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### **Economic Commission for Europe**

#### **Inland Transport Committee**

#### **Working Party on the Transport of Dangerous Goods**

##### **102nd session**

Geneva, 8-12 May 2017

Item 5 (a) of the provisional agenda

**Proposals for amendments to Annexes A and B of ADR:  
construction and approval of vehicles**

### **Amendments to ADR 9.7.3 concerning fastening requirements**

**Transmitted by the Government of Norway\***

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\* In accordance with the programme of work of the Inland Transport Committee for 2016-2017, (ECE/TRANS/2016/28/Add.1 (9.2)).

## Summary

- Executive summary:** Extend the fastening requirements in ADR 9.7.3 already applicable to tank-vehicles, battery-vehicles and vehicles carrying demountable tanks, to apply to vehicles carrying tank-containers, portable tanks and multiple element gas containers (MEGCs). For material requirements, three different options are suggested in the proposal. In addition ADR 7.5.7.4 has been amended for clarification, and a transitional measure is proposed for vehicles that do not comply with the new requirements in 9.7.3.
- Action to be taken:** Amend subsections 9.7.3 and 7.5.7.4 in ADR, and also introduce a new transitional measure.
- Background documents:** Informal document INF.17 of the ninety eighth session of the Working Party  
ECE/TRANS/WP.15/AC.1/2015/39 (Norway)  
ECE/TRANS/WP.15/AC.1/140/Add.2, para. 18-25  
ECE/TRANS/WP.15/AC.1/2016/11 (Norway)  
ECE/TRANS/WP.15/AC.1/142/Add.1, para. 6-11  
Informal document INF.27 of the 100th session of the Working Party  
ECE/TRANS/WP.15/2016/19  
Informal document INF.17 of 101st session of the Working Party  
ECE/TRANS/WP.15/235 para. 21

## Introduction

1. At the autumn session of the Working Party, document ECE/TRANS/WP.15/2006/19 concerning fastening requirements in ADR 9.7.3 was discussed. The proposal to make the fastening requirements applicable for tank-vehicles, battery-vehicles and vehicles carrying demountable tanks to apply to vehicles carrying tank-containers, portable tanks and MEGCs received broad support.

2. The proposed text was not adopted when some delegates had inputs to the proposal and the Working Group was of the opinion that the text could be improved. Norway has received input from other delegations and prepared a new proposal for fastening requirements in ADR 9.7.3, and amendments to 7.5.7.4 in relation to this. In addition a transitional measure has been added.

## Discussion

3. ADR 9.7.3 refers to the forces defined in 6.8.2.1.2 for tanks and tank-containers for the minimum stresses the fastenings in 9.7.3 shall be designed to withstand, in the case of tank-vehicles, battery-vehicles and vehicles carrying demountable tanks.

4. The same fastening requirements should apply to vehicles carrying tank-containers, MEGCs and portable tanks, with a reference to the forces in 6.8.3.1.5 and 6.7.5.2.8 for MEGCs and 6.7.2.2.12, 6.7.3.2.9 and 6.7.4.2.12 for portable tanks.

5. When the forces in the above mentioned paragraphs are the same and equals to the forces specified in 6.8.2.1.2, we suggest to delete the reference to paragraph 6.8.2.1.2 in 9.7.3, and rather state the forces the fastenings on the vehicle shall be capable of absorb, under the maximum permissible load, in the different directions (direction of travel, at right angles to the direction of travel, vertically upwards, vertically downwards).
6. In the proposal twist lock tie-down devices in compliance with ISO 1161:2016 *Series 1 freight containers -- Corner and intermediate fittings – Specifications* are exempted in line with the proposal discussed at the meeting in November (ECE/TRANS/WP.15/2016/19).
7. The fastenings of a tank, MEGC or the elements of a battery-vehicle may include a range of structural components, such as sub-frames bolted or welded to the vehicle to spread high chassis loads over a wide area. It should be made clear that the requirements in 9.7.3 also apply to any supporting frames used for mounting the structural equipment (see 1.2 for the definition of "structural equipment") to the vehicle. This is reflected in the proposal.
8. Paragraphs 6.8.2.1.11-6.8.2.1.13, 6.8.2.1.15 and 6.8.2.1.16 that are referenced in ADR 9.7.3 address stresses under calculation or test pressure of the shell material. This may be interpreted that as no pressure test is prescribed for the chassis this requirement do not apply. However, 0.5 Rm is a relevant value against fatigue cracking under dynamic loading for steel and 20% elongation is the minimum for basic construction steel as S255. In proposal 2a we suggest to remove the material requirements all together from 9.7.3. In proposal 2b we suggest to retain requirements for the material and make them applicable to all constructions mentioned in the proposed 9.7.3.2. In proposal 2c we are just reproducing the requirements of ADR 2017 linked to 6.8.2.1.11-6.8.2.1.13, 6.8.2.1.15 and 6.8.2.1.16 in a separate paragraph.
9. When the fastening requirements in 9.7.3 concerning applied forces are made mandatory for vehicles presently not having this requirement, a transitional measure is necessary and have been added to the proposal.
10. Even the construction and the design of fastenings are in accordance with the proposed requirements, it is important that tank-containers, MEGCs and portable tanks are transported only on vehicles where the fastening securing system are compatible with the system on the tank-container, MEGC or portable tank and in compliance with the requirements in 9.7.3. Paragraph 7.5.7.4 has been amended to address this.

## Proposals

### Proposal 1

11. Add following new transitional measure in chapter 1.6 in ADR:

“1.6.5.xx

Vehicles first registered (or which entered into service if registration is not mandatory) before 1 April 2020 in compliance with the requirements of 9.7.3 applicable until 31 December 2018, but not in compliance with the requirements of 9.7.3 applicable as from 1 January 2019, may continue to be used.”.

## Proposal 2a

12. Amend 9.7.3 in ADR to read as follows:

“9.7.3 Fastening

9.7.3.1 Fastenings shall be designed to withstand static and dynamic stresses in normal conditions of carriage. Fastenings includes any supporting frames used for mounting the structural equipment (see 1.2) to the vehicle.

9.7.3.2 Fastenings in the case of tank-vehicles, battery-vehicles and vehicles carrying tank-containers, demountable tanks, portable tanks, MEGCs or UN MEGCs shall be capable of absorbing, under the maximum permissible load, the following separately applied static forces:

- in the direction of travel: twice the total mass multiplied by the acceleration due to gravity ( $g$ )<sup>1</sup>;
- at right angles to the direction of travel: the total mass multiplied by the acceleration due to gravity ( $g$ )<sup>1</sup>Error! Bookmark not defined.;
- vertically upwards: the total mass multiplied by the acceleration due to gravity ( $g$ )<sup>1</sup>;
- vertically downwards: twice the total mass multiplied by the acceleration due to gravity ( $g$ )<sup>1</sup>.

NOTE: The requirements of this paragraph do not apply to twist lock tie-down devices in compliance with ISO 1161:2016 *Series 1 freight containers -- Corner and intermediate fittings – Specifications*. However, the requirements apply to any frames or other devices used for support of such fastenings on the vehicle.”

Footnote 1 reads: for calculation purposes  $g=9.81 \text{ m/s}^2$ .

## Proposal 2b

13. Keep 9.7.3.1 and 9.7.3.2 given in proposal 2a unchanged, and add the following two paragraphs:

“9.7.3.3 The construction material of fastenings shall have an elongation at fracture, in %, not less than 10000/Rm for steel, with an absolute minimum of 16% for fine grained steels and 20% for other steels. For aluminium and aluminium alloys the elongation at fracture shall be not less than 12%.

9.7.3.4 The stress  $\sigma$  in the material of fastenings shall not exceed 0.75 Re or 0.5 Rm, whichever is lower, under the forces defined in 9.7.3.2.”

## Proposal 2c

14. Keep 9.7.3.1 and 9.7.3.2 given in proposal 2a unchanged, and add the following paragraph:

“9.7.3.3 For tank-vehicles, battery-vehicles and vehicles carrying demountable tanks, the fastenings shall withstand the minimum stresses as defined in 6.8.2.1.11 to 6.8.2.1.13, 6.8.2.1.15 and 6.8.2.1.16.”

### Proposal 3

15. Amend 7.5.7.4 in ADR to read (new text underlined):

“The provisions of 7.5.7.1 shall also apply to the loading, stowage and removal of containers, tank-containers, portable tanks and MEGCs on to and from vehicles. When tank-containers, portable tanks and MEGCs do not use corner castings in the patterns as defined in ISO 1496-1 Series 1 freight containers -- Specification and testing -- Part 1: General cargo containers for general purposes, it shall be verified that the systems used on the tank-containers, portable tanks or MEGCs are compatible with the system on the vehicle and in compliance with the requirements in 9.7.3.”

### Justification

16. The proposed amendments for ADR 9.7.3 and 7.5.7.4 will enhance the safety for vehicles carrying tank-containers, MEGCs and portable tanks. ADR will also be in line with the UN recommendations paragraph 7.2.2.

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