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Regulation No. 117 (Tyre – Rolling resistance, rolling noise and wet grip)

Proposal for Supplement 1 to the 02 series of amendments to Regulation No. 117 (Tyres - Rolling resistance, rolling noise and wet grip)

Submitted by the Working Party on Noise *

The text reproduced below was adopted by the Working Party on Noise (GRB) at its fifty-fourth session to propose an alternative to improve the accuracy of the deceleration method. It is based on ECE/TRANS/WP.29/GRB/2011/11 as reproduced by Annex III to the report (ECE/TRANS/WP.29/GRB/52, para. 12). It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and the Administrative Committee (AC.1) for consideration.

* In accordance with the programme of work of the Inland Transport Committee for 2010–2014 (ECE/TRANS/208, para. 106 and ECE/TRANS/2010/8, 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 6

Paragraph 3.5., amend to read:

"3.5. Duration and speed.

When the deceleration method is selected, the following requirements apply:

(a) The deceleration j shall be determined in exact dω/dt or approximate Δω/Δt form, where ω is angular velocity, t – time;

(b) For duration Δt, the time increments shall not exceed 0.5 s;

(c) Any variation of the test drum speed shall not exceed 1 km/h within one time increment."

Paragraph 4.6.2., amend to read:

"4.6.2. Deceleration method

The deceleration method follows the procedure below:

(a) Remove the tyre from the test surface;

(b) Record the deceleration of the test drum ΔωDo/ Δt and that of the unloaded tyre $\Delta\omega_{T0}/\ \Delta t^3$ or record the deceleration of the test drum j_{D0} and that of the unloaded tyre j_{T0} in exact or approximate form in accordance with paragraph 3.5."

Paragraph 5.1.5., amend to read:

"5.1.5. Deceleration method

Calculate the parasitic losses F_{pl}, in newton.

$$F_{pl} = \frac{I_D}{R}\left(\frac{\Delta\omega_{D0}}{\Delta t_0}\right) + \frac{I_T}{R_r}\left(\frac{\Delta\omega_{T0}}{\Delta t_0}\right)$$

Where:

I_D is the test drum inertia in rotation, in kilogram meter squared,

R is the test drum surface radius, in meter,

ω_{D0} is the test drum angular speed, without tyre, in radians per second,

Δt_0 is the time increment chosen for the measurement of the parasitic losses without tyre, in second,

I_T is the spindle, tyre and wheel inertia in rotation, in kilogram meter squared,

R is the tyre rolling radius, in metre,

ω_{T0} is the tyre angular speed, unloaded tyre, in radian per second.

or

$$F_{pl} = \frac{I_D}{R}\, j_{D0} + \frac{I_T}{R_r}\, j_{T0}$$

Where:

I_D is the test drum inertia in rotation, in kilogram meter squared,

R is the test drum surface radius, in meter,

j_{D0} is the deceleration of the test drum, without tyre, in radians per second squared,

I_T is the spindle, tyre and wheel inertia in rotation, in kilogram meter squared,

R_r is the tyre rolling radius, in metre,

j_{T0} is the deceleration of unloaded tyre, in radians per second squared."

Paragraph 5.2.5., amend to read:

"5.2.5. Deceleration method

The rolling resistance F_r, in newton, is calculated using the equation:

$$F_r = \frac{I_D}{R}\left(\frac{\Delta\omega_v}{\Delta t_v}\right) + \frac{RI_T}{R_r^2}\left(\frac{\Delta\omega_v}{\Delta t_v}\right) - F_{pl}$$

Where:

I_D is the test drum inertia in rotation, in kilogram metre squared,

R is the test drum surface radius, in meter,

F_{pl} represents the parasitic losses as calculated in paragraph 5.1.5.,

Δt_v is the time increment chosen for measurement, in second,

$\Delta\omega_v$ is the test drum angular speed increment, without tyre, in radian per second,

I_T is the spindle, tyre and wheel inertia in rotation, in kilogram metre squared,

R_r is the tyre rolling radius, in metre,

F_r is the rolling resistance, in newton.

or

$$Fr = \frac{I_D}{R} j_V + \frac{RI_T}{R_r^2} j_V - F_{pl}$$

Where:

I_D	is the test drum inertia in rotation, in kilogram metre squared,
R	is the test drum surface radius, in meter,
F_{pl}	represents the parasitic losses as calculated in paragraph 5.1.5.,
j_V	is the deceleration of the test drum, in radians per second squared,
I_T	is the spindle, tyre and wheel inertia in rotation, in kilogram metre squared,
R_r	is the tyre rolling radius, in metre,
F_r	is the rolling resistance, in newton."

Annex 6, Appendix 1

Paragraph 4, amend to read:

"4. Control accuracy

…

(d) time: +/- 0.5 ms

…"