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Tyres: UN Regulation No. 109 (Retreaded tyres for commercial vehicles and their trailers)

Proposal for amendments to UN Regulation No. 109

Submitted by the experts from the Bureau International Permanent des Associations de Vendeurs et Rechapeurs de Pneumatiques (BIPAVÉR), France and the Netherlands*

The text reproduced below has been prepared by the experts from BIPAVÉR, France and the Netherlands in order to align the provisions for retreaded tyres with the proposals of the European Tyre and Rim Technical Organization (ETRTO) for UN Regulations Nos. 54 and 117 and to cover all the tread materials. The document takes into account ECE/TRANS/WP.29/GRBP/2021/3 and informal document GRBP-73-21. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters. For better readability paragraphs with physical/mathematical terms or formulas are deleted and replaced completely.

* In accordance with the programme of work of the Inland Transport Committee for 2021 as outlined in proposed programme budget for 2021 (A/75/6 (Sect.20), para 20.51), 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 2.7.3., amend to read:

- "2.7.3. "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 centreline of the tread, the carcass being stabilized by an essentially inextensible circumferential belt;"

Paragraph 2.8.2., amend to read:

- "2.8.2. "Special use tyre" is a tyre intended for mixed use, both on and off road and/or at restricted speed. **These tyres are primarily designed to initiate and maintain the vehicle in motion in off-road conditions.**

Insert a new paragraph 2.8.4., to read:

- "2.8.4. "Traction tyre" means a tyre in class C2 or C3 bearing the inscription TRACTION and intended to be fitted primarily to the drive axle(s) of a vehicle to maximize force transmission in various circumstances."**

Paragraphs 2.26.-2.26.2., amend to read:

- "2.26. Tyre-size designation" means, **except in the case of types of tyre for which the tyre-size designation is shown in the first column of the tables in Annex 5 to this Regulation, a designation showing:**
- 2.26.1. The nominal section width (S1). ~~This width must be expressed in mm, except in the case of types of tyre for which the size designation is shown in the first column of the tables in Annex 5 to this Regulation;~~"
- 2.26.2. The nominal aspect ratio, ~~except in the case of certain types of tyre for which the size designation is shown in the first column of the tables in Annex 5 to this Regulation~~ or, depending on the tyre design type, the nominal outer diameter expressed in mm;"

Insert new paragraphs 2.26.3. to 2.26.3.2., to read:

- "2.26.3. An indication of the structure placed in front of the rim diameter marking as follows:**
- 2.26.3.1. on diagonal (bias-ply) tyres, a dash "-" or the letter "D";"**
- 2.26.3.2. on radial-ply tyres, the letter "R";"**

Paragraph 2.47., amend to read:

- "2.47. "~~Standard Reference Test Tyre (SRTT)~~" or "**SRTT**" means a tyre that is produced, controlled and stored in accordance with the ~~American Society for Testing and Materials (ASTM)~~ standards **of ASTM International:**
- (a) ~~E1136 – 17 for the size P195/75R14 and referred to as "SRTT14",~~
- (ba) F2872 – 16 for the size 225/75R16C and referred to as "SRTT16C",
- (eb) F2871 – 16 for the size 245/70R19.5 and referred to as "SRTT19.5",
- (dc) F2870 – 16 for the size 315/70R22.5 and referred to as "SRTT22.5",
- (ed) ~~F2493 – 18~~ **F2493 – 19 for the size P225/60R16 and referred to as "SRTT16"."**

Paragraph 2.54., amend to read:

- "2.54. "~~Snow grip index ("SG")~~" means the ~~ratio between the snow grip performance of the a candidate tyre relative to and the performance of the standard reference test tyre applicable SRTT.~~"

Insert new paragraphs 2.58. to 2.60., to read:

- "2.58. **"Professional off-road tyre"** is a special use tyre primarily used for service in severe off-road conditions."
- "2.59. **"Tread depth"** means the depth of the principal grooves."
- "2.59.1. **"Principal grooves"** means the wide circumferential grooves positioned in the central zone of the tyre tread, which, in the case of passenger and light truck (commercial) tyres, have the treadwear indicators located in the base."
- "2.60. **"Void to fill ratio"** means the ratio between the area of voids in a reference surface and the area of this reference surface calculated from the mould drawing."

Paragraph 3.2.13., amend to read:

- "3.2.13. **The inscription "MPT" (or alternatively "ML" or "ET") and/or "POR" if the tyre is classified in the category of use "special".**

ET means Extra Tread, ML stands for Mining and Logging, MPT means Multi-Purpose Truck and POR means Professional Off-Road."

Insert a new paragraph 3.2.18., to read:

- "3.2.18. **The inscription "TRACTION" if the tyre is classified as traction;¹⁰**"

Add a new footnote 10 to read:

¹⁰ Minimum height of marking: refer to dimension C in Annex 3 of this Regulation No. 109."

Paragraph 3.5., amend to read:

- "3.5. The markings referred to in paragraph 3.2. and the approval mark prescribed in paragraphs 3.4. and 5.8. shall be clearly legible and **indelible. They shall be raised above or sunk below the tyre surface** ~~shall be moulded on to or into the tyre~~ or shall be permanently marked on to the tyre."

Insert a new paragraph 3.5.1. to read:

- "3.5.1. **The markings shall be situated in the lower area of the tyre on at least one of its sidewalls, except for the inscriptions mentioned in paragraph 3.2.1."**

Insert a new paragraph 3.5.2. to read:

- "3.5.2. **In the case that the date of manufacture is not moulded, it shall be applied not later than 24 hours after the tyre is removed from the mould."**

Paragraph 4.1.5.3.1.1., first sentence, amend to read:

- 4.1.5.3.1.1. For tyres retreaded by using **either** pre-cured **or mould cure** tread material with a tread pattern covered by paragraph 6.4.4.1. the list shall clearly identify the tyres in order to make the relevant link with the list(s) quoted in paragraph 6.4.4.1. b).

Insert a new paragraph 4.1.5.3.1.3., to read:

- "4.1.5.3.1.3. **For tyres retreaded by using mould cure tread material covered by paragraph 6.4.4.3. the list shall clearly identify the tyres in order to make the relevant link with the list(s) quoted in paragraph 6.4.4.3. b).**

Paragraph 5.4., amend to read:

- "5.4. Before granting approval the authority must be satisfied that retreaded tyres conform to this Regulation and that the tests have been successfully carried out:
- (a) On at least five and not necessarily more than 20 samples of retreaded tyres representative of the range of tyres produced by the retreading production unit when prescribed according to paragraphs 6.5. and 6.6.1. and;

- (b) On at least one sample of retreaded tyres, of each pattern ~~not~~ covered by paragraphs ~~6.4.4.1. and 6.4.4.2-3.~~, representative of the range of tyres produced by the retreading production unit when prescribed according to paragraph 6.6.2.* In case of paragraphs **6.4.4.1. and 6.4.4.2.**, the Type Approval Authority might request a test of compliance for the retreaded tyre. Testing of sampled sizes may be confined to a worst case selection*, at the discretion of the Type Approval Authority or designated Technical Service."

Paragraphs 6.4.4.1 and 6.4.4.2., amend to read:

"6.4.4.1. For tyres retreaded by using pre-cured tread material(s) **or an identical tread pattern design in a mould cure product** with a tread pattern not covered by paragraph 6.4.4.2. having to fulfil the requirements of paragraph 7.2.* the retreader shall ensure that the material manufacturer(s) or the material supplier(s) of the pre-cured tread(s) provides:~~(a) T~~to the Type Approval Authority (TAA) and the Technical Service issuing the approval according to this Regulation and optionally to the retreader:

~~(i)(a)~~ (i) A copy of the test report(s) as in Annex 10, Appendix 2 **and/or** 3 of the representative tyre size(s) (see definition in paragraph 2.) demonstrating compliance of the pre-cured tread(s) to the requirements of paragraph 7.2.

~~(b) To the retreader~~

~~(i)~~ (b) The list(s) of tyre sizes to which it can be applied for the retreading process and validated by the same designated Technical Service and TAA which issued the test report(s) **requested** in paragraph 6.4.4.1. (a). The list(s) shall include at least the tyres defined in paragraph 4.1.5.3.1.1.

~~(ii)~~ (c) A copy of the measures taken to ensure the conformity of production. These measures shall include test results demonstrating that the minimum levels of the snow performances required in paragraph 7.2.1 will be maintained and demonstrating periodically the compliance with the requirement defined in paragraph 9.2.3. or 9.4.3.

6.4.4.2. For tyres retreaded by using either mould cure or pre-cured tread material(s) with the same major features including tread pattern(s) as a new tyre type approved according to UN Regulation No. 117 having fulfilled the requirements about minimum snow performance in severe snow conditions, the retreader shall ensure that the manufacturer of the new tyre type provides:~~(a) T~~to the Type Approval Authority (and the Technical Service) issuing the approval according to this UN Regulation and optionally to the retreader:

(a) ~~a~~—A copy of the UN Regulation No. 117 certificate(s) and a copy of the compliance of the new tyre to the minimum snow performance in severe snow conditions.

~~(b) — To the retreader:~~

~~(i)~~(b) The list(s) of tyre sizes to which it can be applied for the retreading process and validated by the same designated Technical Service** and/or Type Approval Authority that issued the UN Regulation No. 117 certificate(s). The list(s) shall include at least the tyres defined in paragraph 4.1.5.3.1.2.;

~~(ii)~~(c) The drawing(s) of the tread pattern(s) covered by the UN Regulation No 117 certificate(s) **and compound specification;**

~~(iii)~~(d) A copy of the last report of the Conformity of Production as required in UN Regulation No. 117 and demonstrating periodically the compliance with the requirement defined in paragraph 9.2.4. or 9.4.4. "

Insert a new paragraph 6.4.4.3., to read:

- "6.4.4.3. For tyres retreaded by using mould cure tread material(s) and design(s) not covered by paragraphs 6.4.4.1. or 6.4.4.2., having to fulfil the requirements of paragraph 7.2.*, the retreader shall provide to the Type Approval Authority (TAA) and the Technical Service issuing the approval according to this Regulation:**
- (a) **A copy of the test report(s) as in Annex 10, Appendix 2 and/or 3 of the representative tyre size(s) (see definition in paragraph 2.) demonstrating compliance of the mould cure tread(s) to the requirements of paragraph 7.2.;**
 - (b) **The list(s) of tyre sizes to which it can be applied for the retreading process and validated by the same designated Technical Service and TAA which issued the test report(s) requested in paragraph 6.4.4.3. (a). The list(s) shall include at least the tyres defined in paragraph 4.1.5.3.1.3.;**
 - (c) **A copy of the measures taken to ensure the conformity of production. These measures shall include test results demonstrating that the minimum levels of the snow performances required in paragraph 7.2.1. will be maintained and demonstrating periodically the compliance with the requirement defined in paragraph 9.2.2. or 9.4.2.;**
 - (d) **The drawing(s) of the tread pattern(s) and the compound specification.**

Paragraph 7.2.1., amend to read:

- "7.2.1. For Class C2 and C3 tyres, the minimum snow grip index value, as calculated in the procedure described in Annex 10 and compared with the respective Standard Reference Test Tyre (SRTT) shall be as follows:

<i>Class of tyre</i>	<i>Snow grip index (brake on snow method) ^(a)</i>	<i>Snow grip index (spin traction method) ^(b)</i>	<i>Snow grip index (acceleration method) ^(c)</i>
	<i>Ref.s = SRTT16C</i>	<i>Ref.s = SRTT14, SRTT16</i>	<i>Ref.s = SRTT19.5, SRTT22.5</i>
C2	1.02	1.10	No
C3	No	No	1.25

^(a) See paragraph 3 of Annex 10 to this Regulation

^(b) See paragraph 2 of Annex 10 to this Regulation

^(c) See paragraph 4 of Annex 10 to this Regulation"

Paragraph 7.1.4.4., amend to read:

- "7.1.4.4. For retreaded **C3** radial tyres ~~with nominal section width exceeding 305 mm for dual mounting (twinning) and a nominal aspect ratio higher than 60~~, an additional sidewall protective rubber layer (ASP) may be applied to a maximum of 8 mm greater than the overall width of the same tyre size description permitted by Regulation No. 54 provided that:
- (a) This rubber layer is applied to one sidewall only;
 - (b) The sidewall concerned is marked with the wording "ASP" and the wording "OUTSIDE", both markings with a minimal height of 8 mm;
 - (c) The maximum allowed speed rating is index J (100 km/h);
 - (d) **In case of a dual mounting (twinning) only one tyre with ASP is allowed and has to be mounted on the outer wheel position."**

Insert new paragraphs 7.3. to 7.5., to read:

- "7.3. In order to be classified as a "traction tyre", a tyre is required to meet at least one of the conditions of paragraph 7.3.1. below.
- 7.3.1. The tyre shall have a tread pattern with minimum two circumferential ribs, each containing a minimum of 30 block-like elements, separated by grooves and/or sipe elements the depth of which has to be minimum of one half of the tread depth. The use of an alternative option of a physical test will only apply at a later stage following a further amendment to the Regulation including a reference to an appropriate test methods and limit values.
- 7.4. In order to be classified as a "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:
 For C2 tyres: a tread depth ≥ 11 mm and void to fill ratio ≥ 35 per cent
 For C3 tyres: a tread depth ≥ 16 mm and void to fill ratio ≥ 35 per cent
- 7.5. In order to be classified as a 'professional off-road tyre', a tyre shall have all of the following characteristics:
- (a) For ~~C1~~ and C2 tyres:
- (i) A tread depth ≥ 11 mm;
 - (ii) A void-to-fill ratio ≥ 35 per cent;
 - (iii) A maximum speed rating of $\leq Q$.
- (b) For C3 tyres:
- (i) A tread depth ≥ 16 mm;
 - (ii) A void-to-fill ratio ≥ 35 per cent;
 - (iii) A maximum speed rating of $\leq K$."

Paragraph 9.2.2., amend to read:

- "9.2.2. At least 1 tyre once every two years in order to verify conformity of the performance of the snow tyres for use in severe snow conditions fulfilling paragraph 6.6.2. and ~~not~~ covered by paragraphs ~~6.4.4.1. or 6.4.4.2.~~ **6.4.4.3.**"

Paragraph 9.4., amend to read:

- "9.4. The authority which has approved the retreading production unit may at any time verify the conformity control methods applied in each production facility including among others the prescriptions defined in the paragraph 6.4.4.1.c, ~~and~~ 6.4.4.2.e. **d. and 6.4.4.3.c.** For each production facility, the type Approval Authority shall take samples at random and at least the following number of tyres, representative of the range being produced, shall be checked and tested as prescribed in this Regulation:"

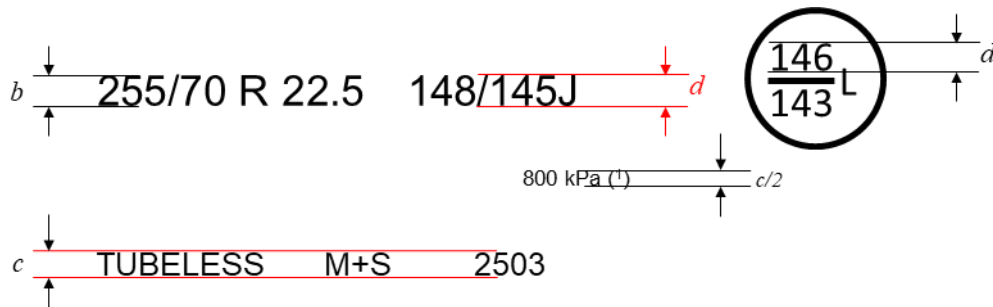
Paragraph 9.4.2., amend to read:

- "9.4.2. At least 1 tyre once every two years in order to verify conformity of the performance of the snow tyres for use in severe snow conditions fulfilling paragraph 6.6.2. and ~~not~~ covered by paragraphs ~~6.4.4.1. or 6.4.4.2.~~ **6.4.4.3.**"

Annex 3,

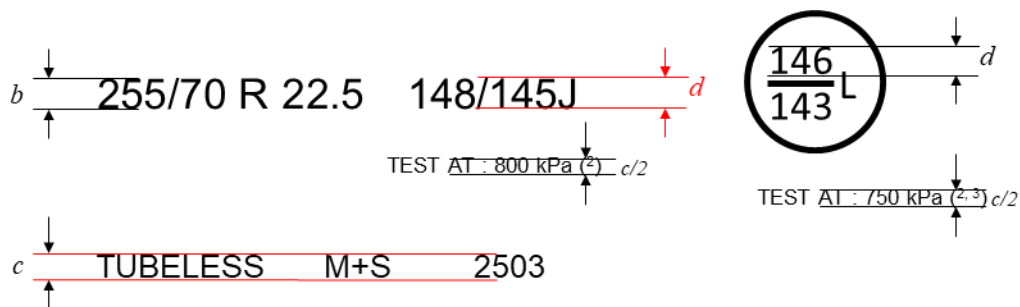
Figure, replace and amend to read:

"Example 1:



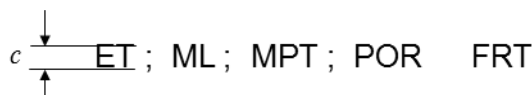
- (1) PSI marking instead of kPa is allowed for tyres first type approved before 1 January 2018. The kPa marking may be preceded by "TEST AT : " or, alternatively, by "TEST INFL : " or the symbol "@".

Example 2:



- (2) "TEST AT : " may be replaced by "TEST INFL : " or the symbol "@ " or be omitted.
 (3) The indication of a second inflation pressure for the additional service description is optional. If there is no indication, the same test inflation applies to both load/speed combinations.

Dimensional requirements for further markings (4):



- (4) For "ML" and "MPT" being part of the tyre size designation marking the minimum dimension *b* applies."

Paragraph 1., last indent, amend to read:

"...

Requiring to be inflated to ~~620~~**800** kPa for **both** load/speed endurance tests **in Example 1 and 800 kPa for the load/speed endurance test according to the main load/speed combination and 750 kPa for the test according to the additional load/speed combination in Example 2** for which the PSI symbol is ~~90~~."

Insert a new subparagraph 3. (e) to read:

- “(e) **If there are two indications for the test inflation pressure, they must be placed in such a way that it is clear which pressure indication belongs to which load/speed combination.**”

Annex 7 – Appendix 2, Part 1, Report, amend to read:

"...

5. Tyre class:
 6. Category of use:

7. Snow grip index ~~SG~~ relative to SRTT according to ~~paragraph 6.4.1.1.~~
 7.1. Test procedure and SRTT used
 8. Comments (if any):
 ..."

Annex 7 – Appendix 2, Part 2, Test data, amend to read:

" ...

5. Test results: mean fully developed decelerations ($m \cdot s^{-2}$) / traction coefficient⁽³⁾

Run number	Specification	SRTT ^(1st test)	Candidate 1	Candidate 2	SRTT ^(2nd test)
1					
2					
3					
4					
5					
6					
Mean					
Standard deviation					
Coefficient of variation	$CV_a \leq 6 \%$				
Coefficient of Validation	$CVal_a(SRTT) \leq 5 \%$				
SRTT weighted average					
Factor f					
Snow grip index		1.00			

- (1) for C2 tyres, corresponding to the indication of the inflation pressure marked on the sidewall as required by paragraph ~~4.1.~~ 3.1. of this Regulation

..."

II. Justification

1. This amendment to UN Regulation No. 109 is required in order to ensure that the test procedures for retreaded tyres are aligned with the proposals of ETRTO in TRANS/WP.29/GRBP/2020/13 for UN Regulation No. 54 and in ECE/TRANS/WP.29/GRBP/2020/16 and ECE/TRANS/WP.29/GRBP/2020/17 for UN Regulation No. 117. The implementation of paragraphs 2.7.3., 2.8.2., 2.8.4., 2.58., 2.59., 2.59.1., 2.60., 7.3., 7.3.1., 7.4. and 7.5. is aligned with UN Regulation No. 117. The modification of paragraph 7.1.4.4. is related to the extended tyre size range that is used in the vehicle original equipment for urban application with the requirement of sidewall protections for the tyres (e.g. 275/70 and 315/60 R 22.5). With the limitation to C3 tyres and the limitation to outside tyre position in dual mounting possible problems in relation to the clearance in the wheel housing are avoided.

III. Justification on ECE/TRANS/WP29/GRBP/2021/3 submitted by ETRTO on 18 January 2021

Paragraphs 3.4., 3.4.1. and 3.4.2.

2. It is not appropriate to amend paragraph 3.4., because it refers only to the approval marking (i.e. the markings referred to in paragraph 5.8 and as shown in Annex 2 to this Regulation) and therefore does not ensure that the marking requirements for retreaded tyres are aligned with the amendment proposed in ECE/TRANS/WP.29/GRBP/2020/13 for UN Regulation No. 54. Consequently, paragraphs 3.4.1. and 3.4.2. do not have to be added.

3. Additionally, the possibility of permanently marking retreaded tyres which are neither raised above nor sunk below the tyre surface has to be kept, because this is a practice largely adopted for retreaded tyres.

Paragraphs 3.5., 3.5.1 and 3.5.2.

4. Paragraph 3.5. has to be amended and paragraphs 3.5.1. and 3.5.2 have to be added to ensure that the marking requirements for retreaded tyres are aligned with the amendment proposed in ECE/TRANS/WP.29/GRBP/2020/13 for UN Regulation No. 54.

IV. Justification linked to informal document GRBP-73-21

5. Paragraph 6.4.4.1. concerns pre-cured tread material(s) or an identical mould-cure tread pattern design not approved according to UN Regulation No. 117 and provided by a supplier. The aim of the proposal is to clarify the documents to be provided to the Type Approval Authority (TAA) by the retreader. In such case the retreader shall ensure that the tread material(s) supplier provides evidence: the test report, Conformity of Production (CoP) and demonstration of the equivalence of design and compound in case of mould cure.

6. Paragraph 6.4.4.2. concerns mould cure or pre-cured tread material(s) approved according to UN Regulation No. 117. The paragraph was rephrased/renumbered for clarification.

7. Paragraph 6.4.4.3. concerns mould cure or pre-cured tread material(s) not approved according to UN Regulation No. 117 and provided or endorsed by the retreader. This is a new paragraph in order to address such case, then the retreader shall provide evidence: the test report and CoP.

8. As a consequence:

- Paragraph 4.1.5.3.1.3. is added (a list of tyres of the application for approval).
- Paragraph 5.4. is modified: a test is requested on the tyres covered by paragraph 6.4.4.3. (and 6.4.4.1. and 6.4.4.2., at the request of TAA).
- Paragraphs 9.2.2. and 9.4.2. are updated according to the new provisions in paragraph 6.4.4.3.
- Paragraph 9.4. is updated according to the renumbering of 6.4.4.2. and the introduction of 6.4.4.3.