

## **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**

**9 March 2021**

Bern, 15–19 March 2021

Item 2 of the provisional agenda:

**Tanks**

### **Comments ECE/TRANS/WP.15/AC.1/2021/11 on requirements of 6.8.3.2 in RID/ADR on items of equipment and automatic closing function of valves on connections to the vapour phase on tanks for flammable and toxic refrigerated liquefied and liquefied gases**

**Transmitted by the European Industrial Gases Association (EIGA)**

#### **Introduction**

1. ECE/TRANS/WP.15/AC.1/2021/11, transmitted by the Government of the Netherlands is proposing that valves on the openings in the vapour phase of tanks for flammable and toxic gases, including refrigerated and liquefied gases, should close in the case of an emergency or automatically in the case of movement of the tank or fire or manually from a safe distance.
2. EIGA Members have concerns about how this would impact the carriage of a number of products specifically UN 1966, Hydrogen, Refrigerated Liquid.

#### **Background**

3. The question of connections to the vapour phase was initially raised at the 2020 Autumn Session of the Joint Meeting, see informal paper 13. The result of the discussions of the tanks working group, see Inf 64, was that The Netherlands were invited to forward an official document for a future session. This is document ECE/TRANS/WP.15/AC.1/2021/11.
4. The key element of ECE/TRANS/WP.15/AC.1/2021/11 is that for new and existing equipment complying with Chapter 6.8 of RID/ADR carrying refrigerated flammable gases and toxic gases, to have an instant closing valve on all openings other than inspection openings and those accommodating safety valves. In addition, flanges fitted with a pressure-release opening of a maximum diameter of 1.5 mm may no longer be used as a closure.
5. This is a fundamental change to the design and operation of tanks of flammable refrigerated liquefied gases, especially UN 1966 Hydrogen, Refrigerated Liquid, but there are also implications for other gases as mentioned below.
6. The proposal is not differentiating between the filling and discharge of a tank and the venting function. Venting of product relies upon an opening in the vapour space of the tank.

#### **Filling of a tank/tank container**

7. The method of filling a tank or a tank container depends on the product. Refrigerated liquid argon, nitrogen, oxygen, natural gas, and ethylene will usually be filled into the top and bottom of the tank simultaneously. This has the effect of regulating the pressure in the

tank during filling. If there is a need to reduce pressure in the tank or tank container, which during filling is typically not required, this will be carried out by the filler by operating the vent valve.

8. Refrigerated liquid hydrogen is filled in a different manner with liquid being filled into the bottom of the tank/tank container and any vapour being recovered back to the hydrogen production plant.

### **Discharging a tank/tank container**

9. The requirement to vent tanks is limited. There can be a requirement to do this if the pressure in the tank/tank container is near the relief valve set point and there is a wish to avoid the risk of the relief valve lifting especially during carriage.

This activity is carried out by a trainer operator at the piping control cabinet.

### **Comments on ECE/TRANS/WP.15/AC.1/2021/11**

## **Introduction**

10. The reference to 4.3.2.2.3 is incorrect, and it should be 4.3.2.3.3.

### **Proposal 1**

11. The title of 6.8.3.2 is Items of equipment, and the proposal is “*Items of equipment of tanks for the carriage of liquefied and refrigerated liquefied gases*”. This will lead to confusion as from 6.8.3.2.18, “*Items of equipment for battery-vehicles and MEGCs*” are covered.

12. The proposed 6.8.3.2.1 is similar in content to the existing 6.8.3.2.2, but with the removal of the requirements that the clause only applied to liquefied gases. The removal of liquefied gases could be due to the proposed change of title to 6.8.3.2, but confirmation is requested.

13. New 6.8.3.2.4 is adding a new requirement for tanks carrying refrigerated liquefied flammable gases to be fitted with instant closing valves. This new requirement will impact UN 1038 Ethylene, Refrigerated Liquid, UN 1961 Ethane, Refrigerated Liquid, UN 1966 Hydrogen, Refrigerated Liquid, UN 1972, Methane, Refrigerated Liquid, UN 3312 Gas, Refrigerated Liquid, Flammable, N.O.S.

14. The new 6.8.3.2.6 is a new requirement in that it would require an instant closing external stop valve in vent lines from the vapour space. This is where there are significant concerns from EIGA Members.

### **Concerns regarding automated closure valves on vent lines**

15. The proposal is requiring that valves on vent lines, shall be instant-closing and shall close automatically in the event of an unintended movement of the tank. This implies that an external energy source will be required to open the valve. There are concerns about this as the vent valve can be used in an emergency to supplement the relief valves. This could be a hazard.

16. In addition, for some tank designs the relief valves are situated in lines that branch off the top filling (vapour) lines. If an automated valve were to close the top filling line, the function of the relief valves will be compromised. This is a major safety risk.

### **Difference between Chapter 6.7 and Chapter 6.8**

17. As proposed, there would be differences between Chapter 6.7 and Chapter 6.8. This would mean that a tank container constructed in accordance with Chapter 6.7 would not require the shut off valve as proposed for Chapter 6.8.

### **Operating experience**

18. There is more than fifty years global experience of operating tanks and tank containers without such valves and with flanges fitted with pressure-release openings. EIGA is not aware of incidents in operations with the current designs.

## **Proposal 2**

### **Modifying existing equipment**

19. Due to the extremely low temperature that liquid hydrogen is shipped at (-253 °C) most piping and valves are vacuum insulated. This is a very specialist type of construction and apart from equipment for UN 1963, Helium Refrigerated Liquid, completely unlike the construction for tanks and tank containers of other refrigerated liquids. For liquid hydrogen, extensive re-engineering is required, and from preliminary reviews may not be feasible for much existing equipment.

20. For the carriage of the other gases mentioned, specifically for tank containers there are constraints concerning spacing within the instrumentation cabinets. In some cases, the complete piping will have to be redesigned in order to accommodate the quick closing valves.

21. Flanges fitted with pressure-release openings (for flammable refrigerated liquefied gases) are an integral part of the design of current equipment, meaning that they are used as the third closure. If this were not to be permitted, there would be need to add in additional valves as a flange or plug that does not have a pressure release opening presents a significant risk to loaders/unloaders as when the flange or plug is removed it may have trapped pressure that results in the flange or plug be ejected with great and uncontrolled force. The pressure relief opening guarantees a safe loosening of the flange or plug.

22. EIGA Members have been reviewing ECE/TRANS/WP.15/AC.1/2021/11 in detail and proposed transitional measures. Irrespective of the practical aspects of modifying equipment, the proposed period is not practical due to time to design, procure parts and modify equipment.

### **Future work**

23. EIGA requests that this proposal is reviewed in more detail to understand the safety and operational implications and how to address the multimodal aspects. In particular taking into account the extensive global operating experience for refrigerated liquid hydrogen and other refrigerated flammable liquids.

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