United Nations ECE/TRANS/WP.15/AC.1/2011/21

Economic and Social Council

Distr.: General
6 January 2011

Original: English

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 5 (b) of the provisional agenda
Proposals for amendments to RID/ADR/ADN: new proposals

Aerosols (UN No. 1950) - Maximum internal pressure at 50 °C

Transmitted by the European Aerosol Federation (FEA)[1, 2]

Summary

Executive summary: Amendments to the maximum internal pressure at 50 °C for aerosols.

Action to be taken: To amend the current text in 6.2.6.1.5 of RID/ADR.

Related document: --

Introduction

1. In order to avoid confusion, FEA would like to highlight that this paper is not related to the document by FEA "Aerosols (UN 1950) Maximum volume of the liquid phase at 50 °C" (ST/SG/AC.10/C.3/2010/44).

[1] 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)).

[2] Circulated by the Intergovernmental Organisation for International Carriage by Rail (OTIF) under the symbol OTIF/RID/RC/2011/21.

2. FEA has proposed to the European Commission to adapt to technical progress the Aerosol Dispensers Directive (ADD) 75/324/EEC.

3. FEA made the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods aware of this information (informal document INF.19 presented at the thirty-seventh session of the Sub-Committee). The FEA proposal to the European Commission is shown in the Annex to this document.

4. An expert group on the ADD, composed of experts of the European Commission and of Members States of the European Union met the 4 November 2010 and agreed to include the increase of maximum internal pressure of 15 bar at 50 °C for aerosol dispensers with non-flammable propellants in the proposal for the next adaptation to technical progress of the ADD.

5. As announced, FEA is willing to address the issue in the regulations covering the different transport modes, but for practical reasons these legislative procedures cannot take place entirely in parallel.

6. Under 6.2.6.1.5, FEA only proposes to change the requirements for aerosols (UN No. 1950), but to keep the requirements for small receptacles containing gas (gas cartridges) (UN No. 2037) unchanged.

Proposal

7. The amendments to the maximum internal pressure at 50 °C for aerosols laid down in 6.2.6.1.5 of RID/ADR are presented below in ***bold italics***:

> "The internal pressure at 50 °C ***of small receptacles containing gas (gas cartridges) (UN No. 2037)*** shall exceed neither two-thirds of the test pressure nor 1.32 MPa (13.2 bar). ~~***Aerosol dispensers and S***~~small receptacles containing gas (gas cartridges) shall be so filled that at 50 °C the liquid phase does not exceed 95 % of their capacity.
>
> ***The internal pressure at 50 °C of aerosol dispensers (UN No. 1950) shall exceed neither two-thirds of the test pressure nor 1.20 MPa (12.0 bar). However if the aerosol does not contain a flammable gas or a flammable gas mixture the internal pressure at 50 °C shall exceed neither two-thirds of the test pressure nor 1.50 MPa (15.0 bar). Aerosol dispensers shall be so filled that at 50 °C the liquid phase does not exceed 95 % of their capacity.***".

Justification

8. See Annex.

Annex

[English only]

Increase in maximum allowable internal pressure at 50 °C

FEA returns to its initial proposal: increase the maximum internal pressure at 50 °C for aerosols using non-flammable propellants from the currently allowed 13.2 bar to 15 bar.

The same level of safety as required by the current Directive obviously must be maintained, i.e. a factor of 1.5 to reach the minimum deformation pressure and 1.8 to minimum burst pressure.

This point was already discussed within the Member States' Experts Committee during the last comitology procedure. Some Member States' experts asked for additional information to support this increase of the allowable pressure and as a result the pressure of 13.2 bar was agreed as an interim measure in line with ADR.

Please find below the supporting information.

Introduction

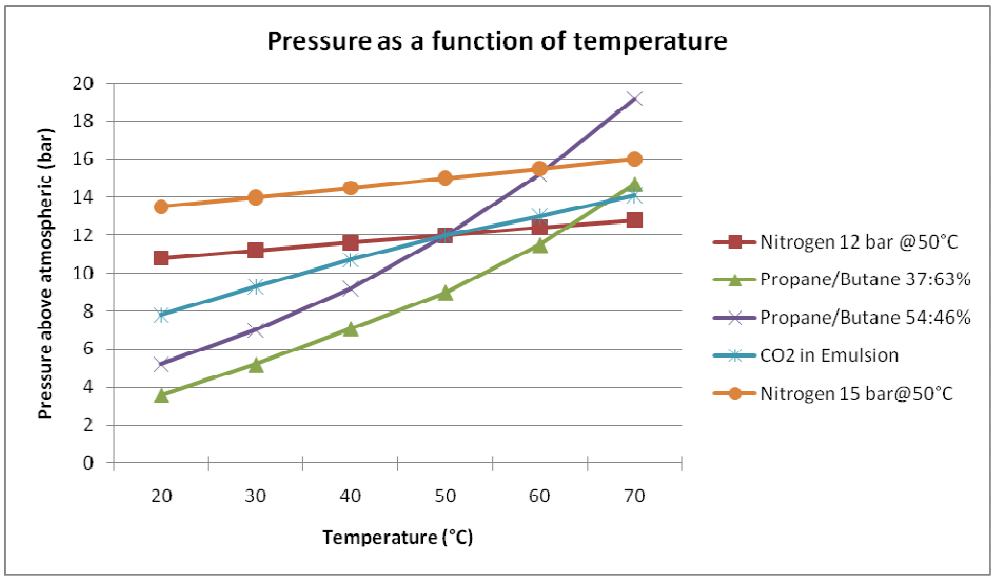
The aerosol industry constantly strives to increase the environmental compatibility of aerosol products and to design these products and their handling in a permanently sustainable manner.

For this purpose using non-flammable compressed gas propellants, which may be a conceivable option for certain products given the premise that the spray efficiency is maintained, calls for an increase in the maximum internal pressure at 50 °C.

Tests have shown that, where compressed gases are used as propellants, an increase to 15 bar at 50 °C can lead to good results for the efficacy and performance of some products.

The following considerations, which serve to guarantee safety, apply to all aerosol containers.

Here it should be noted that compressed gases have more favourable pressure increase characteristics than liquefied propellants, so that the burst hazard is significantly lower in the case of compressed gases.



Temperature (°C)	*Nitrogen 12 bar @ 50°C (bar)*	*Propane/Butane 37:63% (bar)*	*Propane/Butane 54:46% (bar)*	*CO_2 in Emulsion (bar)*	*Nitrogen 15 bar@ 50°C (bar)*
20	10.8	3.6	5.2	7.8	13.5
30	11.2	5.2	7.0	9.3	14.0
40	11.6	7.1	9.2	10.7	14.5
50	12.0	9.0	12.0	12.0	15.0
60	12.4	11.5	15.2	13.0	15.5
70	12.8	14.7	19.2	14.1	16.0

Aerosol Container and Valve Manufacture

During the aerosol container and valve manufacturing process the various production steps as well as finished containers and valves are subjected to numerous inspections.

Current legislation allows aerosol containers pressurised at 13.2 bar at 50 °C if they contain non-flammable propellants. The proposed pressure increase (of approx. 13.6 %) to 15 bar is now technically feasible and the safety of the containers so pressurised can be reliably ensured. The relevant requirements are fully met by the quality systems that are already in place at all levels of the aerosol industry.

This has been confirmed by tests performed on appropriate aerosol containers. The valve, the container, and the container/valve assembly will be adapted in design and performance to suit the higher pressure level and will thus be safe.

Aerosol Valves

Material and design of cups (valves), crimp and clinch for "15 bar" applications have to be chosen, so that tightness compared to 13.2 bar applications is ensured.

In preparation, verifying tests to demonstrate compliance with the following parameters have been established:

- The valve cups for 15 bar applications have to be pressure resistant at the adjusted pressure compared to the pressure resistance of ‘standard’ cups for 13.2 bar applications (i.e. minimum 27.0°bar pressure resistance instead of 23.76 bar).

The movement of the cup boss under the defined pressure is a feature for evaluation of cups/valves.

Aerosol Containers

Both aluminium and tinplate aerosol containers have already been manufactured in "15.0 bar at 50°C" versions.

Such containers have been tested successfully both in internal test series during the aerosol container manufacturing process by container manufacturers and in external tests, using tests designed to check that:

- The containers develop no visible deformation when subjected to a load (deformation pressure) of 22.5 bar during 25 seconds,
- The containers resist a pressure of at least up to 27.0 bar without bursting.

The required pressure resistance was obtained by adapting the material thickness in the container geometry, thus meeting the demand for increased deformation and burst pressure levels.

The following table provides an overview of the various pressure levels and rating values that are valid at the various points of the process (aerosol container-makers, fillers):

Maximum internal pressure at 50°C (as defined by ADD 75/324/EEC) (bar)	*Test pressure (as defined by ADD 75/324/EEC) (bar)*	*Bursting pressure (as defined by ADD 75/324/EEC) (bar)*
10	15	18
12	18	21.6
13.2[a]	19.8	23.76
15[b]	22.5	27

[a] Only for aerosols using non-flammable propellants.

[b] Proposed change, only for aerosols using non-flammable propellants.

Aerosol Container Filling Process

Aerosol containers are filled under the most stringent safety conditions. The filling equipment used in the industry today can be adapted without difficulty to suit the slightly higher pressure level.

As is the current practice, safety devices will be used to prevent overfilled containers from being brought into circulation. Clinch dimensions are adapted at present – and will be adapted in future – to each specific container type and its appropriate valve.

The safety of the aerosol container/valve assembly will be guaranteed by a 100 % water bath test or an alternative test method.

Other tests with aerosols pressurised to 15 bar at 50 °C have demonstrated that such aerosols can be produced without showing any visible permanent distortion or leakage.

All other tests required by the Aerosol Dispensers Directive 75/324/EEC that are designed to guarantee the mechanical strength and chemical compatibility of aerosol packages have, of course, also to be performed.

Empty aerosol containers and filled aerosol dispensers have been tested to demonstrate that safe 15 bar at 50°C applications are technically feasible.

FEA proposes that the wording of the Annex to ADD should be amended as follows (in ***bold italics***):

3.1.2. Filling

At 50 °C, the pressure in the aerosol dispenser must not exceed 12 bar.

However, if the aerosol does not contain a gas or mixture of gases having a flammable range with air at 20 °C and a standard pressure of 1,013 bar, the maximum allowable pressure at 50 °C is ***15 bar***.

Identical requirements should apply to plastic aerosols in the same way.