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Item 4.7.9 of the provisional agenda

**1958 Agreement – Consideration of draft amendments  
to existing Regulations submitted by GRSG**

### **Proposal for the 02 series of amendments to Regulation No. 110 (Specific components for CNG/LNG)**

**Submitted by the Working Party on General Safety Provisions\***

The text reproduced below was adopted by the Working Party on General Safety Provisions (GRSG) at its 108<sup>th</sup> and 109<sup>th</sup> session (ECE/TRANS/WP.29/GRSG/87, para. 42 and ECE/TRANS/WP.29/GRSG/88, para. xx). It is based on ECE/TRANS/WP.29/GRSG/2015/6 and ECE/TRANS/WP.29/GRSG/2015/27, as amended by Annex ~~IV~~xx to the report ECE/TRANS/WP.29/GRSG/88. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee AC.1 for consideration at their November 2015 sessions.

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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.

*Paragraph 2.*, amend to read (deleting two references):

"2. References

.....

EN Standards<sup>4</sup>

~~EN 13322-2 2003 Transportable gas cylinders — Refillable welded steel gas cylinders — Design and construction — Part 2: Stainless steel~~

~~EN ISO 5817 2003 Arc-welded joints in steel: guidance on quality levels for imperfections~~

N 1251-2 2000 Cryogenic vessels. Vacuum insulated vessels of not more than 1,000 litres volume

....."

*Paragraph 6.3.*, amend to read:

"6.3. Every container shall also bear a marking plate with the following data clearly legible and indelible:

- (a) A serial number;
- (b) The capacity in litres;
- (c) The marking "CNG";
- (d) Operating pressure/test pressure/**working pressure** [MPa];
- (e) Mass [kg];
- (f) Year and month of approval (e.g. 96/01);
- (g) Approval mark according to paragraph 7.4. "

*Insert a new paragraph 6.4.*, to read:

"6.4. **Every automatic valve and every pressure relief device fitted to the container shall also bear a marking with the following data clearly legible and indelible:**

- (a) **The marking "CNG";**
- (b) **Working pressure [MPa]."**

*Paragraph 6.4. (former)*, renumber as paragraph 6.5.

*Insert a new paragraph 6.6.*, to read:

"6.6. Every one of the following components shall also bear a clearly legible and indelible marking of the data listed below (a) and (b): pressure relief valve (primary); pressure relief valve (secondary); manual fuel shut off valve; manual vapour shut off valve; LNG check valve; and LNG valves (manual or automatic) fitted to the tank.

- (a) The marking "LNG";
- (b) Working pressure [MPa]."

Paragraph 7.2., amend to read:

"7.2. An approval number ... Its first two digits (at present 02 corresponding to the 02 series of amendments) shall indicate ... type of component."

*Insert a new paragraph 8.2.2., to read:*

**"8.2.2. CNG-1, CNG-2 and CNG-3 containers of welded construction are not permitted."**

*Paragraph 18.1.8.4., amend to read:*

"18.1.8.4. A label shall be placed adjacent to the **CNG and/or LNG** fill receptacle stating the fuelling requirements **with the following data:**

- (a) The marking "CNG" and/or "LNG";**
- (b) Working pressure [MPa].**

**The fuelling requirements shall be as recommended by the manufacturer:"**

*Paragraph 18.5.2.1., amend to read:*

"18.5.2.1. The pressure relief device ... of paragraph 18.5.5. below.

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

*Paragraph 18.5.6.2., amend to read:*

"18.5.6.2. The PRD (pressure triggered) shall ... of paragraph 18.5.5. above.

However, in case of vehicles of category M and N where the container(s) 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) in such a manner that it can discharge the CNG only in a vertical upward direction."

*Paragraph 24.3., amend to read:*

"24.3. Type approvals of components other than fuel rail, as defined in paragraph 4.724., granted according to the original version of this Regulation or of components granted according to the 01 series of amendments, shall remain valid and shall be accepted for the purpose of their installation on vehicles as long as the requirements for the specific component have not changed by any series of amendments."

*Insert new paragraphs 24.8. to 24.12., to read:*

"24.8. As from the official date of entry into force of the 02 series of amendments to this Regulation, no Contracting Party applying this Regulation shall refuse to grant or refuse to accept type approval under this Regulation as amended by the 02 series of amendments.

24.9. As from 1 September 2017 Contracting Parties applying this Regulation shall grant approvals only if the type of components to be approved meets the

- requirements of Part I of this Regulation as amended by the 02 series of amendments to this Regulation.
- 24.10. As from 1 September 2018 Contracting Parties applying this Regulation shall grant approvals only if the vehicle type to be approved meets the requirements of Part II of this Regulation as amended by the 02 series of amendments to this Regulation.
- 24.11. As from 1 September 2019 Contracting Parties applying this Regulation may refuse to recognize approvals of a type of vehicle which have not been granted in accordance with Part II of this Regulation as amended by the 02 series of amendments to this Regulation.
- 24.12. Contracting Parties applying this Regulation shall not refuse to grant extensions of type approvals for existing types of component or vehicle types which have been issued according to this Regulation without taking into account the provisions of the 02 series of amendments to this Regulation.
- 24.13. Notwithstanding paragraphs 24.11. and 24.12., Contracting Parties applying this Regulation shall continue to accept type approvals granted to the preceding series of amendments, which are not affected by the 02 series of amendments."**

*Throughout Annexes 2A and 2C, replace the symbol "01" by "02" (9 times).*

*Annex 3, paragraph 1.1., amend to read:*

- "1.1. Annex 3A sets out minimum requirements for light-weight refillable gas cylinders. The cylinders are intended only for the on-board storage of high pressure compressed natural gas as a fuel for automotive vehicles to which the cylinders are to be fixed. Cylinders may be of any steel, aluminium or non-metallic material, design or method of manufacture suitable for the specified service conditions. This annex also covers stainless steel metal liners of seamless ~~or welded~~ construction. "

*Annex 3A*

*Paragraphs 6.3.2.4. and 6.3.2.5., shall be deleted.*

*Paragraph 6.3.2.6. (former), renumber as paragraph 6.3.2.4. and amend to read:*

- "6.3.2.4. Sulphide stress cracking resistance
- The ultimate tensile strength of the steel from a finished cylinder shall not exceed 1,200 MPa.** If the upper limit of the specified tensile strength for the steel exceeds 950 MPa, the steel from a finished cylinder shall be subjected to a sulphide stress cracking resistance test in accordance with Appendix A to this annex, paragraph A.3. and meet the requirements listed therein."

Table 6.1, amend to read:

"Table 6.1

Material design qualification test

	<i>Relevant paragraph of this annex</i>				
	<i>Steel</i>	<i>Aluminium</i>	<i>Resins</i>	<i>Fibres</i>	<i>Plastic liners</i>
Tensile properties	6.3.2.2.	6.3.3.4.		6.3.5.	6.3.6.
Impact properties	6.3.2.3.				
<del>Bending properties</del>	<del>6.3.2.4.</del>				
<del>Weld examination</del>	<del>6.3.2.5.</del>				
Sulphide stress cracking resistance	<del>6.3.2.4.</del> <del>6.3.2.6.</del>				
Sustained load crack resistance		6.3.3.3.			
Stress corrosion cracking		6.3.3.2.			
Shear strength			6.3.4.2.		
Glass transition temperature			6.3.4.3.		
Softening/Melting temperature					6.3.6.
Fracture mechanics*	6.7.	6.7.			

\* Not required if flawed cylinder test approach in paragraph A.7. of Appendix A to this annex is used."

Annex 3A, paragraph 6.12., replace "Exterior protection may be provided" by "Exterior protection shall be provided".

Annex 3A - Appendix A

Paragraphs A.1. and A.2., amend to read:

"A.1. Tensile tests, steel and aluminium

A tensile test shall be carried out on the material taken from the cylindrical part of the finished cylinder using a rectangular test piece shaped in accordance with the method described in ISO 9809 for steel and ISO 7866 for aluminium. ~~For cylinders with welded stainless steel liners, tensile tests shall be also carried out on material taken from the welds in accordance with the method described in paragraph 8.4. of EN 13322-2.~~ The two faces of the test pieces representing the inside and outside surface of the cylinder shall not be machined. The tensile test shall be carried out in accordance with ISO 6892.

*NOTE* - Attention is drawn to the method of measurement of elongation described in ISO 6892, particularly in cases where the tensile test piece is tapered, resulting in a point of fracture away from the middle of the gauge length.

A.2. Impact test, steel cylinders and steel liners

The impact test shall be carried out on the material taken from

the cylindrical part of the finished cylinder on three test pieces in accordance with ISO 148. The impact test pieces shall be taken in the direction as required in Table 6.2 of Annex 3A from the wall of the cylinder. ~~For cylinders with welded stainless steel liners, impact tests shall be also carried out on material taken from the weld in accordance with the method described in paragraph 8.6. of EN 13322-2.~~ The notch shall be perpendicular to the face of the cylinder wall. For longitudinal tests the test piece shall be machined all over (on six faces), if the wall thickness does not permit a final test piece width of 10 mm, the width shall be as near as practicable to the nominal thickness of the cylinder wall. The test pieces taken in transverse direction shall be machined on four faces only, the inner and outer face of the cylinder wall unmachined."

*Paragraph A.28.*, shall be deleted.

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