



# Economic and Social Council

Distr.: General  
22 August 2016

Original: English

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## Economic Commission for Europe

### Inland Transport Committee

### Working Party on the Transport of Dangerous Goods

#### 101st session

Geneva, 8–11 November 2016

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<sup>1</sup>

### *Summary*

**Executive summary:** Extend the fastening requirements in 9.7.3 to vehicles carrying multiple element gas containers (MEGCs) and other tanks than demountable tanks. Define the minimum stresses the fastenings shall be designed for in the case of vehicles carrying tank-containers, tank swap bodies, MEGCs, UN MEGCs and portable tanks..

**Action to be taken:** Amend subsection 9.7.3 in ADR.

**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 hundredth session of the Working Party

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<sup>1</sup> In accordance with the programme of work of the Inland Transport Committee for 2016-2017, (ECE/TRANS/2016/28/Add.1 (9.1)).

## Introduction

1. At the spring session of the Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods, document ECE/TRANS/WP.15/AC.1/2016/11 concerning MEGCs/tank-containers placed on carrying vehicles (hooklift systems) was discussed in the Tank Working Group. The document proposed amendments for both Chapter 6.8 in ADR/RID and Chapter 9.7 in ADR concerning fastenings and securing MEGCs (and tanks) on vehicles.
2. As a result from the discussion, paragraph 6.8.3.1.5 in ADR/RID was amended to include the frame of MEGCs, so that both elements and their fastenings and the frame of the MEGCs need to be capable of absorbing, under the maximum permissible load, the forces defined in 6.8.2.1.2. See paragraph 8 in the report ECE/TRANS/WP.15/AC.1/142/Add.1 for the amendments adopted by the Joint Meeting.
3. The meeting did not adopt the proposed amendments for section 9.7.3 in ADR. The amendments would imply to extend the requirements concerning acceleration forces as mentioned in 6.8.2.1.2, and in equivalent sections of Chapter 6.7, to include all vehicles carrying a tank or a MEGC in 9.7.3 of ADR. Some experts in the Tank Working Group felt that this would result in more severe requirements for vehicles carrying tank-containers, portable tanks and MEGCs than what they are designed for at this moment. It was mentioned that road vehicles will experience 0.8G under normal condition of carriage, and that the fastenings requirements in 9.7.3 refer to normal condition of carriage.
4. The Tank Working Group could not answer why ADR never implemented the requirements in 7.2.2 of the UN Model Regulations. In addition, the group was not sure what the intention of 7.5.7.4 is in relation to 7.5.7.1. These questions were brought to the attention of the Working Party in May by the secretariat (informal document INF.27) and it was decided to discuss the items at the November session.

## Discussion

5. During transport, all cargo must be placed on the vehicle so that it can neither endanger persons nor goods nor move on or off the vehicle. ADR oversee specific provisions for securing dangerous goods because there can be extra safety risks during transport of such goods. The securing of cargo is addressed in section 7.5.7 in ADR. The requirements for securing packages of dangerous goods and unpacked dangerous goods in 7.5.7.1 are deemed to be complied with if the cargo is secured in accordance with standard EN 12195-1:2010. According to 7.5.7.4 in ADR, the provisions of 7.5.7.1 also apply to loading, stowage and unloading of containers, tank swap bodies, tank-containers, portable tanks and MEGCs onto and off vehicles. However, the intension of 7.5.7.4 in connection with 7.5.7.1 is not clear. Does this define the forces that the fastening arrangements on the vehicle have to be capable to withstand?
6. For forces acting forward on packages, an acceleration force of 0.8 G is normally used in the calculation, which would imply that the load securing arrangement must be capable of withstanding 0.8 of the cargo weight forwards. However, national legislation or recommendations may require the use of other values.
7. The same acceleration value (0.8 G) were mentioned by some experts in the Tank Working Group in relation to 9.7.3 in ADR, where the fastening requirements have to be designed to withstand static and dynamic stresses under normal condition of carriage.

However, there is no reference to this value. The only reference is to the acceleration forces in ADR 6.8.2.1.2, but these are only relevant in the case of tank-vehicles, battery-vehicles and vehicles carrying demountable tanks.

8. Norway is of the opinion that 9.7.3 in ADR also should define the minimum stresses the fastenings shall be designed for, in the cases of vehicles carrying tank-containers, tank swap-bodies, MEGCs, UN-MEGCs and portable tanks. We believe this is necessary, especially as there are no requirements for the choice of securing system for tanks and MEGCs being carried on vehicles. Currently, ADR Chapter 9.7 does not grant the Competent Authority clear authorization to refuse the approval of a vehicle for the transport of a tank-container, tank swap body, MEGC, UN-MEGC or a portable tank in cases where the vehicle is equipped with insufficient arrangements for securing of the cargo transport unit.

9. As an example, the use of hooklift systems is expanding in the transport of dangerous goods. From the transport of non-dangerous goods, the most recent study done by the Accident Investigation Board Norway (AIBN) shows that there is a need for safety improvements in hooklift container transport. Load tests show that the fixed fastening and securing systems are insufficient for securing the container to the tractor and trailer. This study was based on 15 accidents or incidents (the report contains a summary in English: <http://www.aibn.no/Road-Traffic/Published-reports/2016-04>). In June 2015 we also experienced an accident with a MEGC with UN 1971 METHAN, COMPRESSED or NATURAL GAS, COMPRESSED carried on a vehicle with a hooklift system.

10. Supported by the Tank Working Group, Norway questions why ADR never implemented the provisions in 7.2.2 in the UN Model Regulation. MR states that portable tanks may only be carried on vehicles whose fastenings are capable of absorbing the forces equivalent to those we find specified in ADR 6.8.2.1.2. Hopefully WP.15 can help us address this issue.

11. According to the European Best Practice Guidelines on Cargo Securing for Road Transport, locking is by far the best method for load securing. A well-known example is the twist lock for ISO containers. These containers are constructed to international standards and are generally equipped with corner fittings (ISO 1161 covers specification for corner fittings for series 1 ISO freight containers), which when used in conjunction with corresponding twist locks fitted on the vehicle provide a simple and effective restraining method.

12. In the following text, proposal 2 in document ECE/TRANS/WP.15/AC.1/2016/11 from Norway is reproduced with a few corrections. In addition, a note has been added.

Norway asks the Working Party for its opinion on tank-containers, tank swap bodies, MEGCs, UN-MEGCs and portable tanks fitted with ISO type corner fittings being carried on vehicles with corresponding twist locks. Could these be said to meet the safety requirements without further calculations?

## Proposal

13. Amend 9.7.3 as following (old text ~~stricken through~~, new text underlined):

“Fastenings shall be designed to withstand static and dynamic stresses in normal conditions of carriage, ~~and minimum stresses as defined in 6.8.2.1.2, 6.8.2.1.11 to 6.8.2.1.13, 6.8.2.1.15 and 6.8.2.1.16 in the case of tank vehicles, battery vehicles, and vehicles carrying demountable tanks.~~ and the following minimum stresses in the cases listed below:

a) for tank-vehicles and vehicles carrying demountable tanks see 6.8.2.1.2, 6.8.2.1.11 to 6.8.2.1.13, 6.8.2.1.15 and 6.8.2.1.16;

b) for vehicles carrying tank swap bodies and tank containers see 6.8.2.1.2 and 6.8.2.1.11 to 6.8.2.1.13;

c) for battery-vehicles and vehicles carrying MEGCs see 6.8.3.1.5;

d) for vehicles carrying portable tanks see 6.7.2.2.12, 6.7.3.2.9 or 6.7.4.2.12 as applicable; and

e) for vehicles carrying UN-MEGCs see 6.7.5.2.8.

NOTE: If the arrangement for securing a tank-container, tank swap body, MEGC, UN-MEGC or a portable tank to the vehicle is standard twist lock tie-down devices as described in ISO 1161[:1984[2016] Series 1 freight containers- Corner fittings-Specification], the requirements of a) to e) of this paragraph are deemed to be met.”.

## **Justification**

### **Safety**

Securing the cargo properly is essential; regardless of whether the vehicle is carrying a demountable tank, tank container, tank swap body, MEGC, UN-MEGC or a portable tank. The proposed amendments for ADR 9.7.3 will enhance the safety for vehicles carrying these units.

### **Feasibility**

As there are no requirements in ADR for the choice of securing system, it is necessary to define the minimum stresses that the fastening system has to be designed for.

### **Enforceability**

The proposed amendments ensure that the fulfilling of 7.5.7.4 and EN 12195 is not sufficient in meeting the requirements of 9.7.3 for the fastenings of tank-containers, tank swap bodies, MEGCs, UN-MEGCs and portable tanks on a vehicle. ADR will now contain specific requirements for these tanks and MEGCs that are harmonized with the UN Model Regulations and the requirements for vehicles carrying demountable tanks. This will aid the Competent Authorities when presented with vehicles for approval equipped with unusual arrangements for fastenings. Vehicles using standard container fastenings will not be affected by the amendments due to the proposed note.

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