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## Economic Commission for Europe

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### Working Party on the Transport of Dangerous Goods

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Item 6 (a) of the provisional agenda
**Proposals for amendments to Annexes A and B of ADR: construction and approval of vehicles**

# Continued use of fixed tanks (tank-vehicles), demountable tanks and battery-vehicles in accordance with the transitional provisions in 1.6.3.1, 1.6.3.2 and 1.6.3.3 of ADR

**Transmitted by the Government of Germany**[1]

*Summary*

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| **Executive summary:** | For safety reasons, the continued use of fixed tanks (tank-vehicles), demountable tanks and battery-vehicles for gases of Class 2 built before 1 October 1978 on the basis of open-ended transitional provisions should be restricted. |
| **Action to be taken:** | Delete/amend the transitional provisions in 1.6.3.1, 1.6.3.2 and 1.6.3.3 of ADR. |
| **Related documents:** | Document ECE/TRANS/WP.15/AC.1/2014/1 of the Joint Meeting RID/ADR/ADN and report of the tank working group of the Joint Meeting at it March 2014 session ECE/TRANS/WP.15/AC.1/134/Add.1, item 1. |


[1] The present document is submitted in accordance with paragraph 1(c) of the terms of reference of the Working Party, as contained in document ECE/TRANS/WP.15/190/Add.1, which provides a mandate to "develop and update the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)".



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# Introduction

1. With ECE/TRANS/WP.15/AC.1/2014/1, Germany submitted, for the Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods in March 2014, a proposal regarding the possibilities for the continued use of fixed tanks (tank-vehicles), demountable tanks and battery-vehicles in accordance with the transitional provisions in 1.6.3.1, 1.6.3.2 and 1.6.3.3 of ADR.

2. Based on the conclusions of the Working Group on Tanks (see report ECE/TRANS/WP.15/AC.1/132/Add.1), the proposal was to be dealt with by WP.15, as only ADR is concerned.

3. The intention of the submitted proposal was to prohibit or time-limit the continued use of fixed gas tanks (tank-vehicles), demountable tanks and battery-vehicles built before 1 October 1978 in accordance with national provisions. The basis for the proposal were general safety concerns regarding the open-ended use of these gas tanks, since they were built before 1 October 1978 in accordance with national provisions and do not and need not satisfy current safety levels (ADR), for instance in terms of the minimum wall thicknesses (see ECE/TRANS/WP.15/AC.1/2014/1for reasons).

4. The aim of the proposal is neither the safety-related assessment of the individual national calculation codes applied before 1 October 1978 nor the safety-related assessment of older tanks on the whole. The very fact that these tanks are permitted to have a lower minimum wall thickness than ADR-compliant tanks results in a relatively low safety level of these tanks in comparison with ADR-compliant tanks.

5. With the restriction of the continued use of gas tank-wagons built before 1 October 1978 that are not compliant with RID with regard to the minimum wall thickness, fixed gas tanks built before 1 October 1978 are the only type of tank in dangerous goods legislation that is permitted to be kept in service indefinitely, despite the fact that these tanks do not have to meet the minimum wall thickness requirements of ADR. From a safety point of view, this can no longer be accepted.

# Current legal situation

6. In accordance with 1.6.3.1 of ADR, fixed tanks (tank-vehicles), demountable tanks and battery-vehicles built before the entry into force of the requirements applicable as from 1 October 1978 may be kept in service if they meet the following requirements:

- The items of equipment of these tanks meet the requirements of Chapter 6.8;
- The thickness of the shell wall, except in the case of shells intended for the carriage of refrigerated liquefied gases of Class 2, must be appropriate to a calculation pressure of not less than 0.4 MPa (4 bar) (gauge pressure) in the case of mild steel or of not less than 0.2 MPa (2 bar) (gauge pressure) in the case of aluminium and aluminium alloys;
- For non-circular cross-sections of tanks, the diameter to be used as a basis for calculation must be that of a circle whose area is equal to that of the actual cross-section of the tank.

7. In accordance with 1.6.3.2 of ADR, fixed tanks (tank-vehicles), demountable tanks and battery-vehicles may be kept in service under the transitional provisions only if the periodic tests are conducted in accordance with the requirements of 6.8.2.4 and 6.8.3.4 of ADR and with the pertinent special requirements for the various classes.

8. 1.6.3.3 of ADR stipulates that the continued use of fixed tanks (tank-vehicles), demountable tanks and battery-vehicles under the conditions stipulated in 1.6.3.1 of ADR (see paragraph 4 above) is also subject to the conditions in 1.6.3.2 of ADR (see paragraph 5 above) and limited until 30 September 1993. However, fixed tank (tank-vehicles), demountable tanks and battery-vehicles for substances of Class 2 may be kept in service beyond this date under the same conditions.

9. It follows from paragraphs 6 to 8 that fixed tanks (tank-vehicles), demountable tanks and battery-vehicles for gases of Class 2 may be kept in service indefinitely provided their items of equipment meet the requirements of Chapter 6.8. With regard to wall thickness, 1.6.3.1 of ADR only contains a provision for shells intended for the carriage of gases liquefied under pressure, which, however, does not correspond with the requirements for wall thickness in accordance with Chapter 6.8 of ADR. There are no requirements as regards the wall thickness of shells for refrigerated liquefied gases. Thus, all in all, the wall thickness of shells of fixed tanks (tank-vehicles), demountable tanks and battery-vehicles does not have to meet the requirements of the current version of ADR.

10. Before 1 October 1978, fixed tanks (tank-vehicles), demountable tanks and battery-vehicles were built in accordance with different sets of national rules and thus differ to a greater or lesser extent from the state of safety technology required by ADR.

11. This higher harmonized state of safety is mainly due to the ADR-wide introduction of a minimum wall thickness requirement applicable to the entire shell as well as to the limitation of the permissible stresses in accordance with 6.8.2.1.10 and 6.8.2.1.16 of ADR.

## Conclusion

12. For fixed tanks (tank-vehicles), demountable tanks and battery-vehicles built before 1 October 1978 whose minimum wall thickness does not meet the requirements of ADR, the open-ended use should be restricted for reasons of safety.

13. For austenitic tanks for refrigerated liquefied gases, the minimum wall thickness for the inner tank is mainly determined by the table on the minimum thickness of shells in 6.8.2.1.19 of ADR. According to this table, the minimum shell thickness of the inner tank must be 2.5 mm for diameters of not more than 1,80 m and 3 mm for diameters exceeding 1.80 m. Since the manufacturing quality of austenitic steels was worse in the past (e.g. welding and distortion effects), the inner tank of tanks built before 1 October 1978 was often constructed with a wall thickness of more than 3 mm (diameter of more than 1.80 m) Accordingly, the majority of old cryogenic tanks made from austenitic steels should meet today's minimum wall thickness requirements. Thus, those tanks would not be affected by a restriction of the continued use. For the remaining tanks with a reduced wall thickness, the continued use should be restricted.

14. Battery-vehicles have to be considered separately, since there is no direct minimum wall thickness requirement for their elements in ADR. The safety level of the elements is determined by the standards referenced today and/or by the maximum permissible stress - 77% of the minimum guaranteed yield stress at test pressure (formerly, 75 % of the minimum guaranteed yield stress) (6.2.5.3 of ADR). Even if the current transitional provisions of 1.6.3.3 of ADR address the compliance with the minimum wall thicknesses in accordance with Chapter 6.8 of ADR also for battery-vehicles, reference should be made to Chapter 6.2 of ADR for their elements.

## Proposal

**1.6.3.1** (delete)

**1.6.3.2** (delete)

**1.6.3.3** Amend to read as follows:

**"1.6.3.3 (a)** Fixed tanks (tank-vehicles) and demountable tanks whose shells were built before the entry into force of the requirements applicable as from 1 October 1978 may be kept in service if their wall thickness and items of equipment meet the requirements of Chapter 6.8. Battery-vehicles built before the entry into force of the requirements applicable as from 1 October 1978 may be kept in service if the elements of the battery-vehicles meet the relevant requirements of Chapter 6.2 and the items of equipment of the battery-vehicles meet the requirements of Chapter 6.8.

**(b)** Fixed tanks (tank-vehicles) and demountable tanks which are intended for the carriage of gases of Class 2 and whose shells were built before the entry into force of the requirements applicable as from 1 October 1978 may be kept in service until **[**31 December 2021**]** if their items of equipment, but not their wall thickness, meet the requirements of Chapter 6.8. Battery-vehicles built before the entry into force of the requirements applicable as from 1 October 1978 may be kept in service until **[**31 December 2021**]** if their items of equipment, but not the elements of the battery-vehicles, meet the relevant requirements of Chapter 6.2."