

Submitted by the experts of the Informal
Working Group (IWG) on TYRE GTR

Informal document **GRBP-70-18-Rev.1**
70th GRBP 11-13 September 2019
Agenda item 6 (e)

Amendment # 2 to UN GTR No. 16 on Tyres

Subject of Amendment No. 2 to UN GTR No. 16 as authorized by AC.3

Reference: Authorization ECE/TRANS/WP.29/AC.3/48

- Amendment of the GTR text:
 - Amendment to the GTR 16 scope
 - Addition of new definitions (Section 2)
 - **Harmonization of the Load Range concept in relationship to Inflation Pressure** (Section 2)
 - Alignment of the provisions with the most recent developments in UN Regulations Nos. 30 and 54 (Sections 3.3 and 3.5, Annexes 3 and 6)
 - Harmonization of FMVSS 139 requirements relative to UN Regulation No 54 "PSI" index (Sections 3.7 and 3.8)
 - **Addition of new harmonized provisions for physical dimensions of LT/C tyres** (new Section 3.5.2; old Sections 3.20 & 3.21 deleted)
 - **Addition of new harmonized provisions for high speed test for LT/C tyres**
(new Section 3.6.2.2, old Section 3.16 modified with endurance test only renumbered 3.9, old Section 3.19 deleted)

What is submitted to GRBP

- ECE/TRANS/WP.29/GRBP/2019/21: Proposal for Amendment No. 2 to UN GTR No. 16 (Tyres)
- ECE/TRANS/WP.29/GRBP/2019/20: Proposal for the Technical Report on the development of Amendment No. 2 to UN GTR No. 16 (Tyres) – complements ECE/TRANS/WP.29/GRBP/2019/21
- GRBP-70-02: Proposed modifications to the current version of UN GTR No. 16 (highlighted in green)
- GRBP-70-17: Proposal for amendments to ECE/TRANS/WP.29/GRBP/2019/21

Part I: Statement on Technical Rationale and Justification - Updated

Not highlighted in GRBP-70-02

- New Executive Summary
- New paragraphs 2bis, 3bis, 22bis (substituting 23bis), 28ter (old 28ter moved to 28quinquis), 28quater, 28sexies to update the content of the existing Part I
- New paragraphs 49 to 93 – Justification of the content of Amendment No. 2

Part II:

New Harmonized Provisions

a. Physical Dimensions

Addition of new harmonized provisions for physical dimensions of LT/C tyres
(new Section 3.5.2 old Sections 3.20 & 3.21 deleted)

Subdivision in 3 categories:

Physical dimension for metric sizes (excluding all sizes listed in Annex 6)

Most stringent requirements from FMVSS 139/R54 retained

Physical dimension for high flotation sizes (excluding all sizes listed in Annex 6)

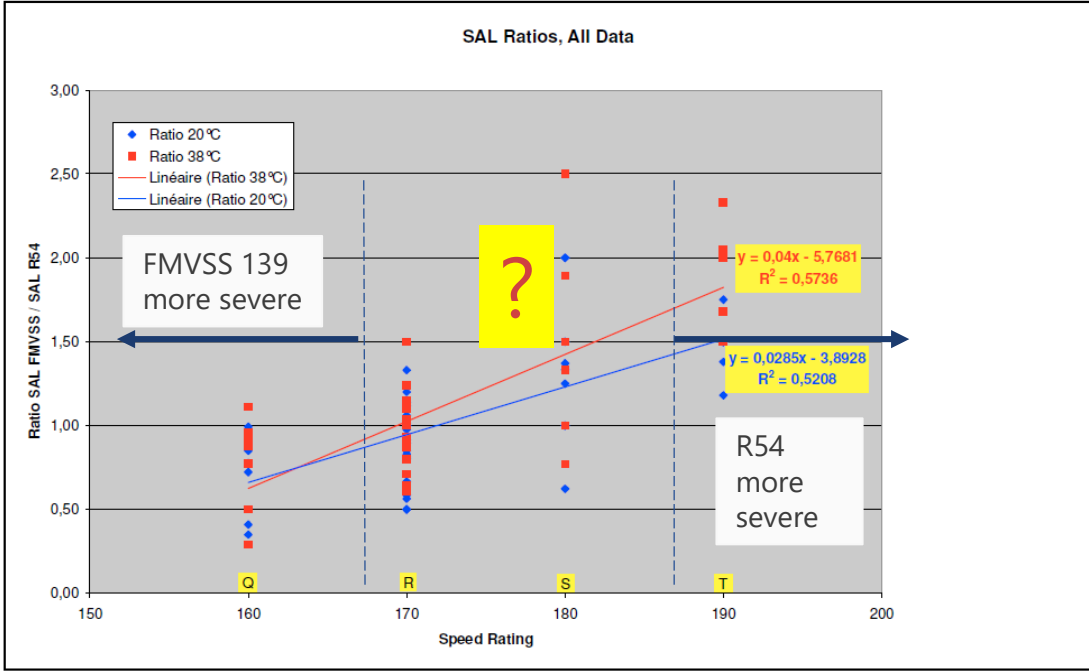
Requirements as per ECE/TRANS/WP.29/GRRF/2018/5 amended by GRRF-86-26,
approved at the 86th GRRF session and submitted for adoption by WP.29/AC.1
at the June 2018 session (ECE/TRANS/WP.29/2018/XX)

Physical dimension for sizes listed in Annex 6 (Legacy)

New Harmonized Provisions

b. High Speed Test

Assessment of FMVSS139 High Speed test vs R54 Load/Speed test made by tyre industry:



Since available results did not allow to decide between R54 and FMVSS139 High Speed tests for 'Q' and 'R' Speed Symbols, one of the reasons of the extension of the IWG mandate by 2 years was requested and confirmed in order to give tyre industry the possibility to confirm the initial results on the High Speed harmonised test method. 17th IWG meeting endorsed the Industry High speed test program. Updated results and proposal were presented to IWG at its 18th session in June 2018.

New Harmonized Provisions

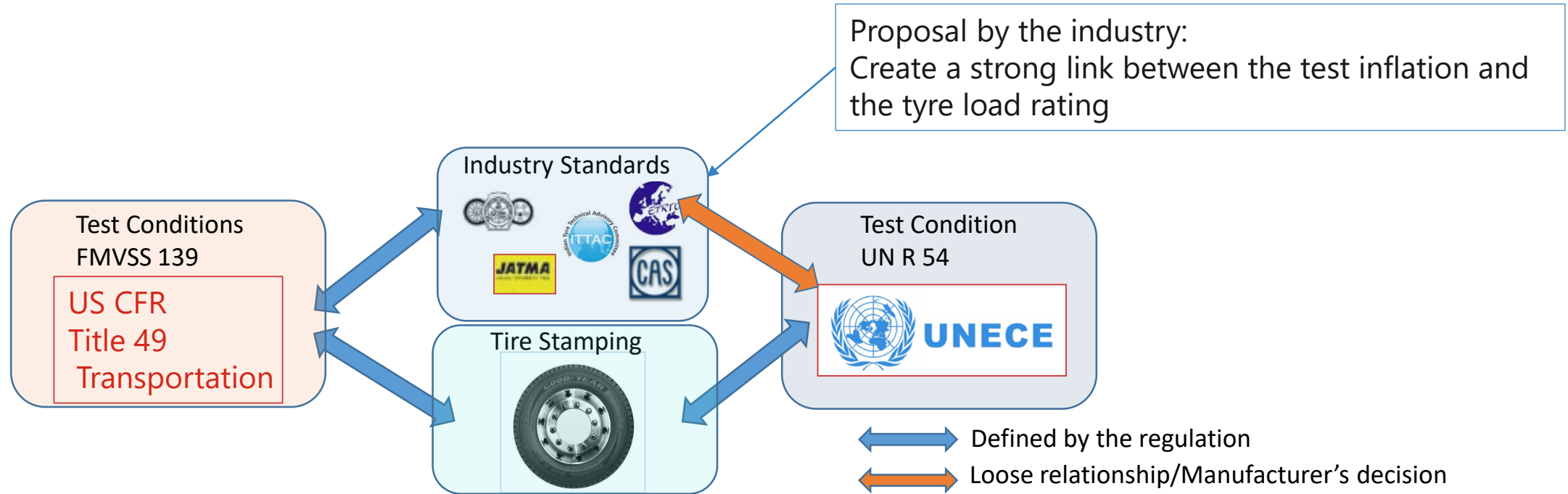
b. High Speed Test (Continued)

- IWG TYRE GTR conclusion:
 - Tyres with Speed Symbol S, T and H: Existing UN Reg 54 HS test
 - Final test speeds are based on the speed symbol of the tyre
 - 25°C ambient temperature
 - Tyres with SS = Q and R: test to 160 resp 170 km/h at 35°C ambient temperature*
Modified UN Reg 54
 - **Test severity is equivalent to existing FMVSS 139 requirement**
 - **Test efficiency (duration – impacting test lab capacity) is significantly improved**
 - All tyres with SS < Q: test to 160 km/h (99 mph) at 35°C ambient temperature: existing FMVSS test

*UN Reg 54 with higher temperature is more severe because it uses 35°C instead of 25°C ambient temperature

New Harmonized concepts:

a. Reference Test Inflation Pressure



Proposal to para 2.61: "Reference Test Inflation Pressure" applicable for LT/C tyres means the minimum cold inflation pressure for the maximum load rating of the tyre in single application;

New Harmonized concepts:

b. Measuring Rim

- Inconsistent usage of the term 'Measuring rim' in definitions and different sections of the GTR:
in some cases – a unique rim width; in other cases – any rim width
- IWG removed the concept of 'measuring rim' in the sense of rims on which a test is to be performed from GTR and replaced it by 'test rim' in line with the ISO definition.
- The GTR was made self consistent with regards to the rims to use for testing without referring to Standards Organisation

New Harmonized concepts:

c. Replacement of load range by a table referring to a Reference Test Inflation Pressure to define the test conditions coming from FMVSS 139

Reference Test Inflation Pressure Range (kPa)	Load range for Nominal section width	
	≤ 295mm	> 295mm
170 – 199	Not Applicable	B
200 – 299	B	C
300 – 399	C	D
400 – 499	D	E
500 – 599	E	Not Applicable

New Harmonized concepts:

d. Harmonized marking covering the maximum load rating and corresponding inflation pressure aligned to the reference test inflation pressure

In the case of LT/C tyres, the maximum load rating and corresponding inflation pressure of the tyre, shown as follows:

"Max load single _____ kg (_____ lb) at ____ kPa (_____ psi) cold

Max load dual _____ kg (_____ lb) at ____ kPa (_____ psi) cold"

For LT/C tyres rated for single fitment only, mark as follows:

"Max load single _____ kg (_____ lb) at ____ kPa (_____ psi) cold "

The inflation pressure marked for single application shall be taken as the Reference Test Inflation Pressure, unless a different value for the Reference Test Inflation Pressure is marked **separately** as follows:

"Max load single _____ kg (_____ lb) at ____ kPa (_____ psi) cold

Max load dual _____ kg (_____ lb) at ____ kPa (_____ psi) cold

TEST AT: _____ kPa*"

For LT/C tyres rated for single fitment only, mark as follows:

"Max load single _____ kg (_____ lb) at ____ kPa (_____ psi) cold

TEST AT: _____ kPa*"

*May be replaced by « TEST INFL : » or the symbol « @ »

In line with the definition of the Reference Test inflation Pressure, the inflation pressure marked for single application (and dual application if applicable) shall be equal or higher than the Reference Test Inflation Pressure.

New Harmonized concepts:

e. Clarification of the concept of maximum load rating and load capacity of a tyre.

The introduction of the concept of the Reference Test Inflation Pressure brought some inconsistency with FMVSS 139, which defines inflation pressure in relation to the tyre load carrying capacity. To harmonize these concepts, Reference Test Inflation Pressure was introduced to clearly define inflation pressure in relation to the maximum load rating.

2.34. "Load index" means a numerical code which indicates the maximum load rating. The list of these indices and their corresponding reference loads is given in Annex 2;

2.40. "Maximum load rating" means the reference mass corresponding to the load index used to define the load capacity of the tyre;

2.61. "Reference Test Inflation Pressure" applicable for LT/C tyres means the minimum cold inflation pressure for the maximum load rating of the tyre in single application;

New Harmonized concepts:

f. Introduction of harmonized provisions of the Tread Wear Indicator for LT/C tyres

Tread wear indicator provisions have been introduced for LT/C tyres, in line with the FMVSS 139 requirements

3.4. Tread wear indicators

3.4.1. Except as noted below, each passenger car tyre and each LT/C tyre shall have at least six transverse rows of tread wear indicators, approximately equally spaced around the circumference of the tyre and situated in the principal grooves of the tread.

3.4.2. For passenger car tyres designed for mounting on rims of nominal rim diameter code 12 or less, not less than three transverse rows of tread wear indicators is acceptable.

3.4.3. The tread wear indicators may be identified by the acronym 'TWI', or by means of a triangle, or by an arrow radially arranged on the tyre, or else by a symbol determined by the manufacturer. These indications may be moulded on both sides of the sidewall in the tyre shoulder region.

3.4.4. The height of each tread wear indicator shall be $1.6_{-0.0}^{+0.6}$ mm.

New Harmonized concepts:

g. Introduction of test equipment tolerances specification guidelines

Annex 11 of UN GTR No. 16 was added to provide Contracting Parties with guidance on harmonised tolerances for various values in the technical prescriptions of UN GTR No. 16.

It is at the discretion of a Contracting Party whether and how tolerances are applied in its national regulations when transposing UN GTR No. 16, understanding that unique tolerances could preclude mutual recognition.

Amendments reflecting Chinese and Indian proposals

A number of proposals made by China and India aimed at harmonization of the provisions of its domestic legislation with those of UN GTR No. 16 were considered and proper amendments in the GTR text were introduced as follows:

- Table added showing the relation between Load Range and Ply Rating
- Number of tread wear indicators
- Strength test: specific requirements for rim diameter codes 13 and below
- China requirements for High-Speed test were considered together with the new provisions for the harmonized High Speed test
- New Annex 11 was introduced as guidelines for the tolerances for test equipment
- Assessment of the required and optional tyre markings
- A new paragraph 1.2.(e) was introduced because some Class C3 tyres with Load Index between 122 and 131 that contain "LT" or "C"

Request to GRBP

GRBP is kindly requested to adopt the following documents and submit those for consideration by WP.29 and AC.3:

1. the draft Amendment No. 2 to UN GTR No. 16 (ECE/TRANS/WP.29/GRBP/2019/21 as amended by GRBP-70-17)

together with

2. the report (ECE/TRANS/WP.29/GRBP/2019/20)

Future works

IWG TYRE GTR identified topics for future TYRE GTR developments:

Extended Mobility Tyres

Elimination of the Overall diameter measurement for Radial tyres after high speed test

Provisions for North American All-Season tyres

Updated Bead Unseating test

Updated Strength test

LT/C Endurance test to be harmonized

Wet Grip for Worn tyres

New provisions for winter performance

Contracting Parties to 1998 Agreement are kindly requested to confirm their interest in further development of UN GTR No 16 with regards to the topics as above and their priorities.

Thank you for your attention!