General notes:

- The author of the text below did his best to make it conform to the outcomes of the meeting of the TF held in Paris on 31 March 2008. Some errors can nevertheless be present.
- This draft is proposed in the format of a new regulation. The informal group of GRRF could however decide to present the text as an amendment to an existing regulation.
- The text contains some proposals for Human Machine Interface provisions. This point was however not discussed during the meeting mentioned above, and is still to be decided.
- Text in square brackets [ ] is subject to further decision by the Contracting Parties or the informal group.
- Notes to the reader are in *italic characters* and in general located below the relevant paragraph/sentence.

PROPOSAL FOR A NEW DRAFT REGULATION:

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF PASSENGER CARS WITH REGARD TO TYRE PRESSURE MONITORING

1. SCOPE

This Regulation applies to the approval of vehicles of category M_1 [1/] with regard to their equipment which may include a tyre pressure monitoring.

Note: GRRF to confirm need for pressure limit and for exclusion of special purpose vehicles.

2. DEFINITIONS

For the purposes of this Regulation

2.1. Tyre Pressure Monitoring System (TPMS) means a system fitted on a vehicle, able to [evaluate/monitor] the inflation pressure of the tyres or the variation of this inflation pressure over time and to transmit corresponding information to the user while the vehicle is running.

2.1.1. Category A TPMS means a system and process for detecting that the inflation pressure of one of the tyres in service has significantly changed in comparison to the others and to the initial state, requiring a corrective action.

[2.1.2. Category B TPMS means a system and process for detecting that the inflation pressure of one or more of the tyres in service has significantly changed to the initial state, requiring a corrective action.

[1/] As defined in Annex 7 of the Consolidated Resolution on the Construction of Vehicles (R.E.3) (TRANS/WP.29/78/Rev.1/Amend.2)

2.1.2. Category B TPMS means a system that detects when one or more of a vehicle's tyre is significantly under-inflated and illuminates a low tyre pressure warning tell-tale.

2.1.2. Category B TPMS means a system and process of measuring the tyre inflation pressure and eventually internal temperature, or (a) parameter(s) that directly correlate(s) to the pressure and delivering an information to the driver that a tyre has reached a level of inflation pressure that requires a corrective action]

Note: 3 paragraphs in [ ]displaying 3 proposals for the definition of TPMS of category B

2.2. Cold tyre inflation pressure means the tyre pressure at ambient temperature, in absence of any pressure build-up due to tyre usage.

2.3. [Minimum cold tyre inflation pressure means the minimum cold tyre inflation pressure, specified by the tyre standardization bodies for given service conditions.]

Note: to be included according to necessity in the regulation. This draft however does not use this definition.

2.4. Recommended cold inflation pressure means the pressure recommended for each tyre position by the vehicle manufacturer, for the intended service conditions of the given vehicle, [as defined on the vehicle placard and/or the vehicle owner's manual].

Notes:

- *To be decided later – OICA to give a position.*
- *OICA position: OICA agrees to keep the text and delete the square brackets.*

2.5. [Tyre Pressure Loss Reminder System (TPRS) is any system fitted on a vehicle, as part of a TPMS, able to give a reminder message periodically to the driver to check and re-adjust the tyre pressure.]

3. APPLICATION FOR APPROVAL

3.1 The application for approval of a vehicle type with regard to its equipment with a tyre pressure monitoring system shall be submitted by the vehicle manufacturer or by his duly accredited representative;

3.2 It shall be accompanied, in triplicate, by a description of the vehicle type with regard to the items specified in annex 1 to this Regulation.

3.3 A vehicle representative of the vehicle type to be approved shall be submitted to the type approval authority or the technical service responsible for conducting the approval tests.

3.4 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. APPROVAL

4.1 If the vehicle submitted for approval pursuant to this Regulation meets the requirements of paragraph 5 below, approval of that vehicle type shall be granted.

4.2 An approval number shall be assigned to each type approved. Its first two digits (at present XXXX for the Regulation in its XXXX) 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 vehicle. However, variants of a model range which are in separate categories with respect to the criteria of paragraph 2.2 may be covered by the same type approval, provided that the results of the tests described in paragraph XXXX do not show major differences.

4.3 Notice of approval or of extension or of refusal of approval of a vehicle type 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.

4.4 There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation an international approval mark consisting of:

4.4.1 a circle surrounding the letter "E" followed by the distinguishing number of the country which granted approval;

4.4.2 the number of this Regulation, followed by the letter "R", a clash and the approval number to the right of the circle prescribed in paragraph 4.4.1.

4.5 If the vehicle conforms to a vehicle type approved, under one or more Regulations annexed to the Agreement, in the country which granted approval under this Regulation, the symbol prescribed in paragraph 4.4.1 need not be repeated; in such a case, the Regulation and approval numbers and the additional symbols for all the Regulations under which approval has been granted in the country which granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.4.1.

4.6 The approval mark shall be clearly legible and be indelible.

4.7 The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.

4.8 Annex 2 to this Regulation gives examples of approval marks.

5. GENERAL REQUIREMENTS

5.1. General

5.1.1. Subject to the requirements of paragraphs [INTRODUCTORY PROVISIONS] any vehicle fitted with a tyre pressure monitoring system complying with the definition of paragraph 2.1. shall meet the performance requirements contained in paragraphs 5.1 to 5.5 of this regulation.

Note:

- *introductory provisions can be found in document TRANS/WP.29/1044, item II, "GENERAL GUIDELINES FOR PROPOSING NEW REGULATION".*
- *If the route of an amendment to an existing regulation were to be followed, transitional provisions will be elaborated accordingly.*

5.1.2. In addition, vehicles fitted with a TPMS of Category A shall meet the requirements of paragraph 5.6.

5.1.3. In addition, vehicles fitted with a TPMS of Category B shall meet the requirements of paragraphs 5.7.

5.1.4. The TPMS shall monitor the tyre pressures at speeds exceeding 30 km/h after a successful learning phase.

5.1.5. Any tyre pressure monitoring system fitted on a vehicle shall comply with the requirements of Regulation N°10 on electromagnetic interferences.

5.2. Learning phase

5.2.1. The TPMS shall monitor the tyre pressures after a successful learning phase

5.2.2. This learning phase shall have a maximum duration of 30 min of cumulative driving above 30 km/h.

5.2.3.. In the case the learning phase is not successful, the driver shall be warned according to paragraph 5.4.

5.3. Deflated tyre detection

When tested according to paragraph 6 and subject to paragraphs 5.6 and 5.7 below, the TPMS shall illuminate the warning signal described in paragraph 5.5 not more than [20] / [5] minutes after the inflation pressure in one or more of the vehicle's tyres is equal to or less than the pressure [25 percent] / [40 kPa] below the vehicle manufacturer's recommended cold inflation pressure.

Notes:

- *This paragraph aims safety improvement*
- *OICA position: 20 minutes and 25% below cold Prec*
- *ETRTO position: 5 minutes and [40 kPa] below cold Prec. However, 25% below cold Prec is acceptable to ETRTO if test procedures are improved.*
- *ETRTO to confirm absolute value of 40 kPa.*

5.4. Malfunction detection

When tested according to paragraph 6.3, the TPMS shall illuminate the warning signal described in paragraph 5.5. not more than [20] / [10] minutes after the occurrence of a malfunction that affects the generation or transmission of control or response signals in the vehicle's tyre pressure monitoring system. The vehicle's TPMS malfunction indicator shall meet the requirements of paragraphs 5.5.1. to 5.5.6.

Notes:

- *OICA position: 20 minutes*
- *ETRTO position: 10 minutes + extension for external influence (ISO recommendation – "If the system is blocked by external influence (e.g. RF noise), the malfunction detection time may be extended.")*
- *Dunlop Tech position: challenges the 10 minutes delay*

5.5. Warning indication

5.5.1. The warning indication shall be by means of an optical yellow warning signal conform to Regulation N°121.

Note: Regulation N° 121 has been last amended by documents ECE/TRANS/WP.29/2007/14 and ECE/TRANS/WP.29/2008/45.

5.5.2. The warning signal shall be activated when the ignition (start) switch is in the "on" (run) position (bulb check).

5.5.3. The warning signal must be visible even by daylight; the satisfactory condition of the signal must be easily verifiable by the driver from the driver's seat.

5.5.4. The malfunction indication may be indicated by the same warning signal as the deflated tyre detection. If the warning signal described in paragraph 5.5.1. is used to indicate both a deflated tyre and a malfunction in the TPMS, the following shall apply: with the ignition (start) switch in the "on" (run) position the warning signal shall flash to indicate a system failure. After a short period of time the warning signal shall remain continuously illuminated as long as the failure exists and the ignition (start) switch is in the "on" (run) position. The flashing and illumination sequence shall be repeated each time the ignition (start) switch is in the "on" (run) position until the failure has been corrected.

5.5.5. When the system is being manually reset in accordance with the vehicle manufacturer's instructions the provisions in paragraphs 5.3 and 5.4 may not apply.

5.6. TPMS of Category A

5.6.1. TPMS of Category A as defined in paragraph 2.6 of this regulation shall always be fitted together with a TPRS as defined in paragraph 2.5 above and meeting the performance requirements of paragraph 5.8.

5.6.2. When tested according to paragraph 6 below, vehicles fitted with a TPMS of category A shall illuminate the warning signal described in paragraph 5.5 taking into account the recommended cold inflation pressure set by the user when initializing the system, in accordance with the vehicle manufacturer's recommendations.

5.6.3. When tested according to paragraph 6 below, vehicles fitted with a TPMS of Category A shall illuminate the warning signal described in paragraph 5.5 if at least one of the tyres in use is underinflated related to the other ones. It may also give an alert if two or more tyres are underinflated.

5.7. TPMS of Category B

5.7.1. Deflated tyre detection

[When tested according to paragraph 6, vehicles fitted with a TPMS of Category B shall illuminate the warning signal described in paragraph 5.5 not more than [20 minutes] / [5 minutes] after the inflation pressure in at least one of the vehicle's tyres, up to a total of four tyres, is equal to or less than the pressure [25 percent] / [20 kPa] below the vehicle manufacturer's recommended cold inflation pressure. The warning signal shall illuminate taking into account the recommended cold inflation pressure set by the user when initializing the system, in accordance with the vehicle manufacturer's recommendations. In the case where there is no possibility to set or reset the system, it shall at least take into account the service conditions for normal load and normal speed.]

Notes:

- *This paragraph aims CO2 emission reduction.*
- *OICA position: 20 minutes and 25% below cold Prec*
- *ETRTO position: 5 minutes and [20 kPa] below cold Prec. However, 25% below cold Prec is acceptable to ETRTO if test procedures are improved.*

[When tested according to paragraph 6, the TPMS shall illuminate the warning signal described in paragraph 5.5 not more than [10 weeks] / [2 weeks] after the inflation pressure in at least one of the vehicle's tyres, up to a total of four tyres, is equal to or less than the pressure [30 kPa] below the vehicle manufacturer's recommended cold inflation pressure. The warning signal shall illuminate taking into account the recommended cold inflation pressure set by the user when initializing the system, in accordance with the vehicle manufacturer's recommendations. In the case where there is no possibility to set or reset the system, it shall at least take into account the service conditions for normal load and normal speed. Compliance with the time delay mentioned above may be demonstrated by a computer simulation which respects the test conditions of paragraph 6.1 and the test procedure of paragraph 6.2.]

Notes:

- *This paragraph aims CO2 emission reduction.*
- *For such time delay, necessity to use computer simulation*
- *Conti Tech: 10 weeks*
- *Schrader and Beru position: 2 weeks*
- *Schrader, Conti & Beru position: 30 kPa below cold Prec.*

5.8. Tyre Pressure Loss Reminder System (TPRS)

5.8.1. Vehicles fitted with a TPRS shall always be fitted with tyres having a permeation rate of or below [30 kPa/10week], when tested according to Annex 4 of this Regulation.

Note: limit and test method to be decided.

5.8.2. The TPRS shall illuminate the warning signal described in paragraph 5.5 in conformity with the vehicle manufacturer provisions, but not more than [10 weeks] after the system has been reset in accordance with the vehicle manufacturer's recommendations.

Note: With the maximum delay of 10 weeks and a maximum permeation rate of 30 kPa/10 weeks, the alert will appear at the latest at an underinflation of 30 kPa.

5.8.2.1. However, if the TPRS is temperature compensated as described in Annex 4 of this regulation, the delay mentioned in paragraph 5.8.3 above may be extended to a maximum of [30] weeks.

6. Tests

Note: could be in an annex

6.1. Test conditions.

6.1.1 Ambient temperature.

The ambient temperature shall be between 0° C and 40° C.

6.1.2 Road test surface.

The road shall have a surface affording good adhesion. The road surface shall be dry during testing.

6.1.3. The tests shall be conducted in an environment free of radio wave interferences

6.1.4. Vehicle conditions.

6.1.4.1 Test weight.

The vehicle may be tested at any condition of load, the distribution of the mass among the axles being that stated by the manufacturer without exceeding any of the maximum permissible mass for each axle.
However, in the case where there is no possibility to set or reset the system, the vehicle shall be unladen. There may be, in addition to the driver, a second person on the front seat who is responsible for noting the results of the tests.

6.1.4.2 Vehicle speed

The vehicle's TPMS shall be calibrated and tested at a speed between [50 km/h and 100 km/h] / [25 km/h and 130 km/h] / [up to 160 km/h]. For vehicles equipped with cruise control, the cruise control shall not be engaged during testing.

Notes:

- *OICA position: between 50 km/h and 100 km/h*
- *ETRTO position: between 25 km/h and 130 km/h*
- *Schrader position: Schrader asks for a max test speed of 160 km/h*

6.1.4.3 Rim position.

The vehicle rims may be positioned at any wheel position, consistent with any related instructions or limitations from the vehicle's manufacturer.

6.1.4.4 Stationary location.

The vehicle's tyres shall be shaded from direct sun when the vehicle is parked. The stationary location shall be such that there is no wind liable to affect the results.

6.1.4.5 Brake pedal application.

Driving time shall not accumulate during service brake application.

6.1.4.6 Tyres.

The vehicle shall be tested with the tyres installed on the vehicle according to the vehicle manufacturer's recommendation. However, the spare tyre may be utilized for TPMS malfunction testing purposes.

6.2. Test procedure

6.2.1. Inflate the vehicle's tyres to the vehicle manufacturer's recommended cold inflation pressure, in accordance with the vehicle manufacturer's recommendation for the loading conditions.

6.2.2. With the vehicle stationary and the ignition locking system in the ''Lock'' or ''Off'' position, activate the ignition locking system to the ''On'' or (''Run'') position.

The tyre pressure monitoring system shall perform a check of lamp function for the low tyre pressure telltale as specified in paragraph 5.5.2 of this Regulation.

6.2.3. If applicable, set or reset the tyre pressure monitoring system in accordance with the vehicle manufacturer's recommendations.

6.2.4. Learning phase.

6.2.4.1. Drive the vehicle for up to 15 minutes of cumulative time (not necessarily continuously) along any portion of the test course.

6.2.4.2. Reverse direction on the course and drive the vehicle for an additional period of time for a total cumulative time of 20 minutes (including the time in 6.2.4.1, and not necessarily continuously).

6.2.5. Deflation phase

6.2.5.1. Stop the vehicle, keep it stationary and shaded for [at least one hour], with the engine off.

6.2.5.2. Vehicles fitted with TPMS of Category A: deflate any combination of one to three tyres until the deflated tyre(s) is (are) at 7 kPa below the inflation pressure at which the tyre pressure monitoring system is required to illuminate the low tyre pressure warning signal.

6.2.5.3. Vehicles fitted with TPMS of Category B: deflate any combination of one to four tyres until the deflated tyre(s) is (are) at 7 kPa below the inflation pressure at which the tyre pressure monitoring system is required to illuminate the low tyre pressure warning signal.

6.2.6. Low tyre pessure detection phase.

6.2.6.1. Drive the vehicle for up to [10–15] / [3-4] minutes of cumulative time (not necessarily continuously) along any portion of the test course.

Notes:

- *OICA position: 10–15 minutes*
- *[ETRTO position: 3-4 minutes]*

6.2.6.2 Reverse direction on the course and drive the vehicle for an additional period of time for a total cumulative time of [20] / [5] minutes (including the time in 6.2.6.1, and not necessarily continuously).

Notes:

- *OICA position: 20 minutes*
- *ETRTO position: 5 minutes*

6.2.6.3 The sum of the total cumulative drive time under paragraphs 6.2.6.1 and 6.2.6.2 shall be the lesser of [20] / [5] minutes or the time at which the low tyre pressure telltale illuminates.

Notes:

- *OICA position: 20 minutes*
- *ETRTO position: 5 minutes*

6.2.6.4. If the low tyre pressure signal did not illuminate, discontinue the test.

6.2.7. If the low tyre pressure telltale illuminated during the procedure in paragraph 6.2., deactivate the ignition locking system to the ‘‘Off’’ or ‘‘Lock’’ position. After a 5 minute period, activate the vehicle’s ignition locking system to the ‘‘On’’ (‘‘Run’’) position. The telltale must illuminate and remain illuminated as long as the ignition locking system is in the "On" ("Run") position.

6.2.8. Keep the vehicle stationary and shaded for a period of up to one hour with the engine off.

6.2.9. Inflate all of the vehicle’s tyres to the vehicle manufacturer’s recommended cold inflation pressure. If the vehicle’s tyre pressure monitoring system has a manual reset feature, reset the system in accordance with the instructions of the vehicle manufacturer. Determine whether the telltale has extinguished. If necessary, drive the vehicle until the telltale has been extinguished.

6.2.10. Repetition of the deflation phase

6.2.10.1. Vehicles fitted with TPMS of Category A: the test may be repeated, using the test procedures in paragraphs 6.2.1 to 6.2.9, with any one, two or three of the tyres on the vehicle under-inflated, in accordance with the provisions of paragraph 5.6.

6.2.10.2. Vehicles fitted with TPMS of Category B: the test may be repeated, using the test procedures in paragraphs 6.2.1 to 6.2.9, with any one, two, three or four of the tyres on the vehicle under-inflated, in accordance with the provisions of paragraph 5.7.

6.3. TPMS malfunction detection

6.3.1. Simulate one or more TPMS malfunction(s) by disconnecting the power source to any TPMS component, disconnecting any electrical connection between TPMS components, or installing a tyre or wheel on the vehicle that is incompatible with the TPMS. When simulating a TPMS malfunction, the electrical connections for the telltale lamps are not to be disconnected.

6.3.2. Drive the vehicle for up to 15 minutes of cumulative time (not necessarily continuously) along any portion of the test course.

6.3.3. Reverse direction on the course and drive the vehicle for an additional period of time for a total cumulative time of 20 minutes (including the time in paragraph 6.3.2, and not necessarily continuously).

6.3.4. The sum of the total cumulative drive time under paragraphs 6.3.2 and 6.3.3 shall be the lesser of 20 minutes or the time at which the TPMS malfunction telltale illuminates.

6.3.5. If the TPMS malfunction indicator did not illuminate in accordance with paragraph 5.4., as required, discontinue the test.

6.3.6. If the TPMS malfunction indicator illuminated during the procedure in paragraph 6.3, deactivate the ignition locking system to the ‘‘Off’’ or ‘‘Lock’’

position. After a 5-minute period, activate the vehicle's ignition locking system to the ''On'' (''Run'') position. The TPMS malfunction indicator shall again signal a malfunction and remain illuminated as long as the ignition locking system is in the ''On'' (''Run'') position.

6.3.7. Restore the TPMS to normal operation. If necessary, drive the vehicle until the warning signal has extinguished.

6.3.8. The test may be repeated using the test procedures in paragraphs 6.3.1 to 6.3.7, with each such test limited to simulation of a single malfunction.

7. Modification of vehicle type or XXX system and extension of approval
8. Conformity of production
9. Penalties for non-conformity of production
10. Production definitely discontinued
11. Names and addresses of Technical Services responsible for conducting approval tests, and of Administrative Departments
12. Introductory provisions

ANNEXES

Annex 1: Communication
Annex 2: Type approval certificate
Annex 3: Arrangements of approval marks

Annex 4: Permeation of the tyres

PROCEDURE FOR DETERMINING THE TYRE PERMEATION RATE

1. this annex applies to vehicles fitted with a TPRS conform to paragraphs 2.5. and 5.8 of this Regulation.

[the amounts of permeation of oxygen and nitrogen shall be measured according to ASTM F 1112 – 06a - Standard Test Method for Static Testing of Tubeless Pneumatic Tires for Rate of Loss of Inflation Pressure]

As a reminder, here is the table established by the Task-Force:

Option 1: TPMS of category B for Safety + CO2 (all wheels) based on FMVSS138 (with updated test procedure)

Option 2: TPMS of category A for Safety (at least one wheel underinflated related to the others) with TPRS for CO2 (all wheels)

Note in the report: Schrader, Beru and ETRTO challenge the CO2 benefits of a time based warning system.

Thresholds:

	Cat A	Cat B	TPRS
P CO2	-	[Prec - 25% (FMVSS value)**] [ETRTO: 20 kPa] [Schrader & Conti & Beru: 30 kPa]	[according to 30 kPa*]
P Safety (cold)	[Prec - 25% (FMVSS value)**] [Prec – 40 kPa] (tb confirmed by ETRTO)		-
Time CO2	-	[20 min (FMVSS)] [Conti: 10 weeks] [Schrader & Beru: 2 weeks] [ETRTO: 5 min] [For test speed see safety]	[10 weeks*]
Time Safety at test condition speed.	[20 min (FMVSS value) at test speed of 50 to 100 km/h] [5 min (ETRTO) at test speed of 25 to 130 km/h]***		-
Time for malfunction detection	[20 min (FMVSS value)] [10 min + extension for external influence (ISO value)]**** For test speed see safety		
HMI CO2			
HMI Safety			

*footnote: based on general permeation rate of maximum 30 kPa/10weeks
**footnote acceptable to ETRTO if test procedures are improved
***footnote: Schrader asks for a max test speed of 160 km/h
**** footnote: Dunlop Tech challenges the 10 min delay