

Proposal for amendments to Regulation No. 110 – CNG/LNG vehicles

The text reproduced below was prepared by The Netherlands proposing the introduction of requirements to UN Regulation No. 110 for the state-of-the-art "CNG accumulator" components used in LNG/CNG systems. Modifications to the original text are marked in bold for new characters and strikethrough for deleted characters.

I. Proposal

Insert a new paragraph 4.78. (Definitions), to read:

"4.78. "CNG accumulator" means a device which is used to store CNG downstream the LNG vaporizer and/or CNG storage system (cylinder(s))."

Paragraphs 8.2. to 18.5.6.3., amend to read:

"8.2. Provisions on CNG containers **and CNG accumulator**

...

8.2.3. Provisions on the CNG accumulator

The CNG accumulator shall be type approved pursuant to the provisions laid down in Annex 3A to this Regulation taking into consideration:

- (a) **the CNG accumulator with a volume \leq 0.75 liter shall be tested as Class 6**
- (b) **the CNG accumulator with a volume $>$ 0.75 liter is considered as a CNG container(cylinder) with a maximum pressure of 26 MPa.**
- (c) **the CNG accumulator shall be equipped with at least the following safety components:**
 - (i) **Automatic cylinder valve according to paragraph 18.5.1.**
 - (ii) **TPRD according to paragraph 18.5.2.**
 - (iii) **Excess flow limiting according to paragraph 18.5.3.**
 - (iv) **Manual valve according to paragraph 18.5.4.**
 - (v) **Gas tight housing according to paragraph 18.5.5.**
 - (vi) **PRD (pressure triggered) according to paragraph 18.5.6.**

...

18.5.4.2. For accumulators a manual shut-off valve OR a mechanism to empty the accumulator prior to maintenance works (SW function ...) shall be added.

...

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

...

18.5.2.1. The pressure relief device (temperature triggered) shall be fitted to the CNG fuel container(s) **and each CNG accumulator** 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.

...

18.5.3.1. The excess flow limiting device shall be fitted in the CNG fuel container(s) **and each CNG accumulator** on the automatic cylinder valve.

...

18.5.5.1. A gas-tight housing over the CNG container(s)/**CNG accumulator** fittings, which fulfils the requirements of paragraphs 18.5.5.2. to 18.5.5.5. shall be fitted to the CNG fuel container/**CNG accumulator**, unless the CNG container(s)/**CNG accumulator** is installed outside the vehicle **outside enclosed spaces such as passenger compartment or cargo area or engine compartment.**

...

18.5.6.2. The PRD (pressure triggered) shall be fitted to the fuel container(s) **and CNG accumulator** in such a manner that it can discharge into the gas-tight housing if that gas-tight housing fulfils the requirements of paragraph 18.5.5. above.

However, in case of vehicles of category M and N where the container(s) **and/or CNG accumulator** is (are) fitted outside the vehicle and on the roof or on the top of the bodywork of the vehicle, the pressure relief device (pressure triggered) shall be fitted to the fuel container(s) **and/or CNG accumulator** in such a manner that it can discharge the CNG only in a vertical upward direction.

18.5.6.3. CNG accumulators shall not be mounted inside the engine compartment or be mounted in the crash zone of the vehicle only inside the frame of the vehicle."

Annex 1A, paragraph 1.2.4.5.7., amend to read:

"1.2.4.5.7. CNG container(s) or cylinder(s): yes/no¹
LNG tank(s) or vessel(s): yes/no¹
CNG accumulator(s): yes/no¹ "

Annex 1B, paragraph 1.2.4.5.7., amend to read:

"1.2.4.5.7. CNG container(s) or cylinder(s): yes/no¹
LNG tank(s) or vessel(s): yes/no¹
CNG accumulator(s): yes/no¹ "

Annex 2B, paragraph 1., amend to read:

"1. CNG/LNG component considered:
Container(s) or cylinder(s)²
Tank(s) or vessel(s)²
CNG accumulator(s)²
Pressure indicator²
Pressure relief valve²

...

- 1.1. Natural Gas Storage System
- 1.1.1. Container(s) or cylinder(s) (for CNG system)
 - 1.1.1.1. Dimensions:
 - 1.1.1.2. Material:.....
- 1.1.2. Tank(s) or vessel(s) (for LNG system)
 - 1.1.2.1. Capacity:.....
 - 1.1.2.2. Material:.....

- 1.1.3. **CNG accumulator**
- 1.1.3.1. **Dimensions:**.....
- 1.1.3.2. **Material:**.....
- 1.1.3.3. **Capacity:**.....
- 1.2. Pressure indicator
- 1.2.1. Working pressure(s):1MPa"

II. Justifications

1. This document is intended to serve as a discussion paper for the experts to investigate the development of requirements for the "CNG accumulator" component type.
2. The CNG engines development requires a stable pressure. To require such a stable pressure coming from LNG systems an intermediate buffer (CNG accumulator) is necessary. Also in CNG engine systems we see that the working pressure on the injectors is more and more going into higher working pressures as stored in the CNG cylinders.
3. In UN Regulation No. 110, the possibility to use a CNG accumulator is mentioned (para. 18.3.2.8. CNG accumulator). However, there are neither requirements nor a possibility to certify such components.
4. For LNG systems, the CNG accumulator is used to stabilize the gas pressure and to allow engine operation while the LNG fuel supply system is not able to deliver fuel.
5. By introducing the above given requirements The Netherlands aims to make this technology available and at the same time ensuring an adequate safety level.

