

28 November 2023

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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)

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#### **Addendum 116 – UN Regulation No. 117**

#### **Revision 5 - Amendment 1**

Supplement 1 to the 03 series of amendments – Date of entry into force: 24 September 2023.

#### **Uniform provisions concerning the approval of tyres with regard to rolling sound emissions and/or to adhesion on wet surfaces and/or to rolling resistance**

This document is meant purely as documentation tool. The authentic and legal binding text is: ECE/TRANS/WP.29/2023/6 (as amended by paragraph 88 of the report ECE/TRANS/WP.29/1171).



**UNITED NATIONS**

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\* 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).

*Table of contents, Annexes*, amend to read:

"7            Procedures for snow performance testing relative to tyres for use in severe snow conditions...  
[...]"

*Paragraph 2.1., subparagraph (e)*, amend to read:

"            (e)    Whether tyre for use in severe snow conditions or not;"

*Paragraph 2.13.1.*, amend to read:

"2.13.1.      "Tyre for use in severe snow conditions" means a snow tyre or a special use tyre whose tread pattern, tread compound or structure is specifically designed to be used in severe snow conditions and that fulfils the requirements of paragraphs 6.5. and 6.5.1. of this Regulation.

2.13.1.1.    "Ice grip tyre" means a class C1 snow tyre that is classified as tyre for use in severe snow conditions and additionally designed to be used on road surfaces covered with ice and that fulfils the requirements of paragraph 6. 5.2. of this Regulation."

*Paragraph 2.18.*, amend to read:

"2.18.        [...]  
(c)    F3611-22 for the size P225/60R16 in worn state and referred to as "moulded SRTT16 worn",  
(d)    F2872 – 16 for the size 225/75R16C and referred to as "SRTT16C",  
(e)    F2871 – 16 for the size 245/70R19.5 and referred to as "SRTT19.5",  
(f)    F2870 – 16 for the size 315/70R22.5 and referred to as "SRTT22.5"."

*Paragraph 3.1.1.*, amend to read:

"3.1.1.        The performance characteristics to be assessed for the type of tyre; "rolling sound emissions level" and/or "adhesion performance level on wet surfaces" of a tyre in new state" and/or "adhesion performance level on wet surfaces of a tyre in worn state" and/or "rolling resistance level"; "snow performance level" in case of tyre for use in severe snow conditions and additionally "ice performance level" in case of ice grip tyre;"

*Paragraph 3.1.5.1.*, amend to read:

"3.1.5.1.      Whether tyre for use in severe snow conditions or not;"

*Paragraph 4.2.6.*, amend to read:

"4.2.6.        The "Alpine Symbol" ("3-peak-mountain with snowflake" conforming to the pictogram described in Annex 7, Appendix 1) if the snow tyre or the special use tyre is classified as tyre for use in severe snow conditions;"

*Paragraph 4.2.6.1.*, amend to read:

"4.2.6.1.      The "Ice Grip Symbol" (conforming to the pictogram described in Annex 8, Appendix 1) if the tyre for use in severe snow conditions is additionally classified as ice grip tyre;"

*Add a new paragraph 4.2.6.2.*, to read:

"4.2.6.2.      The inscription "M+S" or "M.S" or "M&S" if the special use tyre is classified as tyre for use in severe snow conditions in addition to the "Alpine Symbol";"

*Paragraph 6.1.1., footnote below the table of limits for Stage 2*, amend to read:

"The above limits shall be increased by 1 dB(A) for snow tyres that are classified as tyre for use in severe snow conditions, extra load tyres or reinforced tyres, or any combination of these classifications."

Paragraph 6.1.2., table of limits for Stage 2, amend to read:

"

Stage 2			
Category of use		Limit dB(A)	
		Other	Traction tyres
Normal tyre		72	73
Snow tyre		72	73
	Snow tyre that is classified as tyre for use in severe snow conditions	73	75
Special use tyre		74	75
	Special use tyre that is classified as tyre for use in severe snow conditions	74	75

"

Paragraph 6.1.3., table of limits for Stage 2, amend to read:

"

Stage 2			
Category of use		Limit dB(A)	
		Other	Traction tyres
Normal tyre		73	75
Snow tyre		73	75
	Snow tyre that is classified as tyre for use in severe snow conditions	74	76
Special use tyre		75	77
	Special use tyre that is classified as tyre for use in severe snow conditions	75	77

"

Paragraph 6.2.1., table of limits, amend to read:

"

Category of use		Wet grip index (G)
Normal tyre		≥ 1.1
Snow tyre		≥ 1.1
	Snow tyre that is classified as tyre for use in severe snow conditions and with a speed symbol ("R" and above, including "H") indicating a maximum permissible speed greater than 160 km/h	≥ 1.0
	Snow tyre that is classified as tyre for use in severe snow conditions and with a speed symbol ("Q" or below excluding "H")	≥ 0.9

	indicating a maximum permissible speed not greater than 160 km/h	
Special use tyre		Not defined
	Special use tyre that is classified as tyre for use in severe snow conditions	Not defined

"

Paragraph 6.2.2., table of limits, amend to read:

"

Category of use		Wet grip index (G)	
		Other	Traction tyres
Normal tyre		≥ 0.95	≥ 0.85
Snow tyre		≥ 0.95	≥ 0.85
	Snow tyre that is classified as tyre for use in severe snow conditions	≥ 0.85	≥ 0.85
Special use tyre		≥ 0.85	≥ 0.85
	Special use tyre that is classified as tyre for use in severe snow conditions	≥ 0.85	≥ 0.85

"

Paragraph 6.2.3., table of limits, amend to read:

"

Category of use		Wet grip index (G)	
		Other	Traction tyres
Normal tyre		≥ 0.80	≥ 0.65
Snow tyre		≥ 0.65	≥ 0.65
	Snow tyre that is classified as tyre for use in severe snow conditions	≥ 0.65	≥ 0.65
Special use tyre		≥ 0.65	≥ 0.65
	Special use tyre that is classified as tyre for use in severe snow conditions	≥ 0.65	≥ 0.65

"

Paragraph 6.3., last sentence, amend to read:

"... For snow tyres that are classified as tyre for use in severe snow conditions, the limits shall be increased by 1 N/kN."

Paragraph 6.4.1, table of limits, amend to read:

"

Category of use		Wet grip index (G <sub>B</sub> )
Normal tyre		≥ 0.88
Snow tyre		≥ 0.80
	Snow tyre that is classified as tyre for use in severe snow conditions	≥ 0.80

Category of use			Wet grip index ( $G_B$ )
	and with a speed category symbol ("R" and above, including "H") indicating a maximum permissible speed-greater than 160 km/h	Ice grip tyre	$\geq 0.70$
	Snow tyre that is classified as tyre for use in severe snow conditions and with a speed category symbol ("Q" or below excluding "H") indicating a maximum permissible speed not greater than 160 km/h		$\geq 0.70$
		Ice grip tyre	$\geq 0.70$
Special use tyre			Not defined
	Special use tyre that is classified as tyre for use in severe snow conditions		Not defined

For normal tyres with speed category symbol indicating a maximum permissible speed equal to or greater than 300 km/h and aspect ratio equal to or lower than 40, the limit shall be decreased by 0.08."

*Paragraph 6.5.*, amend to read:

"6.5. In order to be classified as a tyre for use in severe snow conditions the tyre shall meet the performance requirements of paragraph 6.5.1. below. The tyre shall meet these requirements based on a test method of Annex 7 by which:

[...]"

*Paragraph 6.5.2.*, replace "a snow tyre for use" by "a tyre for use".

*Paragraph 12.*, insert new subparagraphs 12.9., 12.10. and 12.11., to read:

- "12.9. Until 6 July 2024, Contracting Parties applying this Regulation may continue to grant type approvals of class C1 tyres according to the 03 series of amendments to this Regulation, based on the test procedures for measuring the wet adhesion of tyres in worn state as described in Annex 9 to this Regulation using buffed SRTT16 in worn state as reference tyre.
- 12.10. Notwithstanding paragraph 12.9., Contracting Parties applying this Regulation shall continue to grant extensions to existing type approvals of class C1 tyres according to the 03 series of amendments to this Regulation first granted before 7 July 2024, based on the test procedures for measuring the wet adhesion of tyres in worn state as described in Annex 9 to this Regulation using buffed SRTT16 in worn state as reference tyre. In case a new test has to be performed on a different representative tyre size for an extension to be granted after 7 July 2024, the moulded SRTT16 worn shall be used.
- 12.11. Until 60 months from the entry into force of Supplement 15 to the 02 series of amendments, Contracting Parties applying this Regulation shall continue to grant type approvals and extension to existing type approvals according to the 03 series of amendments to this Regulation, based on tyre-rolling sound emissions tests performed on test sites the surface and the dimensions of which are in accordance with ISO 10844:2014."

*Annex 1,*

*Item 4.1.*, amend to read:

"4.1. Tyre for use in severe snow conditions (Yes/No)<sup>2</sup>"

Item 8.3., amend to read:

"8.3. Wet adhesion level of tyres in worn state of representative size, see paragraph 2.7. of this Regulation, as per the test report in the appendix to Annex 9: ..... (G<sub>B</sub>) using the vehicle or trailer method<sup>2</sup>"

Footnote 6, amend to read:

"<sup>6</sup> In the case of tyre for use in severe snow conditions a test report according to Appendix 2 or Appendix 3, as applicable, to Annex 7 shall be submitted. Additionally in the case of ice grip tyre a test report according to Appendix 2 to Annex 8 shall be submitted."

Annex 3,

Paragraph 2.1., replace "ISO 10844:2014" by "ISO 10844:2021".

Appendix 1, item 6.1, amend to read:

"6.1. Tyre for use in severe snow conditions (Yes/No)<sup>1</sup>"

Annex 5, part (A),

Paragraph 3.3., table of temperatures, amend to read:

"

Category of use		Wetted surface temperature	Ambient temperature
Normal tyre		12 °C – 35 °C	12 °C – 40 °C
Snow tyre		5 °C – 35 °C	5 °C – 40 °C
	Snow tyre that is classified as tyre for use in severe snow conditions	5 °C – 20 °C	5 °C – 20 °C
Special use tyre		not applicable	not applicable
	Special use tyre that is classified as tyre for use in severe snow conditions	not applicable	not applicable

"

Paragraph 4.1.6.4., table 2, amend to read:

"

Table 2

Category of use		$\vartheta_0$ (°C)	$a$	$b$ (°C <sup>-1</sup> )	$c$ (°C <sup>-2</sup> )	$d$ (mm <sup>-1</sup> )
Normal tyre		20	+0.99382	+0.00269	-0.00028	-0.02472
Snow tyre		15	+0.92654	-0.00121	-0.00007	-0.04279
	Snow tyre that is classified as tyre for use in severe snow conditions	10	+0.72029	-0.00539	+0.00022	-0.03037
Special use tyre		not defined				
	Special use tyre that is classified as tyre for use in severe snow conditions	not defined				

"

Paragraph 4.2.8.4., table 4, amend to read:

" Table 4

Category of use		$\vartheta_0$ (°C)	$a$	$b$ (°C <sup>-1</sup> )	$c$ (°C <sup>-2</sup> )	$d$ (mm <sup>-1</sup> )
Normal tyre		20	+0.99757	+0.00251	-0.00028	+0.07759
Snow tyre		15	+0.87084	-0.00025	+0.00004	-0.01635
	Snow tyre that is classified as tyre for use in severe snow conditions	10	+0.67929	+0.00115	-0.00005	+0.03963
Special use tyre		not defined				
	Special use tyre that is classified as tyre for use in severe snow conditions	not defined				

"

Annex 5, part (B),

Paragraph 2.1.2.1., amend to read:

"2.1.2.1. [...]

$$P_t = P_r \cdot \left( \frac{Q_t}{Q_r} \right)^{1.25}$$

Where:

$P_r$  = Inflation pressure corresponding to the indication of the inflation pressure marked on the sidewall as required by paragraph 4.1. of this Regulation.

$Q_t$  = The static test load of the tyre

$Q_r$  = The maximum mass associated with the load capacity index of the tyre."

Annex 6,

Appendix 3, item 6.1, amend to read:

"6.1. Tyre for use in severe snow conditions (Yes/No)<sup>2</sup>"

Annex 7,

Title, amend to read:

## "Procedures for snow performance testing relative to tyres for use in severe snow conditions"

Paragraph 3.1.4.2., amend to read:

"3.1.4.2. For class C2 tyres, the vehicle load shall be such that the resulting loads on the tyres are between 60 per cent and 100 per cent of the load corresponding to the tyre load capacity index.

[...]

$$P_t = P_r \cdot \left( \frac{Q_t}{Q_r} \right)^{1.25}$$

$Q_r$  is the maximum load associated to the load capacity index of the tyre written on the sidewall

$P_r$  is the inflation pressure corresponding to the indication of the inflation pressure marked on the sidewall as required by paragraph 4.1. of this Regulation.

$Q_t$  is the static test load of the tyre

For a vertical load lower than 75 per cent of the load capacity of the tyre, a constant inflation pressure is applied, hence the test inflation pressure  $P_t$  shall be calculated as follows:

$$P_t = P_r \times (0.75)^{1.25} = 0.7 P_r$$

$P_r$  is the inflation pressure corresponding to the indication of the inflation pressure marked on the sidewall as required by paragraph 4.1. of this Regulation.

Check the tyre pressure just prior to testing at ambient temperature."

Annex 8,

Title, amend to read:

## **"Procedures for ice performance testing relative to ice grip tyres of class C1"**

Paragraph 2.4.2.2., Table 3, amend to read:

"Table 3

Calculation of the adjusted mean fully developed deceleration  $d_{m,adj}(R)$  of the reference tyre

<i>If the number and the sequence of candidate tyres within one braking test cycle is</i>	<i>and the candidate tyre to be qualified is</i>	<i>the corresponding adjusted mean fully developed deceleration <math>d_{m,adj}(R)</math> of the reference tyre is calculated as follows</i>
1 $R_i - T_1 - R_f$	$T_1$	$d_{m,adj}(R) = 1/2 \cdot [d_{m,ave}(R_i) + d_{m,ave}(R_f)]$
2 $R_i - T_1 - T_2 - R_f$	$T_1$	$d_{m,adj}(R) = 2/3 \cdot d_{m,ave}(R_i) + 1/3 \cdot d_{m,ave}(R_f)$
	$T_2$	$d_{m,adj}(R) = 1/3 \cdot d_{m,ave}(R_i) + 2/3 \cdot d_{m,ave}(R_f)$

"

Second occurrence of paragraph 2.4.2.2., renumber as 2.4.2.3.

Second occurrence of paragraph 2.4.4.4., renumber as 2.4.4.5.

Paragraph 2.4.4.5. (former), renumber as 2.4.4.6.

Paragraph 2.4.5.2.1., replace "2.4.4.5." by "2.4.4.6."

Annex 9,

Paragraph 2.1.1., amend to read:

"2.1.1.        "Tyre in worn state" or "worn tyre" means, for the purpose of this Regulation, a new tyre artificially worn by reducing the tread depth or, with respect to the reference tyre in worn state, moulded at the height defined in paragraph 2.2.1.2.4.1. of this Annex."

Paragraph 2.1.13., amend to read:

"2.1.13.        "Reference tyre in worn state" or "Reference tyre set in worn state" means a tyre or a tyre set of Standard Reference Test Tyres moulded SRTT16 worn. "



Insert a new paragraph 2.2.1.2.4.1.1., to read:

"2.2.1.2.4.1.1. The rim width shall be one specified by a recognized tyre and rim standards organization as listed in Appendix 4 to Annex 6 to this Regulation. The rim width code shall not differ by more than 0.5 from the measuring rim width code. "

Insert a new paragraph 2.2.1.2.4.1.2., to read:

"2.2.1.2.4.1.2. The inflation pressure for the tread depth measurement shall be between 180 kPa and 220 kPa. "

Paragraph 2.3.1.5., replace "SRTT16 in worn state" by "moulded SRTT16 worn".

Paragraph 2.3.3., table of temperatures, amend to read:

"

Category of use		Wetted surface temperature	Ambient temperature
Normal tyres		12 °C – 35 °C	12 °C – 40 °C
Snow tyres		5 °C – 35 °C	5 °C – 40 °C
	Snow tyre that is classified as tyre for use in severe snow conditions	5 °C – 20 °C	5 °C – 20 °C
Special use tyres		not applicable	not applicable
	Special use tyre that is classified as tyre for use in severe snow conditions	not applicable	not applicable

"

Paragraph 2.4.1.1.4., amend to read:

"2.4.1.1.4. Calculation of the wet grip index of the candidate tyre

[...]

$BFC_{adj}(R)$  is the adjusted average braking force coefficient in accordance with Table 1 of Annex 5;

[...]

$K_{vehicle} = 1.95$  is a factor to grant consistency between previous calculation of the wet grip index and this one, and to ensure convergence between vehicle and trailer method and

coefficients  $a$ ,  $b$ ,  $c$  and  $d$  are given in Table 2.

Table 2

Category of use		$\vartheta_0$ (°C)	$a$	$b$ (°C <sup>-1</sup> )	$c$ (°C <sup>-2</sup> )	$d$ (mm <sup>-1</sup> )
Normal tyre		20	+0.90996	-0.00179	-0.00013	-0.10313
Snow tyre		15	+0.81045	-0.00004	-0.00019	-0.05093
	Snow tyre that is classified as tyre for use in severe snow conditions	10	+0.71094	+0.00172	-0.00025	+0.00127
Special use tyre		not defined				

Category of use		$\vartheta_0$ (°C)	$a$	$b$ (°C <sup>-1</sup> )	$c$ (°C <sup>-2</sup> )	$d$ (mm <sup>-1</sup> )
	Special use tyre that is classified as tyre for use in severe snow conditions	not defined				

"

Paragraph 2.4.2.1.4., amend to read:

"2.4.2.1.4. Calculation of the wet grip index of the candidate tyre

[...]

$\mu_{\text{peak,adj}}(\text{R})$  is the adjusted peak braking force coefficient in accordance with Table 3 of Annex 5;

[...]

$K_{\text{trailer}} = 1.50$  is a factor to grant consistency between previous calculation of the wet grip index and this one, and to ensure convergence between vehicle and trailer method and

coefficients  $a$ ,  $b$ ,  $c$  and  $d$  are given in Table 4.

Table 4

Category of use		$\vartheta_0$ (°C)	$a$	$b$ (°C <sup>-1</sup> )	$c$ (°C <sup>-2</sup> )	$d$ (mm <sup>-1</sup> )
Normal tyre		20	+0.99655	-0.00124	+0.00041	+0.06876
Snow tyre		15	+0.94572	-0.00032	-0.00020	+0.08047
	Snow tyre that is classified as tyre for use in severe snow conditions	10	+0.89488	+0.00061	-0.00080	+0.09217
Special use tyre		not defined				
	Special use tyre that is classified as tyre for use in severe snow conditions	not defined				

"