSS MASS	34.000 kg	MAXIMUM OPERATING GROSS MASS	30 480 kg/ 67 200 lbs
ALLOWABLE STACKING LOAD FOR 1.8g	68.000 kg	ALLOWABLE STACKING LOAD FOR 1.8 g	192 000kg/ 423 280 lbs
TRANSVERSE RACKING TEST FORCE		TRANSVERSE RACKING TEST FORCE	150 000 newtons
NEXT EXIMINATION DATE		07/2007	
CSC SAFETY APPROVAL PLATE			

11. Below is the comparison table of stacking test requirements in CSC Convention and ISO 1496-3:

CSC Convention	ISO 1496-3																																															
<p><i>Annex II – Structural safety requirements and tests. 2 Stacking</i></p> <p><b>1</b> For conditions of international transport where the maximum vertical acceleration varies significantly from 1.8g and when the container is reliably and effectively limited to such conditions of transport, the stacking load may be varied by the appropriate ratio of acceleration.</p> <p><b>2</b> On successful completion of this test the container may be rated for the allowable superimposed static stacking load, which should be indicated on the Safety Approval Plate against the heading: <b>ALLOWABLE STACKING LOAD FOR 1.8g (... kg ... lb).</b></p>	<p><i>ISO 1496-3. 6 Testing</i></p> <p><b>6.2 Test No. 1 - Stacking</b></p> <p><b>6.2.1 General</b></p> <p>This test shall be carried out to prove the ability of a tank container to support a superimposed mass of containers taking into account conditions aboard ships at sea and the relative eccentricities between superimposed containers.</p> <p>Table 2 specifies the force to be applied as a test to each pair of corner fittings and the superimposed mass that the test force represents.</p> <p style="text-align: center;"><b>Table 2-Forces to be applied in stacking test</b></p> <table border="1" data-bbox="576 770 1449 1093"> <thead> <tr> <th rowspan="2">Container designation</th> <th colspan="2">Test force per container (all four corners simultaneously)</th> <th colspan="2">Test force per pair of end fittings</th> <th colspan="2">Superimposed mass represented by test force</th> </tr> <tr> <th>kN</th> <th>Ibf</th> <th>kN</th> <th>Ibf</th> <th>kg</th> <th>Ib</th> </tr> </thead> <tbody> <tr> <td>IAAA, 1AA, 1A and 1AX</td> <td>3 392</td> <td>763 200</td> <td>1 696</td> <td>381 600</td> <td>192 000</td> <td>423 320</td> </tr> <tr> <td>IBBB, 1BB, 1B and 1BX</td> <td>3 392</td> <td>763 200</td> <td>1 696</td> <td>381 600</td> <td>192 000</td> <td>423 320</td> </tr> <tr> <td>1CC, 1C and 1CX</td> <td>3 392</td> <td>763 200</td> <td>1 696</td> <td>381 600</td> <td>192 000</td> <td>423 320</td> </tr> <tr> <td>1D and 1DX</td> <td>896</td> <td>201 600</td> <td>448</td> <td>100 800</td> <td>50 800</td> <td>112 000</td> </tr> </tbody> </table> <p>NOTE: The test force of 3 392 kN per container is derived from the superimposed mass of nine-high stacking, i.e. eight containers stacked on top of one container, all being rated to 24 000 kg, and an acceleration of 1.8g [The corner posts of such containers are known as having been tested to 86 400 kg (190 480 lb)]</p> <p><i>ISO 1496-3. Annex A (normative). Diagrammatic representation of capabilities appropriate to all types and sizes of tank containers, except where otherwise stated</i></p> <table border="1" data-bbox="576 1326 1430 1559"> <thead> <tr> <th>Figure No.</th> <th>End elevations</th> <th>Side elevations</th> </tr> </thead> <tbody> <tr> <td>A.1</td> <td>  </td> <td>  </td> </tr> </tbody> </table> <p style="text-align: center;">Not applicable to 1D and 1DX tank containers</p>	Container designation	Test force per container (all four corners simultaneously)		Test force per pair of end fittings		Superimposed mass represented by test force		kN	Ibf	kN	Ibf	kg	Ib	IAAA, 1AA, 1A and 1AX	3 392	763 200	1 696	381 600	192 000	423 320	IBBB, 1BB, 1B and 1BX	3 392	763 200	1 696	381 600	192 000	423 320	1CC, 1C and 1CX	3 392	763 200	1 696	381 600	192 000	423 320	1D and 1DX	896	201 600	448	100 800	50 800	112 000	Figure No.	End elevations	Side elevations	A.1		
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