Economic and Social Council

Distr.: General
25 August 2015

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

167th session
Geneva, 10-13 November 2015
Item 4.9.3 of the provisional agenda
**1958 Agreement – Consideration of draft amendments
to existing Regulations submitted by GRPE**

Proposal for Supplement 7 to the original version of Regulation No. 85 (Measurement of the net power)

Submitted by the Working Party on Pollution and Energy[*]

The text reproduced below was adopted by the Working Party on Pollution and Energy (GRPE) at its seventy-first session (ECE/TRANS/WP.29/GRPE/71, para. 35). It is based on ECE/TRANS/WP.29/GRPE/2015/12. 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.

Annex 5,

Paragraph 2.3.2., Table 1, footnote 1b, amend to read:

"[1b]   The complete exhaust system shall be fitted as provided for the intended application:
…
The exit from the engine exhaust system is defined as a point 150 mm downstream from the termination of the part of the exhaust system mounted on the engine."

Paragraphs 5.4. to 5.4.3. (adding a new paragraph 5.4.3.), amend to read:

"5.4.   Determination of correction factor α_a and α_d [1]

5.4.1.   Naturally aspirated or pressure-charged positive-ignition engine factor α_a

The correction factor α_a is obtained by applying the formula: [2]

$$\alpha_a = \left(\frac{99}{P_s}\right)^{1.2} \cdot \left(\frac{T}{298}\right)^{0.6}$$

Where

> P_s is the total dry atmospheric pressure in kilopascals (kPa); that is to say, the total barometric pressure minus water vapour pressure

> T is the absolute temperature in kelvins (K) of the air drawn in by the engine.

Conditions to be complied with in the laboratory

For a test to be valid, the correction factor α_a must be such that
$0.93 \leq \alpha_a \leq 1.07$

If these limits are exceeded, the corrected value obtained shall be given and the test conditions (temperature and pressure) precisely stated in the test report.

5.4.2.   Diesel engines - Factor α_d

The power correction factor (α_d) for diesel engines at constant fuel rate is obtained by applying the formula:

Where $\alpha_d = (f_a)\, f_m$

> f_a is the atmospheric factor

> f_m is the characteristic parameter for each type of engine and adjustment

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[1]   The tests may be carried out in air-conditioned test rooms where the atmospheric conditions may be controlled.

[2]   In the case of engines fitted with automatic air temperature control, if the device is such that at full load at 25 °C no heated air is added, the test shall be carried out with the device fully closed. If the device is still operating at 25 °C then the test is made with the device operating normally and the exponent of the temperature term in the correction factor shall be taken as zero (no temperature correction).

5.4.2.1.   Atmospheric factor f_a

This factor indicates the effects of environmental conditions (pressure, temperature and humidity) on the air drawn in by the engine. The atmospheric factor formula differs according to the type of engine.

5.4.2.1.1.   Naturally aspirated and mechanically supercharged engines

$$f_a = \left(\frac{99}{P_s}\right) \cdot \left(\frac{T}{298}\right)^{0.7}$$

5.4.2.1.2.   Turbocharged engines with or without cooling of inlet air

$$f_a = \left(\frac{99}{P_s}\right)^{0.7} \cdot \left(\frac{T}{298}\right)^{1.5}$$

5.4.2.2.   Engine factor f_m

f_m is a function of q_c (fuel flow corrected) as follows:

$f_m = 0.036 \, q_c - 1.14$

Where: $q_c = q/r$

Where:

q is the fuel flow in milligram per cycle per litre of total swept volume (mg/(l.cycle))

r is the pressure ratio of compressor outlet and compressor inlet

(r = 1 for naturally aspirated engines)

This formula is valid for a value interval of q_c included between 40 mg/(l.cycle) and 65 mg/(l.cycle.)

For q_c values lower than 40 mg/(l.cycle), a constant value of f_m equal to 0.3 (f_m= 0.3) will be taken.

For q_c values higher than 65 mg/(l.cycle), a constant value of f_m equal to 1.2 (f_m = 1.2) will be taken (see figure):
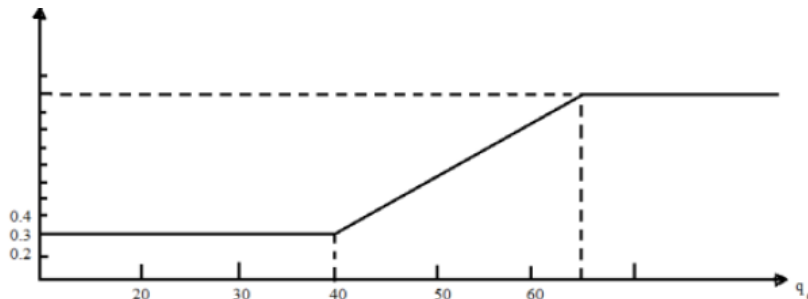
5.4.2.3.   Conditions to be complied with in the laboratory

For a test to be valid; the correction factor α_d must be such that $0.9 \leq \alpha_d \leq 1.1$ If these limits are exceeded, the corrected value obtained shall be given and the test conditions (temperature and pressure) precisely stated in the test report.

5.4.3.   When a turbocharged engine is fitted with a system which allows compensating the ambient conditions temperature and altitude, at the request of the manufacturer, the correction factor α_a or α_d shall be set to the value of 1."

Appendix,

Item 4, amend to read:

"4.   …

Engine speed, min^{-1}		
…		
Net power, kW		
Net torque, Nm		
…		

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