

# TPMS market set to boom in Europe as battle looms over performance standards

**The battle over legislation requiring cars in Europe to have factory fitted tyre pressure monitoring systems is getting dirty.**

By David Shaw, ERJ Staff, dshaw@crain.com

As more evidence comes to light that indirect systems do not deliver on their promises, the car industry is using a range of tactics to ensure that European legislation is diluted to the point where it becomes ineffective.

At an official meeting in Geneva on 20 Oct., the industry confirmed that where multiple tyres are involved, any tyre pressure monitoring system will have 60 minutes to alert the driver to the situation. This compares with an average journey time in Europe of 20 minutes and to a limit of one tyre of 10 minutes.

Another vote at the meeting confirmed a pressure limit of 7kPa on variations, as proposed by the UK government. A proposal from Germany to increase this limit to 15 kPa was rejected.

This effectively permits both direct and the initially less expensive indirect systems, although the indirect systems will have to be carefully tuned to ensure compliance with the rule.

These recommendations were carried forward to a meeting of Working Party 29 in Geneva on 10-13 November.

## Rules are now fixed

There is now little further opportunity to amend these rules before the regulation goes forward and becomes law.

The rejection of the proposal to increase the extra 15 kPa of pressure is the first sign that the industry has woken up to the fact that the rules are in danger of becoming so dilute as to be ineffective. It was only this change that prevented the legislation from becoming a joke, commented Alfonso di Pasquale business development director at Schrader Electronics.

There was another significant development at that meeting. The Commission announced its intention to discuss a new set of tighter limits from 2015. This proposal is not yet certain, but it is unlikely to find its way in front of the technical committee which has been discussing the issue up to now. The proposal is likely to be discussed in January, said Nina Renshaw of the 'Green' lobby group, Transport & Environment.

In the discussion of the legislation so far, there appear to be two areas of misunderstanding. The first is on the cost of the various systems on the market. The second is a basic misunderstanding about the nature of tyre deflation in multiple tyres.

According to Renshaw, "the supporters of indirect systems have managed to boil the debate down to a question of costs." She urged CLEPA and ETRTO to provide transparent lifecycle cost data for the two systems (direct and indirect) before the next decisions are due to be taken.

Currently those who support the direct system quote figures suggesting a direct system adds around €25 to the cost of a vehicle, while an indirect system adds around €8 to the vehicle cost.

Others attempt to quote costs to the consumer and thus multiply these figures by three as a rule of thumb.

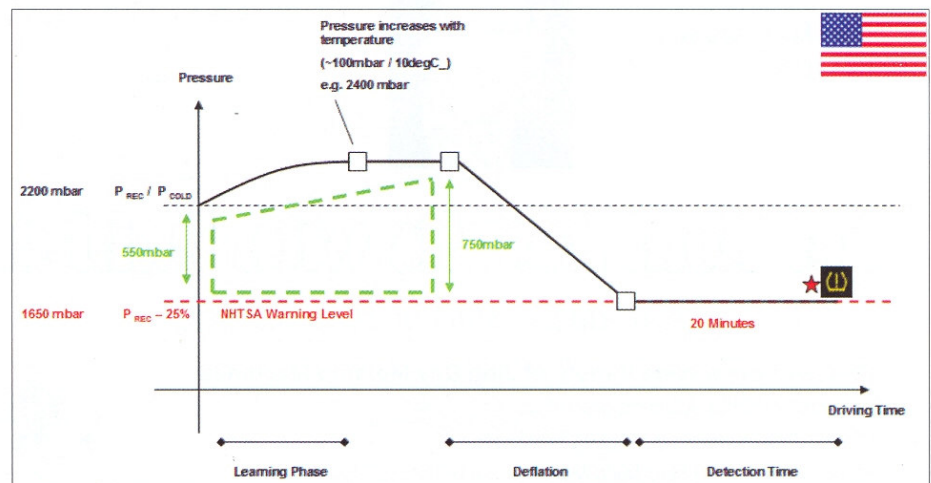
Few to date have added the cost of purchasing OE-specification tyres at replacement to the cost of an indirect system. However, due to the nature of indirect TPMS systems their calibrations rely on knowing the stiffness characteristics of the tyres at different inflation pressures. These parameters are hard-

coded into the vehicle software.

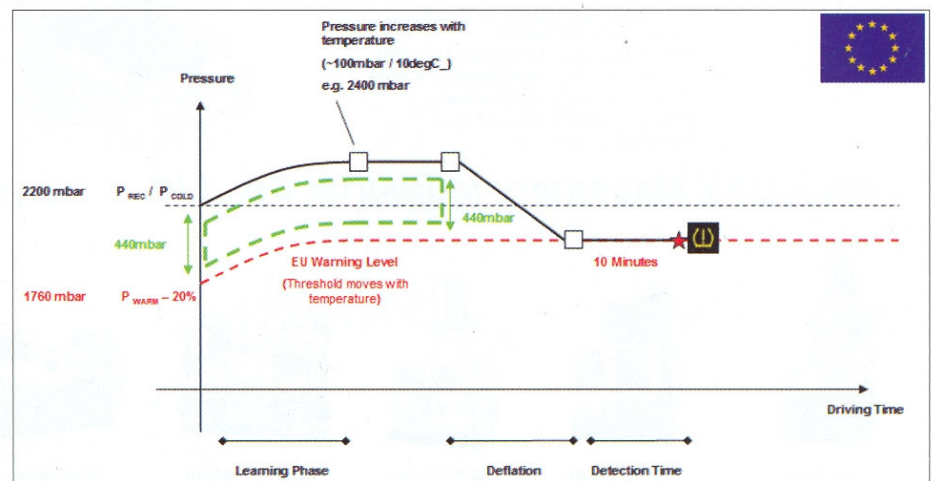
Thus, if an indirect TPMS is to operate at its best, the vehicle must be fitted with OE-specification tyres. This recommendation is written into the owners' manual and imposes a substantial extra cost on the consumer which has been ignored by the lobbyists for indirect systems.

Renshaw added that those who support the cheaper system are tending to ignore the fact that a system which does not work ends up being a waste of money.

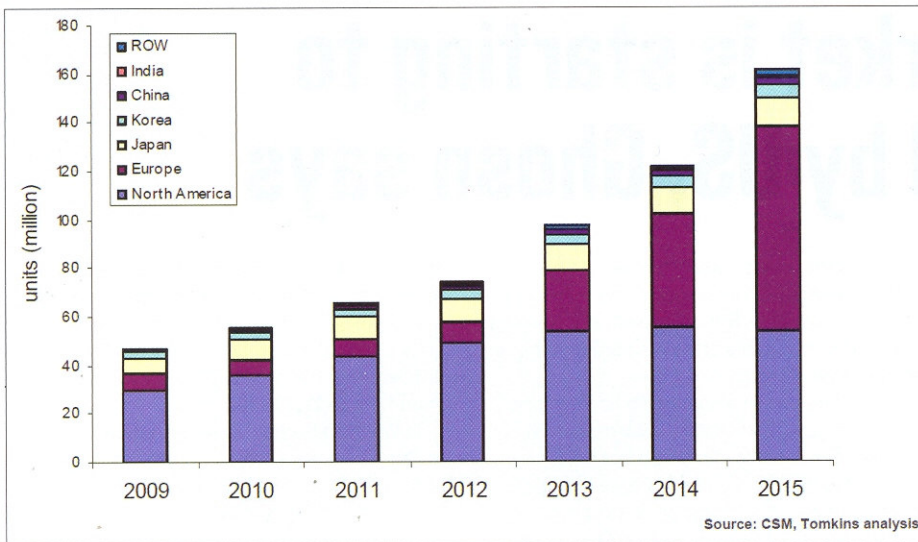
The evidence to date shows that cars fitted with direct TPMS systems consistently operate with inflation pressures closer to the nominal, while there is no difference between cars fitted with no TPMS and those fitted with an indirect TPMS. In other words, an indirect TPMS offers no benefits to the driver in terms of reduced fuel costs and improved safety. Nor do they offer benefits to society in terms of reduced CO<sub>2</sub> output and improved fuel economy.



US technical demands require a warning at 25 percent deflation, within 15 minutes



In Europe, the requirement is likely to be tougher at 20 percent and a 10?? minute limit.



Projected demand for tyre pressure monitoring systems globally

### No difference in types of pressure loss

The second assumption built into the legislation, according to Di Pasquale is that there is some kind of difference in pressure loss due to a penetration puncture on one hand and due to diffusion through the sidewalls on the other.

The assumption that these two conditions should be treated differently is behind the specification for a rapid detection time in the case of a single deflation, but a much longer interval where two or more deflations are involved.

The current draft requires any TPMS to detect a single low-pressure condition within 10 minutes, but where two or more tyres are partially deflated, the limit is extended to 60 minutes.

Why, asked di Pasquale, should a double deflation situation be less in need of an alert than a single deflation situation. One might have thought the opposite to be true. He suggested that the vehicle industry is aware of the limitations of indirect systems and has built this counter-intuitive interval into the legislation to permit unsafe and ineffective systems to be fitted to Europe's cars.

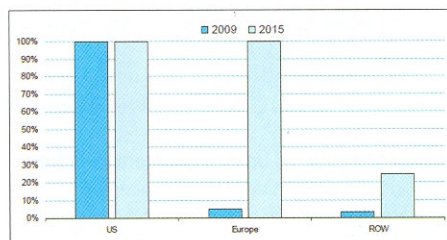
However, there are signs that the mood is swinging in favour of more accurate TPMS systems.

In one change, the German government was neutral on tyre pressure specifications, whereas the Swedish representative was strongly in favour of diluting the legislation.

It was the German government which historically insisted on removing a clause inserted by the European Parliament, referring to the reset button, or re-calibration button.

In most cars featuring an indirect system, the manufacturers include a re-set button which allows the driver to re-calibrate the tyre pressure system. The button is needed because indirect systems use ABS sensors which select wheel rotation rates. When the TPMS detects that one wheel is running faster than its historical records, it interprets that as a change in diameter, which is interpreted as a reduction in pressure.

The systems work by comparing rotation rates among all four wheels. So when one tyre is adjusted for pressure or the tyre is changed,



Demand growth will be strongest in Europe and Asia

the system needs to be re-calibrated to detect the new rolling condition. The driver is meant to do this each time the tyre pressure is altered.

However, most drivers are not aware of this requirement. Even the FIA says that it does not recommend any system in which the driver has access to a reset button.

Even worse, the re-set button can be abused. If a driver realises that one way to stop the tyre pressure warning light from illuminating is to hit the reset button, then the system will become calibrated for a potentially unsafe operating mode.

### Weakness was seen, but then overturned

Parliamentarians realised this weakness and inserted a clause saying the button should only

be accessible to trained personnel. The official rapporteur further said that the clause must remain in the document and should be neither changed nor negotiated away.

Germany, presumably following pressure from car makers who were routinely fitting indirect systems, insisted that the sentence must be withdrawn. In the end, Germany's car makers won, and the clause was deleted.

However at the most recent meeting, the German government took a less aggressive position, remaining neutral on most fronts.

Di Pasquale said the possible tighter limits which may be introduced from 2015 would drive the supporters of indirect systems very hard.

He noted a campaign in north America which highlights the limitations of the indirect system fitted to the latest version of the Audi A6. This is a so-called second-generation system developed by NIRA dynamics, a subsidiary of Audi AG and based in Sweden.

This is said to meet the requirements of the US authorities, but consumers have been surprised by the level of performance it delivers in a premium car, in comparison with the performance offered by direct TPMS systems fitted to low-end vehicles.

Di Pasquale said indirect systems are cheap and offer some level of warning to drivers, but they are suited best to non-regulated environments. In a regulated environment, they do not deliver sufficient savings to permit them to pass legislation for accurate, effective systems.

### Survey says....

The vast majority of UK motorists believe that a tyre pressure monitoring system should alert them to one or more underinflated tyre(s) quickly to be fully effective and safe.

EU legislators opted for an initial compromise arrangement on the 20th October, calling for the alert to be transmitted to the driver within 60 minutes when the tyre pressure drops by 20 percent in more than one tyre.

In the same meeting an extra allowance of 7kPa (kilopascals) has been introduced to compensate pressure gauge inaccuracies during the homologation test.

## FIA says indirect systems are not up to standard – yet

BRUSSELS – The FIA's Brussels office has called for tyre pressure monitoring systems to be developed further. The group, which represents the motoring clubs of the EU region, said it thinks the lower costs associated with indirect systems makes them a more suitable choice. However, it notes that current indirect systems are not suitable for use on Europe's roads, though it expects they soon will be.

Chief among FIA's concerns is the use of the re-set button. The FIA's technical director, W Klanner said it is not right to give ordinary drivers access to the re-calibration function. "It is too complicated" he said in a telephone interview.

Klanner said indirect systems should only be recalibrated when the tyres or wheels are changed. And then it should be done by a garage mechanic or other competent individual. "We think that it needs to be re-calibrated when new tyres are fitted (summer/winter or new tyres) but not when the air is topped up."

Klanner was not aware of any systems on the market which could deliver this performance at present.

Another concern expressed by the FIA was the time taken to report a low pressure condition. The FIA called for a time limit of 5 minutes for a single tyre and a maximum of 15 minutes for multiple tyres.

The FIA position is based primarily on cost. The group says the cost to a consumer of a direct TPMS would be around €100, compared with €30 or so for an indirect system.

However, the group did not take into account a side-effect of the indirect systems which require the user to fit original-equipment specification tyres throughout the life of the vehicle. Klanner said that any system should definitely be capable of operating on a wide variety of tyres, otherwise the systems would effectively be anti-competitive. "We do not recommend any system which requires OE tyres to be fitted at every replacement. Buying a replacement tyre is much cheaper than buying the original equipment tyre through the main dealer service outlet."