

**Economic and Social Council**Distr.: General  
18 July 2014

Original: English

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**Economic Commission for Europe****Inland Transport Committee****World Forum for Harmonization of Vehicle Regulations****Working Party on General Safety Provisions****107<sup>th</sup> session**

Geneva, 30 September–3 October 2014

Item 9 of the provisional agenda

**Regulation No. 110 (CNG/LNG vehicles)****Proposal for amendments to Regulation No. 110 (CNG/LNG vehicles)****Submitted by the expert from the Netherlands\***

The text reproduced below was prepared by the expert from the Netherlands to regulate the direction of discharging for the pressure relief devices of the Compressed Natural Gas (CNG) containers. It is mainly based on informal document GRSG-106-07. The modifications to the current text of Regulation No. 110 are marked in bold for new or strikethrough for deleted characters.

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\* In accordance with the programme of work of the Inland Transport Committee for 2012–2016 (ECE/TRANS/224, para. 94 and ECE/TRANS/2012/12, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

## I. Proposal

*Paragraph 18.5.2.1., amend to read:*

"18.5.2.1. ~~The pressure relief device (temperature triggered) shall be fitted to the CNG fuel container(s) in such a manner that can discharge into the gas-tight housing if that gas-tight housing fulfils the requirements of paragraph 18.5.5. below.~~ **The CNG gas discharge from a pressure relief device (temperature triggered) shall not be directed:**

- (a) **Towards exposed electrical terminals, exposed electrical switches or other ignition sources;**
- (b) **Into or towards the vehicle passenger or luggage compartments;**
- (c) **Towards any class 0 component;**
- (d) **Forward from the vehicle, or horizontally from the back or sides of the vehicle."**

*Insert new paragraphs 18.5.2.2. and 18.5.2.3., to read:*

"18.5.2.2. **In case the container(s) is (are) fitted inside the vehicle the pressure relief device (temperature triggered) shall, in addition to the provisions of paragraph 17.5.2.1., be fitted to the fuel container(s) in such a manner that it can discharge the CNG into an atmospheric outlet that vents outside the vehicle.**

18.5.2.3. **In case the container(s) is (are) fitted on the outside of the vehicle the pressure relief device (temperature triggered) shall, in addition to the provisions of paragraph 15.5.2.1., be fitted to the fuel container(s) in such a manner that it can discharge the CNG only in a vertical upward direction."**

## II. Justification

1. The existing provisions for buses and coaches focus on a rapid evacuation of the vehicle in cases of emergency. However, a fire accident in the Netherlands showed that nevertheless a serious risk remains for the passengers of the vehicle, other road users and the surroundings of the vehicle. In the event of a fire, thermally activated pressure relief devices (TPRDs) provide a controlled release of the gas from the compressed natural gas storage containers before the high temperatures in the fire weaken the containers and cause a hazardous rupture. TPRDs are designed to vent the entire contents of the container rapidly. In that accident, the pressure relief device produced a horizontal jet flame for several minutes which could have had serious consequences for other road users and the area around the vehicle. The experts from the Netherlands consider it necessary to regulate the direction of discharge for the pressure relief devices of the CNG containers. The specification of discharge direction of TPRDs on CNG containers, as proposed above for paragraph 18.5.2.1., is based on existing provisions within Regulation (EU) No. 79/2009 on hydrogen vehicles and comparable with the wording in GTR No. 13 (Global Technical Regulation on hydrogen and fuel cell vehicles) part II, paragraph 5.2.1.3.1. Paragraph 18.5.2.3. is added specifically to deal with the roof mounted CNG tanks.

2. In addition, the current text of paragraph 18.5.2.1. requires that the pressure relief device (PRD) discharges into the gas tight housing. Therefore, the experts from the

Netherlands believe that the gas tight housing is not appropriate for CNG vehicles and should be amended by another provision dealing with the situation where the container is fitted inside the vehicle.

3. These measures should focus on new type approval of vehicles; retrofitting is regarded to belong to the national responsibility of the countries.
4. An excerpt of the performance requirements of GTR No. 13 is reproduced below:

## "II. Text of the Regulation

### 5. Performance requirements

- 5.2.1.3.1. Pressure relief systems (para. 6.1.6. test procedure)
    - (a) Storage system TPRDs. The outlet of the vent line, if present, for hydrogen gas discharge from TPRD(s) of the storage system shall be protected by a cap;
    - (b) Storage system TPRDs. The hydrogen gas discharge from TPRD(s) of the storage system shall not be directed:
      - (i) Into enclosed or semi-enclosed spaces;
      - (ii) Into or towards any vehicle wheel housing;
      - (iii) Towards hydrogen gas containers;
      - (iv) Forward from the vehicle, or *horizontally (parallel to road)* from the back or sides of the vehicle."
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