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Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

Working Party on Noise

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Item 6 of the provisional agenda
Regulation No. 117 (Tyre rolling noise and wet grip adhesion)

Proposal for draft amendments to Regulation No. 117

Submitted by the expert from the European Tyre and Rim Technical Organization *

The text reproduced below was prepared by the expert from the European Tyre and Rim Technical Organization (ETRTO) to clarify in Regulation No. 117 the provisions on the reproducibility of tyre measurements in laboratories. Modifications to the current text of the Regulation are marked in bold for new or strikethrough for deleted characters.

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* In accordance with the programme of work of the Inland Transport Committee for 2006–2010 (ECE/TRANS/166/Add.1, 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

Paragraphs 2.18.9., footnote [9], amend to read:

"[9]   **Measurement reproducibility** σ_m can be estimated by measuring n times (where n ≥ ~~5~~ **3),
on a single tyre,** the whole procedure described ~~section~~ **in paragraph** 4 of Annex 6 ~~to this
Regulation, for at least five tyres, assuming that the variances of at least five tyres are
homogeneous,~~ as follows:

$$\sigma_m = \sqrt{\frac{1}{n} \cdot \sum_{i}^{n} \sigma^2_{m,i}}$$

$$\sigma_{m,i} = \sqrt{\frac{1}{n-1} \cdot \sum_{j=1}^{n} \left(Cr_{i,j} - \frac{1}{n} \cdot \sum_{j=1}^{n} Cr_{i,j} \right)^2}$$

$$\sigma_m = \sqrt{\frac{1}{n-1} \cdot \sum_{j=1}^{n} \left(Cr_j - \frac{1}{n} \cdot \sum_{j=1}^{n} Cr_j \right)^2}$$

Where:

~~i   = either 1 or 5 corresponding to each of the tyres~~

j   = is the counter from 1 to n for the number of repetitions of each measurement for a given tyre

n   = **number of** repetitions of tyre measurements **(n ≥ 3)**"

Annex 6, paragraph 4.7., amend to read:

"4.7.   Allowance for machines exceeding $\sigma_{m,i}$ criterion ……"

Annex 6, paragraph 6.5., amend to read:

"6.5.   The laboratory shall ensure that, based on a minimum of three measurements, the machine maintains the following values of $\sigma_{m,i}$, as measured on a single tyre:

$\sigma_{m,i} \leq 0.075$ N/kN for tyres of Classes C1 and C2

$\sigma_{m,i} \leq 0.06$ N/kN for tyres of Class C3

If the above requirement for $\sigma_{m,i}$ is not met, the following formula shall be applied to determine the minimum number of measurements n (rounded to the immediate superior integer value) that are required by the machine to qualify for conformance with this Regulation.

n = ($\sigma_{m,i}$ / x)^2

……"

II.   Justification

The 02 series of amendments to Regulation No. 117 (ECE/TRANS/WP.29/2010/63) have been adopted by the World Forum for Harmonization of Vehicle Regulations (WP.29) at its June 2010 session without the informative Annexes 8 and 9 (see report (ECE/TRANS/WP.29/1085, para. 45) related to the alignment procedure. Therefore, the reproducibility of the machine used in the laboratory has to be calculated on a single tyre.