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World Forum for Harmonization of Vehicle Regulations

Working Party on Pollution and Energy

Fifty-fourth session
Geneva, 5-8 June 2007
Item 6(a) of the provisional agenda

AMENDMENTS TO UNECE REGULATIONS

REGULATION No. 83

Proposal for draft Corrigendum to Revision 3 of Regulation No. 83
(Emissions of M_1 and N_1 categories of vehicles)

Submitted by the expert from the United Kingdom

The text reproduced below was prepared by the expert from the United Kingdom to correct typographical errors, amongst others, in the determination of power absorbed in the coast-down in Appendix 3 of Annex 4.

The modifications to the current text of the Regulation are marked in **bold** characters.

Note: This document is distributed to the experts of the Working Party on Pollution and Energy only.

A. PROPOSAL

Annex 4 - Appendix 3

Paragraph 5.1.1.2.5., correct to read:

"5.1.1.2.5. Take the average T of the two times t_1 **and** t_2"

Paragraph 5.1.1.2.7., correct to read:

"5.1.1.2.7. Calculate the power by the formula

$$P = \frac{M.V.\Delta V}{\mathbf{500}\ T}$$

where:

P is expressed in kW
V = speed of the test in m/s
ΔV = speed deviation from speed V, in m/s **as specified in paragraph 5.1.1.2.3. of this appendix**
M = reference mass in kg
T = time in seconds (s) "

Annex 7, paragraph 5.2.1., correct "± 5 KPa" to read "**± 0.5 kPa**".

B. JUSTIFICATION

Annex 4 - Appendix 3, paragraph 5.1.1.2.5.

This is the correction of a typographical error.

Annex 4 - Appendix 3, paragraph 5.1.1.2.7

The formula as currently published miscalculates the power requirement, and this amendment corrects that miscalculation.

From first principles, kinetic energy is given by:

$$KE = \frac{M.V^2}{2}$$

The change in kinetic energy for a variation in speed from ΔV above speed V to ΔV below speed V is given by:

$$\Delta KE = \frac{M.[(V + \Delta V)^2 - (V - \Delta V)^2]}{2}$$

$$\Delta KE = \frac{M.4.V.\Delta V}{2}$$

$$\Delta KE = 2.M.V.\Delta V$$

Where:

KE = kinetic energy expressed in joules
M = mass of the vehicle in kg
V = speed of the test in m/s
ΔV = deviation from speed V
T = time in seconds (s)

Power is energy delivered or absorbed per unit time, therefore divide KE in Joules by T to convert to power absorbed in Watts, and by 1000 to convert to kW:

$$P = \frac{2.M.V.\Delta V}{1000.T}$$

thus:

$$P = \frac{M.V.\Delta V}{500.T}$$

Annex 7, paragraph 5.2.1.

This is a correction of a typographical error.

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