

# GRRF TPMS Task Force Conclusions

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# BACKGROUND

## Task Force Members

### Contracting Parties

- Hiroyuki Inomata (JP, JASIC)
- Hiroshi Nagaoka (JP, Nissan)
- Robert Falk (UK, DfT)
- Eddy de Haes (NL, RDW)
- Ian Knowles (EC)
- Ernst A. Pullwitt (D, BAST)

### OICA

- Frank Jenne (Audi)
- Kai Zastrow (PSA)
- Günter Heeß (Daimler Trucks)
- Greg Sanchez (Ford)
- Olivier Fontaine (OICA)
- Antonio Moretti (Renault)
- Manfred Ellmann (BMW)

### ETRTO

- Gilbert Gauthier (Michelin)
- Riccardo Giovannotti (Bridgestone)
- Johannes J. Baumhöfer (Continental)

### CLEPA

- Frederic Arbousse-Bastide (Schrader)
- Anne Saint-Cirgue (Schrader)
- Peter Saeger (Conti VDO)
- Paul Jennison (Knorr Bremse)
- Karl Perras (TRW)
- Jochen Schaefer (BOSCH)
- Wim Verhoeve (CLEPA) - Chair

## Objective of the Task Force

The Force Group (TFG) agrees on the following objective of the TF:

- Collect figures and data about the number of vehicles which are driven with under-inflated tyres, the number of under-inflated tyres on each vehicle and the degree of under-inflation and the effect of this on the fuel consumption, tyre wear, CO2 emission, safety etc.
- Measure the effect of TPMS and other solutions
- Review & validate available data.
- Define 'under-inflation' and how to measure it.
- Agree on the values to be used for the GRRF TPMS Informal WG meeting.
- Estimate the cost for the vehicle manufacturers.
- Calculate the cost/benefit.

## Task Force meetings

The Force Group (TFG) held the following meetings:

1. 12 February 2008, Brussels (CLEPA Offices)
2. 11 March 2008, Brussels (CLEPA Offices)
3. 18 April 2008, Brussels (CLEPA Offices)
4. 25 April 2008, Conference call
5. 19 May 2008, Conference call
6. 27 May 2008, Brussels (CLEPA Offices)
7. 9 June 2008, Conference call

# SECIION A: Passenger Cars (PC)

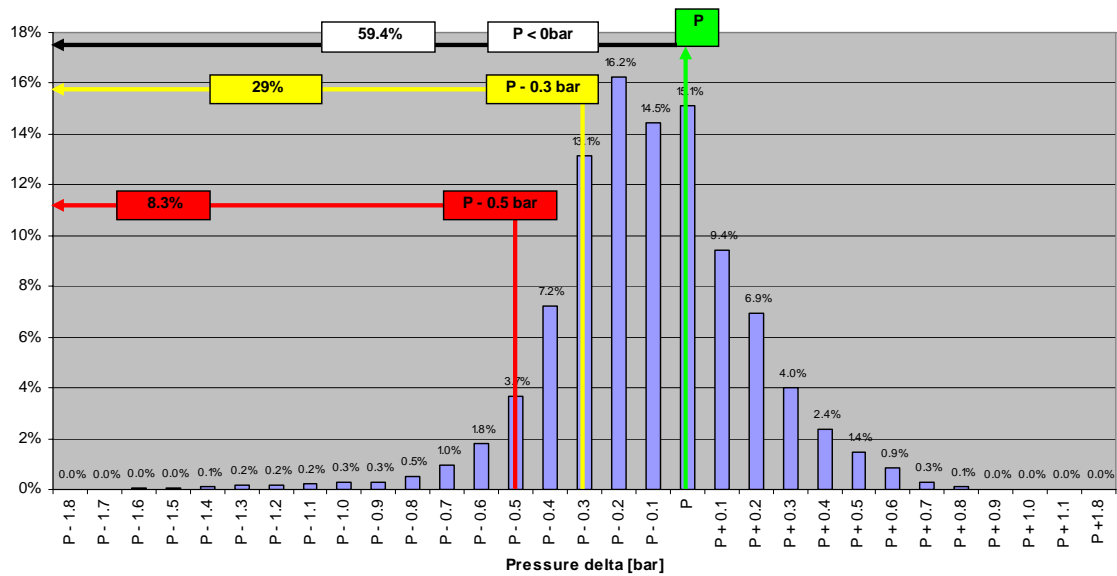
## 1. Distribution of actual tyre pressure on the road

The Task Force Group (TFG) agrees that the following data coming from the Netherlands (NL), Michelin (UK & F) and JASIC (JP) is representative for the real tyre pressure distribution on the road and can be used for the cost/benefit calculations.

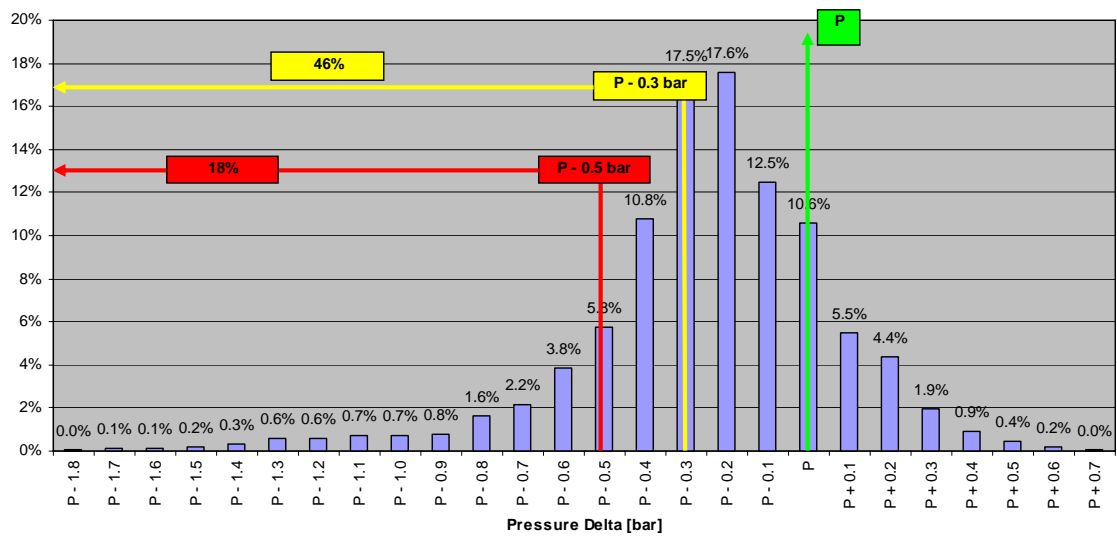
The histograms below give a summary of the tyre pressure distribution for each of the data sets:

### 1.1. The Netherlands data (NL)

**Distribution of tyre pressure per wheel**  
[based on Dutch survey Autumn 2007 by Bandopspanning - sample size 2010 cars]

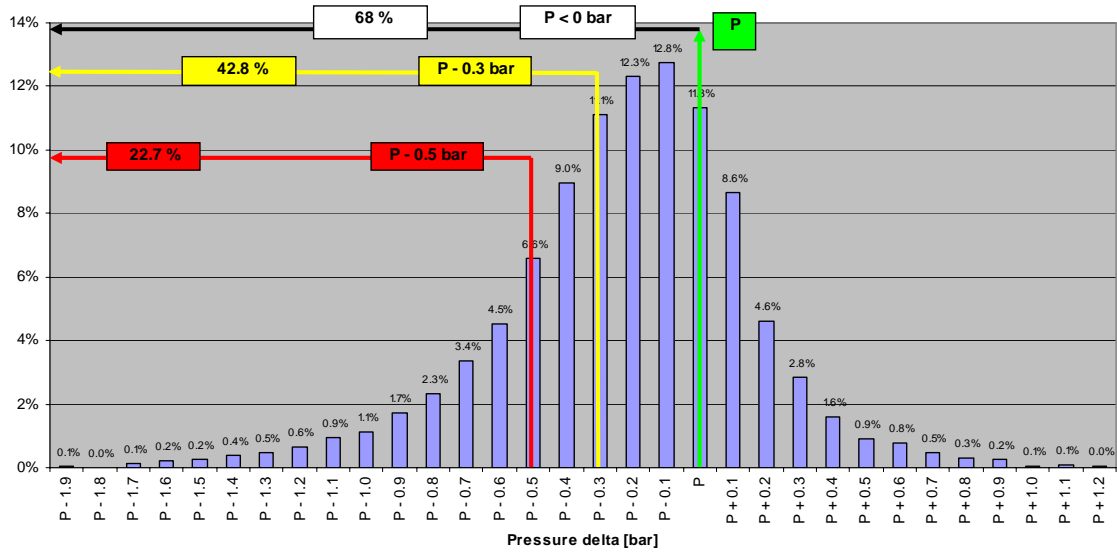


**Distribution of worst tyre pressure delta per car**  
[based on Dutch survey Autumn 2007 by Bandopspanning - sample size 2010 cars]

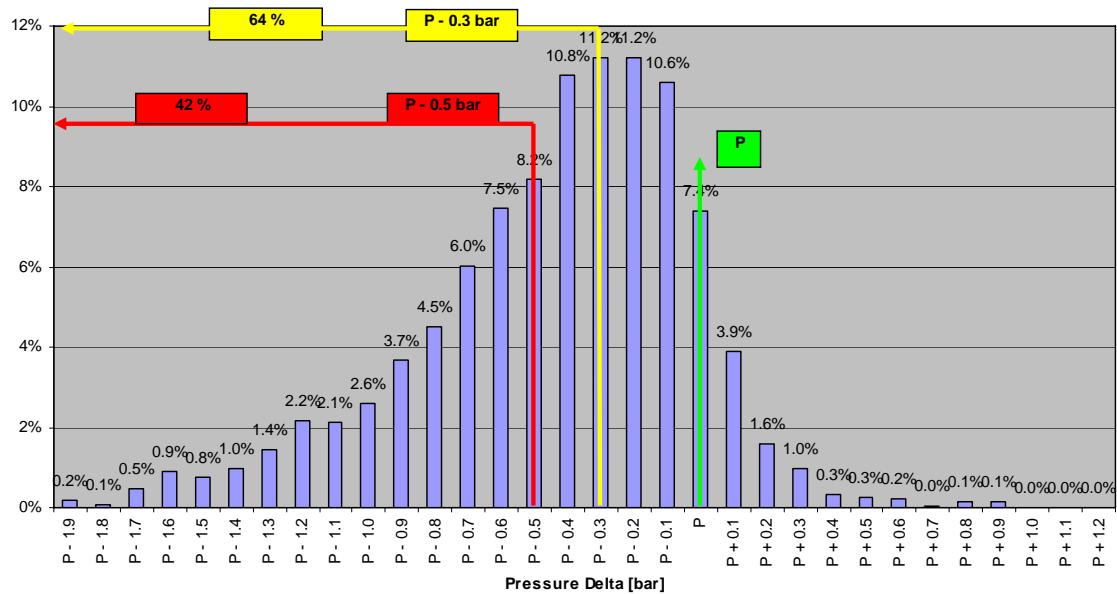


### 1.2. The Michelin data (UK)

**Distribution of tyre pressure per wheel**  
[based on UK survey 2007 by Michelin with 0.2bar offset instead of 0.3bar - sample size 2373 cars]

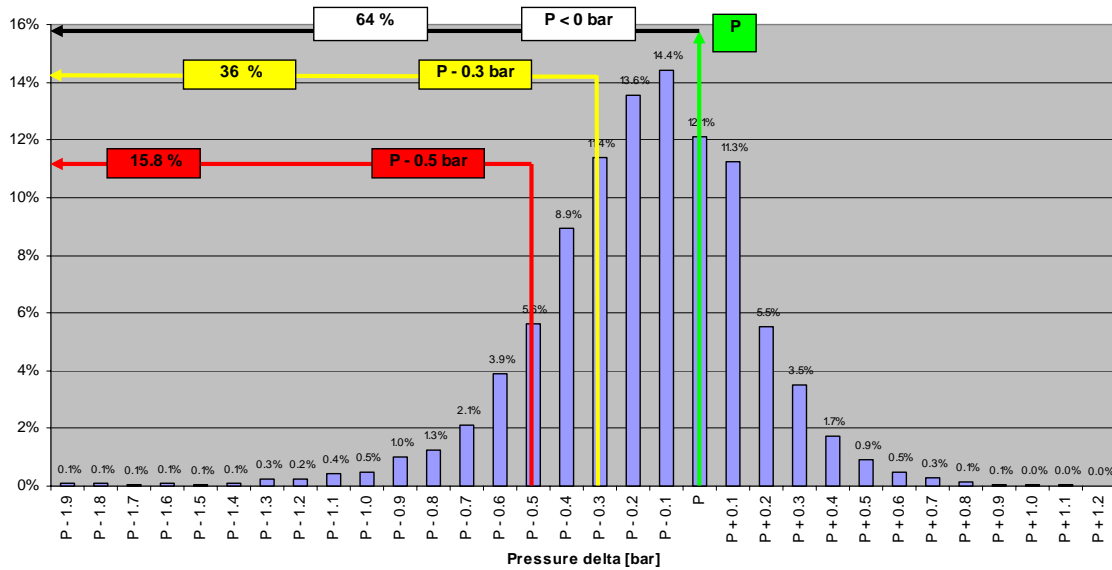


**Distribution of worst tyre pressure delta per car**  
[based on UK survey 2007 by Michelin with 0.2bar offset instead of 0.3bar - sample size 2373 cars]

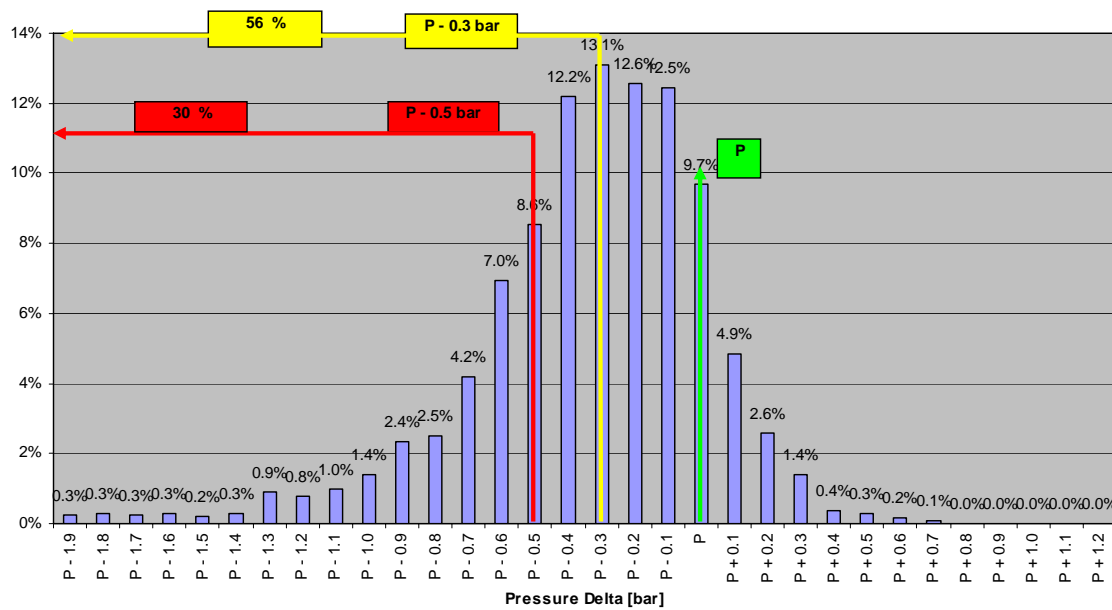


### 1.3. The Michelin data (F)

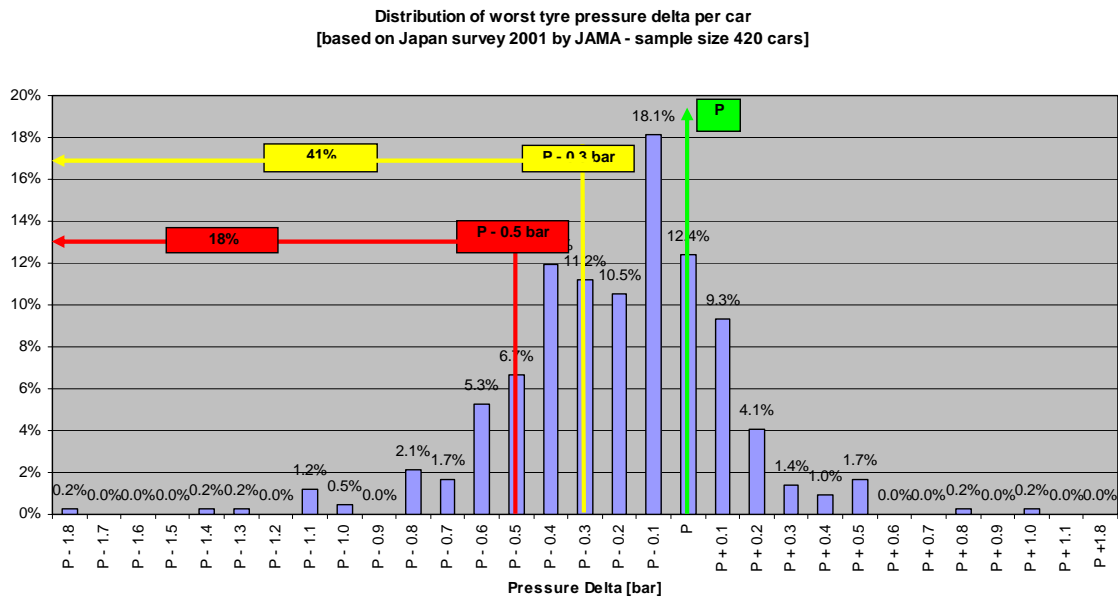
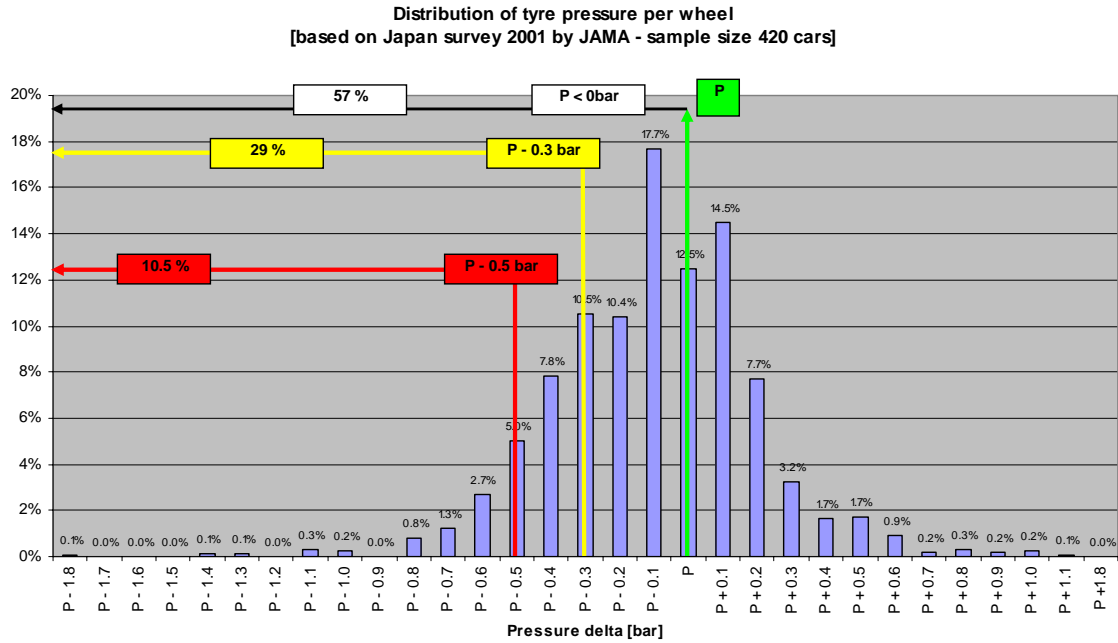
**Distribution of tyre pressure per wheel**  
[based on France survey 2007 by Michelin with 0.2bar offset instead of 0.3bar  
- sample size 2013 cars]



**Distribution of worst tyre pressure delta per car**  
[based on France survey 2007 by Michelin with 0.2bar offset instead of 0.3bar -  
sample size 2013 cars]



### 1.4. The JASIC data (JP)

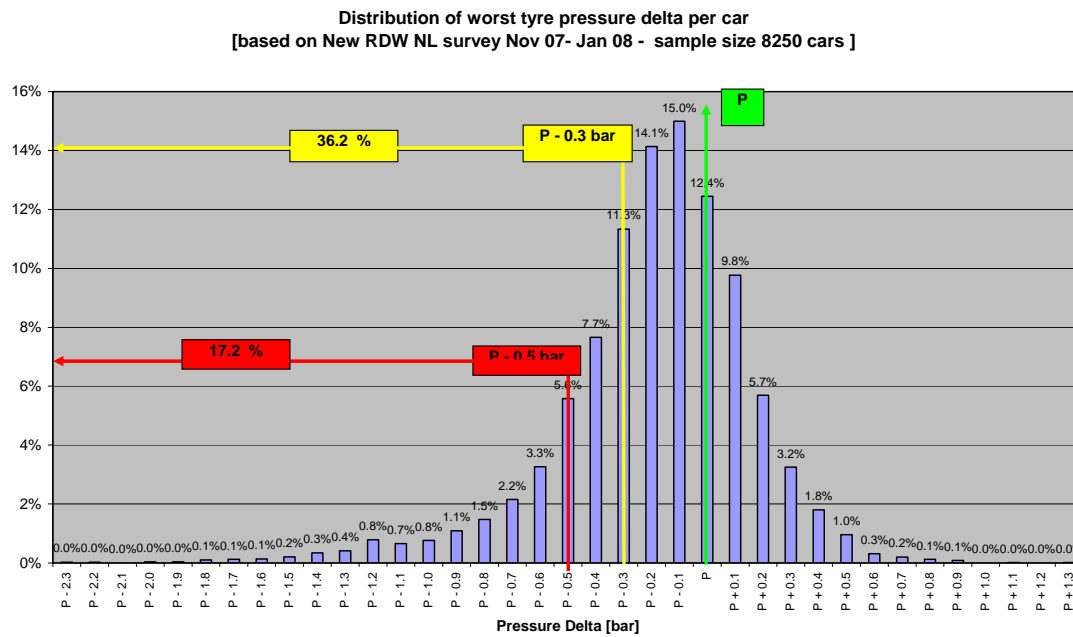
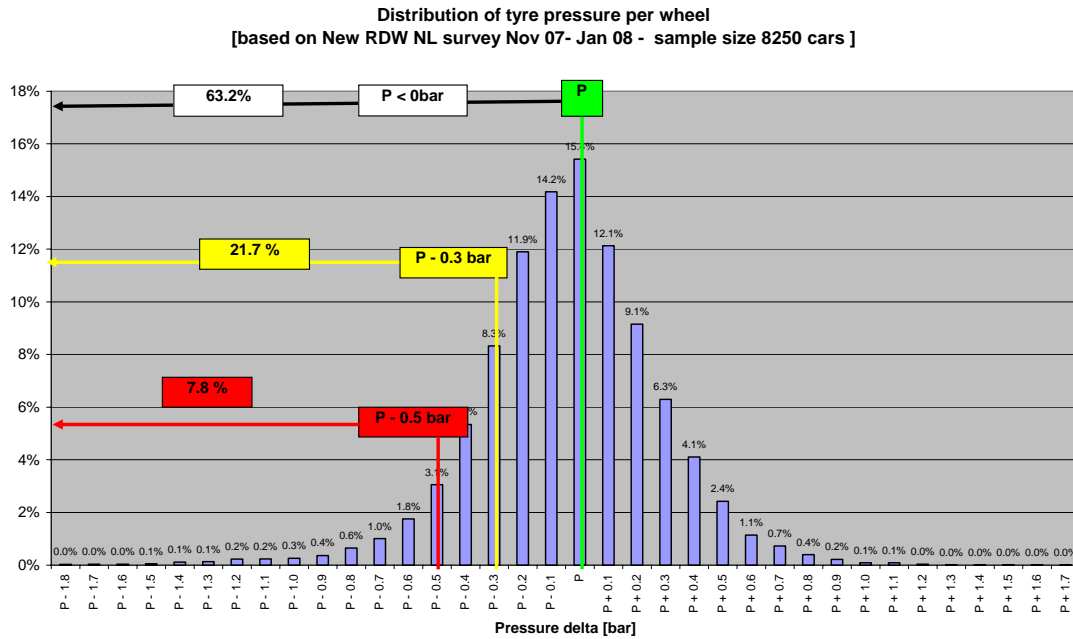


This data can be divided in 3 groups with a total of 228 million vehicles in Europe:

1. JP & NL            45% of all vehicles
2. F                    30% of all vehicles
3. UK                 25% of all vehicles

### 1.5. New RDW data (NL)

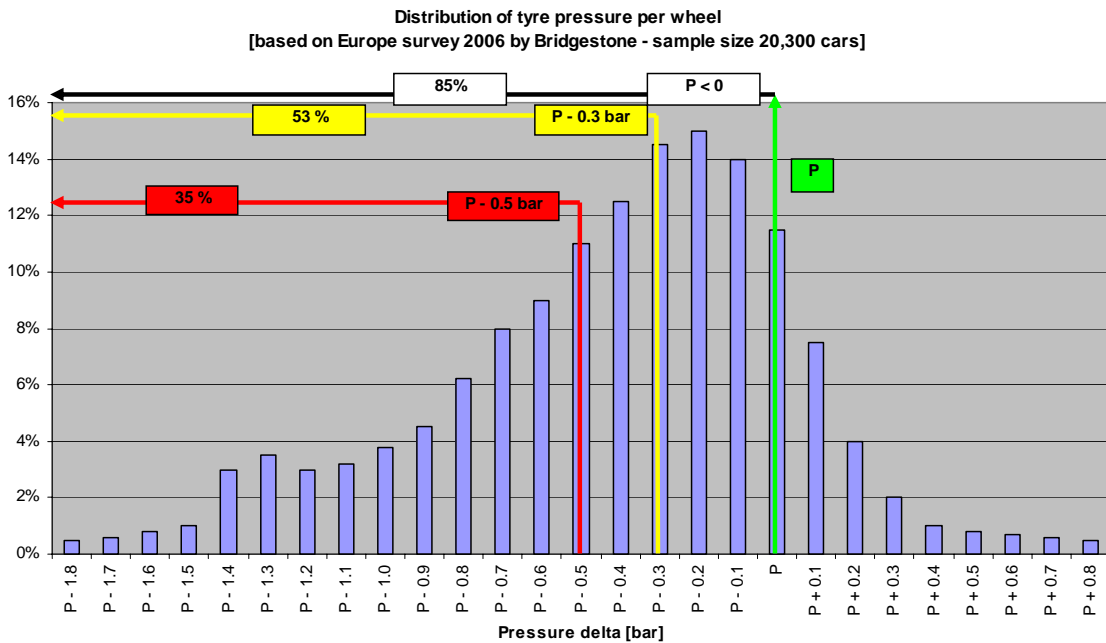
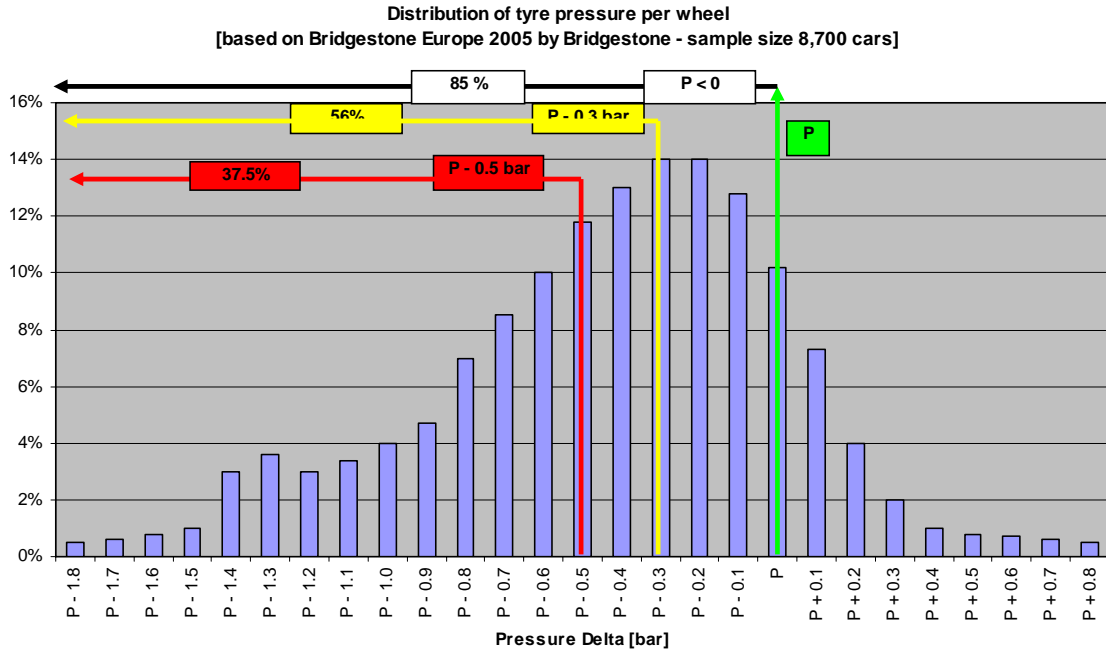
NL (RDW) completed another survey: 8250 cars, among which 6492 VIN numbers could be identified. This survey was completed between Nov 07 and Jan 08, in the same conditions as the first one, mostly on company cars (new and well maintained vehicles).



The Task Force Group (TFG) could not reach an agreement to use the Bridgestone data for the calculations (present below) because the raw data is not made publicly available to the group.

### 1.6. The Bridgestone data (EU – 19 countries)

Note: raw data not publicly available

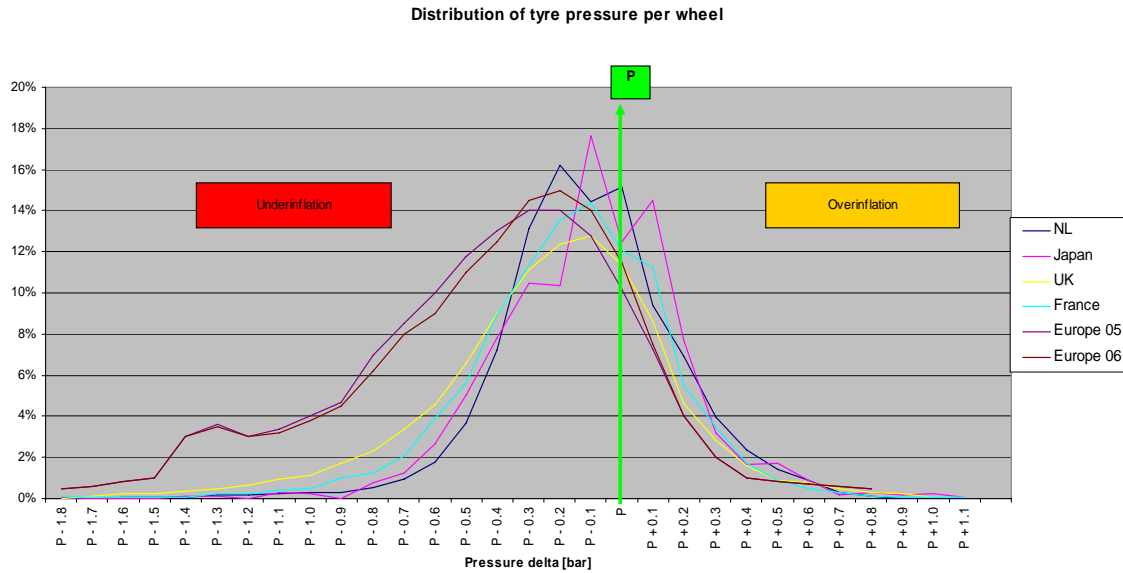




## 2. Detailed analysis of the data

### 2.1. Comparison of the data

When comparing the data under the form of a Gaussian Curve (see graph below), it is clear that all the data sets are comparable, except for the Bridgestone data (Europe 05 and Europe 06).



The TFG concludes to apply the calculation on the 5 selected data sets (paragraph 1.1 to 1.5).

## 2.2. In depth analysis of the NL data

For the 2 Dutch data sets, the actual "Vehicle Identification Numbers" (VIN) of each tested vehicle is available. This information allows confirming the presence of a TPMS system and if so, its type and threshold value.

### 1st set of NL data

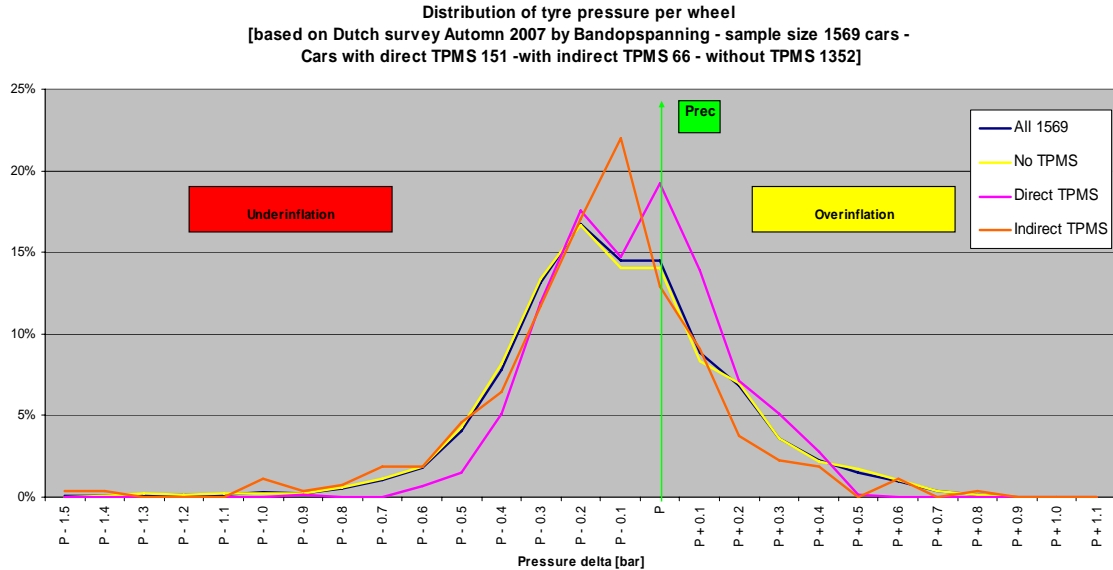
On the 1st NL survey the VIN numbers details are available for 1569 out of 2010 vehicles. So the following information on equipment type of each car is available:

- No TPMS system ( 1352 cars)
- Direct system ( 151 cars)
- Indirect system ( 66 cars)

Analysis of the tyre pressure distribution (breakdown per system):

	Overall (1569)	Without TPMS	With Direct TPMS	With Indirect TPMS
At least 1 tyre Under inflated by 0.3 bar and more	47.7 %	49.3 %	35 %	44 %
At least 1 tyre Under inflated by 0.5 bar and more	18.2 %	19.5 %	5.3 %	21.2 %
% wheels under inflated by 0.3bar and more	29.5 %	30.7 %	19.4 %	29.6 %
% wheels under inflated by 0.5bar and more	8.6 %	9.2 %	2.3 %	11.4%

The data allows representing the tyre pressure distribution (per wheel) in order to compare the effect of each system:



**2nd set of NL data**

On the 2nd NL survey the VIN numbers details are available for 6492 out of 8250 vehicles. So the following information on equipment type of each car is available:

- No TPMS system ( 5797 cars)
- Direct system ( 519 cars)
- Indirect system ( 176 cars)

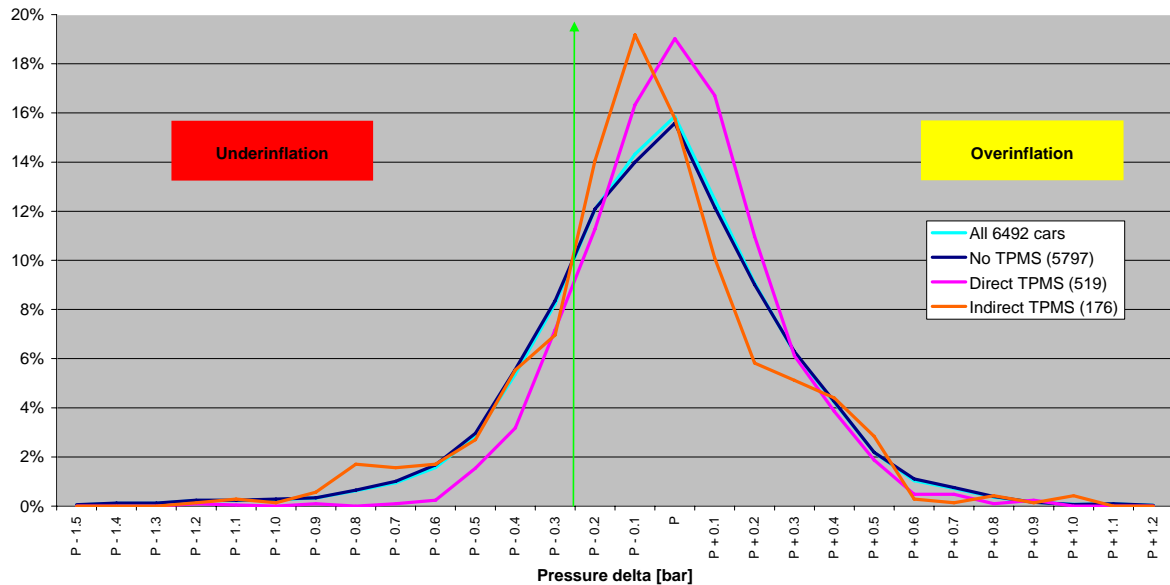
Analysis of the tyre pressure distribution (breakdown per system):

	NL data with details ( 6492)	Without TPMS ( 5797)	With Direct TPMS ( 519)	With Indirect TPMS ( 176)
At least 1 tyre Under inflated by 0.3 bar and more	35.3%	36.3%	26.4%	30.7%
At least 1 tyre Under inflated by 0.5 bar and more	16.3%	17.4%	5.0%	13.6%
Population underinflated P < 0	63.3%	63.5%	59.0%	70.3%
% wheels under inflated by 0.3bar and more	21.0%	21.8%	12.5%	21.3%
% wheels under inflated by 0.5bar and more	7.4%	7.9%	2.1%	8.8%

Note: updated table above (compared to version 04 of the document).

The data allows representing the tyre pressure distribution (per wheel) in order to compare the effect of each system:

**Distribution of tyre pressure per wheel**  
[based on New NL survey May 08 - sample size 8250 cars : 6492 cars data received, among which: 5797 cars No TPMS fitted, 519 cars with Direct TPMS, 176 cars with Indirect TPMS]



Note: updated graph above (compared to version 04 of the document).









