

# DEKRA Test Center

On the safe side

Field survey on tire inflation of  
M1 vehicles - December 2017

DEKRA Test Center reference : 17T&E11-149



*DEKRA report reference 17T&E11-149 of survey performed from 11th of September to 4th of October 2017 is only valid in its entirety.  
An extraction or partial utilization of results for external publication will be under T&E responsibility.*

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## Agenda

- Aim of the survey
- General criteria
- Test protocol
- Location of the survey
- Data processing
- Results

## Aim of the survey

The aim of this survey is first to collect the actual tire inflations and corresponding tire pressures recommended by the vehicles manufacturers, and then to calculate and draw the distributions of tire underinflations/overinflations, and this for the 3 following groups of vehicles:

- Group “R64 dTPMS vehicles” are vehicles equipped with an UNECE Regulation No. R64 TPMS (Tire Pressure Monitoring System) based on the direct technology (which uses an actual factory calibrated pressure sensor to measure each tire pressure).
- Group “R64 iTPMS vehicles” are vehicles equipped with an UNECE Regulation No. R64 TPMS based on the indirect technology (which uses the ABS/ESP tooth wheel sensors to estimate indirectly each tire pressure based on wheel rotation speed and vibration).
- Group “no TPMS vehicles” are vehicles not equipped with a TPMS nor with a tire puncture detection system.

## General criteria

This field survey will be done in 2 different locations : 1 in Portugal and 1 in Italy, and will cover around 1000 vehicles altogether.

It will include only M1 vehicles firstly registered in EU after Nov 1st 2014 in case of Group “R64 dTPMS vehicles” and Group “R64 iTPMS vehicles”.

It will include only M1 vehicles firstly registered in EU after Jan 1st 2009 and before Jan 1st 2014 in case of Group “no TPMS vehicles”.

## Test protocol

### Data to record

- Date, time and location of the survey
- Vehicle's brand & model
- Vehicle's VIN number
- Vehicle load (partially loaded, fully loaded)
- Tire size
- Tire flange temperature
- Relative tire pressure

### Post processed data

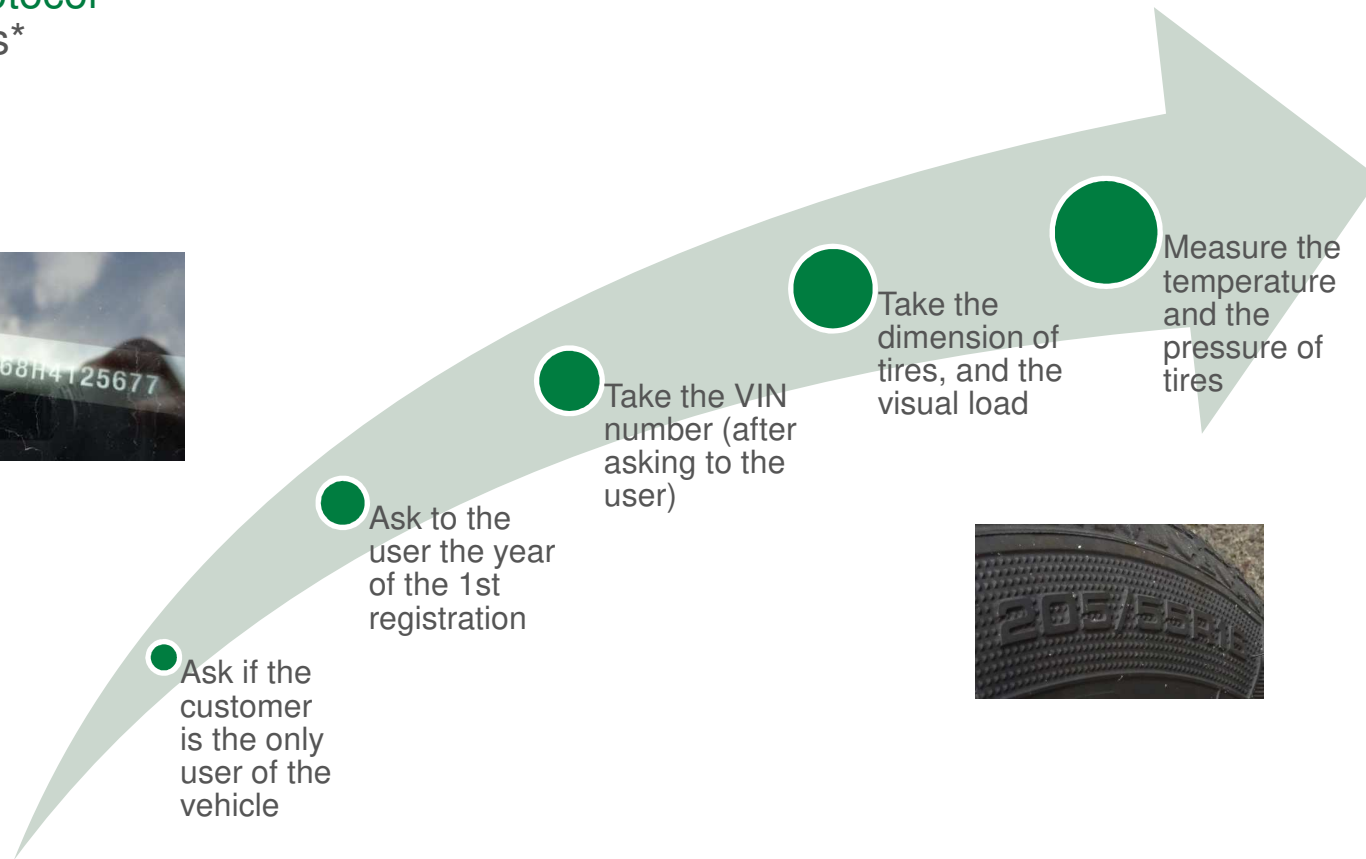
- Vehicle's date of 1st registration
- TPMS equipment (dTPMS, iTPMS or no TPMS)
- Recommended tire pressure placard

## Test protocol

### Equipment used

- Manometer
  - Natech
  - N°IT3471-03
  - Measurement accuracy : 0,05b
  - Daily compared with manometer : AQ336
  
- Thermometer
  - RS – 1319A
  - Serial N° : 100905687 / 100905660 / 100905682
  - Measurement accuracy : 0,1°C

## Test protocol Process\*



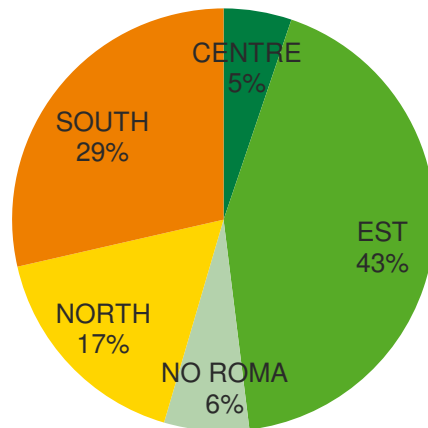
\*The process applied by DEKRA Test Center for the survey was discussed, adapted and approved by T&E.

## Location of the survey Roma, Italy

The survey took place in a shopping mall in Roma from the 11<sup>th</sup> of September to the 04<sup>th</sup> of October 2017.

According to the statistics of the shopping mall, customers come from the 80km around Rome.

### Location of customers surveyed



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## Data processing

With the VIN number, some researches are done :

- Check of the date of registration (Internet bank info + car dealership)
- Recommended pressure (Internet bank info + car dealership)
- Type of TPMS (car dealership)

Vehicles are sorted to keep only the vehicles which we have all the exact information, and sorted in 3 groups :

- noTPMS
- dTPMS
- iTPMS

## Data processing

Pressure measured is corrected with temperature :

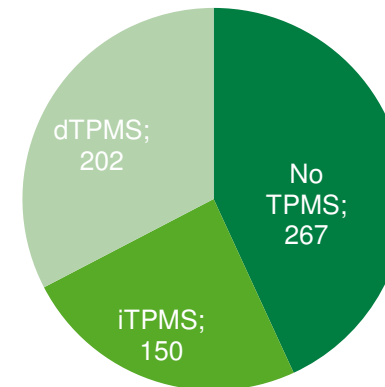
*Normalized cold actual tire pressure = ((measured tire pressure + 101) x (measured ambient temperature + 273)/(measured tire flange temperature + 273)) – 101*

Then pressure delta is calculated between this normalized cold actual pressure and the recommended pressure for each wheel.

## Results Roma

- 619 vehicles validated\* with :
  - 267 noTPMS
  - 150 iTPMS
  - 202 dTPMS

### 619 validated vehicles



\* : Data processing on all measured vehicles requested by T&E (without taking care of balance ratio between each category)

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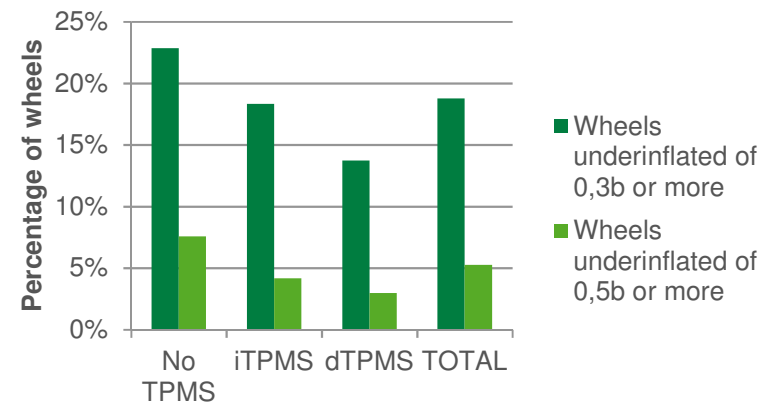
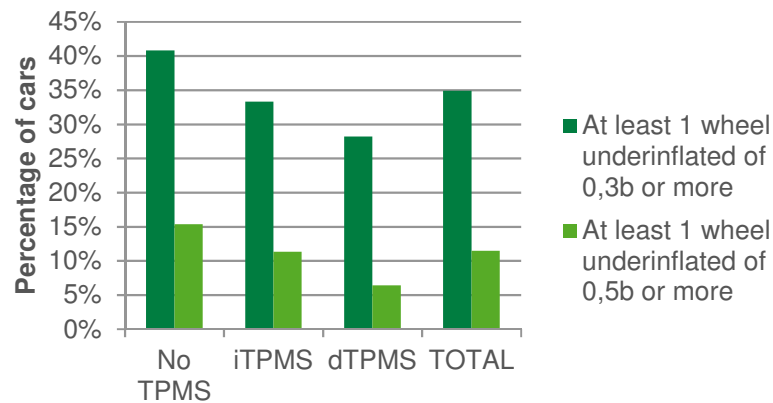
## Results

### Roma

➤ 619 vehicles validated

\*NB: 1 car = 4 wheels

	At least 1 wheel underinflated of 0,3b or more	At least 1 wheel underinflated of 0,5b or more	Wheels underinflated of 0,3b or more	Wheels underinflated of 0,5b or more
<b>No TPMS</b>	<b>41%</b>	<b>15%</b>	<b>23%</b>	<b>8%</b>
<b>iTPMS</b>	<b>33%</b>	<b>11%</b>	<b>18%</b>	<b>4%</b>
<b>dTPMS</b>	<b>28%</b>	<b>6%</b>	<b>14%</b>	<b>3%</b>
<b>TOTAL</b>	<b>35%</b>	<b>11%</b>	<b>19%</b>	<b>5%</b>



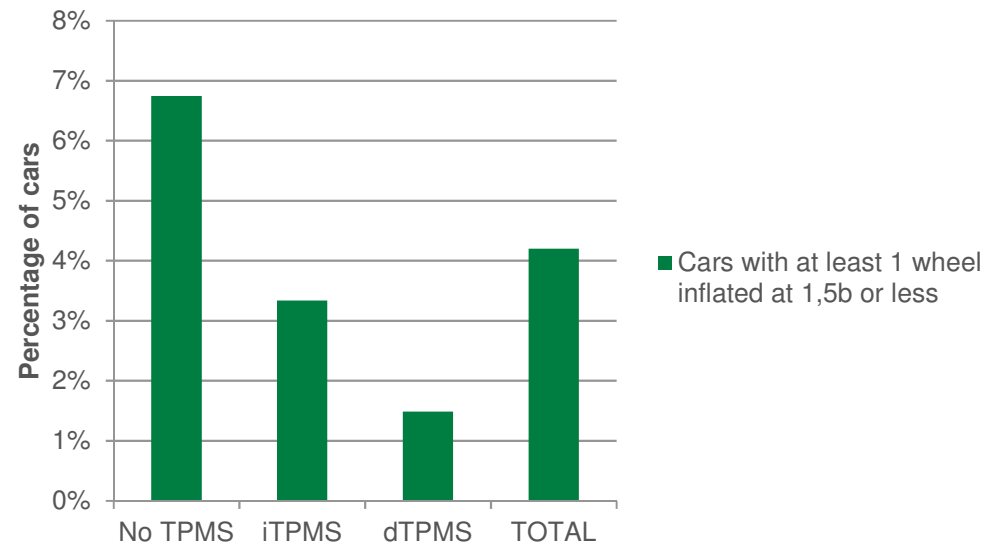
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## Results

### Roma

- 619 vehicles validated

	<b>Cars with at least 1 wheel inflated at 1,5b or less</b>
<b>No TPMS</b>	<b>7%</b>
<b>iTPMS</b>	<b>3%</b>
<b>dTPMS</b>	<b>1%</b>
<b>TOTAL</b>	<b>4%</b>

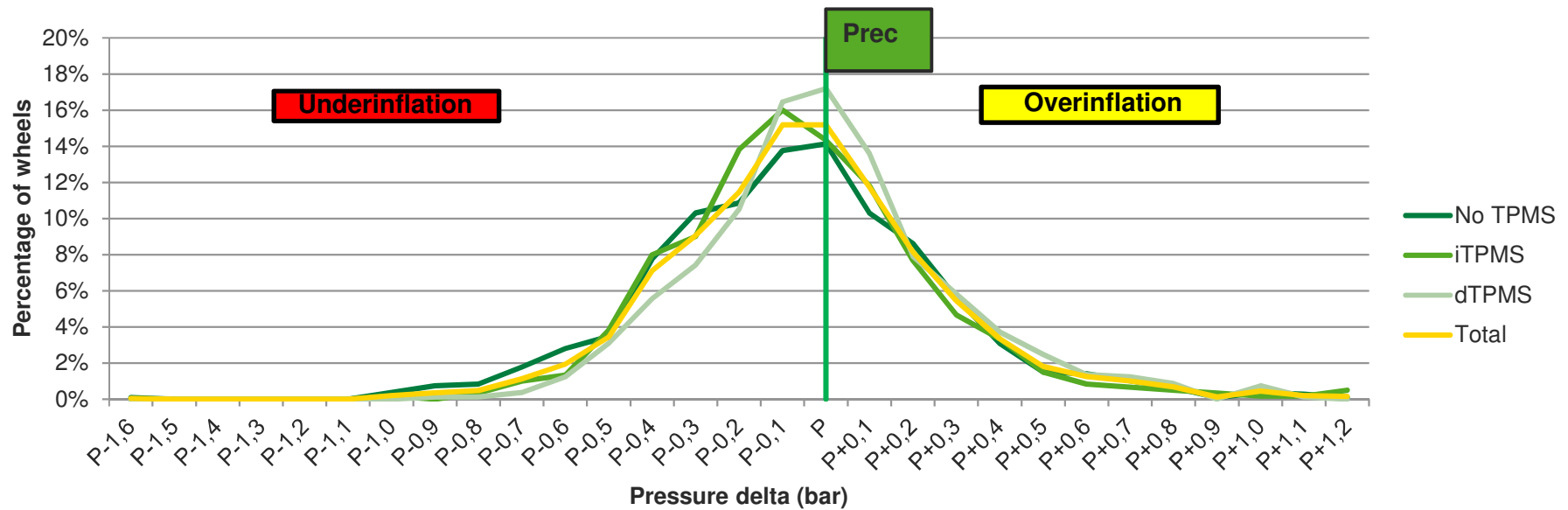


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## Results

Roma

### Distribution of tire pressure per wheel



Pressure delta are gathered as follows :  $P-0,05b < P < P+0,05b$ .

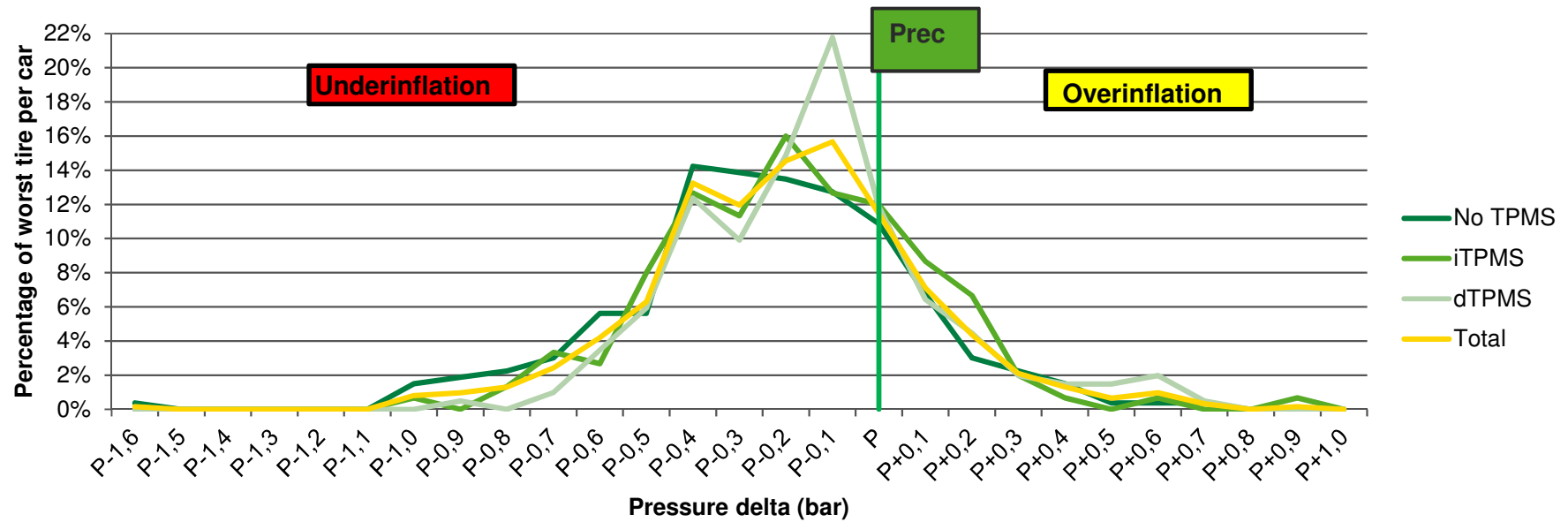
Example :  $P+0,4$  gathers pressure delta from  $P+0,35$  to  $P+0,45$ .

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## Results

Roma

### Distribution of worst tire pressure per car



Pressure delta are gathered as follows :  $P-0,05b < P < P+0,05b$ .

Example :  $P+0,4$  gathers pressure delta from  $P+0,35$  to  $P+0,45$ .

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**SAFETY**

