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### **Economic Commission for Europe**

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**Working Party on General Safety Provisions**

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Item **Y** of the provisional agenda

**Regulation No. 110 (Specific equipment for CNG)**

**Proposal for amendments to document  
ECE/TRANS/WP.29/GRSG/2013/7 on Regulation No.  
110 (Specific equipment for CNG)**

**Submitted by the expert from the Netherlands**

## PROPOSAL:

Document ECE/TRANS/WP.29/GRSG/2013/7 to amend as follows:

1. *Paragraph 8.13 amend to read:*
  - 8.13. Provisions on components fitted to the LNG tank
  - 8.13.1. The LNG tank shall be equipped at least with the following components, which may be either separate or combined: **(special care should be taken to prevent LNG trapping)**
    - 8.13.1.1. Pressure relief valve;
    - 8.13.1.2. Manual valve ~~or automatic valve~~; **(for fuel system maintenance)**
    - 8.13.1.3 Automatic cylinder valve(for fuel shut off)**
    - 8.13.1.4. Excess flow device.
  - 8.13.2. The tank may be equipped with a gas-tight housing, if necessary.
  - 8.13.3. The components mentioned in paragraphs 8.13.1.1. to 8.13.1.4. (above) shall be type approved pursuant to the provisions laid down in Annex 4 to this Regulation.
  
2. *Paragraph 18.6 amend to read:*
  - 18.6. Accessories fitted to the LNG tanks
  - 18.6.1. Automatic valve**
    - 18.6.1.1. The automatic valve shall be installed in the fuel supply line, directly on the LNG tank or (inside in a protected position).**
    - 18.6.1.2. The automatic cylinder valve shall be operated such that the fuel supply is cut off when the engine is switched off, irrespective of the position of the ignition switch, and shall remain closed while the engine is not running. A delay of 2 seconds is permitted for diagnostic.**
  - 18.6.2. Excess flow valve  
The excess flow valve can be fitted inside or directly on the LNG tank (in a protected position).
  - 18.6.3. Pressure relief valve (primary)  
The primary pressure relief valve outlet shall be connected to an open ended pipe-away system to move vented gas away to a high level. Consideration shall be given to preventing any blockage or freezing of the pipe-away. The LNG primary relief valve shall not vent into the gas tight housing (if fitted).
  - 18.6.4. Pressure relief valve (secondary)  
The secondary relief valve may relieve gas immediately from its outlet.  
Protection from water ingress and damage shall be considered. The secondary relief valve outlet shall not be connected to the same pipe-away as the primary relief valve. The LNG secondary relief valve shall not vent into the gas tight housing (if fitted).
  - 18.6.5. Manual ~~fuel shut off~~ valve  
The manual ~~fuel shut off~~ valve shall be mounted directly on the LNG tank (in a protected position). It should be readily accessible. **The manual valve can be integrated into the automatic cylinder valve.**
  - 18.6.6. Manual vapour shut off valve  
The manual vapour shut off valve shall be mounted directly on the LNG tank (in a protected position). It should be readily accessible.
  - 18.6.7. Vent line or connector  
The vent line or connector may be mounted inside or on the LNG tank (in a protected position). It should be readily accessible. The vent connector shall be suitable for the purpose at temperatures indicated in Annex 50 for the working pressure of the LNG tank.
  - 18.6.8. Venting management system  
The primary pressure relief valve shall be piped to a vent stack that extends to a high level. The primary and secondary relief valve outlets shall be protected by fouling by dirt, debris, snow, ice and/or water. The vent stack shall be sized to prevent flow restriction due to pressure drop. Gas exiting the vent stack or secondary relieve valve shall not impinge on enclosed areas, other vehicles, engine intakes, or engine exhaust. In the case of dual tanks, the primary relief valve outlets piping for each tank may be manifold to a common stack.

## **JUSTIFICATION**

For safety reasons it is necessary that all LNG tanks are equipped with an automatic ~~shut-off~~ valve like also required for LPG, H2 and CNG. The proposed amendments are based on the existing requirements for CNG, H2 and LPG. For LNG special care should be taken to prevent LNG trapping. This can happen in case the automatic valve and manual valve are placed in series without taking any precautions.

The inside of the protected area (mentioned between brackets) of the LNG tank is also tested during the bonfire test and the drop tests.

Also the wording automatic cylinder valve is changed into automatic valve. This due to the fact that storage of LNG is in a tank and not a cylinder. The automatic valve is also in the definition list 4.18

The wording used in those parts are:

### **For CNG (regulation 110):**

18.5.1. Automatic valve

18.5.1.1. An automatic cylinder valve shall be installed directly on each CNG container.

18.5.1.2. The automatic cylinder valve shall be operated such that the fuel supply is cut off when the engine is switched off, irrespective of the position of the ignition switch, and shall remain closed while the engine in not running. A delay of 2 seconds is permitted for diagnostic.

### **For H2:**

REGULATION (EC) No 79/2009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 14 January 2009 on type-approval of hydrogen-powered motor vehicles, and amending Directive 2007/46/EC

## **ANNEX I**

List of hydrogen components to be type-approved

Where fitted to a hydrogen-powered vehicle, the following hydrogen components must be type-approved:

(a) components designed to use liquid hydrogen:

1. container;
2. automatic shut-off valve;
3. check valve or non-return valve (if used as a safety device);
4. flexible fuel line (if upstream of first automatic shut-off valve or other safety devices);

Annex VI also says the following, which is similar to our wording, so we can keep our wording as it is.

6. The hydrogen fuel supply lines must be secured with an automatic shut-off valve mounted directly on or within the container. The valve shall close if a malfunction of the hydrogen system so requires or any other event that results in the leakage of hydrogen occurs. When the propulsion system is switched off, the fuel supply from the container to the propulsion system must be switched off and remain closed until the system is required to operate.

### **For LPG (regulation 67 rev.03):**

17.6. Accessories to the fuel container

17.6.1. Remotely controlled service valve with excess flow valve on the container

17.6.1.1. The remotely controlled service valve with excess flow valve shall be installed directly on the fuel container, without any intervening fittings.

17.6.1.2. The remotely controlled service valve with excess flow valve shall be controlled such that it is automatically closed when the engine is not running, irrespective of the position of the ignition switch, and shall remain closed as long as the engine is not running.

17.6.1.3. Notwithstanding the provision of paragraph 17.6.1.2., in case of liquid injection systems, if a fuel recirculation is required to purge the system from gas bubbles (vapour lock), it is allowed to keep the remotely controlled service valve with excess flow valve open for a period not longer than 10 seconds before starting the engine in LPG running mode.

## **ISO/CD 12991 (version from Sept 2011):**

4.7.5 Shut-off valves and non-return valves

The fuel tank shall be provided with shut-off valves for the purpose of securing the fuelling lines and the fuel supply lines to the LNG conversion system(s).

In addition, all LNG fuel supply lines to the LNG conversion system(s), except the lines to the boil-off management system, shall be secured with automatic shut-off valves or excess flow valves. These valves shall be mounted directly on or within the fuel tank.

The fuelling line shall be secured by either a manually or an automatically operated shut-off valve, which shall always be closed except during the fuelling process. If the fuelling connector receptacle is not mounted directly on the fuel tank, a second isolation valve shall be used. This valve may be a manual shut-off valve, an automatic shut-off valve or a non-return valve. When two isolation valves are required, one shall be mounted directly on or within the fuel tank.

The automatic shut-off valves shall close with loss of motive power.

### **AS/NZS 2739 – 2009**

#### *Natural gas (NG) fuel systems for vehicle engines*

The standard requires two types of valves (Reference paragraph 4.1.2):

(f) Service isolation valve.

(h) Fuel shut-off device (solenoid lock off).

They may be combined (excerpts from paragraph 2.1.1): “into multifunction units, provided that such units comply with the requirements for each function.”

The standard makes the difference between the function (and by default location) of each device/valve.

It does not request a specific type of component.



