Submitted by the representative of European Association of Automotive Suppliers, CLEPA

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CLEPA position on TPMS

A. BACKGROUND

Considering the Guidance requested by the Chairman of the GRRF from the WP.29 about the Proposal for amendments to Regulation No. 64 - Temporary use spare wheels - concerning requirements for Tyre Pressure Monitoring Systems –TPMS (see document ECE/TRANS/WP.29/2009/81), two items still needed to be addressed in order to finalize the Technical Requirements: **Time needed to alert the driver** in case of multi-tyre under-inflation, and, **Tolerance or allowance for measurement inaccuracies**.

The European Association of Automotive Suppliers, CLEPA, herewith outlines and justifies its position about these two open issues.

B. PROPOSAL (amendments refer to document GRRF-65-40)

Paragraph 5.3.1., delete the 60 minutes option, adopt the 30 minutes option, and amend, to read:

"5.3.1. When tested according to paragraph 6.2.6.2., the TPMS shall illuminate the warning signal described in paragraph 5.5. within not more than **30** ~~60~~ minutes of cumulative driving time after the in-service operating pressure in one of the vehicle's tyres, up to a total of four tyres, has been reduced by 20 per cent."

Paragraph 6.1.5 amend, to read:

"6.1.5. Accuracy of measurement equipment.

The accuracy of measurement equipment shall be taken into account during the test in accordance with paragraph 6.2.5.**3** ~~**4**~~."

Paragraph 6.2.5.3. : amend, to read:

"6.2.5.3. In both cases above, in order to compensate for inaccuracies of the measuring equipment, the value P_{test} shall be reduced by a further **[**~~[~~5~~]~~ kPa."

Paragraph 6.2.6.2.1., delete the 60 minutes option, and adopt the 30 minutes option, and amend to read:

"6.2.6.2.1. 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 **30** ~~60~~ minutes or the time at which the low tyre pressure telltale illuminates."

C. JUSTIFICATIONS

Time needed to alert the driver in case of multi-tyre under-inflation – **30 minutes**

Paragraph 5.3, and therefore the amendment proposal to paragraph 5.3.1, clearly cover both Fuel Consumption and Safety aspects.

Regarding Fuel Consumption, or CO_2 Emissions, it is clear that a warning time of 30 or 60 minutes for multi-tyre under-inflation makes almost no difference.

However regarding **short term Safety** a warning time of 30 or 60 minutes for multi-tyre under-inflation makes a **significant difference**.

Should a vehicle have 2, 3 or 4 of its tyres significantly under inflated (e.g.: under-inflation of 20% or much more from Pwarm) and having to wait as long as 60 minutes for the driver to be warned is extremely unsafe as it directly impacts the vehicle's braking, cornering and stability performances, as well as its tyres' integrity.

This is why regarding multi-tyre under-inflation:
- the US TPMS Safety based regulation FMVSS 138, calls for a warning time of **20 minutes maximum;** and,
- the published ISO 21750:2006 on TPMS calls for a much shorter warning time of **3 minutes maximum**.

There are a number of predictable cases that any normal driver may have to cope with, in such circumstances multi-tyre under-inflation can have severe short term safety implications, while the root cause for the under-inflation is not, or not only, related to diffusion.
Some concrete examples, between the many existing ones, are highlighted hereafter:
- Highly probable case: 4 tyres of a vehicle have had their pressures decreased over time due to real diffusion (down to say around 10 or 15% below Pwarm), and then 1 of those 4 tyres gets punctured (in such a case warning time would no longer be 10 min maximum after having crossed Pwarm -20%, as requested in the para. 5.2.1, but could be as long as 60 min).
- Same issue as above but with 1 rim out of 4 damaged while cornering, generating a leak path between the tyre and the rim. Same longer warning and same severe consequences as above.
- Vehicle driven further to malfeasance or vandalism (several tyres of a vehicle have been severely deflated - say by 70 or 100 kPa - while the car was parked).
- Vehicle driven further to re-inflation with broken or very inaccurate garage gauges.
- Vehicle driven further to re-inflation due to a driver's confusion about conversion factors between the different pressure units (bar, kPa, psi…) while driving abroad.
- …

Even though the probability for the above examples to happen in real life is not always high, applied to the European fleet of passenger car of 230 million, it would mean millions or tens of millions of cars affected by this potential safety risk, whereas their drivers will rely on their TPMS to warn them and will believe that they are protected by it, while they are not.

Therefore, Clepa's position about multi-tyre under-inflation, is that between the 2 values proposed in brackets, **30** minutes is much preferable to 60 minutes.

However, had there been other alternatives for multi-tyre under-inflation warning time, a lower value of **20 min or less** would have been much safer.

Tolerance or allowance for measurement inaccuracies

Good quality insurance practices obliging, there is no technical reason, in the current draft Regulation wording, to decrease the Ptest of whichever values before proceeding with the type approval tests regarding any under-inflation warning time. Furthermore, doing so is counter productive for both CO_2 emissions and Fuel Consumption to the extent that it could almost jeopardize all the benefits of having an accurate TPMS (refer to GRRF TPMS WG Task Force Conclusion of June 08 - TPM-3-2 r1).

Therefore CLEPA would normally recommend a gauge accuracy of $\pm$ 3 kPa or less. For memory:
- Unanimously voted resolution number 15 at ISO 21750 on TPMS – 2nd April, 08, requires a gauge accuracy of +- 3kPa (ISO 21750 covers vehicles up to 3.75 tons, so it could perfectly also covers UNECE Regulation No. 64, which concerns vehicles having a maximum weight of only 3.5 tons).
- The United States of America's National Highway Traffic and Safety Agency, USA NHTSA, specifications request the use of gauges having an accuracy of $\pm$ 2kPa (See: test procedure TP138/03).

However in order to facilitate a compromise, Clepa accepts the GRRF Chairman's compromise for tolerance or allowance for gauge accuracy of **5 kPa**. It must however be clear that this value is seen as an absolute maximum by CLEPA.
