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Item 5.4. of the provisional agenda

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 106
(Pneumatic tyres for agricultural vehicles)

Submitted by the experts from the European Tyre and Rim Technical Organisation (ETRTO)

Note: The text reproduced below has been prepared by the experts from ETRTO in order to amend Annex 9 of Regulation No. 106 in the view of allowing the load/speed test to be performed on larger test drum than 1.70 meter in diameter. The modifications to the existing text of the Regulation are marked in **bold** characters.

Note: This document is distributed to the Experts on Brakes and Running Gear only.

A. PROPOSAL

Annex 9

Paragraph 3.1., amend to read:

"3.1. Mount the tyre and wheel assembly on the test axle and press it against the outer face of a smooth power-driven test drum of **at least 1700 mm** ± 1 per cent in diameter having a surface at least as wide as the tyre tread."

Insert a new paragraph 3.4.1., to read:

"**3.4.1. In case of a test drum diameter larger than 1700 mm ± 1 per cent, the above "percentage of test load" shall be increased as follows:**

$F_1 = K \cdot F_2$ where:

$$K = \sqrt{\frac{(R_1 / R_2) \cdot (R_2 + r_T)}{(R_1 + r_T)}}$$

R_1 is the diameter of test drum, in millimeter
R_2 is the diameter of the reference test drum of 1700 mm
r_T is the tyre outer diameter (see paragraph 6.2. of this Regulation), in millimeter
F_1 is the percentage of load to be applied for the test drum
F_2 is the percentage of load, as per above table, to be applied for reference test drum of 1700 mm

Example: K = 1 for a test drum diameter of 1700 mm;
In case of a test drum diameter of 3000 mm and a tyre diameter of 1500 mm:

$$K = \sqrt{\frac{(3000/1700) \cdot (1700+1500)}{(3000+1500)}} = 1.12"$$

B. JUSTIFICATION

Annex 9 of Regulation No. 106 requires that all speed symbol D tyres have to undergo the load/speed test.

For the test made on a drum, it specifies that the diameter of the drum shall be 1.70 m ± 1 per cent and that the drum shall be as wide as the tyre tread.

Taking into account the range of drive wheel tractor tyres as well as implement tyres for mixed applications classified with speed symbol D, existing 1.70 m diameter test drums are not capable to test the whole range of those tyres.

It is therefore requested to allow the use of larger diameters test drum provided that the test conditions are equivalent.

The purpose of the proposal is to provide a calculation method to adjust the test load depending on the test drum diameter, keeping a similar test severity.

The formula for the determination of the test load depending on the diameter of the test drum is derived from the ISO 18164 "Truck, bus, passenger-car and motorcycles tyres --- Methods of measuring rolling resistance", paragraph [9.3.] "Drum diameter correction".

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