

20 January 2020

Agreement

Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations*

(Revision 3, including the amendments which entered into force on 14 September 2017)

Addendum 114 – UN Regulation No. 115

Revision 1 - Amendment 3

Supplement 8 to the original version of the Regulation – Date of entry into force: 11 January 2020

Uniform provisions concerning the approval of:

- I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion systems**
- II. Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion systems**

This document is meant purely as documentation tool. The authentic and legal binding text is: ECE/TRANS/WP.29/2019/45.



UNITED NATIONS

* Former titles of the Agreement:

Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958 (original version); Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, done at Geneva on 5 October 1995 (Revision 2).



Add new paragraphs 2.6. and 2.7. to read:

"2.8. "NEDC" means the test cycle to verify the exhaust emissions after a cold start described in UN Regulation No. 83 up to 07 series of amendments.

2.9. "WLTC" means the Worldwide harmonized Light vehicles Test Cycle to verify the exhaust emissions after a cold start, as described in UN GTR No. 15."

Paragraph 6.1.2.1., amend to read:

"6.1.2.1. One LPG retrofit system sample, as described in paragraph 2.2. of this Regulation, installed into the parent vehicle(s), as described in paragraph 2.5. of this Regulation, shall be submitted to the test procedures described in UN Regulations No. 83 and No. 101, in UN GTR No. 15 or UN Regulation No. 49, where applicable, in the limits of the requirements of paragraphs 6.1.2.4. and 6.1.2.5. below. The vehicles and/or the engines are also submitted to a maximum power comparison test, as described in UN Regulation No. 85 for engines, or defined in paragraph 6.1.3. below for vehicles"

Paragraph 6.1.2.4.1.1., amend to read:

"6.1.2.4.1.1. Measurements of tailpipe emissions shall be performed after a cold start with each fuel:

- (a) Reference petrol,
- (b) Reference LPG A,
- (c) Reference LPG B.

The emissions of CO, HC, and NO_x are calculated according to UN Regulation No. 83⁵ or to UN GTR No. 15, as applicable."

Paragraphs 6.1.2.4.1.2.2., 6.1.2.4.1.3. and 6.1.2.4.1.4., amend to read:

"6.1.2.4.1.2.2. Using of the table values only for NEDC cycle:

....

6.1.2.4.1.3. Exhaust emissions test in petrol mode

The test cycle (NEDC or WLTC) shall be chosen according to the initial type approval of the vehicle. The parent vehicle(s), equipped with the retrofit system, shall comply with the limit values according to the type approval of the original vehicle(s) including the deterioration factors applied during the type approval of the original vehicle(s).

6.1.2.4.1.4. Specific requirements for NEDC test cycle.

Subject to the requirements of paragraph 6.1.2.4.1.4.2. below, the tests shall be undertaken three times using reference petrol."

Former paragraph 6.1.2.4.1.4. renumber as 6.1.2.4.1.4.1.

Former paragraph 6.1.2.4.1.5. renumber as 6.1.2.4.1.4.2. and amend to read:

"6.1.2.4.1.4.2. The number of emission tests prescribed in paragraph 6.1.2.4.1.4. may..."

Insert new paragraphs 6.1.2.4.1.5. and 6.1.2.4.1.5.1. to read:

"6.1.2.4.1.5. Specific provision for WLTC test cycle.

Subject to the requirements of paragraph 6.1.2.4.1.5.1 below, the tests shall be undertaken two times using reference petrol.

6.1.2.4.1.5.1. The number of emission tests prescribed in paragraph 6.1.2.4.1.5 may be reduced to one test if the result obtained for each pollutant subject to limitation is less than or equal to 0.9 the emission limit (i.e. $V_1 \leq 0.90 G$);

Where:

- V1 value of the emission of one pollutant obtained from the first test of the Type I performed;
- G limit value of the emissions of one pollutant (CO/HC/NO_x) according to the type approval of the vehicle(s) divided by the deterioration factors."

Paragraph 6.1.2.4.1.6., amend to read:

"6.1.2.4.1.6. Exhaust emissions test in LPG mode

The test cycle (NEDC or WLTC) shall be chosen according to the initial type approval of the vehicle. The parent vehicle, equipped with the retrofit system, shall comply with the limit values according to the type approval of the original vehicle(s) including the deterioration factors applied during the type approval of the original vehicle(s).

If the parent vehicle complies with UN Regulation No. 83, 05 series of amendments, or with Directive 98/69/EC, or with UN Regulation No. 49, 04 series of amendments, or with Directive 1999/96/EC, the vehicle shall not use petrol for more than a maximum of 90 seconds during each test.

For vehicles complying with up to 07 series of amendments to UN Regulation No. 83 or with the 05 or following series of amendments to UN Regulation No.49, this period shall not exceed 60 seconds.

For vehicles approved with the WLTC cycle, this period shall be predetermined and shall not be changed by the driver."

Paragraph 6.1.2.4.1.6.2., amend to read:

"6.1.2.4.1.6.2. Use of petrol

If the parent vehicle complies with UN Regulation No. 83, 05 series of amendments, or with Directive 98/69/EC, or with UN Regulation No. 49, 04 series of amendments, or with Directive 1999/96/EC, the vehicle shall not use petrol for more than a maximum of 90 seconds during each test.

For vehicles complying with up to 07 series of amendments to UN Regulation No. 83 or with the 05 or following series of amendments to UN Regulation No.49, this period shall not exceed 60 seconds.

For vehicles approved with the WLTC cycle, this period shall be predetermined and shall not be changed by the driver."

Paragraph 6.1.2.4.1.7., amend to read:

"6.1.2.4.1.7. Specific provision for NEDC test cycle

Subject to the requirements of paragraph 6.1.2.4.1.7.2 below, the tests shall be undertaken three times with each reference LPG.

6.1.2.4.1.7.1. Notwithstanding the requirements of paragraph 6.1.2.4.1.7. above, for each pollutant or combination of pollutants, one of the three test results may exceed, by not more than 10 per cent, the limit prescribed, provided that the arithmetical mean of the three results is below the prescribed limit. In this case the prescribed limits may be exceeded for more than one pollutant in the same test or in different tests."

Former paragraph 6.1.2.4.1.8. renumber as 6.1.2.4.1.7.2. and amend to read:

"6.1.2.4.1.7.2. The number of emission tests prescribed in paragraph 6.1.2.4.1.7. above..."

Insert new paragraphs 6.1.2.4.1.8. and 6.1.2.4.1.8.1., to read:

"6.1.2.4.1.8. Specific provision for WLTC test cycle

Subject to the requirements of paragraph 6.1.2.4.1.8.1 below, the tests shall be undertaken two times with each reference LPG.

6.1.2.4.1.8.1. The number of emission tests prescribed in paragraph 6.1.2.4.1.8. above on each LPG reference fuel may be reduced to one test if the result obtained for each pollutant or for the combined emission of two pollutants subject to limitation is less than or equal to 0.9 the emission limit (i.e. $M_1 \leq 0.9 G$);

Where:

M_1 value of the emission of one pollutant obtained from the first test of the Type I performed;

G limit value of the emissions of one pollutant (CO/HC/NO_x) or the sum of two pollutants (HC + NO_x) according to the type approval of the vehicle(s) divided by the deterioration factors."

Paragraph 6.1.2.4.3.1., amend to read:

"6.1.2.4.3.1. The emissions of CO₂ are calculated according to UN Regulation No. 101 or to UN GTR No. 15 as applicable, for each parent vehicle, if applicable.

The mean of CO₂ emissions shall be calculated as follows:

...."

Paragraph 6.2.2.1., amend to read:

"6.2.2.1. One CNG retrofit system sample, as described in paragraph 2.2. of this Regulation, installed into the parent vehicle(s), as described in paragraph 2.5. of this Regulation, shall be submitted to the test procedures described in UN Regulations No. 83 and No. 101, in UN GTR No. 15 or UN Regulation No. 49, where applicable, in the limits of the requirements of paragraphs 6.2.2.4. and 6.2.2.5. below. The vehicles and/or the engines are also submitted to a maximum power comparison test, as described in UN Regulation No. 85 for engines, or defined in paragraph 6.2.3. below for vehicles."

Paragraph 6.2.2.4.1.1., amend to read:

"6.2.2.4.1.1. Measurements of tailpipe emissions shall be performed after a cold start with each fuel:

- (a) Reference petrol;
- (b) Reference G20 fuel;
- (c) Reference G25 fuel.

The emissions of CO, HC, and NO_x are calculated according to UN Regulation No. 83⁵ or to UN GTR No. 15, as applicable."

Paragraphs 6.2.2.4.1.2.2., 6.2.2.4.1.3. and 6.2.2.4.1.4., amend to read:

"6.2.2.4.1.2.2. Using of the table values only for NEDC cycle:

....

6.2.2.4.1.3. Exhaust emissions test in petrol mode

The test cycle (NEDC or WLTC) shall be chosen according to the initial type approval of the vehicle. The parent vehicle(s), equipped with the retrofit system, shall comply with the limit values according to the type approval of the original vehicle(s) including the deterioration factors applied during the type approval of the original vehicle(s).

6.2.2.4.1.4. Specific requirements for NEDC test cycle.

Subject to the requirements of paragraph 6.2.2.4.1.4.2 below, the tests shall be undertaken three times using reference petrol."

Former paragraph 6.2.2.4.1.4. renumber as 6.2.2.4.1.4.1.

Former paragraph 6.2.2.4.1.5. renumber as 6.2.2.4.1.4.2. and amend to read:

"6.2.2.4.1.4.2. The number of emission tests prescribed in paragraph 6.2.2.4.1.4. may..."

Insert new paragraphs 6.2.2.4.1.5. and 6.2.2.4.1.5.1. to read:

"6.2.2.4.1.5. Specific provision for WLTC test cycle.

Subject to the requirements of paragraph 6.2.2.4.1.5.1 below, the tests shall be undertaken two times using reference petrol.

6.2.2.4.1.5.1. The number of emission tests prescribed in paragraph 6.2.2.4.1.5 may be reduced to one test if the result obtained for each pollutant subject to limitation is less than or equal to 0.9 the emission limit (i.e. $V1 \leq 0.90 G$);

Where:

V1 value of the emission of one pollutant obtained from the first test of the Type I performed;

G limit value of the emissions of one pollutant (CO/HC/NO_x) according to the type approval of the vehicle(s) divided by the deterioration factors."

Paragraph 6.2.2.4.1.6., amend to read:

"6.2.2.4.1.6. Exhaust emissions test in CNG mode

The test cycle (NEDC or WLTC) shall be chosen according to the initial type approval of the vehicle. The parent vehicle, equipped with the retrofit system, shall comply with the limit values according to the type approval of the original vehicle(s) including the deterioration factors applied during the type approval of the original vehicle(s).

If the parent vehicle complies with UN Regulation No. 83, 05 series of amendments, or with Directive 98/69/EC, or with UN Regulation No. 49, 04 series of amendments, or with Directive 1999/96/EC, the vehicle shall not use petrol for more than a maximum of 90 seconds during each test.

For vehicles complying with up to 07 series of amendments to UN Regulation No. 83 or with the 05 or following series of amendments to UN Regulation No. 49, this period shall not exceed 60 seconds.

For vehicles approved with the WLTC cycle, this period shall be predetermined and shall not be changed by the driver."

Paragraph 6.2.2.4.1.6.2., amend to read:

"6.2.2.4.1.6.2. Use of petrol

If the parent vehicle complies with UN Regulation No. 83, 05 series of amendments, or with Directive 98/69/EC, or with UN Regulation No. 49, 04 series of amendments, or with Directive 1999/96/EC, the vehicle shall not use petrol for more than a maximum of 90 seconds during each test.

For vehicles complying with up to 07 series of amendments to UN Regulation No. 83 or with the 05 or following series of amendments to UN Regulation No. 49, this period shall not exceed 60 seconds.

For vehicles approved with the WLTC cycle, this period shall be predetermined and shall not be changed by the driver."

Paragraph 6.2.2.4.1.7., amend to read:

"6.2.2.4.1.7. Specific provision for NEDC test cycle

Subject to the requirements of paragraph 6.2.2.4.1.7.2 below, the tests shall be undertaken three times with each reference CNG.

6.2.2.4.1.7.1. Notwithstanding the requirements of paragraph 6.1.2.4.1.7. above, for each pollutant or combination of pollutants, one of the three test results may exceed, by not more than 10 per cent, the limit prescribed, provided that the arithmetical mean of the three results is below the prescribed limit. In this case the prescribed limits may be exceeded for more than one pollutant in the same test or in different tests."

Former paragraph 6.2.2.4.1.8. renumber as 6.2.2.4.1.7.2. and amend to read:

"6.2.2.4.1.7.2. The number of emission tests prescribed in paragraph 6.2.2.4.1.7. above..."

Insert new paragraphs 6.2.2.4.1.8. and 6.2.2.4.1.8.1., to read:

"6.2.2.4.1.8. Specific provision for WLTC test cycle

Subject to the requirements of paragraph 6.2.2.4.1.8.1 below, the tests shall be undertaken two times with each reference CNG.

6.2.2.4.1.8.1. The number of emission tests prescribed in paragraph 6.1.2.4.1.8. above on each CNG reference fuel may be reduced to one test if the result obtained for each pollutant or for the combined emission of two pollutants subject to limitation is less than or equal to 0.9 the emission limit (i.e. $M_1 \leq 0.90 G$);

Where:

M_1 value of the emission of one pollutant obtained from the first test of the Type I performed;

G limit value of the emissions of one pollutant (CO/HC/NO_x) or the sum of two pollutants (HC + NO_x) according to the type approval of the vehicle(s) divided by the deterioration factors."

Paragraph 6.2.2.4.3.1., amend to read:

"6.2.2.4.3.1. The emissions of CO₂ are calculated according to UN Regulation No. 101 or to UN GTR No. 15 as applicable, for each parent vehicle, if applicable.

The mean of CO₂ emissions shall be calculated as follows:

...."

Annex 2A

Paragraph 2., amend to read:

"2. Calculation of the LPG energy ratio

....

FC_{norm}: the fuel consumption (l/100 km) calculated in accordance with paragraph 1.4.3. (b) of Annex 6 to UN Regulation No. 101 or with paragraph 6 of Annex 7 to UN GTR No. 15, as applicable. If applicable, the correction factor cf in the equation used to determine FC_{norm} shall be calculated using the H/C ratio of the gaseous fuel;

...."

Annex 2B

Paragraph 2., amend to read:

"2. Calculation of the CNG energy ratio

....

FC_{norm}: the fuel consumption (m³/100 km) calculated in accordance with paragraph 1.4.3. (c) of Annex 6 to UN Regulation No. 101 or with paragraph 6 of Annex 7 to UN GTR No. 15, as applicable;

...."