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**Economic Commission for Europe**

Inland Transport Committee

**World Forum for Harmonization of Vehicle Regulations****Working Party on General Safety Provisions****104<sup>th</sup> session**

Geneva, 15–19 April 2013

Items 7 and 8 of the provisional agenda

**Regulation No. 67 (Equipment for liquefied petroleum gases (LPG)) and  
Regulation No. 110 (Specific equipment for CNG)****Proposal for amendments to Regulations Nos. 67 and 110****Submitted by the expert from the European Association of Automotive  
Suppliers \***

The text reproduced below was prepared by the expert from the European Association of Automotive Suppliers (CLEPA) to introduce into Regulations Nos. 67 and 110 type approval provisions for "valve control at stop-start". The modifications to the existing text of the Regulation are marked in bold characters.

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\* In accordance with the programme of work of the Inland Transport Committee for 2010–2014 (ECE/TRANS/208, para. 106 and ECE/TRANS/2010/8, 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 for amendments to Regulation No. 110

*Insert a new paragraph 4.1.1., to read:*

- "4.1.1. In addition to the provisions of paragraph 4.1., one of the following additional marks shall be used for automatic cylinder valve which comply with Annex 4A, paragraph 2.2.4.:**
- (a) "H1" in case of valves used in start-stop systems; or**
  - (b) "H2" in case of valves used in hybrid electric systems; or**
  - (c) "H3" in case of valves used in start-stop systems with coasting."**

*Insert new paragraphs 17.5.1.3. and 17.5.1.4., to read:*

- "17.5.1.3. The automatic cylinder valve may stay in an open position during the activated stop phase of an automatic stop-start or hybrid electric system.**
- 17.5.1.4. If the automatic valves are closed during activated stop phases, one of the following provisions shall apply:**
- (a) A functional check for each valve shall be carried out once in a driving cycle. In the event that the functional check indicates that the valve is not closing, an indicator shall clearly inform the driver; or**
  - (b) The valves shall comply with Annex 4A, paragraph 2.2.4."**

*Annex 4A, insert a new paragraph 2.2.4., to read:*

- "2.2.4. The automatic cylinder valve for use in stop-start or hybrid electric systems according with paragraph 17.5.1.4.(b) shall be submitted to the following numbers of operations during a test according to paragraph 2.2.3.:**
- (a) 200,000 cycles (mark "H1") for stop-start systems; or**
  - (b) 500,000 cycles (mark "H2") for hybrid electric systems; or**
  - (c) 1,000,000 cycles (mark "H3") for stop-start systems with coasting."**

*Paragraph 2.2.4. (former), renumber as paragraph 2.2.5.*

*Annex 4H, insert new paragraphs 2.1.1. and 2.1.2., to read:*

- "2.1.1. The automatic cylinder valve may stay in an open position during the activated stop phase of an automatic stop-start or hybrid electric system. [The automatic cylinder valves shall be closed in case of a broken fuel supply pipe or during a crash.]**
- 2.1.2. If the automatic cylinder valve is closed during the activated stop phases and not in compliance with Annex 4A, paragraph 2.2.4., a functional check of each valve shall be done once in each driving cycle. In the event that the functional check indicates that the valve is not closing, an indicator shall clearly inform the driver."**

## II. Proposal for amendments to Regulation No. 67

*Insert a new paragraph 4.4., to read:*

- "4.4.** In addition to provisions of paragraphs 4.1. and 4.2., one of the following additional marks shall be used for remotely controlled service valves and remotely controlled shut-off valves which comply respectively with Annex 3, paragraph 4.7, or Annex 7, paragraph 1.7:
- (a) "H1" in case of valves used in automatic start-stop systems; or
  - (b) "H2" in case of valves used in hybrid electric systems; or
  - (c) "H3" in case of valves used in automatic start-stop systems with coasting."

*Insert new paragraphs 17.6.1.3. and 17.6.1.4., to read:*

- "17.6.1.3.** Notwithstanding the provisions of paragraph 17.6.1.2., the remotely controlled service valve may stay in an open position during the activated stop phase of an automatic stop-start or hybrid electric system.
- 17.6.1.4.** If the remotely controlled service valve is closed during the activated stop phases, one of the following provisions shall apply:
- (a) A functional check of the valve shall be carried out once in the driving cycle. In the event that the functional check indicates that the valve is not closing, an indicator shall clearly inform the driver.
  - (b) The valve shall comply with Annex 3, paragraph 4.7."

*Paragraph 17.6.1.3. (former), renumber as paragraph 17.6.1.5.*

*Insert new paragraphs 17.9.6. and 17.9.7., to read:*

- "17.9.6.** The remotely controlled shut-off valve may stay in an open position during the activated stop phase of an automatic stop-start or hybrid electric system. [The remotely controlled shut-off valve shall be closed in case of a broken fuel supply pipe caused by an accident.]
- 17.9.7.** If the remotely controlled shut-off valve is closed during the activated stop phases, one of the following provisions shall apply:
- (a) A functional check of the valve shall be carried out once in the driving cycle. In the event that the functional check indicates that the valve is not closing, an indicator shall clearly inform the driver.
  - (b) The valve shall comply with Annex 7, paragraph 1.7."

*Annex 3, insert a new paragraph 4.7., to read:*

- "4.7.** The remotely controlled service valves for use in accordance with paragraph 17.6.1.4.(b) shall be submitted to the following numbers of cycles during the endurance test of Annex 15, paragraph 9.:
- (a) 200,000 cycles (mark "H1") for stop-start systems;
  - (b) 500,000 cycles (mark "H2") for hybrid electric systems; and
  - (c) 1,000,000 cycles (mark "H3") for stop-start systems with coasting."

*Annex 7, insert a new paragraph 1.7., to read:*

- "1.7. The remotely controlled shut-off valve for use in accordance with paragraph 17.9.7.(b) shall be submitted to the following numbers of cycles during the endurance test of Annex 15, paragraph 9.:**
- (a) 200,000 cycles (mark "H1") for stop-start systems;**
  - (b) 500,000 cycles (mark "H2") for hybrid electric systems; and**
  - (c) 1,000,000 cycles (mark "H3") for stop-start systems with coasting."**

*Annex 14, insert new paragraphs 2.1. and 2.2., to read:*

- "2.1. Notwithstanding the provisions of paragraphs 1. and 2. above, the remotely controlled service valve and shut-off valves may stay in an open position during the activated stop phase of an automatic stop-start system. [The valves and fuel pump shall be closed in the case of a broken fuel supply pipe or/and in case of stalling of the engine.]**
- 2.2. If the remotely controlled service valve and shut-off valve are closed during the activated stop phases and are not complying with Annex 7, paragraph 4.7., or Annex 1, paragraph 1.7., a functional check of each valve shall be carried out once in each driving cycle. In the event that the functional check indicates that a valve is not closing, an indicator shall clearly inform the driver."**

### **III. Justification**

1. The start-stop or hybrid electric functionality of the engine will also be used in CNG/LPG vehicle systems to reduce CO<sub>2</sub> emissions. Thereby, the number of opening/closing cycles of the CNG/LPG tank valves will be increased by a factor of up to fifty. The current text of the Regulation requires the valve to be closed when the engine is switched off. This proposal allows letting the tank valves stay open in an activated stop-start phase as is the case for the idling phase of non stop-start vehicles. Thus the same durability requirement as regards opening/closing cycles of the valves as for non-stop-start systems is preserved. The automatic cylinder valve may stay in an open position to ensure a correct and safe operation of the valve over the life of the vehicle. If the automatic valves are closed during the activated stop phases, then a functional check of each valve can be done once in each driving cycle to monitor that the valve closes when activated to do so over the life time of the vehicle. In the event that the functional check indicates that the valve is not closing, a visible or audible indicator shall clearly inform the driver. Varying durability requirements on opening/closing cycles for the type approval can be avoided.

2. If the automatic valves are closed during activated stop phases and a functional check of each valve is not done once in each driving cycle, the cylinder valves shall be type approved according the expected cycle number of the applied stop-start or hybrid electric system.

3. If the functional check is used and detects a valve which does not close the system, the excess flow device continues to protect.