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Working Party on Noise and Tyres

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Item 4 (a) of the provisional agenda

Tyres: UN Regulation No. 30 (Tyres for passenger cars and their trailers)**Proposal for a Supplement to the 02 series of amendments to
UN Regulation No. 30****Submitted by the experts from 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) addressing several topics: the definition of the radial structure (as a continuation to ECE/TRANS/WP.29/GRBP/2021/9), the definition of snow tyres, the requirements for special use tyres of class C1, the addition of an optional prefix for extra load tyres, a clarification of the description of the load/speed test for run flat tyres and extended mobility tyres (EMT) and editorial corrections. The modifications to the existing text of the UN Regulation are marked in bold for new or strikethrough for deleted characters.

* In accordance with the programme of work of the Inland Transport Committee for 2022 as outlined in proposed programme budget for 2022 (A/76/6 (Sect.20), para 20.76), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



I. Proposal

Paragraph 2.6., amend to read:

- "2.6. "Snow tyre" means a tyre whose tread pattern, tread compound or ~~structure~~ **construction** is primarily designed to achieve in **mud and/or** snow conditions a performance better than that of a normal tyre with regard to its ability to initiate ~~or maintain~~ **and control** vehicle motion."

Paragraph 2.9.3., amend to read:

- "2.9.3. "Radial" or "radial-ply" describes a tyre structure in which the ply cords extend to the beads and are laid substantially at 90° to the centre line of the tread, ~~the carcass being stabilized by an~~ **in a zone including most of the side wall and located outside the bead and the** essentially inextensible circumferential belt **that stabilizes the carcass;**"

Paragraph 2.10., amend to read:

- "2.10. "Reinforced" or "Extra Load" means a tyre designed to carry more load at a higher inflation pressure than the load carried by the corresponding standard version tyre at the standard inflation pressure as specified in ~~ISO 4000-1:2010~~ **ISO 4000-1:2021;**"

Paragraph 2.12., amend to read:

- "2.12. "Bead" means the part of a tyre which is of such shape and ~~structure~~ **construction** as to fit the rim and hold the tyre on it; 1/"

Paragraph 2.25.3.2., amend to read:

- 2.25.3.2. on radial-ply tyres, the letter "R" placed in front of the rim-diameter marking, ~~and, optionally, the word "RADIAL";~~

Paragraph 2.25.3.3., amend to read:

- 2.25.3.3. on bias-belted tyres, the letter "B" placed in front of the rim-diameter marking; ~~and in addition the words "BIAS BELTED";~~

Paragraph 2.25.3.4., amend to read:

- "2.25.3.4. on ~~radial-ply~~ **radial-ply** tyres suitable for speeds in excess of 240 km/h but not exceeding 300 km/h (tyres marked with the speed-~~category~~ symbol "W" or "Y" as part of the service description), the letter "R", placed before the rim diameter marking, may be replaced with the inscription "ZR"; on tyres suitable for speeds in excess of 300 km/h, the letter "R" placed in front of the rim diameter marking shall be replaced by the inscription "ZR";"

Paragraph 2.25.3.5., amend to read:

- 2.25.3.5. on ~~"run flat" or "self supporting"~~ **run flat or self supporting** tyres, the ~~letter~~ **letters "RF"** placed in front of the rim diameter marking (**for example, "235/45 RF 17"**)."

Paragraph 2.25.7., amend to read:

- "2.25.7. an indication of the tyre to rim fitment configuration when it differs from the standard ~~configuration.~~ **configuration;**"

Insert a new paragraph 2.25.8., to read:

- "**2.25.8. optionally the letters "HL" in front of the nominal section width in the case of Extra Load tyres.**"

Insert a new paragraph 2.38., to read:

- "**2.38. "Service description" means the association of the load-capacity index with a speed-category symbol (for example, "94H")."**

Paragraphs 2.38. to 2.43., renumber as 2.39. to 2.44.

Paragraph 3.1.1., amend to read:

3.1.1. The manufacturer's name or the ~~Brand name/trademark~~ **brand name/trademark**;

Paragraph 3.1.5.1., amend to read:

"3.1.5.1. On tyres suitable for speeds in excess of 300 km/h, in addition to what is already defined in ~~2.24.3.4~~ **2.25.3.4**, the tyre shall be marked with a service description ~~consisting of~~ **that includes** the speed-category symbol "Y" ~~and the corresponding load index~~. The service description shall be marked within brackets, for example, "(95Y)".

Paragraph 3.1.6., amend to read:

"3.1.6. The inscription ~~M+S~~ **"M+S"** or "M.S" or "M&S" if the tyre is classified in the category of use "snow tyre" or if the tyre is classified in the category of use "special use tyre" when declared by the tyre manufacturer at paragraph 4.1.3. as complying also with the definition given in paragraph 2.6.;

"M+S" or "M.S" or "M&S" means "Mud and Snow";"

Paragraph 3.1.12.1., amend to read:

3.1.12.1. In addition, in the case of ~~"T" type temporary use spare tyres~~ **T-type temporary use spare tyres**, the legend "INFLATE TO 420 kPa (60 psi)", the upper case characters being at least 12.7 mm high.

Insert a new paragraph 3.1.15., to read:

"3.1.15. Optionally, the word "RADIAL" on radial-ply tyres;"

Insert a new paragraph 3.1.16., to read:

"3.1.16. The words "BIAS-BELTED" on bias-belted tyres;"

Insert a new paragraph 3.1.17., to read:

"3.1.17. The letters "ERS" (meaning "Extended Radial Structure") for tyres with radial structure having a carcass where the ply cords are not laid substantially at 90° to the centre line of the tread across the complete cross section of the tyre;"

Insert a new paragraph 4.1.4.1., to read:

"4.1.4.1. For tyres with radial structure, whether the ply cords of the carcass are laid substantially at 90° to the centre line of the tread across the complete cross section of the tyre;"

Paragraph 6.1.1.1., amend to read:

"6.1.1.1. The section width shall be calculated by the following formula:

$$S = S_1 + K(A - A_1) \quad S = S_1 + K \cdot (A - A_1),$$

where:

S is the ~~"section width"~~ **section width** rounded to the nearest millimetre ~~and measured on the measuring rim~~;

S_1 is the ~~"nominal section width"~~ **nominal section width** (in mm) as shown on the side wall of the tyre in the designation of the tyre as prescribed;

A is the width (expressed in mm) of the measuring rim, as shown by the manufacturer in the descriptive note; 5/

A_1 is the width (expressed in mm) of the theoretical rim.

A_1 shall be taken to equal S_1 multiplied by the factor x , as specified by the manufacturer, and K shall be taken to equal 0.4."

Footnote 5/, amend to read:

"5/ When the ~~conventional number~~ **rim width** is given by ~~codes code~~, the value in mm is obtained by multiplying such number by 25.4."

Paragraph 6.1.2.1., amend to read:

"6.1.2.1. The outer diameter of a tyre shall be calculated by the following formula:

$$D = d + 2H - D = d + 2H$$

where:

D is the outer diameter expressed in millimetres;

d is the nominal rim diameter defined in paragraph 2.26. above, expressed in millimetres;

H is the nominal section height rounded to the nearest millimetre and is equal to:

$$H = 0.01 S_1 \cdot R_a - H = 0.01 S_1 \cdot R_a, \text{ where}$$

S_1 is the nominal section width in millimetres (mm);

~~R_a~~ R_a is the nominal aspect ratio;

all as shown on the side wall of the tyre in the tyre-size designation in conformity with the requirements of paragraph 3.4. above."

Paragraph 6.1.4.2.2., amend to read:

"6.1.4.2.2. in ~~radial ply~~, **radial-ply and** run flat tyres: 4 per cent;"

Paragraph 6.2.1.1., amend to read:

"6.2.1.1. Where application is made for tyres identified by means of letter code "ZR" within the **tyre-size** designation and suitable for speeds over 300 km/h (see paragraph 4.1.16.), the above load/speed test is carried out on one tyre at conditions appropriate for the load-**capacity** index marked on the tyre and the speed-**category** symbol "Y". Another load/speed test must be carried out on a second sample of the same tyre type according to paragraph 2.6. of Annex 7 corresponding to the load and speed conditions specified as maximum by the tyre manufacturer (see paragraph 4.1.16. of this Regulation).

The second test may be carried out on the same tyre sample if the tyre manufacturer agrees."

Paragraph 6.2.2.1., amend to read:

"6.2.2.1. However, a tyre marked with the speed-**category** symbol "Y" which, after undergoing the relevant test, exhibits superficial blistering of the tyre tread caused by the specific test equipment and conditions, is deemed to have passed the test."

Paragraph 6.3.1., amend to read:

"6.3.1. In order to be ~~classified~~ **categorized** as a "~~special use tyre~~" **special use tyre** a tyre shall have a block tread pattern in which the blocks are larger and more widely spaced than for normal tyres and have the following characteristics:

(a) ~~A-a~~ tread depth $\geq 4-9$ mm **and**

(b) ~~A-a~~ void-to-fill ratio $\geq 35-30$ per cent"

Paragraph 6.3.2., amend to read:

"6.3.2. In order to be classified as a "~~professional off-road tyre~~" **professional off-road tyre**, a **special use** tyre shall have all of the following characteristics:

- (a) ~~A~~-a tread depth ≥ 11 mm; **and**
- (b) ~~A~~-a void-to-fill ratio ≥ 35 per cent; **and**
- (c) ~~A~~-~~maximum speed rating of~~ $\leq Q$ -a speed category ≤ 160 km/h."

Insert a new paragraph 11.5., to read:

"11.5. Contracting Parties applying this Regulation shall not refuse to grant extensions of approvals first issued before the entry into force of Supplement [25] to this Regulation and containing in the communication form the information that the tyre-size designation is preceded by the letters "HL" by adding the letters "HL" to the tyre-size designation pursuant to 2.25.8."

Annex 1,

Insert a new item 4.2.1., to read:

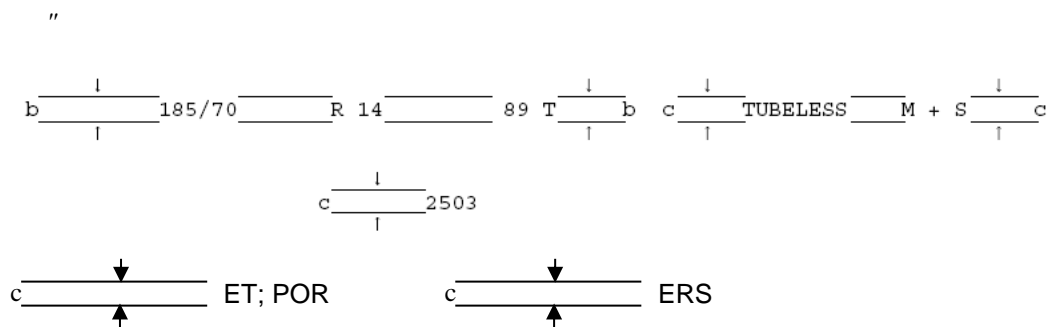
"4.2.1. For special use tyres, whether professional off-road tyre: yes/no"

Insert a new item 4.3.1., to read:

"4.3.1. For tyres with radial structure, whether the ply cords of the carcass are laid substantially at 90° to the centre line of the tread across the complete cross section of the tyre: yes/no"

Annex 3,

Paragraph 1., replace the figure by the following:



b = 6 mm (min.)

c = 4 mm (min.)"

Paragraph 1.(e), amend to read:

"(e) having a load capacity of 580 kg, corresponding to load-**capacity** index 89 in Annex 4 to this Regulation;"

Paragraph 2, last sentence, amend to read:

"The marking of the load-**capacity** index, speed-category **symbol**, date of manufacture and other markings, shall be as given in example 1 above."

Paragraph 3.(b), amend to read:

"(b) the service description ~~comprising the load index and the speed symbol~~ shall be placed immediately after the tyre size designation as defined in paragraph 2.25. of this Regulation;"

Paragraph 3.(c), amend to read:

"(c) The symbols "TUBELESS", "REINFORCED", "~~M+S~~"**M+S**" and "ET" and "POR" may be at a distance from the size-designation."

Insert a new paragraph 3.(d), to read:

"(d) the symbol "ERS" shall be placed close to the tyre-size designation."

Annex 6,

Paragraphs 1.1. to 1.2.5., amend to read:

- "1.1. Mount the tyre on the measuring rim specified by the manufacturer pursuant to paragraph 4.1.13. of this Regulation and inflate it to a pressure of ~~3 to 3.5 bar~~ **300 kPa to 350 kPa**.
- 1.2. Adjust the pressure as follows:
 - 1.2.1. in standard bias-belted tyres: to ~~1.7 bar~~ **170 kPa**;
 - 1.2.2. in diagonal (bias-ply) tyres: to:

Ply rating	Pressure (bar)		
	Speed category		
	L, M, N	P, Q, R, S	T, U, H, V
4	1.7	2.0	-
6	2.1	2.4	2.6
8	2.5	2.8	3.0

Ply rating	Pressure (kPa)		
	Speed-category symbol		
	L, M, N	P, Q, R, S	T, U, H, V
4	170	200	—
6	210	240	260
8	250	280	300

- 1.2.3. in standard radial tyres and in standard ~~Run Flat-run flat~~ **run flat** tyres: to ~~1.8 bar~~ **180 kPa**;
- 1.2.4. in reinforced radial tyres and in reinforced ~~Run Flat-run flat~~ **run flat** tyres: to ~~2.2 bar~~ **220 kPa**;
- 1.2.5. in ~~T-type~~ **T-type** temporary use spare tyres: to ~~4.2 bar~~ **420 kPa**."

Annex 7,

Paragraph 1.2., amend to read:

- "1.2. Inflate it to the appropriate pressure as given (in ~~bar~~ **kPa**) in the table below:
T-type temporary use spare tyres: to ~~4.2 bar~~ **420 kPa**

Speed category	Diagonal (bias ply) tyres			Radial and Run flat tyres		Bias belted tyres
	Ply rating			Standard	Reinforced	Standard
	4	6	8			
L, M, N	2.3	2.7	3.0	2.4	2.8	-
P, Q, R, S	2.6	3.0	3.3	2.6	3.0	2.6
T, U, H	2.8	3.2	3.5	2.8	3.2	2.8
V	3.0	3.4	3.7	3.0	3.4	-

W	-	-	-	3.2	3.6	-
Y	-	-	-	3.2 ^{1/}	3.6	-

Speed-category symbol	Diagonal (bias-ply) tyres			Radial and run flat tyres		Bias-belted tyres
	Ply rating			Standard	Reinforced	Standard
	4	6	8			
L, M, N	230	270	300	240	280	—
P, Q, R, S	260	300	330	260	300	260
T, U, H	280	320	350	280	320	280
V	300	340	370	300	340	—
W	—	—	—	320	360	—
Y	—	—	—	320 ^a	360	—

^{1/a} The value **320 kPa** of "**3.2**" in respect of Speed Category "**Y**" tyres **with speed-category symbol "Y"** was inadvertently omitted from Supplement 5 to the 02 series of amendments which entered into force on 8 January 1995 and may be considered as a Corrigendum to this Supplement and to have been effective from that same date."

Paragraph 2.1., amend to read:

"2.1. Mount the tyre-and-wheel assembly on a test axle and press it against the outer face of a smooth wheel ~~1.70 m ± 1.7 m ± 1~~ per cent or ~~2 m ± 2.0 m ± 1~~ per cent in diameter."

Paragraphs 2.2.1. to 2.2.4., amend to read:

"2.2.1. the maximum load rating ~~equated~~ **corresponding** to the ~~Load Capacity Index~~ **load-capacity index** for tyres with ~~Speed Symbols~~ **speed-category symbols** "L" to "H" ~~inclusive~~, **inclusive**;

2.2.2. the maximum load rating associated with a maximum speed of 240 km/h for tyres ~~Speed Symbol with speed-category symbol "V"~~ (see ~~para. 2.40.2.~~ **paragraph 2.41.2.** of this ~~Regulation~~); **Regulation**);

2.2.3. the maximum load rating associated with a maximum speed of 270 km/h for tyres with ~~speed-category symbol "W"~~ (see ~~paragraph 2.40.3.~~ **2.41.3.** of this ~~Regulation~~); **Regulation**);

2.2.4. the maximum load rating associated with a maximum speed of 300 km/h for tyres with ~~speed-category symbol "Y"~~ (see ~~paragraph 2.40.4.~~ **2.41.4.** of this ~~Regulation~~); **Regulation**);

Paragraph 2.4., amend to read:

"2.4. During the test, the temperature in the test-room must be maintained at between ~~20°~~ **20°** °C and ~~30°~~ **30°** °C or at a higher temperature if the manufacturer agrees."

Paragraph 2.5.2., amend to read:

"2.5.2. Initial test speed: prescribed maximum speed for the type of tyre (see paragraph 2.37.1. of this Regulation), less 40 km/h in the case of the smooth wheel having ~~1.70 m ± 1.7 m ± 1~~ per cent in diameter or less 30 km/h in the case of the smooth wheel having ~~2 m ± 2.0 m ± 1~~ per cent in diameter;"

Paragraphs 2.5.6. and 2.5.7., amend to read:

- "2.5.6. maximum test speed: prescribed maximum speed for the type of tyre, less 10 km/h in the case of the smooth wheel having $1.7\text{ m} \pm 1$ per cent in diameter or equal to the prescribed maximum speed in the case of the smooth wheel having $2.0\text{ m} \pm 1$ per cent in ~~diameter~~ **diameter**;
- 2.5.7. however, for tyres suitable for maximum speed of 300 km/h (speed-category symbol "Y"), the duration of the test is 20 minutes at the initial test speed step and 10 minutes at the last speed step."

Paragraph 3.2., amend to read:

- "3.2. Inflate the tyre to an inflation pressure of ~~2.5 bar~~ **250 kPa** and condition the tyre-and-wheel assembly at a test room temperature at $38\text{ °C} \pm 3\text{ °C}$ for not less than three hours."

Paragraph 3.5., amend to read:

- "3.5. Apply to the test axle ~~a load~~ **the test load** equal to 65 per cent of the maximum load rating corresponding to the load capacity index of the tyre."

Paragraph 3.6., renumber as 3.8.2. and amend to read:

- ~~3.6.~~ **3.8.2.** ~~At the start of the test, measure~~ **Measure** the deflected section height (~~Z1~~ **Z1**);"

Paragraph 3.8., amend to read:

- "3.8. ~~Carry through~~ **Conduct** the test ~~through~~, without interruption in conformity with the following particulars:"

Paragraph 3.8.1., amend to read:

- "3.8.1. ~~time taken to pass~~ **Accelerate the tyre-and-wheel assembly** from zero speed to **the** constant test ~~speed~~ **speed within** 5 minutes;"

Paragraph 3.8.2., renumber as 3.6. and amend to read:

- ~~3.8.2.~~ **3.6.** ~~test~~ **Test** speed: 80 km/h in case of $2.0\text{ m} \pm 1$ per cent drum diameter, or 75 km/h in case of $1.7\text{ m} \pm 1$ per cent drum diameter"

Paragraph 3.8.3., amend to read:

- "3.8.3. ~~duration of test~~ **Run the tyre-and-wheel assembly** at the **constant** test ~~speed~~ **speed and the constant test load for** 60 minutes;"

Paragraph 3.9., renumber as 3.8.4. and amend to read:

- ~~3.9.~~ **3.8.4.** ~~At the end of the test, measure~~ **Measure** the deflected section height (~~Z2~~ **Z2**)."

Paragraph 3.9.1., renumber as 3.9. amend to read:

- ~~3.9.1.~~ **3.9.** Calculate the change in per cent of the deflected section height compared to the deflected section height at the start of the test as $\frac{(Z_1 - Z_2)}{Z_1} \times 100$. "
 $[(Z_1 - Z_2)/Z_1] \times 100$. "

Paragraph 4.2., amend to read:

- "4.2. Inflate it to an inflation pressure of ~~2.5 bar~~ **250 kPa** and condition the tyre-and-wheel assembly at a test room temperature at $25\text{ °C} \pm 3\text{ °C}$ for not less than three hours."

Paragraph 4.5., amend to read:

- "4.5. Apply to the test axle ~~a load~~ **the test load** equal to 60 per cent of the maximum load rating corresponding to the load capacity index of the tyre."

Paragraph 4.6., renumber as 4.8.2. and amend to read:

- ~~4.6.~~ **4.8.2.** ~~At the start of the test, measure~~ **Measure** the deflected section height (~~Z1~~ **Z1**);"

Paragraph 4.8., amend to read:

"4.8. ~~Carry~~ **Conduct** the test ~~through~~, without interruption in conformity with the following particulars:"

Paragraph 4.8.1., amend to read:

"4.8.1. ~~time taken to pass~~ **Accelerate the tyre-and-wheel assembly** from zero speed to ~~the~~ constant test ~~speed=~~ **speed within** 5 minutes;"

Paragraph 4.8.2., renumber as 4.6. and amend to read:

~~4.8.2.~~ **4.6.** test **Test** speed: 80 km/h in case of 2.0 m ± 1 per cent drum diameter, or 75 km/h in case of 1.7 m ± 1 per cent drum diameter"

Paragraph 4.8.3., amend to read:

"4.8.3. ~~duration of test~~ **Run the tyre-and-wheel assembly** at the **constant** test ~~speed=~~ **speed and the constant test load for** 60 minutes;"

Paragraph 4.9., renumber as 4.8.4. and amend to read:

~~4.9.~~ **4.8.4.** ~~At the end of the test, measure~~ **Measure** the deflected section height (~~Z₂-Z₂~~)." "

Paragraph 4.9.1., renumber as 4.9. amend to read:

~~4.9.1.~~ **4.9.** Calculate the change in per cent of the deflected section height compared to the deflected section height at the start of the test as ~~((Z₁—Z₂)/Z₁) × 100.~~ "
 $[(Z_1 - Z_2)/Z_1] \times 100.$ "

II. Justification

1. At the seventy-second session of the Working Party on Noise and Tyres (GRBP), France proposed an amendment to the definition of "radial tyre" in UN Regulation No. 30 (ECE/TRANS/WP.29/GRBP/2020/21), which was completed by the European Commission by informal document GRBP-72-24 and later consolidated and further amended by ECE/TRANS/WP.29/GRBP/2021/9. The proposal is augmented by providing that tyres with a carcass construction that follows the new definition, and not the previous definition, shall be marked by "ERS" (Extended Radial Structure) in order to be able to identify them.

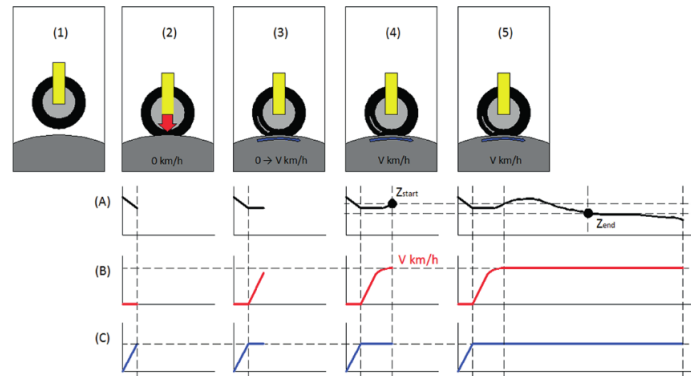
2. The definition of "snow tyre" is amended to clarify that "snow tyres" are not only suitable for the use in snow conditions but also on mud and by replacing the term "maintain vehicle motion" (i. e. keep vehicle speed and direction of movement constant) by a more general concept of "controlling vehicle motion" (i. e. also being able to change vehicle speed and direction of movement as intended).

3. In line with the proposal for changing the requirements for special use tyres of class C1 made for the 04 series of UN Regulation No. 117, it is proposed reduce the required tread depth to 9 mm and the void-to-fill ratio to 30 %.

4. In the ETRTO Standards Manual a new prefix for extra load tyres was introduced. It is proposed to allow adding this prefix to the tyre size designation on an optional basis.

5. The description of the load/speed tests for run flat and EMT tyres is revised with the aim to clarify the succession of steps in the test procedure, so that it is aligned with the standard ISO 16992.

Figure
Steps in the test procedure (source: Figure 4 from ISO 16992:2018)



- (1) – attachment, (2) – apply load, (3) – acceleration, (4) – start of the test, measure Z_{start} ($= Z_1$),
 (5) – test continued until Z_{end} ($= Z_2$)
 (A) – deflected section height, (B) – wheel speed, (C) – wheel load

6. For the conduction of the test, it is important that the deflection section heights are measured while the tyre-and-wheel assembly is running at the test speed, because the deflection heights change when the speed is changed due to the effect of centrifugal forces.

7. Various editorial corrections are introduced, e.g. ensuring that the terms "load-capacity index", "speed-category symbol" and "structure" are used consistently throughout the text or rectifying an error-prone construction of the plus-minus sign by the correct character. A reference to the standard ISO 4000-1 is updated to the latest edition. The pressure unit of measure bar is replaced by kilopascals. Similar to the change made in Regulation No. 54 (Supplement 24), the definition of "service description" is introduced for the association of load-capacity index and speed-category symbol. This term has been used at various places in the text but was not defined properly.