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## Proposal for amendments to Regulation No. 117

**Note:** The text reproduced below was prepared by the experts from the European Tyre and Rim Technical Organisation (ETRTO) and agreed by the experts from the Russian Federation. It aims to correcting inconsistencies in time measurement accuracy in Annex 6. This document answers the agreement of GRB, recalled in ECE/TRANS/WP.29/GRB/56 paragraph 16, to await a revised proposal jointly prepared by the experts from the Russian Federation and ETRTO on new time measurement accuracy for instrumentation involved in the rolling resistance method (Annex 6 to Regulation 117). The modifications to the existing text of the Regulation are underlined for new or strikethrough for deleted characters.

### I. Proposal

*Annex 6, Appendix 1*

*Paragraph 4, amend to read:*

"4. Control accuracy

...

(d) Time:  ~~$\pm 0.5$  ms~~

- **$\pm 0.2$  % 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**
- **$\pm 5$  % for the other time durations specified in Annex 6**

*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:

<i>Parameter</i>	<i>Load Index <math>\leq 121</math></i>	<i>Load Index <math>&gt; 121</math></i>
Tyre load	$\pm 10$ N or $\pm 0.5$ % <sup>(a)</sup>	$\pm 30$ N or $\pm 0.5$ % <sup>(a)</sup>
Inflation pressure	$\pm 1$ kPa	$\pm 1.5$ kPa
Spindle force	$\pm 0.5$ N or $\pm 0.5$ % <sup>(a)</sup>	$\pm 1.0$ N or $\pm 0.5$ % <sup>(a)</sup>
Torque input	$\pm 0.5$ Nm or $\pm 0.5$ % <sup>(a)</sup>	$\pm 1.0$ Nm or $\pm 0.5$ % <sup>(a)</sup>
Distance	$\pm 1$ mm	$\pm 1$ mm
Electrical power	$\pm 10$ W	$\pm 20$ W
Temperature	$\pm 0.2$ °C	

<i>Parameter</i>	<i>Load Index ≤ 121</i>	<i>Load Index &gt; 121</i>
Surface speed	±0.1 km/h	
Time	±0.01 s ± 0.1 % - ± 10sec <sup>(b)</sup>	
Angular velocity	±0.1 %	

(a) Whichever is greater.

(b) **+/- 0.1 % s 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  
+/- 10 sec for the other time durations specified in Annex 6**

## II. Justification

1. Regulation 117, Annex 6 specifies time duration values within several paragraphs:
  - 3.5.a on deceleration method data acquisition ( maximum 0.5s 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 diameter).
  - 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 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 2 accuracy sets of values are introduced in paragraphs 4 and 5 of Regulation 117, Annex 6, Appendix 1:
  1. A control accuracy of +/- 0.2 % s and a corresponding instrumentation accuracy of +/- 0.1 % s 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
  2. A control accuracy of +/- 5% and an instrumentation accuracy of maximum +/- 10 sec 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 paragraph 2.
5. The justification of the proposed values for the other time durations in Regulation 117 Annex 6 (paragraphs 4.2 – 4.3 – 4.4 and 6.5) is that:
  - From the ETRTO experts experience a control accuracy of +/- 5% is well fitted to the repeatability and reproducibility of the different tyre rolling resistance measurement methods.

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- An instrumentation accuracy of 10 sec is well adapted to the above control accuracy (minimum +/- 30 sec for duration of 10 minutes) and easy to reach with available time measuring devices.
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