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Regulation No. 117 (Tyre rolling noise and wet grip adhesion)

Proposal for Supplement 7 to the 02 series of amendments to Regulation No. 117

Submitted by the experts from the Russian Federation and the European Tyre and Rim Technical Organisation*

The text reproduced below was prepared by the experts from the European Tyre and Rim Technical Organisation (ETRTO) and agreed upon by the experts from the Russian Federation. It aims to correct inconsistencies in time measurement accuracy for instrumentation involved in the rolling resistance method (Annex 6 to Regulation No. 117) and follows the decision by GRB to await a revised proposal jointly prepared by the experts from the Russian Federation and ETRTO (ECE/TRANS/WP.29/GRB/56 para. 16). The modifications to the existing text of the Regulation are underlined for new or strikethrough for deleted characters.

* 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.

I. Proposal

Annex 6, Appendix 1, paragraph 4, amend to read:

"4. Control accuracy

…

(d) Time: ~~±0.5 ms~~

(i) +/- 0.2 per cent for the time increments specified in Annex 6, paragraph 3.5.(a) for the data acquisition in the deceleration method, both in Δω/Δt or dω/dt form;

(ii) +/- 5 per cent for the other time durations specified in Annex 6.

Annex 6, Appendix 1, paragraph 5, amend to read:

"5. Instrumentation accuracy

The instrumentation used for readout and recording of test data shall be accurate within the tolerances stated below:

Parameter	*Load Index ≤ 121*	*Load Index > 121*
Tyre load	±10 N or ±0.5 % [(a)]	±30 N or ±0.5 % [(a)]
Inflation pressure	±1 kPa	±1.5 kPa
Spindle force	±0.5 N or ±0.5 % [(a)]	±1.0 N or ±0.5 % [(a)]
Torque input	±0.5 Nm or ±0.5 % [(a)]	±1.0 Nm or ±0.5 % [(a)]
Distance	±1 mm	±1 mm
Electrical power	±10 W	±20 W
Temperature	±0.2 °C	
Surface speed	±0.1 km/h	
Time	~~±0.01 s~~ **± 0.1 % - ± 10 s[(b)]**	
Angular velocity	±0.1 %	

[(a)] Whichever is greater.

[(b)] **+/- 0.1 per cent for the time increments specified in Annex 6, paragraph 3.5.(a) for the data acquisition in the deceleration method, both in Δω/Δt or dω/dt form**
+/- 10 sec for the other time durations specified in Annex 6.

II. Justification

1. Regulation No. 117, Annex 6 specifies time duration values in several paragraphs:

- 3.5.(a) on deceleration method data acquisition (maximum 0.5 s duration);
- 4.2. on thermal conditioning (minimum of 3 hours for Class C1 tyres and of 6 hours for Class C2 and C3 tyres);
- 4.3. on pressure adjustment (verified 10 minutes after the adjustment is made);

- 4.4. on tyre warm up (30, 50, 150 and 180 minutes according to tyre category, LI and nominal rim diameters);
- 6.5. on warm-up duration in the case of multiple successive measurements (10, 20 or 30 minutes according to tyre category).

2. In contrast, Annex 6, Appendix 1 gives only one control accuracy value for time in its paragraph 4 (d), plus or minus 0.02 second. This means that this accuracy value applies to all the time durations specified in Regulation No. 117, Annex 6 and quoted above. This is not realistic for durations of more than one minute and not well fitted to the need of data acquisition for deceleration method.

3. To solve this issue, it is proposed that two accuracy sets of values are introduced in paragraphs 4 and 5 of Regulation No. 117, Annex 6, Appendix 1:

(i) A control accuracy of +/- 0.2 per cent and a corresponding instrumentation accuracy of +/- 0.1 per cent for the time increments specified in Annex 6, paragraph 3.5(a) for the data acquisition in the deceleration method, both in $\Delta\omega/\Delta t$ or $d\omega/dt$ form;

(ii) A control accuracy of +/- 5 per cent and an instrumentation accuracy of maximum +/- 10 seconds for the other time durations specified in Annex 6.

4. The justification of the proposed values for the data acquisition in the deceleration method is the one the experts from the Russian Federation built in informal document GRB-58-13, part II, para. 2.

5. The justification of the proposed values for the other time durations in Regulation No. 117, Annex 6 (paragraphs 4.2, 4.3, 4.4 and 6.5) is that:

- The ETRTO experts experience shows that a control accuracy of +/- 5 per cent is well fitted to the repeatability and reproducibility of the different tyre rolling resistance measurement methods;
- An instrumentation accuracy of 10 seconds is well adapted to the above control accuracy (minimum +/- 30 seconds for duration of 10 minutes) and easy to reach with available time measuring devices.