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Working Party on the Transport of Dangerous Goods

Joint Meeting of the RID Safety Committee and the
Working Party on the Transport of Dangerous Goods
(Geneva, 13-23 September 2005)

PROPOSALS FOR AMENDMENTS TO RID/ADR/ADN

Chapters 4.2 and 6.7: Portable tanks

Transmitted by the Government of Germany*

The secretariat has received from the Central Office for International Carriage by Rail (OCTI) the proposal reproduced below.

SUMMARY

***Executive summary*:** Problems concerning the allocation of requirements for tanks and the definition of sufficiently high design pressure and test pressure exist for portable tanks.

***Action to be taken*:** Amendment of the relevant paragraphs in Chapters 4.2 and 6.7.

***Related documents*:** OCTI/RID/GT-III/2004-A and Add.1, (TRANS/WP.15/AC.1/96 and -/Add.1, informal document INF.9 (Joint Meeting 2004), OCTI/RID/GT-III/2005-A and -/Add.1 (TRANS/WP.15/AC.1/98 and -/Add.1), document OCTI/RID/GT-III/2005/18 (TRANS/WP.15/AC.1/2005/18).

* Circulated by the Central Office for International Carriage by Rail (OCTI) under the symbol OCTI/RID/GT-III/2004/66.

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Introduction

After this problem had been discussed on a number of occasions in the working group on tanks and in the Joint Meeting itself, Germany submitted informal document INF.9 in September 2004; it was discussed in the working group on tanks and recommended for adoption by the Joint Meeting.

The Joint Meeting shared the opinion of the working group concerning the marking of tanks with the tank instruction, but was unable to reach an agreement on the proposal to amend the definitions of maximum allowable working pressure, design pressure and test pressure, since reservations had been put forward because partial pressure (of air or other gases) in the tank had not been taken into consideration.

The representative of Germany was invited to submit a new official proposal to the next Joint Meeting in an endeavour to find an appropriate solution.

At its March 2005 session in Bern, the Joint Meeting had before it document OCTI/RID/GT-III/2005/18 (TRANS/WP.15/AC.1/2005/18), submitted by UIC which had originally proposed the discussion on this subject. The new proposal contained in this document was discussed by the working group on tanks but could not be supported since pressure in the liquid caused by the dynamic stresses (g values) had not been taken into account.

Following a discussion on determining the partial pressure of gases in the ullage space, Germany was invited to resubmit a proposal taking this area of pressure into account and thus enabling the test pressure to be calculated. On adoption by the Joint Meeting, the result should serve as a proposal to amend the United Nations Model Regulations.

Proposed solution

The existing definitions of maximum allowable working pressure and design pressure are supplemented by an alternative taking the partial pressure into account.

Proposal (the new passages appear in bold)

Amendment of the definitions of maximum allowable working pressure and design pressure in 6.7.2.1 as follows:

"*Maximum allowable working pressure (MAWP)* means a pressure that shall be not less than the highest of the following pressures measured at the top of the shell while in operating position:

(a) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(b) The maximum effective gauge pressure to which the shell is designed, which shall not be less than the sum of:

(i) The absolute vapour pressure (in bar) of the substance at 65°C, minus 1 bar; and

(ii) The partial pressure (in bar) of air or other gases in the ullage space being determined by a maximum ullage temperature of 65°C and a liquid expansion due to an increase in mean bulk temperature of $t_r - t_f$ (t_f = filling temperature, usually 15°C; t_r = maximum mean bulk temperature, 50°C) **or the pressure resulting from the overlap with gases in the ullage space at a maximum ullage temperature of 65°C but not amounting to less than 0.5 bar.**

Design pressure means the pressure to be used in calculations required by a recognized pressure vessel code. The design pressure shall be not less than the highest of the following pressures:

(a) The maximum effective gauge pressure allowed in the shell during filling or discharge; or

(b) The sum of:

(i) The absolute vapour pressure (in bar) of the substance at 65°C, minus 1 bar;

(ii) The partial pressure (in bar) of air or other gases in the ullage space being determined by a maximum ullage temperature of 65°C and a liquid expansion due to an increase in mean bulk temperature of $t_r - t_f$ (t_f = filling temperature, usually 15°C; t_r = maximum mean bulk temperature, 50°C) **or the pressure resulting from the overlap with gases in the ullage space at a maximum ullage temperature of 65°C but not amounting to less than 0.5 bar;**

and

(iii) A head pressure determined on the basis of the static forces specified in 6.7.2.2.12, but not less than 0.35 bar; or

(c) Two thirds of the minimum test pressure specified in the applicable portable tank instruction in 4.2.5.2.6;

Test pressure means the maximum gauge pressure at the top of the shell during the hydraulic pressure test equal to not less than 1.5 times the design pressure. The minimum test pressure for portable tanks intended for specific substances is specified in the applicable portable tank instruction in 4.2.5.2.6."

Justification

Contrary to the test pressure defined for RID/ADR tanks in Chapter 6.8, the design pressure in the case of portable tanks to date has to be calculated in theory for each case, each substance and each filling state. The minimum test pressure is calculated by multiplying the design pressure by 1.5.

To date the tank user is not, however, in a position to determine the design pressure during use. By means of the alternative calculation of the ullage pressure, the test pressure may be clearly ascertained.

Impact on safety: The amendments proposed do not pose problems since to date the test pressure of tanks has been selected internationally, in accordance with the tank instruction for the substances in question. The portable tank instruction in Column (11) of Table A for UN No. 1089 acetaldehyde should be revised with reference to the minimum test pressure.

Feasibility: Fewer problems in the selection of the tank as a result of the simple and unambiguous determination of the test pressure.

Applicability: Current practice can be kept since transitional requirements are unnecessary.
