6 August 2013

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*

(Revision 2, including the amendments which entered into force on 16 October 1995)

Addendum 116 – Regulation No. 117

Revision 2 - Amendment 2

Supplement 2 to the 02 series of amendments – Date of entry into force: 15 July 2013

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

---

UNITED NATIONS

* Former title 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.

Title of the Regulation on pages 1 and 3, amend to read**:**

"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"

The list of contents,

The title of Annex 1, amend to read**:**

"Communication"

The title of Annex 7, amend to read:

"7. Procedures for snow performance testing relative to snow tyre for use in severe snow conditions ..... 74"

The text of the Regulation,

Paragraph 2.5., amend to read:

"2.5. "*Representative tyre size*" means the tyre size which is submitted to the test described in Annex 3 to this Regulation with regard to rolling sound emissions, or Annex 5 for adhesion on wet surfaces or Annex 6 for rolling resistance to assess the conformity for the type approval of the type of tyre, or Annex 7 for use in severe snow conditions."

Paragraph 2.11., amend to read:

"2.11. "*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."

Insert a new paragraph 2.11.1., to read:

"2.11.1. "*Snow tyre for use in severe snow conditions*" means a snow tyre whose tread pattern, tread compound or structure is specifically designed to be used in severe snow conditions and that fulfils the requirements of paragraph 6.4."

Paragraph 2.16., amend to read:

"2.16. "*Standard reference test tyre*" (SRTT) means a tyre that is produced, controlled and stored in accordance with the ASTM (American Society for Testing and Materials) standards:

(a) E1136-93 (2003) for the size P195/75R14.

(b) F2872 (2011) for the size 225/75 R 16 C."

Paragraph 2.17., amend to read:

"2.17. Wet Grip or Snow Grip measurements – Specific definitions"

Paragraph 2.17.3., amend to read:

"2.17.3. "*Control tyre*" means a normal production tyre that is used to establish the wet grip or snow grip performance of tyre sizes unable to be fitted to the same vehicle as the standard reference test tyre – see paragraph 2.2.2.15. of Annex 5 and paragraph 3.4.3. of Annex 7 to this Regulation."

Insert a new paragraph 2.17.5., to read:

"2.17.5. "*Snow grip index ("SG")*" means the ratio between the performance of the candidate tyre and the performance of the standard reference test tyre."

Paragraphs 2.17.5. to 2.17.7. (former), renumber as paragraphs 2.17.6. to 2.17.8.

Paragraph 3.1.1., amend to read:

"3.1.1. The performance characteristics to be assessed for the tyre type; "rolling sound emissions level" and/or "adhesion performance level on wet surfaces" and/or "rolling resistance level". Tyre "snow performance level" in cases of "snow tyre for use in severe snow conditions";"

Paragraph 4.1.6.5., the formula, correct to read:

"

$$G(T) = \left[\frac{BFC(T)}{BFC(R)} \times 125 + a \times (t - t_0) + b \times \left(\frac{BFC(R)}{BFC(R_0)} - 1{,}0 \right) \right] \times 10^{-2}$$

"

Paragraph 4.2.5., amend to read (footnote 11 remains unchanged):

"4.2.5. The inscription "TRACTION"[11] if the tyre is classified as "traction tyre";"

Paragraph 4.2.6., amend to read:

"4.2.6. The "Alpine" symbol ("3-peak-mountain with snowflake" conforming to the symbol described in Annex 7, Appendix 1) shall be added if the snow tyre is classified as "snow tyre for use in severe snow conditions"."

Paragraph 4.2.7. shall be deleted.

Paragraph 4.2.8. (former), renumber as paragraph 4.2.7.

Paragraph 6.1.1., the table, amend to read:

"6.1.1.

Stage 2	
Nominal Section Width	*Limit dB(A)*
185 and lower	70
Over 185 up to 245	71
Over 245 up to 275	72
Over 275	74
The above limits shall be increased by 1 dB(A) for "snow tyre for use in severe snow conditions" , extra load tyres or reinforced tyres, or any combination of these classifications.	

"

Paragraph 6.1.2, the tables, amend to read (include removing of the footnote *):

"6.1.2.

Stage 1	
Category of use	*Limit dB(A)*
Normal tyre	75
Snow tyre	77
Special use tyre	78

Stage 2			
Category of use		*Limit dB(A)*	
		Other	*Traction Tyres*
Normal tyre		72	73
Snow tyre		72	73
	Snow tyre for use in severe snow conditions	73	75
Special use tyre		74	75

"

Paragraph 6.1.3., the tables, amend to read (include removing of the footnote *):

"6.1.3.

Stage 1	
Category of use	*Limit dB(A)*
Normal tyre	76
Snow tyre	78
Special use tyre	79

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

"

Paragraph 6.2.1., the table, amend to read:

"6.2.1.

Category of use		*Wet grip index (G)*
Normal tyre		≥ 1.1
Snow tyre		≥ 1.1
	"Snow 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 for use in severe snow conditions" and with a speed symbol ("Q" or below excluding "H") indicating a maximum permissible speed not greater than 160 km/h	≥ 0.9
Special use tyre		Not defined

"

Paragraphs 6.3.1. and 6.3.2., the tables, amend to read:

"6.3.1. The maximum values for stage 1 for the rolling resistance coefficient shall not exceed the following (value in N/kN is equivalent to value in kg/tonne):

Tyre class	*Max value (N/kN)*
C1	12.0
C2	10.5
C3	8.0
For "snow tyre for use in severe snow conditions", the limits shall be increased by 1 N/kN.	

6.3.2. The maximum values for stage 2 for the rolling resistance coefficient shall not exceed the following (value in N/kN is equivalent to value in kg/tonne):

Tyre class	*Max value (N/kN)*
C1	10.5
C2	9.0
C3	6.5
For "snow tyre for use in severe snow conditions", the limits shall be increased by 1 N/kN.	

"

Paragraph 6.4., amend to read:

"6.4. In order to be classified as a "snow tyre for use in severe snow conditions" the tyre shall meet the performance requirements of paragraph 6.4.1. The tyre shall meet these requirements based on a test method of Annex 7 by which:

.....

of the candidate tyre is compared to that of a standard reference tyre.

The relative performance shall be indicated by a snow index."

Paragraph 6.4.1.1., amend to read:

"6.4.1.1. Class C1 and C2 tyres

The minimum snow index value, as calculated in the procedure described in Annex 7 and compared with the SRTT shall be as follows:

Class of tyre	*Snow grip index (brake on snow method)*[(a)]		*Snow grip index (spin traction method)*[(b)]
	Ref. = C1 – SRTT 14	*Ref. = C2 – SRTT 16C*	*Ref. = C1 – SRTT 14*
C1	1.07	No	1.10
C2	No	1.02	1.10

(a) See paragraph 3 of Annex 7 to this Regulation
(b) See paragraph 2 of Annex 7 to this Regulation"

Annex 1,

Paragraph 14.1.and its footnote 7, amend to read:

"14.1. 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[7].

_____

[7] In the case of "snow tyre for use in severe snow conditions" a test report according to Appendix 2 of Annex 7 shall be submitted."

Annex 5,

Paragraph 2.2.2.15.1., amend to read:

"2.2.2.15.1. The wet grip index of the control tyre relative to the SRTT (G1) and of the candidate tyre relative to the control tyre (G2) shall be established using the procedure in paragraphs 2.2.2.1. to 2.2.2.14."

Paragraph 2.2.2.15.5., amend to read:

"2.2.2.15.5. The SRTT and control tyres shall be discarded if there is irregular wear or damage or when the performance appears to have been deteriorated."

Annex 6,

Paragraph 2.2., amend to read

"2.2. Measuring rim (see Appendix 2)

The tyre shall be mounted on a steel or light alloy measuring rim, as follows:

(a) For Class C1 tyres, the width of the rim shall be as defined in ISO 4000-1:2010,

(b) For Class C2 and C3 tyres, the width of the rim shall be as defined in ISO 4209 1:2001.

In cases where the width is not defined in the above mentioned ISO Standards, the rim width as defined by one of the standards organizations as specified in Appendix 4 may be used."

Appendix 1,

Paragraph 2.1., amend to read

"2.1. Width

For passenger car tyre rims (C1 tyres), the test rim width shall be the same as the measuring rim determined in ISO 4000-1: 2010 clause 6.2.2.

For truck and bus tyres (C2 and C3), the rim width shall be the same as the measuring rim determined in ISO 4209-1:2001, clause 5.1.3.

In cases where the width is not defined in the above mentioned ISO Standards, the rim width as defined by one of the standards organizations as specified in Appendix 4 may be used."

Paragraph 5., in the table, where the tolerances are given for spindle force and torque input, amend both rows to read:

"

Spindle force	+/- 0.5 N or +/- 0.5% (a)	+/- 1.0 N or +/- 0.5% (a)
Torque input	+/- 0.5 Nm or +/- 0.5% (a)	+/- 1.0 Nm or +/- 0.5% (a)

"

Paragraph 5.1.5., correct to read:

"5.1.5. Deceleration method

….

Where:

I_D is the test drum inertia in rotation, in kilogram meter squared,

R is the test drum surface radius, in meter,

ω_{D0} is the test drum angular speed, without tyre, in radians per second,

Δt_0 is the time increment chosen for the measurement of the parasitic losses without tyre, in second,

I_T is the spindle, tyre and wheel inertia in rotation, in kilogram meter squared,

R_r is the tyre rolling radius, in metre,

ω_{T0} is the tyre angular speed, unloaded tyre, in radian per second.

"

Add a new Appendix 4, to read

"**Annex 6 – Appendix 4**

Tyre standards organizations

1. The Tire and Rim Association, Inc. (TRA)
2. The European Tyre and Rim Technical Organisation (ETRTO)
3. The Japan Automobile Tyre Manufacturers' Association (JATMA)
4. The Tyre and Rim Association of Australia (TRAA)
5. South Africa Bureau of Standards (SABS)
6. China Association for Standardization (CAS)
7. Indian Tyre Technical Advisory Committee (ITTAC)
8. International Standards Organisation (ISO)"

Annex 7, the title, amend to read:

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

Paragraph 1., amend to read:

"1. Specific definitions for snow test when different from existing ones"

Paragraph 2., amend to read:

"2. Spin traction method for Classes C1 and C2 tyres (traction force test per paragraph 6.4. (b))"

Paragraph 3., amend to read:

"3. Braking on snow method for Classes C1 and C2 tyres"

Paragraph 3.1.1., amend to read (footnote 1 remains unchanged):

"3.1.1. Test course

The braking tests shall be done on a flat test surface of sufficient length and width, with a maximum 2 per cent gradient, covered with packed snow.

The snow surface shall be composed of a hard packed snow base at least 3 cm thick and a surface layer of medium packed and prepared snow about 2 cm thick.

The air temperature, measured about one meter above the ground, shall be between -2 °C and -15 °C; the snow temperature, measured at a depth of about one centimetre, shall be between 4 °C and -15 °C.

It is recommended to avoid direct sunlight, large variations of sunlight or humidity, as well as wind.

The snow compaction index measured with a CTI penetrometer[1] shall be between 75 and 85.

[1] See appendix of ASTM standard F1805-06 for details."

Paragraph 3.1.2., amend to read:

"3.1.2. Vehicle

The test shall be conducted with a standard production vehicle in good running order and equipped with an ABS system.

The vehicle used shall be such that the loads on each wheel are appropriate to the tyres being tested. Several different tyre sizes can be tested on the same vehicle."

Paragraph 3.1.3., amend to read and to amend numbering:

"3.1.3. Tyres

The tyres should be "broken-in" prior to testing to remove spew, compound nodules or flashes resulting from the moulding process. The tyre surface in contact with snow shall be cleaned before performing a test.

Tyres shall be conditioned at the outdoor ambient temperature at least two hours before their mounting for tests. Tyre pressures shall then be adjusted to the values specified for the test.

In case a vehicle cannot accommodate both the reference and candidate tyres, a third tyre ("control" tyre) may be used as an intermediate. First test control vs. reference on another vehicle, then test candidate vs. control on the vehicle."

Paragraph 3.1.4., amend to read:

"3.1.4 Load and pressure:"

Insert new paragraphs 3.1.4.1. and 3.1.4.2., to read:

"3.1.4.1. For C1 tyres, the vehicle load shall be such that the resulting loads on the tyres are between 60 per cent and 90 per cent of the load corresponding to the tyre load index.

The cold inflation pressure shall be 240 kPa.

3.1.4.2. For 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 index.

The static tyre load on the same axle should not differ by more than 10 per cent.

The inflation pressure is calculated to run at constant deflection:

For a vertical load higher or equal to 75 per cent of the load capacity of the tyre, a constant deflection is applied, hence the test inflation pressure "Pt" shall be calculated as follows:

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

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

Pr is the reference pressure corresponding to the maximum load capacity Qr

Qt 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 Pt shall be calculated as follows:

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

Pr is the reference pressure corresponding to the maximum load capacity Qr

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

Paragraph 3.4.1.3., amend to read:

"3.4.1.3. The snow grip index (SG) in per cent of a candidate tyre shall be computed as:

$$\text{Snow Grip Index (candidate)} = \frac{\text{Mean (candidate)}}{\text{wa (SRTT)}}$$ "

Insert new paragraphs 3.4.3. to 3.4.3.5., to read:

"3.4.3. In the case where the candidate tyres cannot be fitted to the same vehicle as the SRTT, for example, due to tyre size, inability to achieve required loading and so on, comparison shall be made using intermediate tyres, hereinafter referred to as "control tyres", and two different vehicles. One vehicle shall be capable of being fitted with the SRTT and the control tyre and the other vehicle shall be capable of being fitted with the control tyre and the candidate tyre.

3.4.3.1 The snow grip index of the control tyre relative to the SRTT (SG1) and of the candidate tyre relative to the control tyre (SG2) shall be established using the procedure in paragraphs 3.1. to 3.4.2.

The snow grip index of the candidate tyre relative to the SRTT shall be the product of the two resulting snow grip indices that is SG1 x SG2.

3.4.3.2. The ambient conditions shall be comparable. All tests shall be completed within the same day.

3.4.3.3. The same set of control tyres shall be used for comparison with the SRTT and with the candidate tyre and shall be fitted in the same wheel positions.

3.4.3.4. Control tyres that have been used for testing shall subsequently be stored under the same conditions as required for the SRTT.

3.4.3.5. The SRTT and control tyres shall be discarded if there is irregular wear or damage or when the performance appears to have been deteriorated."

Paragraph 4.8.3., Table 1, correct to read:

"Table 1

If the number of sets of candidate tyres between two successive runs of the reference tyre is:	*and the set of candidate tyres to be qualified is:*	*then "Ra" is calculated by applying the following:*
1 | R - T1 – R	T1	Ra = 1/2 (R1 + R2)
2 | R - T1 – T2 – R	T1 T2	Ra = 2/3 R1 + 1/3 R2 Ra = 1/3 R1 + 2/3 R2
3 | R - T1 – T2 - T3 – R	T1 T2 T3	Ra = 3/4 R1 + 1/4 R2 Ra = 1/2 (R1 + R2) Ra = 1/4 R1 + 3/4 R2

"

Appendix 1, amend to read:

"Minimum 15 mm base and 15 mm height."

Appendix 2,

The title, amend to read:

"Test reports and test data for C1 and C2 tyres"

Paragraph 2.1., amend the table to read:

"

	At start of tests	*At end of tests*	*Specification*
Weather			
Ambient temperature			-2 °C to -15 °C
Snow temperature			4 °C to -15 °C
CTI index			75 to 85
Other			

"

Paragraph 4.3., the table, amend to read:

"

	SRTT (1st test)	*Candidate*	*Candidate*	*SRTT (2nd test)*
Tyre dimensions				
Test rim width code				
Tyre loads F/R (kg)				
Load index F/R (per cent)				
Tyre pressure F/R(kPa)				

"