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Item 5 (b) of the provisional agenda

Proposals for amendments to RID/ADR/ADN: new proposals

RID/ADR 6.2.3 – Requirements to be met by pressure-activated pressure relief devices for non-UN pressure receptacles

Transmitted by the Government of Germany*,**

Summary

Explanatory summary: Except for closed cryogenic receptacles, there are no requirements concerning the conditions under which pressure-activated pressure relief devices of non-UN pressure receptacles have to be activated and concerning the capacity of the pressure relief device to prevent the pressure receptacle from bursting.

Decision to be taken: Introduce set pressure and capacity requirements for pressure-activated pressure relief devices of non-UN pressure receptacles.

Related document: Informal document [UN/SCETDG/56/INF.35](#).

Introduction

1. At the fifty-sixth (December 2019) of the Sub-Committee of Experts on the Transport of Dangerous Goods (SCETDG), Germany submitted a document (informal document [UN/SCETDG/56/INF.35](#)) on the activation conditions of pressure relief devices. SCETDG agreed to continue the work on this issue but noted that the existing provisions at national and regional level on operating temperatures should be taken into account.

* A/77/6 (Sect.20), para. 20.76

** Circulated by the Intergovernmental Organisation for International Carriage by Rail (OTIF) under the symbol OTIF/RID/RC/2023/10

2. Following the afore-mentioned session, further discussions were held with international experts (from competent authorities and industry associations). In these discussions, it became clear that the dangerous goods provisions, in particular in Europe (RID/ADR) and the United States of America (USA) (e.g. CFR 49), contain very different requirements to be met by pressure relief devices. The greatest difference lies in the level of the permissible set pressure of the pressure relief devices. While in Europe the priority is on preventing activation under normal conditions of carriage (below the test pressure), the safety concept in the USA focusses on protection against bursting in the event of fire and therefore prohibits activation above the test pressure. This significant difference prevents worldwide harmonisation. This is the reason why this proposal is now being submitted for RID/ADR only.

Current situation

3. Except for closed cryogenic receptacles (see 6.2.1.3.6.5), there are no requirements on the conditions under which pressure-activated pressure-relief devices of non-UN pressure receptacles designed, constructed and tested in accordance with the standards referenced in 6.2.4.1 must or must not yet be activated.

4. The pressure within a pressure receptacle mainly depends on the ambient temperature. Insulation can further increase the effect of temperature.

5. Under normal conditions of carriage, pressure relief devices must not be activated to prevent the contents from being released, possibly creating a dangerous situation.

6. Pressure relief devices must also not be activated at a too high pressure, as this might result in an unacceptable stress (plastic deformation) on the pressure receptacle.

7. Also, except for closed cryogenic receptacles in 6.2.1.3.6.5, there are no requirements concerning the capacity of the pressure relief device required to prevent the pressure receptacle from bursting.

Conclusion

8. In accordance with P200 (5) (a), (b), (c) and (e), a temperature of +65 °C is used as a basis when determining the test pressure of pressure receptacles. Although not explicitly defined, this temperature is considered to be the maximum temperature under normal conditions of filling and carriage.

9. Based on the information discussed during the sessions of the working group on provisions for pressure receptacles and closures in accordance with Chapter 6.2 of the UN Model Regulations, an internal pressure of the pressure receptacle of up to 1.15 times the test pressure can be tolerated in certain cases. This value is already used for liquefied petroleum gas (LPG) pressure relief valves in standard EN 13953 referenced in 6.2.4.1.

10. Unlike in the case of pressure relief valves, where temperature only has a very limited impact on the set pressure, the burst pressure of bursting discs is heavily dependent on temperature. Common design temperatures for bursting discs are indoor temperature (approximately +20 °C) and high temperature (approximately +65 °C). According to manufacturers of bursting discs, it is almost impossible to guarantee the minimum burst pressure or the required burst pressure range at both +20 °C and +65 °C. Therefore, in view of paragraph 9 above, the design temperature for bursting discs is to be set at +65 °C.

11. The aim of this proposal is to harmonise the set pressure and the capacity of pressure-activated pressure relief devices for non-UN pressure receptacles.

12. In addition, this proposal only aims to introduce future requirements. There is no need to take measures for pressure receptacles already in service, even if they are equipped with pressure relief devices that do not comply with these future requirements.

Proposal

13. Insert a new 6.2.3.3.7 to read as follows:
- “**6.2.3.3.7** Activation of pressure relief devices shall not result in the ejection of any particles.”
14. Amend P200 (2) in 4.1.4.1 to read as follows, also inserting a new footnote ¹ (new text is underlined):
- “(2) Pressure receptacles containing toxic substances with an LC₅₀ less than or equal to 200 ml/m³ (ppm) as specified in the table shall not be equipped with any pressure relief device. Pressure relief devices shall be fitted on UN pressure receptacles used for the carriage of UN No. 1013 carbon dioxide and UN No. 1070 nitrous oxide.
- Pressure relief devices for refillable non-UN pressure receptacles shall be activated between the pressure building up in the pressure receptacle at a temperature of +65 °C and 1.15 times the test pressure of the pressure receptacle. In the case of a bursting disc, the burst pressure shall be designed for a reference temperature of +65 °C.
- The capacity of the pressure relief devices of non-UN pressure receptacles shall be sufficient to prevent the pressure receptacle from bursting. This shall be demonstrated by calculation in accordance with a recognized technical code¹ or, for pressure relief valves, by measurement and evaluation or, for bursting discs, by testing.
- ¹ See, for example, CGA publication S-1.1–2022 “Pressure Relief Device Standards – Part 1 – Cylinders for Compressed Gases”.”
15. Insert a new 1.6.2.23 to read as follows:
- “**1.6.2.23** Pressure relief devices of pressure receptacles constructed before 1 January 2027 but which do not meet the set pressure and capacity requirements of 4.1.4.1, packing instruction P 200 (2) applicable from 1 January 2025, may still be used.”

Justification

16. This amendment aims to harmonise the previous national designs so that pressure relief devices will in the future have uniform set pressures and capacities.