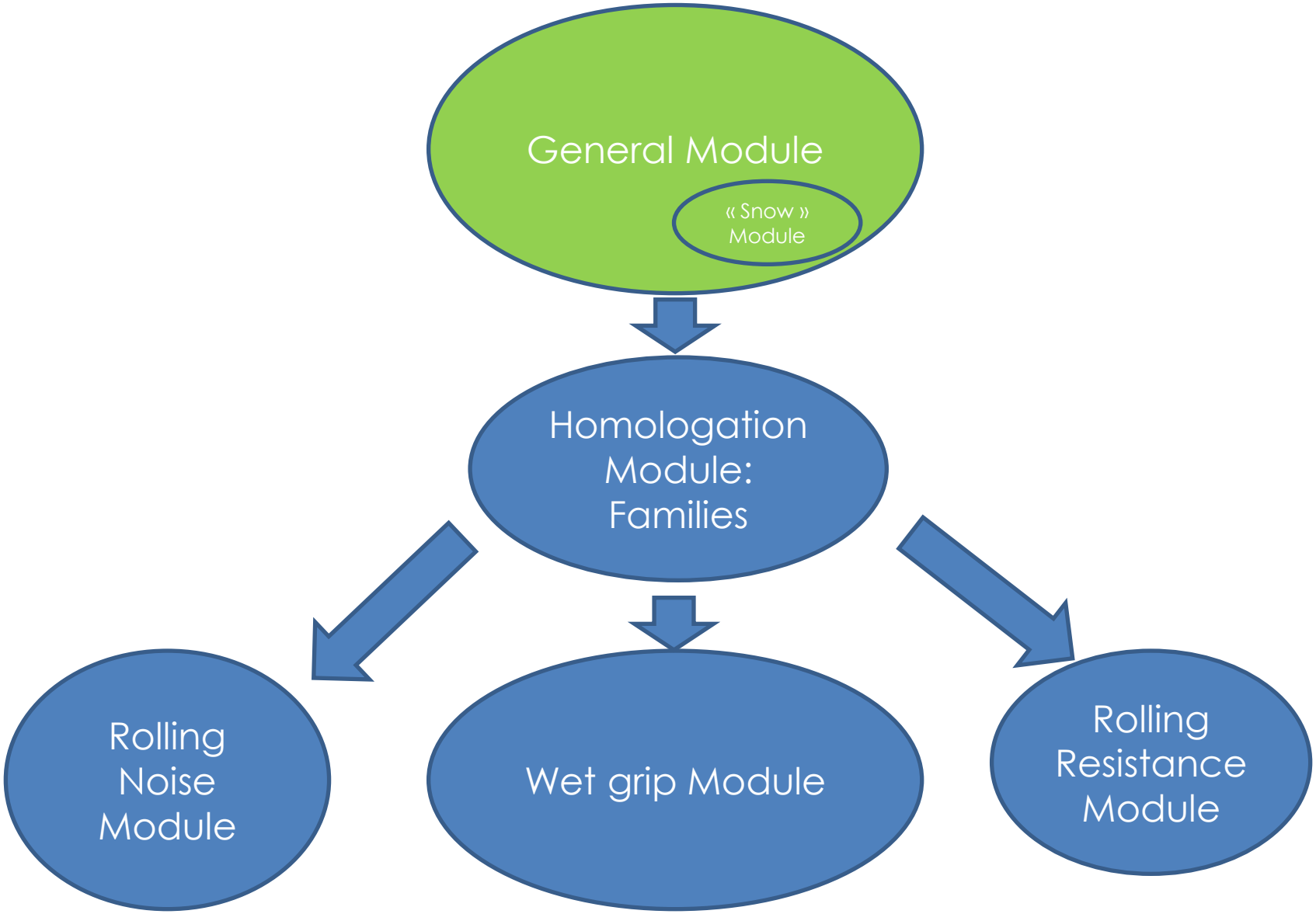
HOMOLOGATION/LABELLING FOR EUROPEAN TIRES

General Module


General Module
« Snow »
Module
Homologation
Module:
Families
Rolling
Noise
Module
Wet grip Module
Rolling
Resistance
Module

WHICH ARE THE DIFFERENT CLASSES OF TYRES

***"Tyre class"*: one of the following groupings:**

"Class C1 tyres": New tyres conforming to Regulation No. 30 designed mainly for vehicles of category M_1, N_1, O_1 and O_2.

"Class C2 and C3 tyres" : New tyres conforming to Regulation No. 54 designed mainly for vehicles of category M_2, M_3, N et O_3 and O_4

- *"Class C2 tyres"* : Tyres identified by a load capacity index (LI) in single formation lower or equal to 121 and a speed category symbol (SI) >= "N";

- *"Class C3 tyres"* : Tyres identified by :
  a) A load capacity index (LI) in single formation > = 122; or
  b) A load capacity index (LI) in single formation < =121 and a speed category symbol (SI) < = "M".

WHICH ARE THE TYRES NOT INCLUDED?

- Tyres designed as "Temporary use spare tyres" and marked "Temporary use only";
- Tyres having a nominal rim diameter code ≤ 10 (or ≤ 254 mm) or ≥ 25 (or ≥ 635 mm);
- Tyres designed for competitions;
- Tyres intended to be fitted to road vehicles of categories other than M, N and O;
- Tyres fitted with additional devices to improve traction properties (e.g. studded tyres);
- Tyres with a speed rating less than 80 km/h (speed symbol F);
- Tyres designed only to be fitted to vehicles registered for the first time before 1 October 1990.
- Professional off-road tyres.
- Retreaded tyres

WHICH ARE THE PERFORMANCES CONCERNED?

- **The Rolling Resistance :** Energy impact by reduction of the fuel consumption and CO2 emission.

- **Wet Grip :** Impact on the security by reduction of the braking distances in wet conditions.

- **Rolling Noise :** Environmental impact by reduction of the noises

WHICH ARE THE REGULATIONS WHICH APPLY?

In Europe :

- The regulation 117 from GENEVA and its amendments: **Approval** issued by the Adminisrative Authorities within the framework of the reception of the vehicles and their components . The process is resulting from the Agreements of 1958.

- The Regulation 1222/2009 of BRUSSELS and its amendments: **Certification** issued by the tyre Manufacturer within the framework of the process of consumer information through labelling.

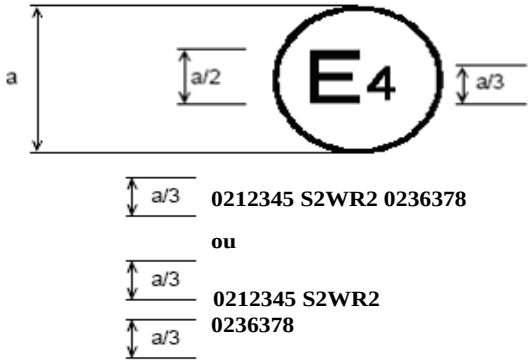
Date of entry into force : 1st november 2012

WHICH ARE THE MANDATORY RULES IN TERM OF MARKINGS?

Homologation R117-02:

- The Approval mark E moulded into or onto the sidewall of the tyre.

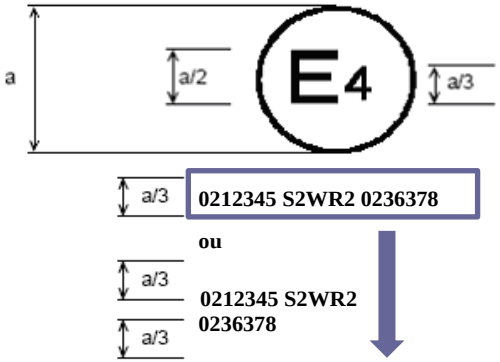
Exemple 2



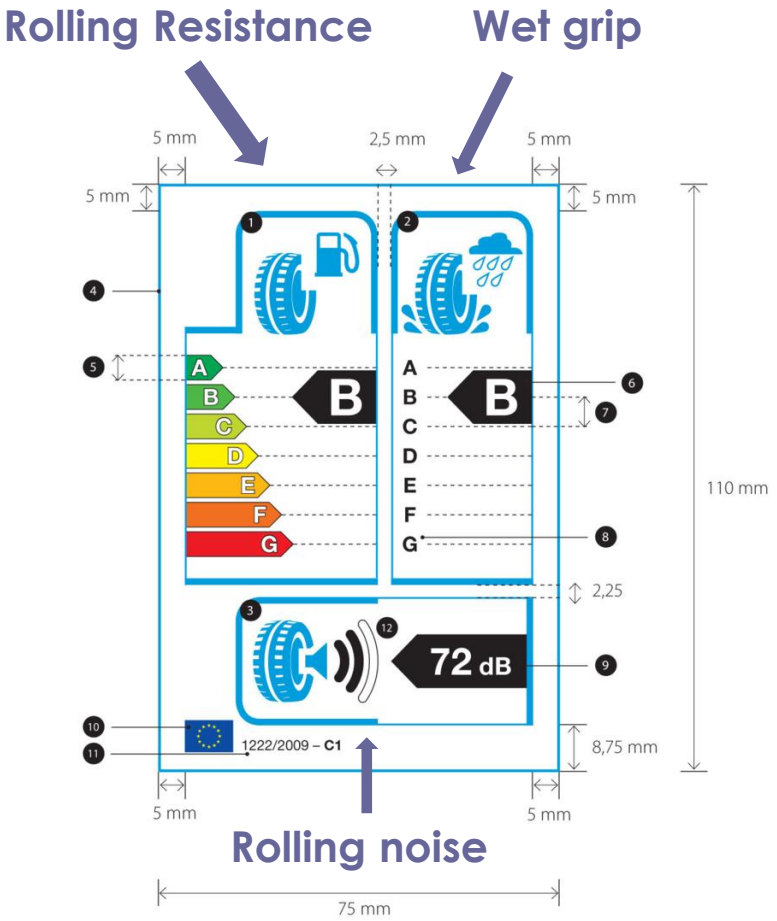
a ≥ 12 mm

- Labelling R1222/2009: For the tyre manufactured after the 1st of July 2012 :
  - Either to affix a sticker on the tread of the pneumatic tyre
  - Or put at the disposal a printed label accompanying the batch by identical pneumatic tyres

Exemple 2



a ≥ 12 mm



- **S** to identify additional conformity to the requirements on tyre **rolling sound emissions**;
- **W** to identify additional conformity to the requirements on tyre **adhesion on wet surfaces**;
- **R** to identify additional conformity to the requirements on tyre **rolling resistance**.

- **021245** is the **approval number issued by the authorities** (02 indicates that the approval was granted according to the 02 series of amendments of the regulation).
- **0236378** is the **approval number according to the 02 series of amendments of the regulation 30**.

WHICH ARE MANDATORY LIMITS?

Coefficient of the rolling resistance

APPROVAL

C1	C2	C3
		RRC ≤ 6,5
RRC ≤ 10,5	RRC ≤ 9,0	RRC ≤ 8,0
RRC ≤ 12,0	RRC ≤ **10,5**	

LABELLING

C1	C2	C3	Class of fuel efficiency
RRC ≤ 6,5	RRC ≤ 5,5	RRC ≤ 4,0	A
6,6 ≤ RRC ≤ 7,7	5,6 ≤ RRC ≤ 6,7	4,1 ≤ RRC ≤ 5,0	B
7,8 ≤ RRC ≤ 9,0	6,8 ≤ RRC ≤ 8,0	5,1 ≤ RRC ≤ 6,0	C
Empty	Empty	6,1 ≤ RRC ≤ 7,0	D
9,1 ≤ RRC ≤ 10,5	8,1 ≤ RRC ≤ 9,2	7,1 ≤ RRC ≤ **8,0**	E
10,6 ≤ RRC ≤ 12,0	9,3 ≤ RRC ≤ **10,5**	RRC ≥ 8,1	F
RRC ≥ 12,1	RRC ≥ 10,6	Empty	G

In red: limit stage 1 (R1)
In blue : limit stage2 (R2)

WHICH ARE MANDATORY LIMITS?

Wet Grip

APPROVAL

C1	C2	C3
		0,8 ≤ G
1,10 ≤ G	0,95 ≤ G	

LABELLING

C1	C2	C3	Classe of wet grip efficiency
1,55 ≤ G	1,40 ≤ G	1,25 ≤ G	A
1,40 ≤ G ≤ 1,54	1,25 ≤ G ≤ 1,39	1,10 ≤ G ≤ 1,24	B
1,25 ≤ G ≤ 1,39	1,10 ≤ G ≤ 1,24	0,95 ≤ G ≤ 1,09	C
Empty	Empty	0,80 ≤ G ≤ 0,94	D
1,10 ≤ G ≤ 1,24	0,95 ≤ G ≤ 1,09	0,65 ≤ G ≤ 0,79	E
G ≤ 1,09	G ≤ 0,94	G ≤ 0,64	F
Empty	Empty	Empty	G

WHICH ARE MANDATORY LIMITS?

Rolling Noise

In red : limit stage 1 (S1)
In Blue : limit stage 2 (S2)

APPROVAL

Sub-class of C1	Nominal width S	LV = Limit values (dB(A))
	≤145	72 / 70
	145 < S ≤ 165	73 / 70
	165 < S ≤ 185	74 / 70
C1A	≤185	70
C1B	185 < S ≤ 215	75 / 71
C1C	215 < S ≤ 245	76 / 71
C1D	245 < S ≤ 275	76 / 72
C1E	>275	76 / 74

Class of tyre	Category of use	LV = Limit values (dB(A))
C2	Normal	75 / 72
C3	Normal	76 / 73

LABELLING

N ≤ LV – 3 dB

LV- 3db ≤ N ≤ LV

N > LV

WHICH ARE MANDATORY DATES?

APPROVAL

Rolling resistance

New types of C1,C2,C3 tyres	01/11/2012	01/11/2016
All C1,C2,C3 for new types of vehicles	01/11/2013	01/11/2017
New C1 and C2	01/11/2014	01/11/2018
New C3	01/11/2016	01/11/2020

Rolling noise

New types of C1,C2,C3 tyres	04/08/2003	01/11/2012
All C1,C2,C3 for new types of vehicles		01/11/2013
New C1 L<=185	01/10/2009	01/11/2016
New C1 185 < L<= 215	01/10/2010	01/11/2016
New C1 L> 215	01/10/2011	01/11/2016
New C2 and C3	01/10/2009	01/11/2016

Wet grip

New types of C1 tyres	01/11/2012
All C1,C2,C3 for new types of vehicles	01/11/2013
New C1	01/11/2014
New types of C2,C3 tyres	01/11/2016
All C1,C2,C3 for new types of vehicles	01/11/2017
New C1 and C2	01/11/2018
New C3	01/11/2020

In red: limit stage 1
In blue : limite stage 2

LABELLING : Only one date = 1st november 2012

CASES OF REINFORCED TYRES, SNOW TYRES, SEVERE SNOW TYRE AND/OR SPECIAL TYRES?

These kinds of tyres profit from additional tolerances on the limits of approval:

Rolling Noise :

- Stage 1:
  - + 1 dB (A) for reinforced C1 tyres and + 2 dB (A) for C1 tyres of special use.
  - +2dB (A) for C2 or C3 snows tyres or severe snows tyres and +3dB (A) for C1 tyres of special use.

- Stage 2:
  - +1 dB (A) for reinforced C1 tyres and/or severe snow tyres.
  - +1dB (A) for C2 or C3 severe snow tyres and +2dB (A) for C2 or C3 special use tyres.
  - Case of C2 traction tyres : +1 dB (A) in addition to the tolerances granted to the normal category or special use and + 2dB (A) in addition to the tolerance granted to the category severe snow.
  - Case of C3 traction tyres : +2dB (A) in addition to the tolerances granted to the normal category or special use and + 2dB (A) in addition to the tolerance granted to the category snow and severe snow.

CASES OF REINFORCED TYRES, SNOW TYRES, SEVERE SNOW TYRE AND/OR SPECIAL TYRES?

These kinds of tyres profit from additional tolerances on the limits of approval:

Wet grip :

- Stage 1:
  - - 0,1 for severe snow C1 tyres with a speed symbol (SI) >= R (including H)
  - - 0,2 for severe snow C1 tyres with a speed symbol (SI) <= Q (excluding H)
  - - 0,1 for severe snow C2 tyres or spécial use
  - - 0,15 for snow, severe snow C3 tyres or spécial use
  - - 0,1 for C2 traction tyres in addition to the tolerances granted to the normal category or snow.
  - - 0,15 for C3 traction tyres in addition to the tolerances granted to the normal category.

Rolling resistance :

- Etape 1 ou 2:
  - +1,1 N/KN for C1, C2, C3 severe snow tyres.

HOW ARE THE REINFORCED PNEUMATIC TYRES, SNOW, EXTREME SNOW AND/OR OF SPECIAL USE CHARACTERIZED?

Special use tyre : a tyre intended for mixed use both on- and off-road or for other special duty.

This kind of tyre bears on its sidewall the inscription "MPT" (or alternatively "ML" or "ET") and /or "POR".
The acronym:

- "ET" means Extra Tread,
- "ML" stands for Mining and Logging
- "MPT " means «Multi-Purpose Truck » and
- "POR" means "professional off-road"

To be classified as a "special use tyre" a tyre shall have a block tread pattern with the following characteristics:

- For C1 or 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

In addition the "professional off-road "tyre shall have

- For C1 and C2 tyres: A maximum speed rating of < = Q
- For C3 tyres: A maximum speed rating of < = K

HOW ARE THE REINFORCED PNEUMATIC TYRES, SNOW, EXTREME SNOW AND/OR OF SPECIAL USE CHARACTERIZED?

- **Reinforced tyre or extra-load tyre**: a tyre of Class C1 bearing on its sidewall the inscription « REINFORCED » or « EXTRA LOAD ».

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

- **Snow tyre**: 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.
  It bears the inscription « M+S » (or « M.S » or « M&S »).

- **Snow tyre for use in severe snow conditions**: a snow tyre whose the performance was evaluated according to the protocols and that fulfils the requirements.
  This kind of tyre bears the alpin symbol:

HOW ARE EVALUATED THE PERFORMANCES OF SNOW TYRES USED IN SEVERE SNOW CONDITIONS?

	C1	C2	C3
Braking method	X (1,07)	X (1,02)	
Spin traction method (ASTM F1805-06)	X (1,10)	X (1,10)	
Acceleration method			X (1,25)

(): minimum performance.

General principle :

- To compare the performances obtained with reference tyres (SRTT) to those obtained with the candidate tyres (ratio > limit value):
  - SRTT Candidate tyre 1 SRTT or,
  - SRTT Candidate tyre 1 Candidate tyre 2 SRTT or,
  - SRTT Candidate tyre 1 Candidate tyre 2 Candidate tyre 3 SRTT,

SRTT: Standard Reference Test Tyre.

HOW ARE EVALUATED THE PERFORMANCES OF SNOW TYRES USED IN SEVERE SNOW CONDITIONS?

The track:

- Preparation of the surface to obtain a packed snow with a given level of snow compaction (measurement with a penetrometer : 70 à 80 for braking method and 75 à 85 for traction method).

- (Smithers US)

HOW ARE EVALUATED THE PERFORMANCES OF SNOW TYRES USED IN SEVERE SNOW CONDITIONS?

Traction method
Smithers US

The vehicles:

- Braking : vehicle with an anti lock system
- Traction: dedicated vehicle.
- Acceleration: Standard vehicle with if possible a traction control system

The reference tyres known as SRTT:

- For C1 or C2: P195/75R 14 defined in the standard ASTM E1136-93 (2003)
- For C2: 225/75R 16C in ASTM F 2872(2011)
- For C3: either 245/70R 19.5 in ASTM F 2871(2011) for the tires having a width < 285, or 315/70R 22.5 in ASTM F 2870(2011) for the others.

The environmental conditions:

- Ambient temperature (1m above the ground): between -2°C and -15°C
- Ground temperature (1cm under the surface): between -4°C and -15°C

HOW ARE EVALUATED THE PERFORMANCES OF SNOW TYRES USED IN SEVERE SNOW CONDITIONS?

The loadings:

- Between two values corresponding each one to a percentage of the working load indicated by the index of load (LI) of the tyre.

The inflation pressures :

- Braking : C1: 240 kPa; C2: P=Pref× (Q/Qref) $^{1.25}$ if vertical load > = 75% Q and P= (0.7) Pref if vertical load < 75% Q with Q = load under test, Qref= maximum loading (LI) and Pref the pressure used at Qref indicated on the sidewall of the tyre.
- Traction:
  - For C1: The pressure is given in the tables of the standards . It must be checked that 74% of the load at the inflation pressure (indicated on the sidewall) or at 280 kPa for a reinforced tyre is less than the load capacity of the vehicle. If not, take the lower value given in the tables.
  - For C2 : Checking made at 345 kPa.
- Acceleration:
  - For C3: P = (0,7)xPref with Pref the pressure used at Qref indicated on the sidewall

HOW ARE EVALUATED THE PERFORMANCES OF SNOW TYRES USED IN SEVERE SNOW CONDITIONS?

The method:

- Braking :
  1. Drive the vehicle at a speed not lower than 28 km/h.
  2. When the measuring zone has been reached, the vehicle gear is set into neutral, the brake pedal is depressed sharply by a constant force sufficient to cause operation of the ABS on all wheels of the vehicle and to result in stable deceleration of the vehicle and held down until the speed is < 8 km/h.

     The same day :
     - 6 repeats SRTT, then shift aside to test next tyre on fresh surface
     - 6 repeats Candidate tyre 1, then shift aside
     - [6 repeats Candidate tyre 2, then shift aside]
     - 6 repeats SRTT
  3. The mean fully developed deceleration between 25 km/h and 10 km/h shall be computed from time, distance, speed, or acceleration measurements..
     - The coefficient of variation by pneumatic tyre is calculated
     - (CV = Standard deviation /Average): CV must be <= 6%

HOW ARE EVALUATED THE PERFORMANCES OF SNOW TYRES USED IN SEVERE SNOW CONDITIONS?

- Braking (continuation) :

4. Control : Variation between the average SRTT initial and average SRTT final < 5%

5. Calculation of the performance (snow grip index (SG)):
   - If the test sequence is = SRTT Candidate tyre 1 SRTT

$$SG1 = \text{Result of Candidate 1} / \tfrac{1}{2} [\text{Result (SRTT)i} + \text{Result (SRTT)f}]$$

   - If the test sequence is = SRTT Candidate tyre 1 Candidate tyre 2 SRTT

$$SG\ 1 = \text{Result Candidate 1} / [\tfrac{2}{3}\ \text{Result (SRTT)i} + \tfrac{1}{3}\ \text{Result (SRTT)f}]$$
$$SG\ 2 = \text{Result Candidate 2} / [\tfrac{1}{3}\ \text{Result (SRTT)i} + \tfrac{2}{3}\ \text{Result (SRTT)f}]$$

6. Storage precautions of the tyres have to be taken and the wear of the reference tyres SRTT have to be monitored.

HOW ARE EVALUATED THE PERFORMANCES OF SNOW TYRES USED IN SEVERE SNOW CONDITIONS?

The method :

- Acceleration (vehicle fitted with a Traction Control System) :
  1. Drive the vehicle at a constant speed between 4 km/h and 11 km/h and the gear ratio capable of covering the speed range of at least 19 km/h for the complete test programme,
  2. Starting with a defined initial speed, the full throttle is applied to activate the Traction Control system until a final speed = initial speed + 15 km/h,
  3. Measure the distance between the initial speed and the final speed being sure that the average slip ratio remains between 10% and 40%,
  4. Repeat the tests at least 6 times,
  5. Calculate the Average Acceleration AA :

$$AA = (\text{final speed}^2 - \text{initial speed}^2) / 2 \times \text{Distance}$$

The coefficient of variation by pneumatic tyre is calculated
(CV = Standard deviation /Average): CV must be <= 6%

  6. Control : Variation between the average SRTT initial and average SRTT final < 6%
  7. Calculation of the performance (snow grip index (SG)):
     - If the test sequence is = SRTT Candidate tyre 1 SRTT

SG1 = Result of Candidate 1/ ½ [Result (SRTT)i + Result (SRTT)f]

HOW ARE EVALUATED THE PERFORMANCES OF SNOW TYRES USED IN SEVERE SNOW CONDITIONS?

The method:

- Traction:
  1. Drive the vehicle at a very slow speed then the full throttle is applied quickly.

Additional device on the tyre.

Candidate tyre

(Smithers US)

2. Record the speed of the vehicle, the spin velocity of the non-driven wheel, the spin velocity of the driven wheel and the longitudinal forces (F) and vertical (V) of the wheel with the candidate tyre.
3. Calculate the average value of test run driving coefficient u = F/V for a speed range starting at 3,2 km/h and continuing for 1,5 second.
4. Repeat the tests at least 10 times and eliminate any individual test run > 1,5 standard deviations from calculated average écart (mini 8 valid runs).The coefficient of variation by pneumatic tyre is calculated (CV = Standard deviation /Average):

CV must be <= 15%

HOW ARE EVALUATED THE PERFORMANCES OF SNOW TYRES USED IN SEVERE SNOW CONDITIONS?

- Traction (continuation):
  5. Calculation of the performance (snow grip index (SG)):

If the test sequence is = SRTT Candidate tyre 1 SRTT

SG1 = Result of Candidate 1/ ½ [Result (SRTT)i + Result (SRTT)f]

Foot note: each candidate tyre should be tested at least three times preferably on different days.

HOW ARE ASSESSED THE PRODUCTS SOLD ON THE MARKET?

HOMOLOGATION (Regulation 117):

- **Conformity of production by picking**

(mini: 1 time/2 years, random sampling)

Rolling Resistance : The measured value shall not be greater than the mandatory limit by more than 0.3

Wet Grip : The measured value shall not be greater than the mandatory limit.

Rolling Noise : The measured value shall not be greater than the declared value by more than + 1 dB(A)

Case of non-conformity:
Approval withdrawn

LABELLING (Regulation1235/2011):

- **Surveillance of the market by picking** :

The conformity is guaranteed when:

Rolling Resistance : The aligned value shall not be greater than the upper limit of the declared class by more than 0.3

Wet Grip : The measured value shall not be lower than the lower limit of the declared class .
Rolling Noise : The measured value shall not be greater than the declared value by more than + 1 dB(A)

Case of non-conformity :
Either:3 more tyres of the same type and application of the above provisions on the average values.

Or: Application of the rules of the conformity of production when the values of the labelling are derived from the approval test results.

WHICH ARE THE OBLIGATIONS AND THE RESPONSABILITIES?

HOMOLOGATION

- **The holder of the approval :**

General provisions defined in the appendix 2 of the 1958 Agreement (verification of the conformity of production):

- Existence of procedures for effective control of the conformity of products (vehicles, equipment or parts) to the type approval;
- Have access to the testing equipment necessary for checking the conformity to each approved type;
- Record the test results and keep them for a period to be determined in agreement with the approval authority (this period must not exceed 10 years);
- Analyze the results of each type of test, verify and ensure the stability of the product characteristics

LABELLING

- **Tyre suppliers:**
  - Affix a sticker on the tyre tread or accompany the batch by a label in printed format.
  - Indicate the classes and the noise level in technical promotional material, including on their websites,
  - Make technical documentation available to the authorities of Member States on request, for a period ending five years after the last tyre of a given tyre type has been made available on the market.

Footnote: Technical documentation includes the test reports

Tyre distributors :

- Ensure tyres, at the point of sale, bear the sticker provided by suppliers or the existence of a label in printed format.

WHICH ARE THE OBLIGATIONS AND THE RESPONSABILITIES?

HOMOLOGATION

- Ensure that for each type of product, at least the the tests prescribed in the applicable Regulations are carried out

- Restore conformity of the corresponding production after further sampling and tests.

LABELLING

- **Tyre distributors (continuation)**
  - Provide end-users with information on classes and noise level where tyres offered for sale are not visible to the end-user.

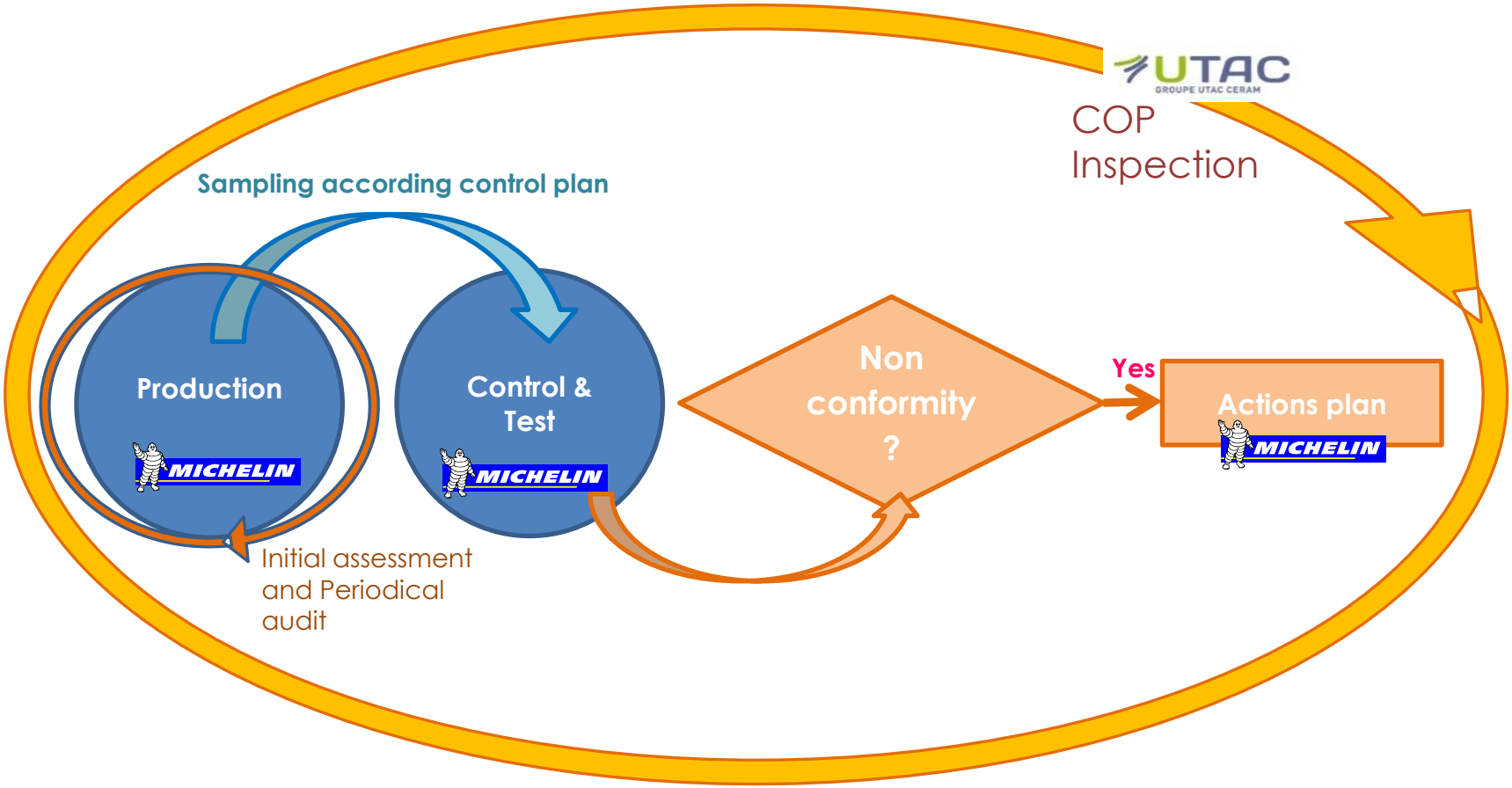
  - Mention with information on or with the bills delivered to end-users when they purchase tyres.

- **Vehicle suppliers and vehicle distributors**
  - Provide end-users with information where they are offered a choice at the point of sale between different tyres to be fitted on a new vehicle which they are intending to acquire,

  - Indicate the classes and the noise level in technical promotional material.

The application of '58 agreements

COP : Conformity of Production



WHICH ARE THE FUTURE AMENDMENTS OR DEVELOPMENTS ?

- **APPROVAL and LABELLING**
  - For measuring the rolling noise, the possibility of continuing to use the track built according to standard 10844 (1994) until 13th february 2019 .
  - For the pneumatic tyres C2 and C3 , introduction of some coefficients in the calculation of the index of adherence on wet surface to ensure a better reproducibility of the tests.
- **LABELLING**
  - Introduction, since 1st January 2015, of the new alignment values relating to the rolling resistance for the reference laboratories.

THANK YOU FOR YOUR ATTENTION