

**Economic and Social Council**Distr.: General
6 July 2017

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations**Working Party on Brakes and Running Gear****Eighty-fourth session**

Geneva, 19-22 September 2017

Item 7(e) of the provisional agenda

Tyres: Regulation No. 106**Proposal for amendments to Regulation No. 106 (Tyres for agricultural vehicles and their trailers)****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) amending Regulation No. 106. The modifications to the existing text of the 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 2016–2017 (ECE/TRANS/254, para. 159 and ECE/TRANS/2016/28/Add.1, cluster 3.1), 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.

GE.17-11305(E)



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I. Proposal

Paragraph 6.1.2., amend to read:

"6.1.2. However, for the types of tyre for which the size designation is given in the first column of the tables in Annex 5, the theoretical rim width **code (A1)**⁴ and the nominal section width (S1) are given opposite the tyre size designation in those tables."

Paragraph 6.2.1., amend to read:

"6.2.1. Except as provided by paragraph 6.2.2., the outer diameter of a tyre is calculated by the following formula:

$$D = d + 2 H$$

Where:

D is the outer diameter expressed in mm;

d is the conventional number denoting the nominal rim diameter expressed in mm (see paragraph 2.1~~69~~);

H is the nominal section height in mm and is equal to:

$$H = 0.01 \times Ra \times S1$$

Where:

Ra is the nominal aspect ratio;

S1 is the "nominal section width" in mm.

All as shown on the sidewall of the tyre in the tyre-size designation in conformity with the requirements of paragraph 2.1~~58~~."

Annex 5, Table 5, amend the following entry:

" Table 5 (3 of 3)

Agricultural implement tyres - Normal section sizes

Tyre size designation	Theoretical rim width code (A1)	Nominal section width (S1) (mm)	Overall diameter (D) (mm)		Nominal rim diameter (d) (mm)
				(*)	
....					
8.25 - 20 IMP	6	229	934	950	508
....					

Annex 5, Table 6, Note 1 amend to read:

"1 The suffix "IMP" may be replaced by the wording "IMPLEMENT" or by the suffix 'IND' in case of tyres marked with classification code 'I-3' on the Tyre sidewall."

Annex 5, Table 7, amend the following entry:

" Table 7

Agricultural high flotation tyres

<i>Tyre size designation⁵</i>	<i>Theoretical rim width code (A1)</i>	<i>Nominal section width (S1) (mm)</i>	<i>Overall diameter (D) (mm)</i>	<i>Nominal rim diameter (d) (mm)</i>
...

Notes:

- These Tyres may be classified in categories of use "Tractor Drive Wheels" or "Implement".
- Implement Tyres are identified either by suffix "IMP" placed after the Tyre size designation (e.g. 11x4.00 - 4 IMP) or by the word "IMPLEMENT" marked on the Tyre sidewalls.
- Tyres of radial structure are identified by means of the letter "R" in place of " - " (e.g. 11x4.00 R 4).
- Coefficient "b" for the calculation of the Overall diameter Dmax:
 - 1.12 for tyres with Nominal rim Diameter (d) less than 380 mm;
 - 1.10 for tyres with Nominal rim Diameter (d) 381 mm and above.
- In case of Tyre Size designations not included in this table (e.g. 27x10.00 – 16):**
 - the first number (e.g. 27) represents the overall diameter (D) expressed by code**
 - the second number (e.g. 10.00) represents the nominal section width (S1) expressed by code, and**
 - the third number (e.g. 16) represents the nominal rim diameter (d) expressed by code,****To convert dimensions expressed in code to mm multiply by 25.4 and round to the nearest mm.**
The theoretical rim width code (A1) is taken to equal to the nominal section width (S1) expressed by code multiplied by the factor 0.8 rounded to the nearest 0.5 step.

Annex 7, amend to read:

"Variation of load capacity with speed

(See paragraphs ~~2.30-33.~~ and ~~2.31-34.~~ of this Regulation)..."

Annex 7, Part A, amend to read:

"Part A: Drive wheel tyres for agricultural tractors

Applicable to tyres classified with categories of use: "Tractor drive wheel"
(see paragraph 2.20. of this Regulation)

Variation of load carrying capacity (per cent)

<i>Speed (km/h)</i>	<i>Speed category symbol</i>				<i>(1)</i>	<i>(2)</i>
	<i>A2</i>	<i>A6 (+)</i>	<i>A8 (+)</i>	<i>D (+)</i>		
10	[0]	+40	+50	+50	+ 58	+ 56
15	-6	+30	+34	+34	+ 32	+ 44
20	-11	+20	+23	+23	+ 26	+ 33
25	-16	+7	+11	+18,5	+ 19	+ 22
30	-20	[0]	+7	+15	+ 12	+ 11
35	-24	-10	+3	+12	+ 10	+ 6
40	-27	-20	[0]	+9,5	+ 6	[0]
45	-	-	-4	+7	+ 2	-
50	-	-	-9	+5	[0]	-
55	-	-	-	+3	-	-
60	-	-	-	+1,5	-	-
65	-	-	-	[0]	-	-
70	-	-	-	-9	-	-

The above load/speed variations table does not apply to IF and VF Tyres.

The above load/speed variations apply when the tyre is not subjected to sustained high torque service.

- (+) For field applications with sustained high torque service the values shown in the line 30 km/h apply.
- (1) These percentages apply only in case of tyres listed in Annex 5, Table 7, with nominal rim diameter (d) 381 mm and above, marked with speed symbol "B"
- (2) **These percentages apply only in case of diagonal tyres listed in Annex 5, Table 2 'Drive wheel tyres for agricultural tractors - Normal section sizes' with nominal section width (S1) 211 mm and above (i.e. section width code 8.3 and above) marked with speed symbol "A8"**

Annex 7, Part B amend to read:

"Part B: Steering wheel tyres for agricultural and forestry tractors

Applicable to tyres classified with category of use "Tractor steering wheels" and marked "Front" or "F-1" or "F-2" (see paragraph ~~2.21-24.~~ of this Regulation)

Variation of load carrying capacity (per cent) (see paragraphs ~~2.30-33.~~ and ~~2.31-34.~~ of this Regulation)"

Annex 7, Part C amend to read:

"Part C: Implement tyres

Applicable to tyres classified with categories of use: "Implement" and marked "IMP" or "IMPLEMENT" (see paragraph ~~2.22-25.~~ of this Regulation)

Variation of load carrying capacity (per cent) (see paragraphs ~~2.30-33.~~ and ~~2.31-34.~~ of this Regulation)"

Annex 7, Part D amend to read:

"Part D: Tyres for forestry machines

Applicable to tyres classified with categories of use: "Forestry machines" (see paragraph ~~2.41-44.~~ of this Regulation)

Variation of load carrying capacity (per cent) for tyres marked with speed category symbols A6 and A8"

Annex 7, Part E amend to read:

"Part E: Tyres for construction applications (industrial tractors)

Applicable to tyres classified with categories of use: "Construction Applications" (see paragraph ~~2.42-45.~~)

Variation of load carrying capacity (per cent) for tyres marked with speed category symbol A8"

II. Justification

1. Para 6.1.2. is amended to align the wording to the headers in Annex 5 and to correct the reference to the footnote.
2. Para 6.2.1. is amended to restore the proper references after renumberings that occurred within the last Supplements.
3. The amendment of Annex 5, Table 5 is needed to add the value for the Overall diameter (D) in column (*) that applies to tyres marked with classification code "I-3".
4. The amendment of Annex 5, Table 6, Note 1 is necessary because most of the tyre sizes listed in such table, especially those identified by the "classification code I-3" (i.e. Traction tread) are currently available in both versions: 'implement' to be used on agricultural machinery and 'IND' to be used on construction application vehicles. The two types of tyres have the same type of size designation and the same dimensions. Therefore some manufacturers identify those tyres with the suffix 'IND' rather than with the suffix 'IMP' thus applying the variation of load capacity with speed as published in Annex 7 Part E in conformity to Supplement 11 to the Regulation. The reason for this proposal is to avoid a duplication of tables with a new table only replacing the suffix IMP with the suffix IND.
5. The addition of the footnote to Annex 5, Table 7 is the answer to the request by GRRF to ETRTO ("...to introduce the appropriate formulae in the Regulation instead of continuously updating Annex 5." - ref. paragraph 36 of ECE/TRANS/WP.29/GRRF/83) as done for Regulation No. 54.
6. References in Annex 7 are amended to restore the correctness after renumbering that occurred with the introduction of three new paragraphs in Supplement 15 approved during the 172nd session of WP.29.
7. The amendment of Annex 7, Part A is to be in conformity with Tire and Rim Association (TRA) specifications for code designated diagonal tyres with speed symbol A8. TRA is the only standardization body listing tractor drive wheel code designated tyres, as those listed in Annex 5, Table 2, with speed symbol A8, but for historical reasons they did assign a specific set of bonus loads with the speed that differ from the one adopted for other types of tyres for tractor drive wheels marked with speed symbol A8.