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Agreement

Concerning the Adoption of Harmonized Technical United Nations Regulations for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these United Nations Regulations*

(Revision 3, including the amendments which entered into force on 14 September 2017)

Addendum 53 – UN Regulation No. 54

Revision 3 - Amendment 5

Supplement 23 to the original version of the Regulation – Date of entry into force:
29 December 2018

Uniform provisions concerning the approval of pneumatic tyres for commercial vehicles and their trailers

This document is meant purely as documentation tool. The authentic and legal binding texts is:
ECE/TRANS/WP.29/2018/55.



UNITED NATIONS

* Former titles of the Agreement:
Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, done at Geneva on 20 March 1958 (original version);
Agreement concerning the Adoption of Uniform Technical Prescriptions for Wheeled Vehicles, Equipment and Parts which can be Fitted and/or be Used on Wheeled Vehicles and the Conditions for Reciprocal Recognition of Approvals Granted on the Basis of these Prescriptions, done at Geneva on 5 October 1995 (Revision 2).

UN Regulation No. 54, amend to read:

"Uniform provisions concerning the approval of pneumatic tyres for commercial vehicles and their trailers

Contents

| | <i>Page</i> |
|--|-------------|
| 1. Scope | 3 |
| 2. Definitions..... | 3 |
| 3. Markings | 7 |
| 4. Application for approval | 9 |
| 5. Approval..... | 10 |
| 6. Specifications | 11 |
| 7. Modification and extension of approval of a tyre type..... | 14 |
| 8. Conformity of production..... | 15 |
| 9. Penalties for non-conformity of production | 15 |
| 10. Production definitively discontinued..... | 15 |
| 11. Names and addresses of Technical Services responsible for conducting approval tests, and of Type Approval Authorities | 16 |
| Annexes | |
| 1 Communication | 18 |
| 2 Arrangement of approval mark | 19 |
| 3 Arrangement of tyre markings | 21 |
| 4 List of symbols of load-capacity indices | 23 |
| 5 Tyre-size designation and dimensions..... | 25 |
| Part I - European tyres..... | 25 |
| Part II - United States tyres | 30 |
| 6 Method of measuring pneumatic tyres | 37 |
| 7 Procedure for load/speed endurance tests..... | 38 |
| Appendix 1 - Endurance-test programme..... | 39 |
| Appendix 2 - Relation between the pressure index and the units of pressure | 41 |
| 8 Variation of load capacity with speed commercial vehicles tyres - Radial and diagonal..... | 42 |
| 9 Communication - Upgrade of service description for the purposes of retreading in accordance with UN Regulation No. 109..... | 44 |

1. Scope

This Regulation covers new pneumatic tyres* designed primarily for vehicles of categories M₂, M₃, N, O₃ and O₄.^{1,2} However, it does not apply to tyre types identified by speed category symbols corresponding to speeds below eighty (80) km/h.

2. Definitions

For the purposes of this Regulation:

- 2.1. "*Type of tyre*" means tyres which do not differ in such essential characteristics as:
- (a) The manufacturer's name;
 - (b) Tyre-size designation;
 - (c) Category of use (normal tyre, snow tyre, special use tyre);
 - (d) Structure (diagonal (bias-ply, radial);
 - (e) Speed category symbol;
 - (f) Load-capacity indexes;
 - (g) Tyre cross-section.
- 2.2. "*Manufacturer*" means the person or body who is responsible to the Type Approval Authority (TAA) for all aspects of the type-approval and for ensuring the conformity of production."
- 2.3. "*Brand name/trademark*" means the identification of the brand or trademark as defined by the tyre manufacturer and marked on the sidewall(s) of the tyre. The brand name/trademark may be the same as that of the manufacturer".
- 2.4. "*Trade description/commercial name*" means an identification of a range of tyres as given by the tyre manufacturer. It may coincide with the brand name/trademark.
- 2.5. Category of use:
- 2.5.1. "*Normal tyre*" means a tyre intended for normal, on-road use;
 - 2.5.2. "*Snow tyre*" means a tyre whose tread pattern, tread compound or structure is primarily designed to achieve in snow conditions a performance better than that of a normal tyre with regard to its ability to initiate or maintain vehicle motion;
 - 2.5.3. "*Special use tyre*" means a tyre intended for mixed use both on- and off-road or for other special duty. These tyres are primarily designed to initiate and maintain the vehicle in motion in off-road conditions;

¹ As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.6, para. 2. - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

² This Regulation defines requirements for tyres as a component. It does not limit their installation on any categories of vehicles.

* For the purpose of this Regulation, "tyres" means "pneumatic tyres".

- 2.5.3.1. "*Professional off-road tyre*" is a special use tyre primarily used for service in severe off-road conditions;
- 2.6. "*Structure*" of a tyre means the technical characteristics of the tyre's carcass. A distinction is made between the following structures in particular:
- 2.6.1. "*Diagonal*" or "*bias-ply*" describes a tyre structure in which the ply cords extend to the beads and are laid at alternate angles substantially less than 90° to the centreline of the tread;
- 2.6.2. "*Radial*" 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;
- 2.7. "*Bead*" means the part of a tyre which is of such shape and structure as to fit the rim and to hold the tyre on it;³
- 2.8. "*Cord*" means the strands forming the fabric of the plies in the tyre;³
- 2.9. "*Ply*" means a layer of rubber-coated parallel cords³;
- 2.10. "*Carcass*" means that part of a tyre other than the tread and the rubber sidewalls which, when inflated, bears the load;³
- 2.11. "*Tread*" means that part of a tyre which comes into contact with the ground, protects the carcass against mechanical damage and contributes to ground adhesion;³
- 2.12. "*Sidewall*" means the part of a tyre between the tread and the area designed to be covered by the rim flange;³
- 2.13. "*Lower sidewall*" means the area included between the line of maximum section width of the tyre and the area designed to be covered by the rim flange;³
- 2.13.1. However, in case of tyres identified by the "tyre to rim fitment configuration" (see paragraph 3.1.12.) symbol "A", it means the area of the tyre which is seating on the rim;
- 2.14. "*Tread groove*" means the space between two adjacent ribs and/or blocks in the tread pattern;³
- 2.15. "*Section width (S)*" means the linear distance between the outsides of the sidewalls of an inflated tyre, excluding elevations due to labelling (marking), decoration or protective bands or ribs;³
- 2.16. "*Over-all width*" means the linear distance between the outsides of the sidewalls of an inflated tyre, including labelling (marking), decoration and protective bands or ribs;³
- 2.17. "*Section height (H)*" means a distance equal to half the difference between the outer diameter of the tyre and the nominal rim diameter;
- 2.18. "*Nominal aspect ratio (Ra)*" means one hundred times the number obtained by dividing the number expressing the section height (H) by the number expressing the nominal section width (S₁), both dimensions expressed in the same units;

³ See explanatory figure.

- 2.19. "Outer diameter (D)" means the overall diameter of an inflated new tyre³;
- 2.20. "Tyre-size designation" means:
- 2.20.1. A designation showing:
- 2.20.1.1. 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;
- 2.20.1.2. 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;
- 2.20.1.3. A conventional number "d" (the "d" symbol) denoting the nominal diameter of the rim and corresponding to its diameter expressed either in codes (number below 100) or in millimetres (numbers above 100). Numbers corresponding to both types of measurement may be used together in the designation;
- 2.20.1.3.1. The values of the "d" symbols expressed in millimetres are shown below:

| <i>Nominal rim diameter code ("d" symbol)</i> | <i>Value of the "d" symbol expressed in mm</i> |
|---|--|
| 8 | 203 |
| 9 | 229 |
| 10 | 254 |
| 11 | 279 |
| 12 | 305 |
| 13 | 330 |
| 14 | 356 |
| 15 | 381 |
| 16 | 406 |
| 17 | 432 |
| 18 | 457 |
| 19 | 483 |
| 20 | 508 |
| 21 | 533 |
| 22 | 559 |
| 24 | 610 |
| 25 | 635 |
| 14.5 | 368 |
| 16.5 | 419 |
| 17.5 | 445 |
| 19.5 | 495 |
| 20.5 | 521 |
| 22.5 | 572 |
| 24.5 | 622 |
| 26 | 660 |
| 28 | 711 |
| 30 | 762 |

- 2.20.1.4. An indication of the tyre to rim fitment configuration when it differs from the standard configuration and is not already expressed by the symbol "d" denoting the nominal rim diameter code;
- 2.21. "Nominal rim diameter (d)" means the diameter of the rim on which a tyre is designed to be mounted³;
- 2.22. "Rim" means the support for a tyre-and-tube assembly, or for a tubeless tyre, on which support the tyre beads are seated³;
- 2.23. "Theoretical rim" means a rim whose width would be equal to x times the nominal section width of a tyre; the value of x shall be specified by the manufacturer of the type;
- 2.24. "Measuring rim" means the rim on which a tyre must be fitted for dimensional measurements;
- 2.25. "Test rim" means the rim on which a tyre must be fitted for load/speed endurance testing;
- 2.26. "Chunking" means the breaking away of pieces of rubber from the tread;
- 2.27. "Cord separation" means the parting of the cords from their coating;
- 2.28. "Ply separation" means the parting of adjacent plies;
- 2.29. "Tread separation" means the pulling away of the tread from the carcass;
- 2.30. "Load-capacity index" means one or two numbers which indicate the load the tyre can carry in single or in single and dual operation at the speed corresponding to the associated speed category and when operated in conformity with the requirements governing utilization specified by the manufacturer. A type of tyre can have either one or two sets of load capacity indices depending on whether or not the provisions of paragraph 6.2.5. are applied. The list of these indices and their corresponding loads is given in Annex 4;
- 2.31. "Speed category" means:
- 2.31.1. The speeds, indicated by a symbol, at which the tyre can carry the load indicated by the associated load-capacity index;
- 2.31.2. The speed categories are as shown in the table below:⁴

| <i>Speed-category symbol</i> | <i>Corresponding speed (km/h)</i> |
|------------------------------|-----------------------------------|
| F | 80 |
| G | 90 |
| J | 100 |
| K | 110 |
| L | 120 |
| M | 130 |
| N | 140 |
| P | 150 |
| Q | 160 |


⁴ For consistency, the symbols and speeds shown in this table are the same as those for passenger cars (as in UN Regulation No. 30). They should not be taken to indicate the speeds at which commercial vehicles fitted with such tyres may be operated on the roads.

| <i>Speed-category symbol</i> | <i>Corresponding speed (km/h)</i> |
|------------------------------|-----------------------------------|
| R | 170 |
| S | 180 |
| T | 190 |
| U | 200 |
| H | 210 |

- 2.32. "*Table load-capacity variation with speed*" means:
The table, in Annex 8, showing as a function of the load-capacity indices and nominal-speed-category symbols the load variations which a tyre can withstand when used at speeds different from that conforming to its nominal-speed-category symbol. The load variations do not apply in the case of the additional load capacity symbol and speed category obtained when the provisions of paragraph 6.2.5. are applied;
- 2.33. "*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;
- 2.34. "*Tyre Class*" means one of the following groupings:
- 2.34.1. *Class C2 tyres*: Tyres identified by a load capacity index in single formation lower or equal to 121 and a speed category symbol higher or equal to "N";
- 2.34.2. *Class C3 tyres*: Tyres identified by:
- (a) A load capacity index in single formation higher or equal to 122;
or
 - (b) A load capacity index in single formation lower or equal to 121 and a speed category symbol lower or equal to "M".

3. Markings

- 3.1. Tyres submitted for approval shall bear on both side walls in the case of symmetrical tyres and at least on the outer side wall in the case of asymmetrical tyres:
- 3.1.1. The manufacturer's name or the Brand name/trademark;
 - 3.1.2. The trade description/commercial name (see paragraph 2.4. of this Regulation). However, the trade description is not required when it coincides with the Brand name/trademark.
 - 3.1.3. The tyre-size designation as defined in paragraph 2.20. of this Regulation;
 - 3.1.4. An indication of the structure as follows:
 - 3.1.4.1. On diagonal (bias-ply) tyres: no indication, or the letter "D";
 - 3.1.4.2. On radial-ply tyres: the letter "R" placed in front of the rim-diameter marking and, optionally, the word "RADIAL";
 - 3.1.5. The speed-category symbol (or symbols);
 - 3.1.5.1. An indication of the tyre's nominal speed category in the form of the symbol prescribed in paragraph 2.31.2. above;

- 3.1.5.2. An indication of a second speed category in cases where paragraph 6.2.5. below is applied;
- 3.1.6. The inscription 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 2.5.2.;
- 3.1.7. The load-capacity indices as defined in paragraph 2.30. of this Regulation;
- 3.1.8. The word "TUBELESS" if the tyre is designed for use without an inner tube;
- 3.1.9. The date of manufacture in the form of a group of four digits, the first two showing the week and the last two the year of manufacture. However, this marking, which it is permissible to restrict to one sidewall, shall not be mandatory, on any tyre submitted for approval, until two years after the date of entry into force of this Regulation;⁵
- 3.1.10. In the case of tyres which can be regrooved, the symbol “” at least 20 mm in diameter, or the word "REGROOVABLE", moulded into or on to each sidewall;
- 3.1.11. An indication, by the "PSI" index, of the inflation pressure to be adopted for the load/speed endurance tests, as explained in Annex 7, Appendix 2. However, this indication, which it is permissible to restrict to one sidewall, shall not be mandatory, on any tyre submitted for approval, until two years after the date of entry into force of this Regulation.
- For tyres first approved after 1 January 2018, the Inflation pressure for the dimension measurement and for the load/speed endurance test, pursuant to paragraph 4.1.12. of this Regulation, shall be indicated in kilopascals, replacing the "PSI" index.
- It is allowed to use kPa marking instead of PSI for tyres first type approved before 1 January 2018.;
- 3.1.12. In the case of tyres first approved after 1 March 2004 the identification referred to in paragraph 2.20.1.4. shall be placed only immediately after the rim diameter marking referred to in paragraph 2.20.1.3.;
- 3.1.13. The inscription "MPT" (or alternatively "ML" or "ET") and /or "POR" if the tyre is classified in the category of use "special use tyre". In addition, they may also bear the inscription M+S or M.S or M&S.
- "ET" means Extra Tread, "ML" stands for Mining and Logging, "MPT" means Multi-Purpose Truck and "POR" means Professional Off Road;⁶
- 3.1.14. The prefix "LT" before the tyre size designation, or the suffix "C" or "LT" after the rim diameter marking referred to in paragraph 2.20.1.3., and, if applicable, after the tyre to rim fitment configuration referred to in paragraph 2.20.1.4., or the suffix "LT" after the service description.

⁵ Before 1 January 2000, the date of manufacture may be indicated by a group of three digits, the first two showing the week and the last one the year of manufacture.

⁶ This marking shall only be mandatory for tyre types approved to this Regulation after the entry into force of Supplement 14 to the Regulation.

- 3.1.14.1. This marking is optional in the case of tyres fitted on 5° drop centre rims, suitable for single and dual fitment, having a load capacity index in single lower or equal to 121 and destined for the equipment of motor vehicles;
- 3.1.14.2. This marking is mandatory in the case of tyres fitted on 5° drop centre rims, suitable for single fitment only, having a load capacity index higher or equal to 122 and destined for the equipment of motor vehicles;
- 3.1.15. The suffix "CP" after the rim diameter marking referred to in paragraph 2.20.1.3., and, if applicable, after the tyre to rim fitment configuration referred to in paragraph 2.20.1.4. This marking is mandatory in the case of tyres fitted on 5° drop centre rims, having a load capacity index in single lower or equal to 121 and specifically designed for the equipment of motor caravans;
- 3.1.16. The inscription "FRT" (Free Rolling Tyre) in case of tyres designed for the equipment of trailer axles and axles of motor vehicles other than front steering and drive axles.
- 3.2. Tyres shall exhibit a free space sufficiently large to accommodate an approval mark as shown in Annex 2 to this Regulation.
- 3.3. Annex 3 to this Regulation gives an example of an arrangement of the tyre markings.
- 3.4. The markings referred to in paragraph 3.1. and the approval mark prescribed in paragraph 5.4. of this Regulation shall be moulded on to or into the tyres. They shall be clearly legible and shall, except for the marking referred to in paragraph 3.1.1., 3.1.2. and 3.1.13. above, be located on at least one lower sidewall.
- 3.4.1. However, for tyres identified by the "tyre to rim fitment configuration" (see paragraph 3.1.12.) symbol "A", the markings may be placed anywhere on the sidewall of the tyre.

4. Application for approval

- 4.1. The application for approval of a type of tyre with regard to this Regulation shall be submitted by the tyre manufacturer or by his duly accredited representative. It shall specify:
 - 4.1.1. The tyre-size designation;
 - 4.1.2. The manufacturer's name;
 - 4.1.2.1. The Brand name(s)/trademark(s);
 - 4.1.2.2. The trade description(s)/commercial name(s).
 - 4.1.3. Category of use (normal tyre, snow tyre, special use tyre);
 - 4.1.3.1. For the tyres belonging to the category of use "special use tyre" those which may bear the inscription M+S or M.S or M&S.
 - 4.1.4. Structure: diagonal (bias ply) or radial;
 - 4.1.5. The speed category;
 - 4.1.6. The load-capacity indexes;
 - 4.1.7. Whether the tyre is intended to be used with or without an inner tube;

- 4.1.8. The overall dimensions: overall section width and outer diameter;
- 4.1.9. The factor "x" referred to in paragraph 2.23. above;
- 4.1.10. The rims on which the tyre can be mounted;
- 4.1.11. The measuring rim and test rim;
- 4.1.12. The inflation pressure for the dimension measurement and for the load/speed endurance test pressure;
- 4.1.13. The additional load/speed combinations in cases where paragraph 6.2.5. below is applied.
- 4.2. The application for approval shall be accompanied (all in triplicate) by a sketch, or a representative photograph, which identify the tyre tread pattern and a sketch of the envelope of the inflated tyre mounted on the measuring rim showing the relevant dimensions (see paragraphs 6.1.1. and 6.1.2.) of the type submitted for approval. It shall also be accompanied either by the test report issued by the approved test laboratory or by one or two samples of the tyre type, at the discretion of the competent authority. Drawings or photographs of the side wall and tread of the tyre shall be submitted once production has been established, no later than one year after the date of issue of the type approval.
- 4.3. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.
- 4.4. Where a tyre manufacturer submits application for type approval for a range of tyres, it is not considered necessary to carry out a load/speed test on every type of tyre in the range. Worst case selection may be made at the discretion of the approval authority.

5. Approval

- 5.1. If the type of tyre submitted for approval in pursuance of this Regulation meets the requirements of paragraph 6. below, approval of that type of tyre shall be granted.
- 5.2. An approval number shall be assigned to each type approved; its first two digits (at present 00 for the Regulation in its original form) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party may not assign the same number to another type of tyre.
- 5.3. Notice of approval or of refusal of approval of a type of tyre pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in Annex 1 to this Regulation.
- 5.4. There shall be affixed, conspicuously, to every tyre conforming to a type of tyre approved under this Regulation, in the space referred to in paragraph 3.2. above and in addition to the markings prescribed in paragraph 3.1. above, an international approval mark consisting of:

- 5.4.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval⁷; and
- 5.4.2. An approval number.
- 5.5. The approval mark shall be clearly legible and be indelible.
- 5.6. Annex 2 to this Regulation gives an example of the arrangement of the approval mark.
- 5.7. Subsequent retreading in accordance with UN Regulation No. 109

In the case where, during the course of production of a particular tyre type, the manufacturer has obtained a new approval for that same tyre type to be marked with a service description indicating a higher load index or different speed symbol than the earlier marking and where the tyre manufacturer authorizes the earlier tyre type to be retreaded and marked with the later service description, the tyre manufacturer shall complete the Communication document given in Annex 9 to this Regulation and shall submit this to the Type Approval Authority that has granted the new approval. If the authorization for upgrading only applies to tyres from a particular manufacturing plant, or produced during particular production periods, the information necessary to identify the tyres shall be stated on the Communication document.

The Type Approval Authority shall communicate this information to other Parties to the Agreement which apply this Regulation and tyre manufacturers or Type Approval Authorities shall release this information on the request of any retreading production unit that is approved in accordance with UN Regulation No. 109.

6. Specifications

- 6.1. Dimensions of tyres
 - 6.1.1. Section width of a tyre
 - 6.1.1.1. The section width shall be obtained by means of the following formula:

$$S = S1 + K (A - A1),$$

Where:

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

S1 is "the nominal section width" in millimetres, as shown on the sidewall of the tyre in the tyre designation as prescribed;

A is the width of the measuring rim in millimetres, as shown by the manufacturer in the descriptive note; and

A1 is the width of the theoretical rim in millimetres.

⁷ The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), document ECE/TRANS/WP.29/78/Rev.6/Amend.3 - www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html

A1 shall be taken to equal S1 multiplied by the factor x as specified by the manufacturer, and K shall be taken to equal 0.4.

6.1.1.2. However, for the types of tyres whose designation is given in the first column of the tables in Annex 5 to this Regulation, the section width shall be deemed to be that given opposite the tyre designation in those tables.

6.1.1.3. However, for tyres identified by the "tyre to rim fitment configuration" (see paragraph 3.1.12.) symbol "A", K shall be taken to equal 0.6.

6.1.2. Outer diameter of a tyre

6.1.2.1. The outer diameter of a tyre shall be obtained by means of the following formula:

$$D = d + 2H$$

where:

D is the outer diameter expressed in millimetres;

d is the conventional number defined in paragraph 2.20.1.3. above, expressed in millimetres;

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

$$H = S1 \cdot 0.01 Ra, \text{ where}$$

S1 is the nominal section width in millimetres;

Ra is the nominal aspect ratio;

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

6.1.2.2. However, for the types of tyres whose designation is given in the first column of the tables in Annex 5 to this Regulation, the outer diameter shall be deemed to be that given opposite the tyre designation in those tables.

6.1.2.3. However, for tyres identified by the "tyre to rim fitment configuration" (see paragraph 3.1.12.) symbol "A", the outer diameter shall be that specified in the tyre-size designation as shown on the sidewall of the tyre.

6.1.3. Method of measuring tyres

The dimensions of tyres shall be measured by the procedure described in Annex 6 to this Regulation.

6.1.4. Tyre section width specifications

6.1.4.1. The overall width of a tyre may be less than the section width or widths determined pursuant to paragraph 6.1.1. above.

6.1.4.2. It may exceed that value by 4 per cent in case of radial-ply tyres and by 8 per cent in the case of diagonal (bias-ply) tyres. However, for tyres intended for dual mounting (twinning) listed in column A of the following table, the overall width of the tyre may exceed the value determined pursuant to paragraph 6.1.1. above taking into account the tolerances listed in column B; different specific tolerances are listed in annex 5 Part II in footnotes of the relevant tables. The respective limits shall be rounded to the nearest millimetre (mm).

| <i>A</i> | <i>B</i> |
|---|----------|
| radial metric tyres with nominal section width exceeding 305 mm and aspect ratio higher than 60 | 2% |
| radial tyres listed in Annex 5 Part 1 with section width exceeding 305 mm | 2% |
| diagonal (bias-ply) metric tyres with nominal section width exceeding 305 mm | 4% |
| diagonal (bias-ply) tyres listed in Annex 5 Part 1 with section width exceeding 305 mm | 4% |

6.1.4.3. However, for tyres identified by the "tyre to rim fitment configuration" (see paragraph 3.1.12.) symbol "A", the overall width of the tyre, in the lower area of the tyre, equals the nominal width of the rim on which the tyre is mounted, as shown by the manufacturer in the descriptive note, increased by 27 mm.

6.1.5. Tyre outer diameter specifications

The outer diameter of a tyre must not be outside the values D_{\min} and D_{\max} obtained from the following formulae:

$$D_{\min} = d + 2 \cdot H_{\min}$$

$$D_{\max} = d + 2 \cdot H_{\max}$$

Where:

$$H_{\min} = H \cdot a \quad \text{rounded to the nearest mm}$$

$$H_{\max} = H \cdot b \quad \text{rounded to the nearest mm}$$

and

6.1.5.1. For sizes listed in Annex 5 and for tyres identified by the "tyre to rim fitment configuration" (see paragraph 3.1.12.) symbol "A", the nominal section height H is equal to:

$$H = 0.5 (D-d), \text{ rounded to the nearest mm - for references see paragraph 6.1.2.1.}$$

6.1.5.2. For other sizes, not listed in Annex 5

"H" and "d" are as defined in paragraph 6.1.2.1.

6.1.5.3. Coefficients "a" and "b" are respectively:

6.1.5.3.1. Coefficient "a" = 0.97

| | | |
|----------------------------|--------|----------|
| 6.1.5.3.2. Coefficient "b" | Radial | Diagonal |
| For normal use tyres | 1.04 | 1.07 |
| For special use tyres | 1.06 | 1.09 |

6.1.5.3.3. For tyres of the category of use "snow tyre" the outer diameter shall not exceed the following value

$$D_{\max, \text{snow}} = 1.01 \cdot D_{\max} \quad \text{rounded to the nearest mm}$$

where D_{\max} is the maximum outer diameter established in conformity with the above.

- 6.2. Load/speed endurance test
- 6.2.1. Each type of tyre shall undergo at least one load/speed endurance tests carried out by the procedure described in Annex 7 to this Regulation.
- 6.2.2. A tyre which, after undergoing the endurance test, does not exhibit any tread separation, ply separation, cord separation, chunking or broken cords shall be deemed to have passed the test.
- 6.2.3. The outer diameter of the tyre, measured six hours after the load/speed endurance test, must not differ by more than 3.5 per cent from the outer diameter as measured before the test.
- 6.2.4. Where application is made for the approval of a type of tyre for the load/speed combinations given in the table in Annex 8, the endurance test prescribed in paragraph 6.2.1. above need not be carried out for load and speed values other than the nominal values.
- 6.2.5. Where application is made for the approval of a type of tyre which has a load/speed combination in addition to the one that is subject to the variation of load with speed given in the table in Annex 8, the endurance test prescribed in paragraph 6.2.1. above shall also be carried out on a second tyre of the same type at the additional load/speed combination.
- 6.3. Tread pattern of a tyre
- 6.3.1. 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
- 6.3.2. In order to be classified as a 'professional off-road tyre', a tyre shall have all of the following characteristics:
- (a) For 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 $\leq K$.

7. Modification and extension of approval of a tyre type

- 7.1. Every modification of a tyre type shall be notified to the Type Approval Authority which approved the tyre type. That Authority may then either:
- 7.1.1. Consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the tyre still meets the requirements; or

- 7.1.2. Require a further test report from the Technical Service responsible for carrying out the tests.
- 7.2. A modification of the tread pattern of the tyre shall not be considered to necessitate a repetition of the tests prescribed in paragraph 6. of this Regulation.
- 7.3. Confirmation or refusal of approval, specifying the alterations, shall be communicated by the procedure specified in paragraph 5.3. above to the Parties to the Agreement which apply this Regulation.
- 7.4. The competent Type Approval Authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.

8. Conformity of production

The conformity of production procedures shall comply with those set out in the Agreement, Schedule 1 (E/ECE/TRANS/505/Rev.3), with the following requirements:

- 8.1. Tyres approved under this Regulation shall be so manufactured as to conform to the type approved, by meeting the requirements set forth in paragraph 6. above.
- 8.2. The Type Approval Authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. For each production facility, the normal frequency of these verifications shall be once every two years.

9. Penalties for non-conformity of production

- 9.1. The approval granted in respect of a type of tyre pursuant to this Regulation may be withdrawn if the requirement laid down in paragraph 8.1. above is not complied with or if the tyres taken from the series have failed to pass the tests prescribed in that paragraph.
- 9.2. If a Party to the Agreement which applies this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the model in annex 1 to this Regulation.

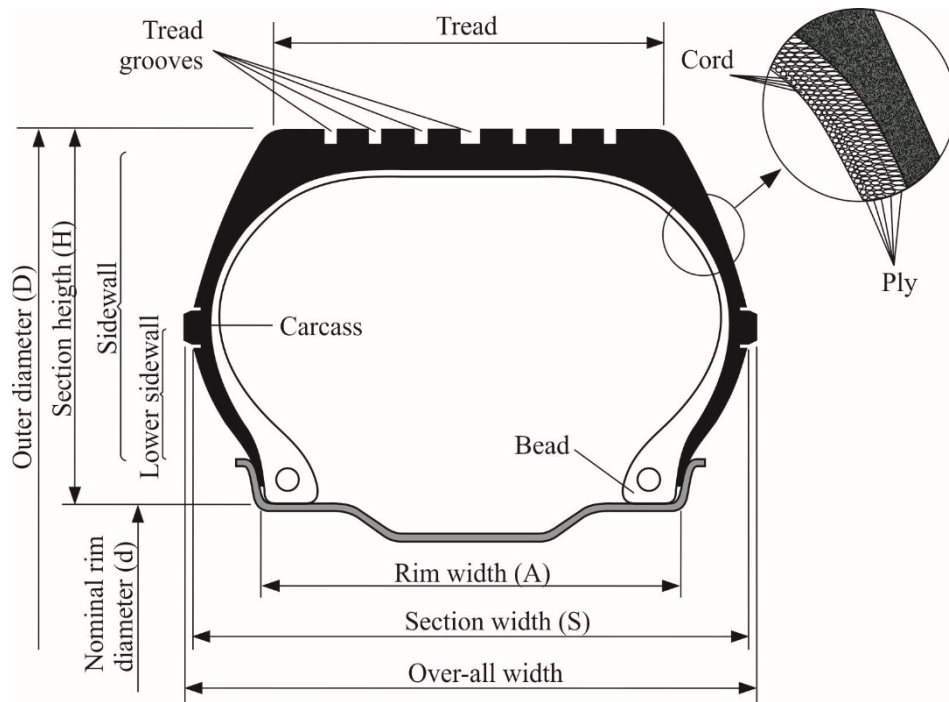
10. Production definitively discontinued

If the holder of an approval completely ceases to manufacture a type of tyre approved in accordance with this Regulation, he shall so inform the Type Approval Authority which granted the approval. Upon receiving the relevant communication that Authority shall inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of copies of the communication form conforming to the model in Annex 1 to this Regulation.

11. Names and addresses of Technical Services responsible for conducting approval tests, of test laboratories, and of Type Approval Authorities

- 11.1. The Contracting Parties to the 1958 Agreement which apply this Regulation shall communicate to the United Nations Secretariat the names and addresses of the technical services responsible for conducting approval tests and, where applicable, of the approved test laboratories and of the Type Approval Authorities which grant approval and to which forms certifying approval or extension of approval or refusal of approval or withdrawal of approval or production definitively discontinued, issued in other countries, are to be sent.
- 11.2. The Contracting Parties to the 1958 Agreement which apply this Regulation may designate laboratories of tyre manufacturers, as approved, test laboratories.
- 11.3. Where a Contracting Party to the 1958 Agreement applies paragraph 11.2. above, it may, if it so desires, be represented at the tests by one or more persons of its choice.

Article I. Explanatory figure
Article II. (See paragraph 2. of the Regulation)



Annex 1

Communication

(Maximum format: A4 (210 x 297 mm))



issued by : Name of administration:

.....

- Concerning:² Approval granted
 Approval extended
 Approval refused
 Approval withdrawn
 Production definitively discontinued

of a type of pneumatic tyre for motor vehicles pursuant to UN Regulation No. 54

Approval No. Extension No.

1. Manufacturer's name and address:.....
2. Tyre type designation:³.....
- 2.1. Brand name(s)/trademark(s):
- 2.2. Trade description(s)/ Commercial name(s)/
3. If applicable, name and address of manufacturer's representative:
-
-
4. Summarized description:
- 4.1. Size of tyre
- 4.2. Category of use: normal/snow/special²
- 4.3. Structure: diagonal (bias-ply)/radial²
- 4.4. Tyre class: C2 / C3²
- 4.5. Speed category symbol:

¹ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

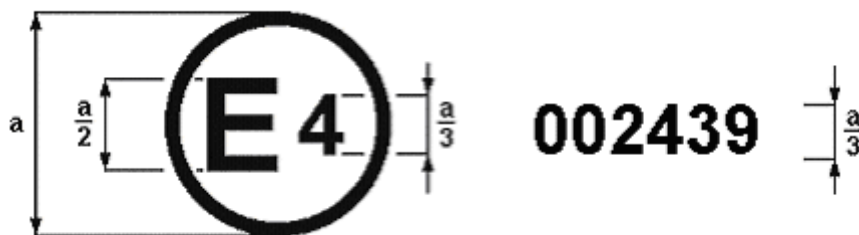
² Strike out what does not apply.

³ A list of brand name(s)/trademark(s) or Trade description(s)/ Commercial name(s) may be annexed to this communication

- 4.5.1. Nominal:.....
- 4.5.2. Additional (if applicable):
- 4.6. Load-capacity indices:
 - 4.6.1. Corresponding to nominal speed: single twinned (dual)
 - 4.6.2. Corresponding to additional speed: single twinned (dual)
5. Technical Service and, where applicable, test laboratory approved for purposes of approval or of verification of conformity:.....
.....
6. Date of report issued by that Service:.....
7. Number of report issued by that Service:
8. Reasons(s) of extension (if applicable):
9. Any remarks:
10. Place:
11. Date:
12. Signature:
13. Annexed to this communication is a list of documents in the approval file deposited at the Type Approval Authorities having delivered the approval and which can be obtained upon request.

Annex 2

Arrangement of approval mark



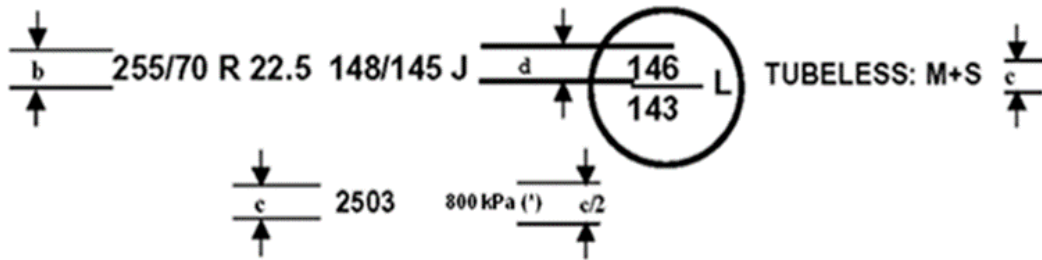
$a = 12 \text{ mm (min.)}$

The above approval mark affixed to a tyre shows that the type of tyre concerned has been approved in the Netherlands (E 4) under approval number 002439. The first two digits of the approval number indicate that the approval was granted in accordance with the requirements of UN Regulation No. 54 in its original form

Note: The approval number must be placed close to the circle and either above or below the "E" or to left or right of that letter. The digits of the approval number must be on the same side of the "E" and face in the same direction. The use of Roman numerals as approval numbers should be avoided so as to prevent any confusion with other symbols.

Annex 3

Arrangement of tyre markings



(*) PSI marking instead of kPa is allowed for tyres first type approved before 1 January 2018.

↓
c ————— **ET; ML; MPT; POR**
↑

| | <i>Minimum heights of markings (mm)</i> |
|---|---|
| b | 6 |
| c | 4 |
| d | 6 |

- These markings define a tyre:
 - Having a nominal section width of 255;
 - Having a nominal aspect ratio of 70;
 - Of radial-ply structure (R);
 - Having a nominal rim diameter of 572 mm, for which the symbol is 22.5;
 - Having load capacities of 3,150 kg when single and 2,900 kg when twinned (dual), corresponding respectively to the load indices 148 and 145 shown in Annex 4 to this Regulation;
 - Having a reference speed of 100 km/h corresponding to speed category symbol: J;
 - Classified in the category of use Snow: M+S;
 - Able to be used additionally at 120 km/h (speed category symbol L) with a load capacity of 3,000 kg when single and 2,725 kg when twinned (dual), corresponding respectively to the load indices 145 and 143 shown in Annex 4 to this Regulation;
 - Capable of being fitted without inner tube: "TUBELESS";
 - Manufactured during the twenty-fifth week of the year 2003, and

Requiring to be inflated to 800 kPa for load/speed endurance tests, for which the PSI symbol is 90.

2. In the particular case of tyres having a tyre to rim fitment configuration "A", the marking shall be in the form of the following example:

235-700 R 450A

Where:

235 is the nominal section width in mm

700 is the outer diameter expressed in mm

R is an indication of the structure of the tyre - see paragraph 3.1.4. of this Regulation

450 is the nominal diameter of the rim expressed in mm

A is the tyre to rim fitment configuration.

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

3. The positioning and order of the markings constituting the tyre designation shall be the following:

(a) The tyre-size designation as defined in paragraph 2.20. of this Regulation shall be grouped as shown in the example above: 255/70 R 22.5 or 235-700 R 450A;

(b) The service description comprising the load index/indices and the speed symbol shall be placed immediately after the tyre-size designation as defined in paragraph 2.20. of this Regulation;

(c) The symbols "TUBELESS" and "M+S" or "FRT" or "MPT" (and equivalents) may be at a distance from the tyre-size designation

(d) If paragraph 6.2.5. of this Regulation is applied, the additional load-capacity indices and speed-category symbol must be shown inside a circle near the nominal load-capacity indices and speed-category-symbol appearing on the tyre sidewall.

Annex 4

List of symbols of load-capacity indices

| <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | 45 | 40 | 140 | 80 | 450 | 120 | 1 400 | 160 | 4 500 | 200 | 14 000 | 240 | 45 000 |
| 1 | 46.2 | 41 | 145 | 81 | 462 | 121 | 1 450 | 161 | 4 625 | 201 | 14 500 | 241 | 46 250 |
| 2 | 47.5 | 42 | 150 | 82 | 475 | 122 | 1 500 | 162 | 4 750 | 202 | 15 000 | 242 | 47 500 |
| 3 | 48.7 | 43 | 155 | 83 | 487 | 123 | 1 550 | 163 | 4 875 | 203 | 15 500 | 243 | 48 750 |
| 4 | 50 | 44 | 160 | 84 | 500 | 124 | 1 600 | 164 | 5 000 | 204 | 16 000 | 244 | 50 000 |
| 5 | 51.5 | 45 | 165 | 85 | 515 | 125 | 1 650 | 165 | 5 150 | 205 | 16 500 | 245 | 51 500 |
| 6 | 53 | 46 | 170 | 86 | 530 | 126 | 1 700 | 166 | 5 300 | 206 | 17 000 | 246 | 53 000 |
| 7 | 54.5 | 47 | 175 | 87 | 545 | 127 | 1 750 | 167 | 5 450 | 207 | 17 500 | 247 | 54 500 |
| 8 | 56 | 48 | 180 | 88 | 560 | 128 | 1 800 | 168 | 5 600 | 208 | 18 000 | 248 | 56 000 |
| 9 | 58 | 49 | 185 | 89 | 580 | 129 | 1 850 | 169 | 5 800 | 209 | 18 500 | 249 | 58 000 |
| 10 | 60 | 50 | 190 | 90 | 600 | 130 | 1 900 | 170 | 6 000 | 210 | 19 000 | 250 | 60 000 |
| 11 | 61.5 | 51 | 195 | 91 | 615 | 131 | 1 950 | 171 | 6 150 | 211 | 19 500 | 251 | 61 500 |
| 12 | 63 | 52 | 200 | 92 | 630 | 132 | 2 000 | 172 | 6 300 | 212 | 20 000 | 252 | 63 000 |
| 13 | 65 | 53 | 206 | 93 | 650 | 133 | 2 060 | 173 | 6 500 | 213 | 20 600 | 253 | 65 000 |
| 14 | 67 | 54 | 212 | 94 | 670 | 134 | 2 120 | 174 | 6 700 | 214 | 21 200 | 254 | 67 000 |
| 15 | 69 | 55 | 218 | 95 | 690 | 135 | 2 180 | 175 | 6 900 | 215 | 21 800 | 255 | 69 000 |
| 16 | 71 | 56 | 224 | 96 | 710 | 136 | 2 240 | 176 | 7 100 | 216 | 22 400 | 256 | 71 000 |
| 17 | 73 | 57 | 230 | 97 | 730 | 137 | 2 300 | 177 | 7 300 | 217 | 23 000 | 257 | 73 000 |
| 18 | 75 | 58 | 236 | 98 | 750 | 138 | 2 360 | 178 | 7 500 | 218 | 23 600 | 258 | 75 000 |
| 19 | 77.5 | 59 | 243 | 99 | 775 | 139 | 2 430 | 179 | 7 750 | 219 | 24 300 | 259 | 77 500 |
| 20 | 80 | 60 | 250 | 100 | 800 | 140 | 2 500 | 180 | 8 000 | 220 | 25 000 | 260 | 80 000 |
| 21 | 82.5 | 61 | 257 | 101 | 825 | 141 | 2 575 | 181 | 8 250 | 221 | 25 750 | 261 | 82 500 |
| 22 | 85 | 62 | 265 | 102 | 850 | 142 | 2 650 | 182 | 8 500 | 222 | 26 500 | 262 | 85 000 |
| 23 | 87.5 | 63 | 272 | 103 | 875 | 143 | 2 725 | 183 | 8 750 | 223 | 27 250 | 263 | 87 500 |
| 24 | 90 | 64 | 280 | 104 | 900 | 144 | 2 800 | 184 | 9 000 | 224 | 28 000 | 264 | 90 000 |
| 25 | 92.5 | 65 | 290 | 105 | 925 | 145 | 2 900 | 185 | 9 250 | 225 | 29 000 | 265 | 92 500 |
| 26 | 95 | 66 | 300 | 106 | 950 | 146 | 3 000 | 186 | 9 500 | 226 | 30 000 | 266 | 95 000 |
| 27 | 97.5 | 67 | 307 | 107 | 975 | 147 | 3 075 | 187 | 9 750 | 227 | 30 750 | 267 | 97 500 |
| 28 | 100 | 68 | 315 | 108 | 1 000 | 148 | 3 150 | 188 | 10 000 | 228 | 31 500 | 268 | 100 000 |
| 29 | 103 | 69 | 325 | 109 | 1 030 | 149 | 3 250 | 189 | 10 300 | 229 | 32 500 | 269 | 103 000 |
| 30 | 106 | 70 | 335 | 110 | 1 060 | 150 | 3 350 | 190 | 10 600 | 230 | 33 500 | 270 | 106 000 |
| 31 | 109 | 71 | 345 | 111 | 1 090 | 151 | 3 450 | 191 | 10 900 | 231 | 34 500 | 271 | 109 000 |
| 32 | 112 | 72 | 355 | 112 | 1 120 | 152 | 3 550 | 192 | 11 200 | 232 | 35 500 | 272 | 112 000 |
| 33 | 115 | 73 | 365 | 113 | 1 150 | 153 | 3 650 | 193 | 11 500 | 233 | 36 500 | 273 | 115 000 |
| 34 | 118 | 74 | 375 | 114 | 1 180 | 154 | 3 750 | 194 | 11 800 | 234 | 37 500 | 274 | 118 000 |

| <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> | <i>LI</i> | <i>kg</i> |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | | | | | | | | | | | | 000 |
| 35 | 121 | 75 | 387 | 115 | 1 215 | 155 | 3 875 | 195 | 12 150 | 235 | 38 750 | 275 | 121 500 |
| 36 | 125 | 76 | 400 | 116 | 1 250 | 156 | 4 000 | 196 | 12 500 | 236 | 40 000 | 276 | 125 000 |
| 37 | 128 | 77 | 412 | 117 | 1 285 | 157 | 4 125 | 197 | 12 850 | 237 | 41 250 | 277 | 128 500 |
| 38 | 132 | 78 | 425 | 118 | 1 320 | 158 | 4 250 | 198 | 13 200 | 238 | 42 500 | 278 | 132 000 |
| 39 | 136 | 79 | 437 | 119 | 1 360 | 159 | 4 375 | 199 | 13 600 | 239 | 43 750 | 279 | 136 000 |

Annex 5

Tyre-size designation and dimensions

Part I - European tyres

Article III. Table A

Article IV. Code designated sizes mounted on 5° tapered rims or flat base rims.

Radial and diagonal constructions

| Tyre-size designation (+) | Measuring rim width code | Nominal rim diameter d (mm) | Outer diameter D (mm) | | Section width S (mm) | |
|---------------------------|--------------------------|-----------------------------|-----------------------|----------|----------------------|----------|
| | | | Radial | Diagonal | Radial | Diagonal |
| Std. series | | | | | | |
| 4.00R8 (*) | 2.50 | 203 | 414 | 414 | 107 | 107 |
| 4.00R10(*) | 3.00 | 254 | 466 | 466 | 108 | 108 |
| 4.00R12(*) | 3.00 | 305 | 517 | 517 | 108 | 108 |
| 4.10/3.50-6 | 2.50 | 152 | - | 320 | - | 95 |
| 3.50-8 | 2.50 | 203 | - | 394 | - | 103 |
| 4.40-10 | 3.50 | 254 | - | 480 | - | 124 |
| 4.50R8 (*) | 3.50 | 203 | 439 | 439 | 125 | 125 |
| 4.50R10(*) | 3.50 | 254 | 490 | 490 | 125 | 125 |
| 4.50R12(*) | 3.50 | 305 | 545 | 545 | 125 | 128 |
| 5.00R8 (*) | 3.00 | 203 | 467 | 467 | 132 | 132 |
| 5.00R10(*) | 3.50 | 254 | 516 | 516 | 134 | 134 |
| 5.00R12(*) | 3.50 | 305 | 568 | 568 | 134 | 137 |
| 6.00R9 | 4.00 | 229 | 540 | 540 | 160 | 160 |
| 6.00R14C | 4.50 | 356 | 626 | 625 | 158 | 158 |
| 6.00R16(*) | 4.50 | 406 | 728 | 730 | 170 | 170 |
| 6.50R10 | 5.00 | 254 | 588 | 588 | 177 | 177 |
| 6.50R14C | 5.00 | 356 | 640 | 650 | 170 | 172 |
| 6.50R16(*) | 4.50 | 406 | 742 | 748 | 176 | 176 |
| 6.50R20(*) | 5.00 | 508 | 860 | - | 181 | - |
| 7.00R12 | 5.00 | 305 | 672 | 672 | 192 | 192 |
| 7.00R14C | 5.00 | 356 | 650 | 668 | 180 | 182 |
| 7.00R15(*) | 5.00 | 381 | 746 | 752 | 197 | 198 |
| 7.00R16C | 5.50 | 406 | 778 | 778 | 198 | 198 |
| 7.00R16 | 5.50 | 406 | 784 | 774 | 198 | 198 |
| 7.00R20 | 5.50 | 508 | 892 | 898 | 198 | 198 |
| 7.50R10 | 5.50 | 254 | 645 | 645 | 207 | 207 |
| 7.50R14C | 5.50 | 356 | 686 | 692 | 195 | 192 |
| 7.50R15(*) | 6.00 | 381 | 772 | 772 | 212 | 212 |
| 7.50R16(*) | 6.00 | 406 | 802 | 806 | 210 | 210 |
| 7.50R17(*) | 6.00 | 432 | 852 | 852 | 210 | 210 |
| 7.50R20 | 6.00 | 508 | 928 | 928 | 210 | 213 |

| Tyre-size designation (+) | Measuring rim width code | Nominal rim diameter d (mm) | Outer diameter D (mm) | | Section width S (mm) | |
|---|--------------------------|-----------------------------|-----------------------|----------|----------------------|----------|
| | | | Radial | Diagonal | Radial | Diagonal |
| 8.25R15 | 6.50 | 381 | 836 | 836 | 230 | 234 |
| 8.25R16 | 6.50 | 406 | 860 | 860 | 230 | 234 |
| 8.25R17 | 6.50 | 432 | 886 | 895 | 230 | 234 |
| 8.25R20 | 6.50 | 508 | 962 | 970 | 230 | 234 |
| 9.00R15 | 6.00 | 381 | 840 | 840 | 249 | 249 |
| 9.00R16(*) | 6.50 | 406 | 912 | 900 | 246 | 252 |
| 9.00R20 | 7.00 | 508 | 1018 | 1012 | 258 | 256 |
| 10.00R15 | 7.50 | 381 | 918 | 918 | 275 | 275 |
| 10.00R20 | 7.50 | 508 | 1052 | 1050 | 275 | 275 |
| 10.00R22 | 7.50 | 559 | 1102 | 1102 | 275 | 275 |
| 11.00R16 | 6.50 | 406 | 980 | 952 | 279 | 272 |
| 11.00R20 | 8.00 | 508 | 1082 | 1080 | 286 | 291 |
| 11.00R22 | 8.00 | 559 | 1132 | 1130 | 286 | 291 |
| 11.00R24 | 8.00 | 610 | 1182 | 1180 | 286 | 291 |
| 12.00R20 | 8.50 | 508 | 1122 | 1120 | 313 | 312 |
| 12.00R22 | 8.50 | 559 | 1174 | 1174 | 313 | 312 |
| 12.00R24 | 8.50 | 610 | 1226 | 1220 | 313 | 312 |
| 13.00R20 | 9.00 | 508 | 1176 | 1170 | 336 | 342 |
| 14.00R20 | 10.00 | 508 | 1238 | 1238 | 370 | 375 |
| 14.00R24 | 10.00 | 610 | 1340 | 1340 | 370 | 375 |
| 16.00R20 | 13.00 | 508 | 1370 | 1370 | 446 | 446 |
| 80 Series | | | | | | |
| 12/80 R 20 | 8.50 | 508 | 1008 | - | 305 | - |
| 13/80 R 20 | 9.00 | 508 | 1048 | - | 326 | - |
| 14/80 R 20 | 10.00 | 508 | 1090 | - | 350 | - |
| 14/80 R 24 | 10.00 | 610 | 1192 | - | 350 | - |
| 14.75/80 R 20 | 10.00 | 508 | 1124 | - | 370 | - |
| 15.5/80 R 20 | 10.00 | 508 | 1158 | - | 384 | - |
| Wide Base Tyres for Multipurpose Trucks | | | | | | |
| 7.50 R 18 MPT | 5.50 | 457 | | 885 | - | 208 |
| 10.5 R 18 MPT | 9 | 457 | | 905 | 276 | 270 |
| 10.5 R 20 MPT | 9 | 508 | | 955 | 276 | 270 |
| 12.5 R 18 MPT | 11 | 457 | | 990 | 330 | 325 |
| 12.5 R 20 MPT | 11 | 508 | | 1040 | 330 | 325 |
| 14.5 R 20 MPT | 11 | 508 | | 1095 | 362 | 355 |
| 14.5 R 24 MPT | 11 | 610 | | 1195 | 362 | 355 |

(+) Tyres in diagonal construction are identified by an hyphen in place of the letter 'R' (e.g. 5.00-8).
(*) The tyre-size designation may be supplemented with the letter 'C' (e.g. 6.00-16C).

Article V. Table B

Article VI. Code designated sizes mounted on 15° tapered rims - Radial

| <i>Tyre-size designation</i> | <i>Measuring rim width code</i> | <i>Nominal rim diameter d (mm)</i> | <i>Outer diameter D (mm)</i> | <i>Section width S (mm)</i> |
|------------------------------|---------------------------------|--|----------------------------------|---------------------------------|
| 7 R 17.5 (*) | 5.25 | 445 | 752 | 185 |
| 7 R 19.5 | 5.25 | 495 | 800 | 185 |
| 8 R 17.5 (*) | 6.00 | 445 | 784 | 208 |
| 8 R 19.5 | 6.00 | 495 | 856 | 208 |
| 8 R 22.5 | 6.00 | 572 | 936 | 208 |
| 8.5 R 17.5 | 6.00 | 445 | 802 | 215 |
| 9 R 17.5 | 6.75 | 445 | 820 | 230 |
| 9 R 19.5 | 6.75 | 495 | 894 | 230 |
| 9 R 22.5 | 6.75 | 572 | 970 | 230 |
| 9.5 R 17.5 | 6.75 | 445 | 842 | 240 |
| 9.5 R 19.5 | 6.75 | 495 | 916 | 240 |
| 10 R 17.5 | 7.50 | 445 | 858 | 254 |
| 10 R 19.5 | 7.50 | 495 | 936 | 254 |
| 10 R 22.5 | 7.50 | 572 | 1020 | 254 |
| 11 R 22.5 | 8.25 | 572 | 1050 | 279 |
| 11 R 24.5 | 8.25 | 622 | 1100 | 279 |
| 12 R 22.5 | 9.00 | 572 | 1084 | 300 |
| 13 R 22.5 | 9.75 | 572 | 1124 | 320 |
| 15 R 19.5 | 11.75 | 495 | 998 | 387 |
| 15 R 22.5 | 11.75 | 572 | 1074 | 387 |
| 16.5 R 19.5 | 13.00 | 495 | 1046 | 425 |
| 16.5 R 22.5 | 13.00 | 572 | 1122 | 425 |
| 18 R 19.5 | 14.00 | 495 | 1082 | 457 |
| 18 R 22.5 | 14.00 | 572 | 1158 | 457 |
| 70 Series | | | | |
| 10/70 R 22.5 | 7.50 | 572 | 928 | 254 |
| 11/70 R 22.5 | 8.25 | 572 | 962 | 279 |
| 12/70 R 22.5 | 9.00 | 572 | 1000 | 305 |
| 13/70 R 22.5 | 9.75 | 572 | 1033 | 330 |

(*) The tyre-size designation may be supplemented with the letter 'C' (e.g. 7 R 17.5C).

Article VII. Table C

Article VIII. Tyres for light commercial vehicles - Radial and diagonal constructions

| Tyre-size designation (+) | Measuring rim width code | Nominal rim diameter d (mm) | Outer diameter D (mm) | | Section width S (mm) | |
|------------------------------|--------------------------------|-----------------------------------|--------------------------|----------|-------------------------|----------|
| | | | Radial | Diagonal | Radial | Diagonal |
| Metric Designated | | | | | | |
| 145 R 10 C | 4.00 | 254 | 492 | - | 147 | - |
| 145 R 12 C | 4.00 | 305 | 542 | - | 147 | - |
| 145 R 13 C | 4.00 | 330 | 566 | - | 147 | - |
| 145 R 14 C | 4.00 | 356 | 590 | - | 147 | - |
| 145 R 15 C | 4.00 | 381 | 616 | - | 147 | - |
| 155 R 12 C | 4.50 | 305 | 550 | - | 157 | - |
| 155 R 13 C | 4.50 | 330 | 578 | - | 157 | - |
| 155 R 14 C | 4.50 | 356 | 604 | - | 157 | - |
| 165 R 13 C | 4.50 | 330 | 596 | - | 167 | - |
| 165 R 14 C | 4.50 | 356 | 622 | - | 167 | - |
| 165 R 15 C | 4.50 | 381 | 646 | - | 167 | - |
| 175 R 13 C | 5.00 | 330 | 608 | - | 178 | - |
| 175 R 14 C | 5.00 | 356 | 634 | - | 178 | - |
| 175 R 16 C | 5.00 | 406 | 684 | - | 178 | - |
| 185 R 13 C | 5.50 | 330 | 624 | - | 188 | - |
| 185 R 14 C | 5.50 | 356 | 650 | - | 188 | - |
| 185 R 15 C | 5.50 | 381 | 674 | - | 188 | - |
| 185 R 16 C | 5.50 | 406 | 700 | - | 188 | - |
| 195 R 14 C | 5.50 | 356 | 666 | - | 198 | - |
| 195 R 15 C | 5.50 | 381 | 690 | - | 198 | - |
| 195 R 16 C | 5.50 | 406 | 716 | - | 198 | - |
| 205 R 14 C | 6.00 | 356 | 686 | - | 208 | - |
| 205 R 15 C | 6.00 | 381 | 710 | - | 208 | - |
| 205 R 16 C | 6.00 | 406 | 736 | - | 208 | - |
| 215 R 14 C | 6.00 | 356 | 700 | - | 218 | - |
| 215 R 15 C | 6.00 | 381 | 724 | - | 218 | - |
| 215 R 16 C | 6.00 | 406 | 750 | - | 218 | - |
| 245 R 16 C | 7.00 | 406 | 798 | 798 | 248 | 248 |
| 17 R 15 C | 5.00 | 381 | 678 | - | 178 | - |
| 17 R 380 C | 5.00 | 381 | 678 | - | 178 | - |
| 17 R 400 C | 150 mm | 400 | 698 | - | 186 | - |
| 19 R 400 C | 150 mm | 400 | 728 | - | 200 | - |
| Code Designated | | | | | | |
| 5.60 R 12 C | 4.00 | 305 | 570 | 572 | 150 | 148 |
| 6.40 R 13 C | 5.00 | 330 | 648 | 640 | 172 | 172 |
| 6.70 R 13 C | 5.00 | 330 | 660 | 662 | 180 | 180 |
| 6.70 R 14 C | 5.00 | 356 | 688 | 688 | 180 | 180 |
| 6.70 R 15 C | 5.00 | 381 | 712 | 714 | 180 | 180 |

(+) Tyres in diagonal construction are identified by an hyphen in place of the letter 'R' (e.g. 145-10 C).

Article IX. Table D

Article X. Tyres for special applications - Radial and diagonal construction

| <i>Tyre-size designation (+)</i> | <i>Measuring rim width code</i> | <i>Nominal rim diameter d (mm)</i> | <i>Outer diameter D (mm)</i> | <i>Section width S (mm)</i> |
|----------------------------------|---------------------------------|------------------------------------|------------------------------|-----------------------------|
| Code Designated | | | | |
| 15x4 1/2-8 | 3.25 | 203 | 385 | 122 |
| 16x6-8 | 4.33 | 203 | 425 | 152 |
| 16.5x6.5-8 | 5.375 | 203 | 411 | 165 |
| 18x7 | 4.33 | 203 | 462 | 173 |
| 18x7-8 | 4.33 | 203 | 462 | 173 |
| 21x8-9 | 6.00 | 229 | 535 | 200 |
| 21x4 | 2.32 | 330 | 565 | 113 |
| 22x4 1/2 | 3.11 | 330 | 595 | 132 |
| 23x5 | 3.75 | 330 | 635 | 155 |
| 23x9-10 | 6.50 | 254 | 595 | 225 |
| 25x6 | 3.75 | 330 | 680 | 170 |
| 27x10-12 | 8.00 | 305 | 690 | 255 |
| 28x9-15 | 7.00 | 381 | 707 | 216 |
| Metric designated | | | | |
| 200-15 | 6.50 | 381 | 730 | 205 |
| 250-15 | 7.50 | 381 | 735 | 250 |
| 300-15 | 8.00 | 381 | 840 | 300 |

(+) Tyres in radial construction are identified by the letter 'R' in place of the hyphen '-' (e.g. 15x4 1/2 R 8).

Part II - United States tyres

- Tolerances shown at the bottom of the tables apply in place of those shown in paragraphs 6.1.4.2. and 6.1.5.3.
- Outer diameters are listed for the various categories of use: Normal, Snow, Special.

Article XI. Table A

Article XII. Tyres for light commercial vehicles (LT tyres)

Article XIII. Diagonal and radial

| Tyre-size designation ¹ | Measuring rim width code | Nominal rim diameter d(mm) | Outer diameter D (mm) ² | | Section width S (mm) ³ |
|------------------------------------|--------------------------|----------------------------|------------------------------------|------|-----------------------------------|
| | | | Normal | Snow | |
| 6.00-16LT | 4.50 | 406 | 732 | 743 | 173 |
| 6.50-16LT | 4.50 | 406 | 755 | 767 | 182 |
| 6.70-16LT | 5.00 | 406 | 722 | 733 | 191 |
| 7.00-13LT | 5.00 | 330 | 647 | 658 | 187 |
| 7.00-14LT | 5.00 | 356 | 670 | 681 | 187 |
| 7.00-15LT | 5.50 | 381 | 752 | 763 | 202 |
| 7.00-16LT | 5.50 | 406 | 778 | 788 | 202 |
| 7.10-15LT | 5.00 | 381 | 738 | 749 | 199 |
| 7.50-15LT | 6.00 | 381 | 782 | 794 | 220 |
| 7.50-16LT | 6.00 | 406 | 808 | 819 | 220 |
| 8.25-16LT | 6.50 | 406 | 859 | 869 | 241 |
| 9.00-16LT | 6.50 | 406 | 890 | 903 | 257 |
| | | | | | |
| G78-15LT | 6.00 | 381 | 711 | 722 | 212 |
| H78-15LT | 6.00 | 381 | 727 | 739 | 222 |
| L78-15LT | 6.50 | 381 | 749 | 760 | 236 |
| L78-16LT | 6.50 | 406 | 775 | 786 | 236 |
| | | | | | |
| 7-14.5LT ⁴ | 6.00 | 368 | 677 | - | 185 |
| 8-14.5LT ⁴ | 6.00 | 368 | 707 | - | 203 |
| 9-14.5LT ⁴ | 7.00 | 368 | 711 | - | 241 |
| 7-17.5LT | 5.25 | 445 | 758 | 769 | 189 |
| 8-17.5LT | 5.25 | 445 | 788 | 799 | 199 |

¹ Tyres in Radial construction are identified by the letter "R" in place of "-" (e.g. 6.00 R 16LT).

² Coefficient "b" for the calculation of Dmax: 1.08.

³ Overall width may exceed this value up to +8 per cent.

⁴ The suffix "MH" may replace "LT" in the tyre-size designation (e.g. 7-14.5 MH).

Table B
Tyres for light commercial vehicles (high flotation tyres)
Diagonal and radial

| Tyre-size designation ^{1,4} | Measuring rim width code | Nominal rim diameter <i>d</i> (mm) | Outer diameter <i>D</i> (mm) ² | | Section width <i>S</i> (mm) ³ |
|--------------------------------------|--------------------------|------------------------------------|---|-----------------------------|--|
| | | | Highway Tread ⁶ | Traction Tread ⁵ | |
| 9-15LT | 8.00 | 381 | 744 | 755 | 254 |
| 10-15LT | 8.00 | 381 | 773 | 783 | 264 |
| 11-15LT | 8.00 | 381 | 777 | 788 | 279 |
| 24x7.50-13LT | 6.00 | 330 | 597 | 604 | 191 |
| 27x8.50-14LT | 7.00 | 356 | 674 | 680 | 218 |
| 28x8.50-15LT | 7.00 | 381 | 699 | 705 | 218 |
| 29x9.50-15LT | 7.50 | 381 | 724 | 731 | 240 |
| 30x9.50-15LT | 7.50 | 381 | 750 | 756 | 240 |
| 31x10.50-15LT | 8.50 | 381 | 775 | 781 | 268 |
| 31x11.50-15LT | 9.00 | 381 | 775 | 781 | 290 |
| 31x12.50R15LT | 10.00 | 381 | 775 | 781 | 318 |
| 31x13.50-15LT | 11.00 | 381 | 775 | 781 | 345 |
| 31x15.50-15LT | 12.00 | 381 | 775 | 781 | 390 |
| 32x11.50-15LT | 9.00 | 381 | 801 | 807 | 290 |
| 33x9.50 R15LT | 7.50 | 381 | 826 | 832 | 240 |
| 33x10.50R15LT | 8.50 | 381 | 826 | 832 | 268 |
| 33x10.50R17LT | 8.50 | 432 | 826 | 832 | 268 |
| 33x10.50R18LT | 8.50 | 457 | 826 | 832 | 268 |
| 33x11.50R18LT | 9.00 | 457 | 826 | 832 | 290 |
| 33x11.50R20LT | 9.00 | 508 | 826 | 832 | 290 |
| 33x12.50-15LT | 10.00 | 381 | 826 | 832 | 318 |
| 33x12.50R17LT | 10.00 | 432 | 826 | 832 | 318 |
| 33x12.50R18LT | 10.00 | 457 | 826 | 832 | 318 |
| 33x12.50R20LT | 10.00 | 508 | 826 | 832 | 318 |
| 33x12.50R22LT | 10.00 | 559 | 826 | 832 | 318 |
| 33x13.50R15LT | 11.00 | 381 | 826 | 832 | 345 |
| 33x15.50R15LT | 12.00 | 381 | 826 | 832 | 390 |
| 34x10.50R17LT | 8.50 | 432 | 851 | 858 | 268 |
| 34x12.50R18LT | 10.00 | 457 | 851 | 858 | 318 |
| 35x11.50R17LT | 9.00 | 432 | 877 | 883 | 290 |
| 35x11.50R18LT | 9.00 | 457 | 877 | 883 | 290 |
| 35x11.50R20LT | 9.00 | 508 | 877 | 883 | 290 |
| 35x12.50-15LT | 10.00 | 381 | 877 | 883 | 318 |
| 35x12.50R17LT | 10.00 | 432 | 877 | 883 | 318 |
| 35x12.50R18LT | 10.00 | 457 | 877 | 883 | 318 |
| 35x12.50R20LT | 10.00 | 508 | 877 | 883 | 318 |
| 35x12.50R22LT | 10.00 | 559 | 877 | 883 | 318 |

| Tyre-size designation ^{1,4} | Measuring rim width code | Nominal rim diameter d (mm) | Outer diameter D (mm) ² | | Section width S (mm) ³ |
|--------------------------------------|--------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------------|
| | | | Highway Tread ⁶ | Traction Tread ⁵ | |
| 35x13.50R15LT | 11.00 | 381 | 877 | 883 | 345 |
| 35x13.50R18LT | 11.00 | 457 | 877 | 883 | 345 |
| 35x13.50R20LT | 11.00 | 508 | 877 | 883 | 345 |
| 35x14.50R15LT | 12.00 | 381 | 877 | 883 | 372 |
| 36x13.50R18LT | 11.00 | 457 | 902 | 908 | 345 |
| 36x14.50R15LT | 12.00 | 381 | 902 | 908 | 372 |
| 36x14.50R17LT | 12.00 | 432 | 902 | 908 | 372 |
| 36x14.50R18LT | 12.00 | 457 | 902 | 908 | 372 |
| 36x15.50R15LT | 12.00 | 381 | 902 | 908 | 390 |
| 36x15.50R20LT | 12.50 | 508 | 902 | 908 | 395 |
| 37x11.50R20LT | 9.00 | 508 | 928 | 934 | 290 |
| 37x12.50-15LT | 10.00 | 381 | 928 | 934 | 318 |
| 37x12.50 R17LT | 10.00 | 432 | 928 | 934 | 318 |
| 37x12.50R18LT | 10.00 | 457 | 928 | 934 | 318 |
| 37x12.50R20LT | 10.00 | 508 | 928 | 934 | 318 |
| 37x12.50R22LT | 10.00 | 559 | 928 | 934 | 318 |
| 37x13.50R15LT | 11.00 | 381 | 928 | 934 | 345 |
| 37x13.50R17LT | 11.00 | 432 | 928 | 934 | 345 |
| 37x13.50R18LT | 11.00 | 457 | 928 | 934 | 345 |
| 37x13.50R20LT | 11.00 | 508 | 928 | 934 | 345 |
| 37x13.50R22LT | 11.00 | 559 | 928 | 934 | 345 |
| 37x13.50R24LT | 11.00 | 610 | 928 | 934 | 345 |
| 37x13.50R26LT | 11.00 | 660 | 928 | 934 | 345 |
| 37x14.50-15LT | 12.00 | 381 | 928 | 934 | 372 |
| 38x13.50R17LT | 11.00 | 432 | 953 | 959 | 345 |
| 38x13.50R20LT | 11.00 | 508 | 953 | 959 | 345 |
| 38x13.50R22LT | 11.00 | 559 | 953 | 959 | 345 |
| 38x13.50R24LT | 11.00 | 610 | 953 | 959 | 345 |
| 38x14.50R17LT | 12.00 | 432 | 953 | 959 | 372 |
| 38x14.50R18LT | 12.00 | 457 | 953 | 959 | 372 |
| 38x14.50R20LT | 12.00 | 508 | 953 | 959 | 372 |
| 38x15.50R15LT | 12.00 | 381 | 953 | 959 | 390 |
| 38x15.50R17LT | 12.00 | 432 | 953 | 959 | 390 |
| 38x15.50R18LT | 12.00 | 457 | 953 | 959 | 390 |
| 38x15.50R20LT | 12.00 | 508 | 953 | 959 | 390 |
| 39x13.50R17LT | 11.00 | 432 | 978 | 985 | 345 |
| 40x13.50R17LT | 11.00 | 432 | 1004 | 1010 | 345 |
| 40x13.50R20LT | 11.00 | 508 | 1004 | 1010 | 345 |
| 40x14.50R17LT | 12.00 | 432 | 1004 | 1010 | 372 |
| 40x14.50R18LT | 12.00 | 457 | 1004 | 1010 | 372 |
| 40x14.50R20LT | 12.00 | 508 | 1004 | 1010 | 372 |

| Tyre-size designation ^{1,4} | Measuring rim width code | Nominal rim diameter d (mm) | Outer diameter D (mm) ² | | Section width S (mm) ³ |
|--------------------------------------|--------------------------|-----------------------------|------------------------------------|-----------------------------|-----------------------------------|
| | | | Highway Tread ⁶ | Traction Tread ⁵ | |
| 40x15.50R20LT | 12.00 | 508 | 1004 | 1010 | 390 |
| 40x15.50R22LT | 12.00 | 559 | 1004 | 1010 | 390 |
| 40x15.50R24LT | 12.00 | 610 | 1004 | 1010 | 390 |
| 40x15.50R26LT | 12.50 | 660 | 1004 | 1010 | 395 |
| 42x14.50R17LT | 12.00 | 432 | 1055 | 1061 | 372 |
| 42x14.50R20LT | 12.00 | 508 | 1055 | 1061 | 372 |
| | | | | | |
| 8.00-16.5LT | 6.00 | 419 | 720 | 730 | 203 |
| 8.75-16.5LT | 6.75 | 419 | 748 | 759 | 222 |
| 9.50-16.5LT | 6.75 | 419 | 776 | 787 | 241 |
| 10-16.5LT | 8.25 | 419 | 762 | 773 | 264 |
| 12-16.5LT | 9.75 | 419 | 818 | 831 | 307 |
| | | | | | |
| 30x9.50-16.5LT | 7.50 | 419 | 750 | 761 | 240 |
| 31x10.50-16.5LT | 8.25 | 419 | 775 | 787 | 266 |
| 33x12.50-16.5LT | 9.75 | 419 | 826 | 838 | 315 |
| 35x12.50 R16.5LT | 10.00 | 419 | 877 | 883 | 318 |
| 37x12.50-16.5LT | 9.75 | 419 | 928 | 939 | 315 |
| 37x14.50-16.5LT | 11.25 | 419 | 928 | 939 | 365 |

- ¹ Tyres in Radial construction are identified by the letter "R" in place of "-" (e.g. 24x7.50 R 13LT).
- ² Coefficient 'b' for the calculation of D_{max}: 1.07. The manufacturer shall declare in section 9 of the communication form in Annex 1 ('Any remarks') the type of tread selected for the application.
- ³ Overall width may exceed this value up to +7 per cent.
- ⁴ In case of Tyre size designations not included in this table (e.g. 37x14.50R17LT):
 - a) the first number (e.g. 37) represents the nominal overall diameter expressed by code,
 - b) the second number (e.g. 14.50) represents the nominal section width (S₁) expressed by code (must end in .50),
 - c) the third number (e.g. 17) 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.

The Outer diameter (D) is calculated as follows:

 - a) Normal D (mm) = (overall diameter (expressed by code) – 0.48) x 25.4 rounded to the nearest mm.
 - b) Snow D (mm) = (overall diameter (expressed by code) – 0.24) x 25.4 rounded to the nearest mm."
- ⁵ Traction tread tyres are those bearing at least one of the following inscriptions:
 - Inscription(s) defined in section 3.1.13. of this Regulation.
 - Alpine symbol (3PMSF) as defined in UN Regulation 117.
 - "TRACTION" inscription as defined in UN Regulation 117.
- ⁶ Highway tread tyres are all tyres that are not Traction tread.

Article XIV. Table C

Article XV. Code designated tyres mounted on 5° tapered or flat base rims

Article XVI. Diagonal and radial

| Tyre-size designation ¹ | Measuring rim width code | Nominal rim diameter d (mm) | Outer diameter D (mm ²) | | | Section width S (mm) ³ |
|------------------------------------|--------------------------|-----------------------------|-------------------------------------|------|------|-----------------------------------|
| | | | Normal | | Snow | |
| | | | (a) | (b) | | |
| 6.50-20 | 5 | 508 | 878 | - | 893 | 184 |
| 7.00-15TR | 5.5 | 381 | 777 | - | 792 | 199 |
| 7.00-18 | 5.5 | 457 | 853 | - | 868 | 199 |
| 7.00-20 | 5.5 | 508 | 904 | - | 919 | 199 |
| 7.50-15TR | 6 | 381 | 808 | - | 825 | 215 |
| 7.50-17 | 6 | 432 | 859 | - | 876 | 215 |
| 7.50-18 | 6 | 457 | 884 | - | 901 | 215 |
| 7.50-20 | 6 | 508 | 935 | - | 952 | 215 |
| 8.25-15TR | 6.5 | 381 | 847 | 855 | 865 | 236 |
| 8.25-20 | 6.5 | 508 | 974 | 982 | 992 | 236 |
| 9.00-15TR | 7 | 381 | 891 | 904 | 911 | 259 |
| 9.00-20 | 7 | 508 | 1019 | 1031 | 1038 | 259 |
| 10.00-15TR | 7.5 | 381 | 927 | 940 | 946 | 278 |
| 10.00-20 | 7.5 | 508 | 1054 | 1067 | 1073 | 278 |
| 10.00-22 | 7.5 | 559 | 1104 | 1118 | 1123 | 278 |
| 11.00-20 | 8 | 508 | 1085 | 1099 | 1104 | 293 |
| 11.00-22 | 8 | 559 | 1135 | 1150 | 1155 | 293 |
| 11.00-24 | 8 | 610 | 1186 | 1201 | 1206 | 293 |
| 11.50-20 | 8 | 508 | 1085 | 1099 | 1104 | 296 |
| 12.00-20 | 8.5 | 508 | 1125 | - | 1146 | 315 |
| 12.00-24 | 8.5 | 610 | 1226 | - | 1247 | 315 |
| 14.00-20 | 10 | 508 | 1241 | - | 1266 | 375 |
| 14.00-24 | 10 | 610 | 1343 | - | 1368 | 375 |
| 16.00-20 | 11.25 | 508 | 1309 | 1320 | - | 438 |

¹ Tyres in Radial construction are identified by the letter "R" in place of "-"(e.g. 6.50 R 20).

² Coefficient 'b' for the calculation of Dmax : 1.06 . Category of use: Normal Service tyres: (a) Highway tread (b) Heavy tread

³ Overall width may exceed this value up to +6 per cent.

Article XVII. Table D

Article XVIII. Code designated tyres for special services

Article XIX. Diagonal and radial

| Tyre-size designation | Measuring rim width code | Nominal rim diameter <i>d</i> (mm) | Outer diameter <i>D</i> (mm) ¹ | | Section width <i>S</i> (mm) ² |
|-----------------------|--------------------------|------------------------------------|---|------|--|
| | | | (a) | (b) | |
| 10.00-20ML | 7.5 | 508 | 1073 | 1099 | 278 |
| 11.00-22ML | 8 | 559 | 1155 | 1182 | 293 |
| 13.00-24ML | 9 | 610 | 1302 | - | 340 |
| 14.00-20ML | 10 | 508 | 1266 | - | 375 |
| 14.00-24ML | 10 | 610 | 1368 | - | 375 |
| 15-19.5ML | 11.75 | 495 | 1019 | - | 389 |
| 24 R 21 | 18 | 533 | 1372 | - | 610 |

¹ Coefficient "b" for the calculation of Dmax : 1.06.

Category of use: special (a) Traction tread (b) Heavy tread

² Overall width may exceed this value up to +8 per cent.

Article XX. Table E

Article XXI. Code designated tyres mounted on 15° tapered rims

Article XXII. Diagonal and radial

| Tyre-size designation ¹ | Measuring rim width code | Nominal rim diameter <i>d</i> (mm) | Outer diameter <i>D</i> (mm) ² | | | Section width <i>S</i> (mm) ³ |
|------------------------------------|--------------------------|------------------------------------|---|------|------|--|
| | | | Normal | | Snow | |
| | | | (a) | (b) | | |
| 8-19.5 | 6.00 | 495 | 859 | - | 876 | 203 |
| 8-22.5 | 6.00 | 572 | 935 | - | 952 | 203 |
| 9-22.5 | 6.75 | 572 | 974 | 982 | 992 | 229 |
| 10-22.5 | 7.50 | 572 | 1019 | 1031 | 1038 | 254 |
| 11-22.5 | 8.25 | 572 | 1054 | 1067 | 1073 | 279 |
| 11-24.5 | 8.25 | 622 | 1104 | 1118 | 1123 | 279 |
| 12-22.5 | 9.00 | 572 | 1085 | 1099 | 1104 | 300 |
| 12-24.5 | 9.00 | 622 | 1135 | 1150 | 1155 | 300 |
| 12.5-22.5 | 9.00 | 572 | 1085 | 1099 | 1104 | 302 |
| 12.5-24.5 | 9.00 | 622 | 1135 | 1150 | 1155 | 302 |
| | | | | | | |
| 14-17.5 | 10.50 | 445 | 907 | - | 921 | 349 (-) |
| 15-19.5 | 11.75 | 495 | 1005 | - | 1019 | 389 (-) |
| 15-22.5 | 11.75 | 572 | 1082 | - | 1095 | 389 (-) |
| 16.5-22.5 | 13.00 | 572 | 1128 | - | 1144 | 425 (-) |
| 18-19.5 | 14.00 | 495 | 1080 | - | 1096 | 457 (-) |
| 18-22.5 | 14.00 | 572 | 1158 | - | 1172 | 457 (-) |
| | | | | | | |
| 24R20.5 | 18.00 | 521 | 1369 | - | - | 606 |

¹ Tyres in Radial construction are identified by the letter "R" in place of "-" (e.g. 8R19.5).

² Coefficient "b" for the calculation of Dmax : 1.05.

Category of use: Normal Service tyres: (a) Highway tread (b) Heavy tread

³ Overall width may exceed this value up to +6 per cent

(-) Overall width may exceed this value up to +5 per cent.

Annex 6

Method of dimension measurement for measuring tyres

1. The tyre is mounted on the measuring rim specified by the manufacturer pursuant to paragraph 4.1.11. of this Regulation and is inflated to the pressure specified by the manufacturer pursuant to paragraph 4.1.12. of this Regulation.
2. The tyre fitted on its rim is conditioned to the ambient temperature of the laboratory for at least 24 hours.
3. The pressure is readjusted to the value specified in paragraph 1. above.
4. The overall width is measured by caliper at six equally-spaced points, account being taken of the thickness of the protective ribs or bands. The highest measurement so obtained is taken as the overall width.
5. The outer diameter is calculated from the maximum circumference.

Annex 7

Procedure for load/speed endurance tests

1. Preparing the tyre
 - 1.1. Mount a new tyre on the test rim specified by the manufacturer pursuant to paragraph 4.1.11. of this Regulation.
 - 1.2. Use a new inner tube or combination of inner tube, valve and flap (as required) when testing tyres with inner tubes.
 - 1.3. Inflate the tyre to the pressure corresponding to the pressure specified by the manufacturer pursuant to paragraph 4.1.12. of this Regulation.
 - 1.4. Condition the tyre-and-wheel assembly at test-room temperature for not less than three hours.
 - 1.5. Readjust the tyre pressure to that specified in paragraph 1.3. above.
2. Test procedure
 - 2.1. Mount the tyre-and-wheel assembly on the test axle and press it against the outer face of a smooth power-driven test drum 1.70 m \pm 1 per cent in diameter having a surface at least as wide as the tyre tread.
 - 2.2. Apply to the test axle a series of test loads expressed in per cent of the load indicated, in Annex 4 to this Regulation, opposite the load index engraved on the sidewall of the tyre, in accordance with the test programme below. Where the tyre has load-capacity indices for both single and twinned utilization, the reference load for single utilization shall be taken as the basis for the test loads.
 - 2.2.1. In the case of tyres with a speed category symbol above P, test procedures are as specified in paragraph 3.
 - 2.2.2. For all other tyre types, the endurance test programme is shown in Appendix 1 to this annex.
 - 2.3. The tyre pressure must not be corrected throughout the test and the test load must be kept constant throughout each of the three test stages.
 - 2.4. During the test the temperature in the test-room must be maintained at a temperature between 20 °C and 30 °C or at a higher temperature if the manufacturer so agrees.
 - 2.5. The endurance-test programme shall be carried out without interruption.
3. Load/speed test programme for tyre with speed category symbol Q and above
 - 3.1. This programme applies to:
 - 3.1.1. All tyres marked with load capacity index in single 121 or less.
 - 3.1.2. Tyres marked with load capacity index in single 122 and above and with the additional marking "C", or "LT", referred to in paragraph 3.1.14. of this Regulation.
 - 3.2. Load placed on the wheel as a percentage of the load corresponding to the load index:

- 3.2.1. 90 per cent when tested on a test drum 1.70 m \pm 1 per cent in diameter;
 - 3.2.2. 92 per cent when tested on a test drum 2.0 m \pm 1 per cent in diameter.
 - 3.3. Initial test speed: speed corresponding to the speed category symbol less 20 km/h;
 - 3.3.1. Time to reach the initial test speed 10 min.
 - 3.3.2. Duration of the first step = 10 min.
 - 3.4. Second test speed: speed corresponding to the speed category symbol less 10 km/h;
 - 3.4.1. Duration of the second step = 10 min.
 - 3.5. Final test speed: speed corresponding to the speed category symbol:
 - 3.5.1. Duration of the final step = 30 min.
 - 3.6. Total test duration: 1 h.
 - 4. Equivalent test methods
- If a method other than that described in paragraph 2. above is used, its equivalence must be demonstrated.

Annex 7 - Appendix 1

Endurance-test programme

| Load index | Tyre speed category symbol | Test-drum speed | | Load placed on the wheel as a percentage of the load corresponding to the load index | | |
|-------------|----------------------------|-------------------------------|--|--|---------------------|-------|
| | | Radial-ply km.h ⁻¹ | Diagonal (bias-ply) km.h ⁻¹ | 7 h. | 16 h. | 24 h. |
| 122 or more | F | 32 | 32 | 66 % | 84 % | 101 % |
| | G | 40 | 32 | | | |
| | J | 48 | 40 | | | |
| | K | 56 | 48 | | | |
| | L | 64 | - | | | |
| | M | 72 | - | | | |
| 121 or less | F | 32 | 32 | 70 % <u>4 h.</u> | 88 % <u>6 h.</u> | 106 % |
| | G | 40 | 40 | | | |
| | J | 48 | 48 | | | |
| | K | 56 | 56 | | | |
| | L | 64 | 56 | 75 % | 97 % | 114 % |
| | M | 80 | 64 | 75 % | 97 % | 114 % |
| | N | 88 | - | 75 % | 97 % | 114 % |
| | P | 96 | - | 75 % | 97 % | 114 % |

Notes:

- (1) "Special-use" tyres (see paragraph 2.1. (c) of this Regulation) should be tested at a speed equal to 85 per cent of the speed prescribed for equivalent normal tyres.
- (2) Tyres with load index 122 or more, speed category symbols N or P and the additional marking "LT", or "C", referred to in paragraph 3.1.14. of this Regulation, shall be tested with the same programme as specified in the above table for tyres with load index 121 or less.

Annex 7 - Appendix 2

Relation between the pressure index and the units of pressure

| <i>Pressure Index ("PSI")</i> | <i>Bar</i> | <i>kPa</i> |
|-----------------------------------|------------|------------|
| 20 | 1.4 | 140 |
| 25 | 1.7 | 170 |
| 30 | 2.1 | 210 |
| 35 | 2.4 | 240 |
| 40 | 2.8 | 280 |
| 45 | 3.1 | 310 |
| 50 | 3.4 | 340 |
| 55 | 3.8 | 380 |
| 60 | 4.1 | 410 |
| 65 | 4.5 | 450 |
| 70 | 4.8 | 480 |
| 75 | 5.2 | 520 |
| 80 | 5.5 | 550 |
| 85 | 5.9 | 590 |
| 90 | 6.2 | 620 |
| 95 | 6.6 | 660 |
| 100 | 6.9 | 690 |
| 105 | 7.2 | 720 |
| 110 | 7.6 | 760 |
| 115 | 7.9 | 790 |
| 120 | 8.3 | 830 |
| 125 | 8.6 | 860 |
| 130 | 9.0 | 900 |
| 135 | 9.3 | 930 |
| 140 | 9.7 | 970 |
| 145 | 10.0 | 1 000 |
| 150 | 10.3 | 1 030 |
| ... | ... | ... |

Annex 8

Variation of load capacity with speed commercial vehicles tyres - Radial and diagonal

(See paras. 2.30. and 2.32.)

| <i>Variation of load capacity (per cent)</i> | | | | | | | | | | |
|--|------------------------------|------|------|------|---|------|---------------------------------------|-------|-------|----------------|
| <i>Speed (km/h)</i> | <i>All load indices</i> | | | | <i>Load indices ≥ 122¹</i> | | <i>Load indices ≤ 121¹</i> | | | |
| | <i>Speed category symbol</i> | | | | <i>Speed category symbol</i> | | <i>Speed category symbol</i> | | | |
| | F | G | J | K | L | M | L | M | N | P ² |
| 0 | +150 | +150 | +150 | +150 | +150 | +150 | +110 | +110 | +110 | +110 |
| 5 | +110 | +110 | +110 | +110 | +110 | +110 | +90 | +90 | +90 | +90 |
| 10 | +80 | +80 | +80 | +80 | +80 | +80 | +75 | +75 | +75 | +75 |
| 15 | +65 | +65 | +65 | +65 | +65 | +65 | +60 | +60 | +60 | +60 |
| 20 | +50 | +50 | +50 | +50 | +50 | +50 | +50 | +50 | +50 | +50 |
| 25 | +35 | +35 | +35 | +35 | +35 | +35 | +42 | +42 | +42 | +42 |
| 30 | +25 | +25 | +25 | +25 | +25 | +25 | +35 | +35 | +35 | +35 |
| 35 | +19 | +19 | +19 | +19 | +19 | +19 | +29 | +29 | +29 | +29 |
| 40 | +15 | +15 | +15 | +15 | +15 | +15 | +25 | +25 | +25 | +25 |
| 45 | +13 | +13 | +13 | +13 | +13 | +13 | +22 | +22 | +22 | +22 |
| 50 | +12 | +12 | +12 | +12 | +12 | +12 | +20 | +20 | +20 | +20 |
| 55 | +11 | +11 | +11 | +11 | +11 | +11 | +17.5 | +17.5 | +17.5 | +17.5 |
| 60 | +10 | +10 | +10 | +10 | +10 | +10 | +15.0 | +15.0 | +15.0 | +15.0 |
| 65 | +7.5 | +8.5 | +8.5 | +8.5 | +8.5 | +8.5 | +13.5 | +13.5 | +13.5 | +13.5 |
| 70 | +5.0 | +7.0 | +7.0 | +7.0 | +7.0 | +7.0 | +12.5 | +12.5 | +12.5 | +12.5 |
| 75 | +2.5 | +5.5 | +5.5 | +5.5 | +5.5 | +5.5 | +11.0 | +11.0 | +11.0 | +11.0 |
| 80 | 0 | +4.0 | +4.0 | +4.0 | +4.0 | +4.0 | +10.0 | +10.0 | +10.0 | +10.0 |
| 85 | -3 | +2.0 | +3.0 | +3.0 | +3.0 | +3.0 | +8.5 | +8.5 | +8.5 | +8.5 |
| 90 | -6 | 0 | +2.0 | +2.0 | +2.0 | +2.0 | +7.5 | +7.5 | +7.5 | +7.5 |
| 95 | -10 | -2.5 | +1.0 | +1.0 | +1.0 | +1.0 | +6.5 | +6.5 | +6.5 | +6.5 |
| 100 | -15 | -5 | 0 | 0 | 0 | 0 | +5.0 | +5.0 | +5.0 | +5.0 |
| 105 | - | -8 | -2 | 0 | 0 | 0 | +3.75 | +3.75 | +3.75 | +3.75 |
| 110 | - | -13 | -4 | 0 | 0 | 0 | +2.5 | +2.5 | +2.5 | +2.5 |
| 115 | - | - | -7 | -3 | 0 | 0 | +1.25 | +1.25 | +1.25 | +1.25 |
| 120 | - | - | -12 | -7 | 0 | 0 | 0 | 0 | 0 | 0 |
| 125 | - | - | - | - | - | 0 | -2.5 | 0 | 0 | 0 |
| 130 | - | - | - | - | - | 0 | -5.0 | 0 | 0 | 0 |
| 135 | - | - | - | - | - | - | -7.5 | -2.5 | 0 | 0 |

| <i>Variation of load capacity (per cent)</i> | | | | | | | | | | |
|--|------------------------------|---|---|---|---|---|---------------------------------------|-------|-------|------|
| <i>Speed (km/h)</i> | <i>All load indices</i> | | | | <i>Load indices ≥ 122¹</i> | | <i>Load indices ≤ 121¹</i> | | | |
| | <i>Speed category symbol</i> | | | | <i>Speed category symbol</i> | | <i>Speed category symbol</i> | | | |
| 140 | - | - | - | - | - | - | -10 | -5 | 0 | 0 |
| 145 | - | - | - | - | - | - | - | -7.5 | -2.5 | 0 |
| 150 | - | - | - | - | - | - | - | -10.0 | -5.0 | 0 |
| 155 | - | - | - | - | - | - | - | - | -7.5 | -2.5 |
| 160 | - | - | - | - | - | - | - | - | -10.0 | -5.0 |

¹ The load capacity indices refer to a single operation.

² Load variations are not allowed for speeds above 160 km/h. For speed category symbols "Q" and above the speed category corresponding to the speed category symbol (see paragraph 2.31.2.) specifies the maximum speed permitted for the tyre.

Annex 9

Communication

Upgrade of service description for the purposes of retreading in accordance with UN Regulation No. 109

(Maximum format: A4 [210 x 297mm])

Issued by (Name and address of tyre manufacturer):

Declaration:

The tyre corresponding to the following details has been approved to operate at a higher service description than that of the tyre originally approved. It is therefore permitted, subject to any limitations given in paragraph 4.1.1. below, for a tyre bearing the original service description and approval number, to be retreaded to the upgraded service description.

It is also agreed that this information may be released by an approval authority to any retreading production unit that is approved in accordance with UN Regulation No. 109.

1. Manufacturer's name:
2. Manufacturer's tyre type designation:
- 2.1. Brand name(s)/trademark(s):
- 2.2. Trade description(s)/ Commercial name(s)/.....
3. Tyre Size designation:
- 3.1. Category of use (Normal, Snow or Special):
4. Service description
- 4.1. Original tyre:.....
Approval No. pursuant to UN Regulation No. 54.
.....
Granted by:
- 4.1.1. Where applicable, the production plant in which tyres suitable for upgrading were produced, the production periods concerned, and the means of identifying either or both of these issues:

- 4.2. Upgraded tyre:
 - Approval No. pursuant to UN Regulation No. 54.
 - Granted by:
 - 5. Authorized by (tyre manufacturer's representative):
 - 5.1. Name (Block capitals):
 - 5.2. Department:
 - 5.3. Signature: "
-