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## Economic Commission for Europe

### Inland Transport Committee

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

##### Joint Meeting of the RID Committee of Experts and the Working Party on the Transport of Dangerous Goods

Bern, 21-25 March 2011

Item 2 of the provisional agenda

##### Tanks

### Determination of a tank code for the carriage of UN No. 1402 Calcium carbide

#### Transmitted by Germany and the International Union of Private Wagons (UIP)<sup>1, 2</sup>

#### Background

1. Calcium carbide (CaC<sub>2</sub>, UN No. 1402), a substance of Class 4.3, (as a mixture) is primarily used in the production of steel and acetylene. In 2009, the European production output was of 270,000 tons. The use of calcium carbide mixtures as desulphurization agent is necessary for producing quality steel.
2. Prior to the restructuring of RID/ADR, there was only one entry for UN No. 1402 Calcium carbide, in marginal 2471, item number 17° (b). An entry for packing group I (at that time letter (a) of the relevant item number in the list of substances) did not exist.
3. With the restructuring of RID/ADR, two entries (packing groups I and II) for UN No. 1402 Calcium carbide have been included in Table A of Chapter 3.2. Calcium carbide assigned to packing group II may still be carried in bulk and in tanks with tank code "SGAN". Calcium carbide assigned to packing group I may only be carried in portable tanks (tank instruction T9).

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<sup>1</sup> In accordance with the programme of work of the Inland Transport Committee for 2010–2014 (ECE/TRANS/208, para.106, ECE/TRANS/2010/8, programme activity 02.7 (c)).

<sup>2</sup> Circulated by the Intergovernmental Organisation for International Carriage by Rail (OTIF) under the symbol OTIF/RID/RC/2011/18.

4. As a consequence of the discussions on this situation during the last session of the Joint Meeting, Germany has initiated the multilateral special agreement RID 4/2010 (signed, so far, by Germany, Austria, France and Switzerland) as well as the multilateral agreement M226 for ADR (signed by Germany and France).

## Current situation

5. According to the current provisions, calcium carbide fulfils the criteria to be assigned to packing group I (see 2.2.43.1.8 (a)).

6. Due to the above-mentioned special agreements, carriage in bulk in the currently used silo-wagons/silo-vehicles is limited in time.

7. To be able to lift the multilateral special agreements at the end of their five-year period of application in 2015, a transport modality as well as the necessary framework have to be established in RID/ADR.

## Proposal

8. It is proposed to allow the carriage of UN No. 1402 Calcium carbide, Class 4.3, packing group I as (+)-substance in tanks that have been approved according to dangerous goods Regulations and to allocate tank code "S4AN" with special provisions TU4, TU22 and TM2 to this substance.

9. Chapter 3.2, Table A:

<i>UN No.</i>	<i>column</i>	<i>modification</i>
1402,	(12)	add: "S4AN(+)".
Packing Group	(13)	add: "TU4 TU22 TM2".

10. Chapter 4.3

4.3.4.1.3 (c) At the end of the phrase, add the following text:

"UN 1402 CALCIUM CARBIDE: code S4AN;"

## Justification

11. For more than 35 years and under special transport conditions that are similar to the proposed special provisions, the European carbide industry has carried calcium carbide (CaC<sub>2</sub>) in bulk in silo-wagons/silo-vehicles by road and rail, without incidents or negative experiences reported. Due to this long practical experience with silo-wagons/silo-vehicles of 2.5 bars, carriage of calcium carbide in tanks of 4 bars can be justified.

12. In contact with water, calcium carbide produces the flammable gas acetylene. Putting acetylene under pressure might lead to its spontaneous decomposition. This exothermal reaction will then lead to dramatic and unlimited pressure increases. In spite of the special transport conditions fixed in the above-mentioned special provisions to avoid this problem, a tank burst due to spontaneous decomposition will lead to much more dramatic consequences with a 10 bar tank than with a 4 bar tank. Of minor importance, however, when dealing with such solid substances are a better protection against external influences on the tank by means of higher calculation pressures and the resulting higher wall thicknesses.

Literature:

Th. Schendler, H.P. Schulze, Stabilitätsgrenzdrücke von Acetylen/Gas-Gemischen, Chem.-Ing. Tech 62 (1990) Nr. 1, S. 41-43.

13. If a tank code "S10AN" was introduced, actual common aluminium alloys and low strength steels (with well-proven material properties) could no longer be used as tank material, due to the then necessary high wall thicknesses.

14. Furthermore, a tank code "S10AN" would lead to a higher tank weight and, consequently, to a much lower payload per individual transport. In comparison to a S4AN tank, more individual transports would be needed to carry a given transport volume, which would have negative impacts on environment and safety.

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