

ECONOMIC COMMISSION FOR EUROPE

INLAND TRANSPORT COMMITTEE

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, 13-17 September 2004)

Chapters 4.2 and 6.7: Portable tanks

Allocation of tank instructions and determination of Test pressures

Development of a draft proposal of amendment to the UN Model Regulations

Transmitted by the Government of Germany

SUMMARY

<i>Explanatory summary:</i>	With portable tanks there is the problem of the allocation of tank instructions and the determination of test pressures
<i>Decision to be taken:</i>	Amendments to the relevant paragraphs in chapters 4.2 and 6.7
<i>Related documents:</i>	OCTI/RID/GT-III/2003/33 (TRANS/WP15/AC.1/2003/33) OCTI/RID/GT-III/2003-A/Add.1 (TRANS/WP.15/AC.1/92/Add.1) paragraph 14; OCTI/RID/GT-III/2003-B/Add.1 (TRANS/WP.15/AC.1/94/Add.8) paragraph 13.

Introduction

With document OCTI/RID/GT-III/2003/33 (TRANS/WP15/AC.1/2003/33) the International Union of Railways (UIC) described to the Joint Meeting problems which concern the use of the appropriate type of a portable tank and which up to now have not been solved despite several applications to the UN Expert Committee for the Transport of Dangerous Goods.

These problems for the operator (consignor or filler) of a tank are:

1. the allocation of the tank instruction to the tank,
2. the determination of a sufficient test pressure,

3. the determination of a sufficient design pressure in case of the carriage of several substances, and
4. the calculation of the dynamic share of the pressure as a consequence of the static forces used as basis.

The Tank Working Group of the Joint Meeting has recognized the problems and asked the representative of UIC to deal with the question in a small working group outside the Tank Working Group and to present again proposed solutions to the Joint Meeting (see report of the Joint Meeting OCTI/RID/GT-III/2003-B (TRANS/WP.15/AC.1/94) paragraph 155 item 13.

The discussions that were conducted in the meantime, based on experience made with the application of the provisions for portable tanks, have confirmed the problems.

The Joint Meeting is requested to induce consultations on the attempt to solve the problems described in the following which was developed by the Tank Working Group, with the aim of preparing applications for amendments to the UN Model Regulations and to present them to the Joint Meeting for decision.

Application

1. Application is made for the possibility of fitting the relevant tank instruction to the tank itself:

Insert in paragraph 6.7.2.20.2 after “Unladen (tare) mass...” „relevant tank instruction according to paragraph 4.2.5“.

2. Application is made to amend the definitions of the maximum allowable working pressure, the design pressure and the test pressure in sub-paragraph 6.7.2.1 as follows:

“Maximum allowable working pressure: A pressure that shall not be 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 absolute vapour pressure (in bar) of the substance at 65 ° C, minus 1 bar; or
- c) two thirds of the minimum test pressure laid down in the applicable instruction for portable tanks in paragraph 4.2.5.2.6.

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

- a) the maximum allowable working pressure; and
- b) a liquid pressure determined on the basis of the static forces mentioned in paragraph 6.7.2.2.12, but amounting to at least 0.35 bar.

Test pressure: The maximum gauge pressure at the top of the shell during the hydraulic pressure test equal to not less than 1.5 times the maximum allowable working pressure. The minimum test pressure for portable tanks for the individual substance to be carried is specified in the applicable portable tank instruction in paragraph 4.2.5.2.6.

3. The allocation of the substances to the tank instructions, especially to the instructions T1 to T5, should be re-examined with regard to the minimum test pressure. The substance UN 1089 acetaldehyde should be newly allocated.
4. Consequential amendment: In paragraph 6.7.2.3.2 change “design pressure” to read “maximum allowable working pressure”.

Reasons

Ad 1. The allocation of a substance to a tank is effected by the tank instruction. This allocation is very difficult without showing the tank instruction at the tank itself, and is only possible through an intensive examination of the tank plate and the equipment.

Ad. 2 In the list of dangerous substances in the UN model provisions and in table A of chapter 3.2 RID/ADR every substance entry also comprises instructions for portable tanks. Minimum test pressures are allocated to these tank instructions as is the case with the RID/ADR tank codings.

In contrast to the test pressure for RID/ADR tanks laid down in chapter 6.8, the minimum test pressure for portable tanks has to be determined for every substance and every level of filling. The test pressure of the tank which is actually required results from the multiplication of the design pressure with the value 1.5 taking into account the minimum test pressure in the tank instruction.

The determination of the design pressure during operation, however, is not possible for the user.

The test pressure should therefore be definite and clear for all parties involved as a fixed quantity independent of the substance, i.e. of the tank instruction or the chosen (higher) working pressure.

The determination of the additional static forces to be absorbed due to the liquid pressure above the minimum value of 0.35 bar mentioned in chapter 6.7 is dependent on the design and is effected with the tank calculation by the manufacturer on the basis of recognized technical regulations and taking into consideration the requirements in paragraph 6.7.2.2.12 (absorption of static forces).

The partial pressure occurring in the unfilled space can be neglected since the required test pressure usually is determined by the filling pressure or the discharge pressure.

The new definition allows the design pressure to reach the level of the test pressure. This is covered by the requirement in paragraph 6.7.2.3.3 which says that the maximum allowable membrane stress shall not exceed 0.75 Re or 0.50 Rm.

Ad. 3 For tanks with low test pressures the share of the liquid pressure due to the static forces in relation to the vapour pressure can reach values which necessitate a re-allocation of substances.

Safety: The proposed amendments will not cause problems, since up to now the test pressure of the tank is chosen worldwide in accordance with the tank instructions for the substances concerned.

Feasibility: Fewer problems with the selection of the tank through a simple and definite determination of the test pressure.

Actual application: The current practice can be maintained.
