General notes:

- 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 or in any other regulatory form.
- The text contains some proposals for Human Machine Interface provisions. This point was however not discussed in detail during the meetings of the Task Force, and is still to be decided.
- Text in square brackets [ ] is subject to further decision by the informal group or the Contracting Parties .
- 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 TYPE-APPROVAL OF VEHICLES WITH REGARD TO TYRE PRESSURE MONITORING SYSTEMS AND DEVICES

1. SCOPE

This Regulation applies to:

1.1. the type approval of vehicles of category M_1/N_1 up to 3500kg with regard to their equipment which includes tyre pressure monitoring systems.

1.2. the type-approval as separate technical units of tyre pressure monitoring devices which are fitted to vehicles in 1.1 as retrofit or replacement parts.

2. DEFINITIONS

For the purposes of this Regulation

2.1. [Tyre Pressure Monitoring Function means a function of a vehicle able to evaluate 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.]

2.2. Tyre Pressure Monitoring System (TPMS) means a system fitted on a vehicle, able to perform a function evaluate 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.

2.3. Tyre Pressure Monitoring Device (TPMD) means a separate technical unit fitted as a retrofit- or replacement part on a vehicle, able to evaluate 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.

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

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

2.6. Recommended cold inflation pressure (Prec) 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.

2.7. [In service operating pressure is the inflation pressure elevated from the cold pressure by temperature effects during vehicle usage.]

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.

3.5. The application for approval of a retrofit- or replacement part as a separate technical unit shall be submitted by the manufacturer or by his duly accredited representative,

3.6. For each type of device referred to in paragraph 2.3. for which type-approval is requested, the application for approval shall be accompanied by the following documents in triplicate.

3.6.1. Description of the device comprising all the relevant details, referred to in to this Regulation

3.6.2. Drawings indicating the intended location of the approval mark.

3.6.3. Instruction manual for the device installation on vehicles

3.6.4. End-user service manual

3.7. A sample of the specific device, properly installed in the parent vehicle(s).

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 slash 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.

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

5.2. Tyre pressure detection for incident-related pressure loss

When tested according to paragraph 6, the TPMS shall illuminate the warning signal described in paragraph 5.5 not more than 10 minutes after the in service operating pressure in one of the vehicle's tyres is reduced by 25% or to 150 kPa, whatever is higher.

5.3. Detection for a tyre pressure level significantly below the recommended pressure for optimum performance (including fuel consumption and safety)

5.3.1 [When tested according to paragraph 6, the TPMS shall illuminate the warning signal described in paragraph 5.5 not more than 60 minutes in at least one of the vehicle's tyres, up to a total of four tyres after:

a) the warm tyre inflation pressure is reduced by 25% or
b) the warm tyre inflation pressure is reduced by a value greater than (Prec – Pmin + 20kPa).]

5.4. Malfunction detection

[When tested according to paragraph 6.2, the TPMS shall illuminate the warning signal described in paragraph 5.5. not more than 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. If the system is blocked by external influence (e.g. RF noise), the malfunction detection time may be extended.]

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 is 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.

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].
[The whole speed range shall be covered during the test.]
For vehicles equipped with cruise control, the cruise control shall not be engaged during testing.

Notes:

- *OICA position:*
  - *Good fuel economy: 60 to 90 km/h*
  - *Dangerously low pressure: 50 km/h to 130 km/h*
- *ETRTO position: between 25 km/h and 130 km/h*

- *Schrader position: Schrader asks for a maximum 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 utilised for TPMS malfunction testing purposes.

[6.1.5. Accuracy of measurement equipment

The accuracy of measurement equipment shall be taken into account during the test.]

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. [Deflate one of the vehicle's tyres, up to a total of two tyres on the same vehicle side, until it is at [7 kPa below] the inflation pressure at which the tyre pressure monitoring system is required to illuminate the low tyre pressure warning signal.]

6.2.5.2. [Deflate at least one of the vehicle's tyres, up to a total of 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.]

Note:

- *OICA, Dunlop Tech Sumitomo, Nira: paragraph 6.2.5.1. for dangerously low pressure level (5.2), paragraph 6.2.5.2. for pressure level significantly below the optimum pressure for good fuel economy (5.3.).*
- *UK, NL, ETRTO, Continental, Beru: If the provisions for optimum pressure for good fuel consumption (see 5.4.1) are met for 4 tyres, the provisions for dangerously low pressure level can address 1 tyre at the time only. If not, the provisions for dangerously low pressure level shall address up to 4 tyres at the time.*

6.2.6. Low tyre pressure detection phase

6.2.6.1. Procedure for detection of pressure level significantly below the optimum pressure for good fuel economy (5.3.).

Drive the vehicle along any portion of the test course (not necessarily continuously). The sum of the total cumulative drive time shall be the lesser of [60] minutes or the time at which the low tyre pressure telltale illuminates.

6.2.6.2. Procedure for systems aiming prevention of dangerously low pressure level (5.2.).

Drive the vehicle along any portion of the test course (not necessarily continuously). The sum of the total cumulative drive time shall be the lesser of [10] minutes or the time at which the low tyre pressure telltale illuminates.

6.2.6.3. 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 6.2.6., 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

The test may be repeated, using the test procedures in paragraphs 6.2.1 to 6.2.9, with the relevant number of tyres on the vehicle under-inflated, in accordance with the provisions of paragraph 5.2. or 5.3., whichever is relevant.

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 tyre pressure monitoring system and extension of approval

8. Conformity of production

<u>Explanatory note</u>: scheme of test procedure.