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## 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, 18–22 March 2013

Item 3 of the provisional agenda

**Standards****Miscellaneous proposals for amendment of RID/ADR related  
to pressure receptacles, tanks and their equipment**Transmitted by the European Committee for Standardisation (CEN)<sup>1,2</sup>*Summary*

<b>Executive summary:</b>	This document identifies six safety issues on pressure receptacles, tanks and their equipment where EN and EN ISO standards of some sectors referenced in RID/ADR Chapters 6.2 and 6.8 include additional and more stringent essential safety requirements. For the sake of a uniform interpretation and implementation of these safety requirements in all related standards it is suggested to amend the transport of dangerous goods regulations.
<b>Action to be taken:</b>	Discussion, possibly prepared by an ad hoc working group. Agreement on a procedure to resolve the issues in the Joint Meeting and in the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods.
<b>Related documents:</b>	Report of the last session (ECE/TRANS/WP15/AC.1/128), para.19 and informal document INF.37, para. 3.1.

<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/2013/8.

## Introduction

1. As part of its report to the Joint Meeting in September 2012 the representative of CEN informed about several safety issues which arose in the context of the discussion of draft EN and EN ISO standards by the working group on standards. This was done under the impression that RID and ADR could be improved in order to ensure the uniform interpretation and implementation of these safety requirements in all related standards referenced in the transport of dangerous goods regulations.

The following safety issues were identified:

- Use of fusible plugs in acetylene cylinders
- First period inspection period for acetylene cylinders
- Type approval for acetylene cylinders
- Dynamic design of tank service equipment
- Design and testing of lifting lugs for pressure drums
- The completeness and adequacy of the existing provisions of RID/ADR on valves.

2. The representative of EIGA explained the involvement of his organization in the first three items, all of them related to acetylene cylinders and expressed its intention to take the lead in resolving the issues. Therefore this document is limited to the last three items.

3. CEN is aware, that the questioned RID/ADR requirements are also related to the United Nations Model Regulations and could be discussed on this level first. However, CEN is not a body accredited with the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods. Furthermore, the last item is specifically regulated in RID/ADR and need to be settled by the Joint Meeting. It is proposed, therefore, that the issues be discussed by the Joint Meeting first and then by the United Nations Sub-Committee of experts, as relevant.

### **I. Dynamic design of tank service equipment**

4. RID/ADR require shells and their service equipment to be designed (amongst others) against dynamic stresses in normal conditions of carriage as defined in 6.8.2.1.2. Whereas this requirement is well addressed in tank design standards referenced in RID/ADR (EN 13094, EN 14025, EN 12493, EN 13530-2 and EN 14389-2), this is not the case for standards on tank service equipment.

5. It has been experienced that safety valves have been caused to open and not close again after impact. An impact test has been included, therefore, in one of the tank safety valve standard FprEN 14129 submitted for reference in RID/ADR. It requires withstanding impacts of 100 g in all three axes.

6. It is evident that sensitivity against impact is related to the shape and construction of valves and may be relevant for spring-loaded valves only. It is also clear that “industrial valves” for stationary tanks and which are also used for rail and road tanks are not required to be designed against dynamic loads. This may need to be covered by a capability requirement rather than type test of the valve.

7. Experts on the transport of LPG in tank vehicles have drawn the conclusion that safety valves should be designed against decelerations of 100 g in all three axes.

## Proposal 1

8. It is recommended that this issue be discussed by the Working Group on Tanks of the Joint Meeting. This may result in a recommendation for amendment of RID/ADR, chapters 6.8. It may then also be decided whether this issue should be brought to the attention of the United Nations Sub-Committee of experts with respect to an amendment of the requirements on portable tanks (RID/ADR, Chapter 6.7).

## II. Design and testing of lifting lugs for pressure drums

9. Pressure drums cannot be handled manually and are either lifted by forklift pockets at the bottom or lifting devices attached on top of the drums. These lifting devices (lugs) are repeatedly loaded, snatch lifting included. There are no related requirements in the United Nations Model Regulations nor in RID/ADR.

10. EN 14893 - *LPG equipment and accessories - Transportable Liquefied Petroleum Gas (LPG) welded steel pressure drums with a capacity between 150 litres and 1 000 litres* – as well as EN 12208 - *Transportable gas cylinders - Specification for welded pressure drums up to 1000 litre capacity for the transport of gases - Design and construction*, require the design of these lugs against snatch loading and an initial and periodic lifting test with every pressure drum with a safety factor of 2.0. However, EN 1251-2 *Cryogenic vessels – Transportable, vacuum insulated, of not more than 1 000 litres volume – Part 2: Design, fabrication, inspection and testing*, is limited to a general requirement in this respect.

11. Given the importance which is given to the safe design and initial testing it is questioned whether the capabilities of the lifting lugs should be repeatedly demonstrated after years of repeated loading and possible damage.

## Proposal 2

12. It is suggested adding provisions on the design, inspection and periodic inspection of lifting lugs attached to pressure drums and cryogenic vessels. A design type test requirement with a safety factor of 2.0 against specified stress limits and the total mass of the drum and the testing of all lifting lugs as part of the initial testing with the same loading has shown satisfactory performance. Periodic inspection may also be considered.

## III. Provisions on valves for pressure receptacles

13. In the context of the discussion of standards on cylinder and tank valves, such as
- prEN ISO/DIS 10297 Gas cylinders — Cylinder valves — Specification and type testing;
  - prEN ISO/DIS 14246 Gas cylinders — Cylinder valves — Manufacturing tests and examinations;
  - FprEN 13175 LPG Equipment and accessories - Specification and testing for Liquefied Petroleum Gas (LPG) pressure vessel valves and fittings;
  - FprEN 14129 LPG Equipment and accessories - Pressure relief valves for LPG pressure vessels;
  - FprEN 16257 Tanks for the transport of dangerous goods - Service equipment - Footvalve sizes other than 100 mm dia (nom).

referenced or intended to be referenced in RID/ADR, Chapters 4.1, 6.2 and 6.8, it appears that consistency, adequacy and completeness of these requirements are questionable.

14. This issue has become of increased relevance with the introduction of the option of a separate type approval of “valves and other service equipment ((for tanks)) for which a

standard is listed in the table in 6.8.2.6.1” in addition to this option for “the conformity assessment of valves and other accessories ((of pressure receptacles)) having a direct safety function” regulated in RID/ADR 6.2.3.6.1.

15. It is understood that type approvals and conformity assessments shall be based on a complete set of requirements on design, manufacture, type testing, testing/inspection of serial samples and marking. The existing requirements cover only part of this need.

16. This judgement is related to the understanding of the term “pressure receptacle” as defined in 1.2.1 of RID/ADR which does not include nor exclude their closures. Going through the requirements of Chapter 6.2 some requirements are addressed to “pressure receptacles and their closures” (6.2.1.1, 6.2.1.2.1, 6.2.1.2.2, 6.2.3.1.1 and 6.2.5.3) whereas other requirements are related to the term “pressure receptacle” (6.2.1.1.4, 6.2.1.1.6, 6.2.1.1.8.2, 6.2.1.1.9, 6.2.1.3.3, 6.2.1.3.4, 6.2.1.3.5, 6.2.1.6.1. and others). It becomes evident from the text of these requirements related to “pressure receptacles” that this term excludes the closures of the receptacles.

16. This understanding is also underlying the definition of “transportable pressure equipment” in Article 2 (1)(a) of the TPED Directive<sup>3</sup>, which defines:

“(1) ‘transportable pressure equipment’ means:

(a) all pressure receptacles, their valves and other accessories when appropriate, as covered in Chapter 6.2 of the Annexes to Directive 2008/68/EC;”.

17. The consequences of this interpretation are as follows:

(a) Missing requirements on the design and type testing: Except from the burst test and a general requirement to prevent damage during normal handling and carriage there are no requirements related to the design (which is performance oriented) and to the type testing. A gas leak tightness (capability) requirement (independent from the activity requirement in 4.1.4.1) and an endurance requirement (if applicable) are deemed necessary;

(b) Imperfect requirements on the type approval of closures:

So far, the independent type approval of closures is not included in 6.2.1.4. This option is almost hidden as a second paragraph in 6.2.3.6 1 on conformity assessment procedures and valid for “valves and other accessories having a direct safety function”. Consistency in terms and the incorporation in 6.2.1.4 are disputable;

(c) Missing requirements on initial inspection and tests in 6.2.1.5: There are no requirements on the initial inspection and test of closures. A minimum of initial inspection and tests split into tests on an adequate sample and tests on all manufactured items, would need to be added, such as:

- Conformity with design standard and/or approved design type specification (batch testing);
- Check of connecting thread using gauges (batch testing);
- Leak tightness (all items);
- External conditions, visual (all items);
- Check of marking (all items); and

(d) Missing requirements on marking: Whereas the TPED Directive requires the pi marking which indicates compliance with RID/ADR, the United Nations Model

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<sup>3</sup> Council directive 1999/36/EC of 29 April 1999 on transportable pressure equipment.

Regulations and RID/ADR may consider a marking requirement related to design type specification and approval authority. The marking requirements given in 6.2.2.7 are mainly not applicable for closures.

18. Some of these conclusions may also be relevant for “service equipment” of “tanks” which, by definition include its service equipment.

### **Proposal 3**

19. It is suggested that an ad hoc Group be requested to consider the issues described above and to prepare proposals for amendment of RID/ADR.

20. These proposals will need to reflect the option of a continued practice to approve the design of receptacle/tank including closure/service equipment which is still possible and is the only option in the United Nations Model Regulations and legislation based thereon.

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