UNECE R64 BENCHMARKING TEST SPECIFICATION

| Test ID | Number of <br> Iteration | Test Profile | Speed profile of Learning Phase | Speed profile of Detection Phases | Characteristics of Detection Phases | $\begin{aligned} & \text { Tyre(s) } \\ & \text { to } \\ & \text { Deflate } \end{aligned}$ | Test Sequence |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| P-00 | 2 | R64 Homologation cycle | 20 mins @ $80 \mathrm{~km} / \mathrm{h}$ constant with 1 x speed peak above $120 \mathrm{~km} / \mathrm{h}$ (5s) | Constant speed @ $80 \mathrm{~km} / \mathrm{h}$ 1 x speed peak above $120 \mathrm{~km} / \mathrm{h}$ (5s) during first 10 mins | $\begin{aligned} & 1^{\text {tit }} \cdot 10 \text { mins @ }-20 \% \\ & 2^{\text {nid }}: 10 \mathrm{mins} @-20 \% \\ & 3^{\text {rid }}: 50 \mathrm{mins} @-25 \% \end{aligned}$ | Rear Right | A |
| P-01 | 2 | Calibration with 1 Tyre @ 1.4 bar | 20 mins @ $80 \mathrm{~km} / \mathrm{h}$ constant with 1 x speed peak above $120 \mathrm{~km} / \mathrm{h}(5 \mathrm{~s})$ | Constant speed @ $80 \mathrm{~km} / \mathrm{h}$ <br> 1 x speed peak above $120 \mathrm{~km} / \mathrm{h}$ (5s) during first 10 mins | 70 mins | $\begin{aligned} & \text { Rear } \\ & \text { Right } \end{aligned}$ | B |
| D-00 | 2 | R64 Homologation cycle | 20 mins @ $80 \mathrm{~km} / \mathrm{h}$ constant with 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}$ (5s) | Constant speed @ $80 \mathrm{~km} / \mathrm{h}$ <br> 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}$ (5s) <br> after $1-3$ mins pause | $\begin{aligned} & 1^{\mathrm{tr}}: 60 \mathrm{mins} @-20 \%-7 \mathrm{kPa} \\ & 2^{\text {rid }}: 60 \mathrm{mins} @-20 \%-7 \mathrm{kPa} \\ & 3^{\text {rd }}: 60 \mathrm{mins} @-25 \%-7 \mathrm{kPa} \end{aligned}$ | ALL | C |
| D-01 | 2 | R64 calibration LSL / detection USL | $20 \min @ 45 \mathrm{~km} / \mathrm{h}$ constant with 1x speed peak above $100 \mathrm{~km} / \mathrm{h}$ (5s) | Constant speed @ $95 \mathrm{~km} / \mathrm{h}$ 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}$ (5s) after 1-3 mins pause | $\begin{aligned} & 1^{\mathrm{P}:} 60 \mathrm{mins} @-20 \%-7 \mathrm{kPa} \\ & 2^{\mathrm{mid}} 60 \mathrm{mins} @-20 \%-7 \mathrm{kPa} \\ & 3^{\mathrm{d}:} 60 \mathrm{mins} @-25 \%-7 \mathrm{kPa} \end{aligned}$ | ALL | C |
| D-02 | 2 | R64 calibration city / detection USL | $20 \min$ @ $0-50 \mathrm{~km} / \mathrm{h}$ with 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}$ ( 5 s ) | Constant speed @ $95 \mathrm{~km} / \mathrm{h}$ 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}$ (5s) after $1-3$ mins pause |  | ALL | C |
| D-03 | 2 | R64 average calibration Speed / Detection Max Speed | $\begin{aligned} & 20 \text { mins @ } 80 \mathrm{~km} / \mathrm{h} \text { constant with } \\ & 1 \mathrm{x} \text { speed peak above } 100 \mathrm{~km} / \mathrm{h}(5 \mathrm{~s}) \end{aligned}$ | Constant speed Drive @ 140-150 $\mathrm{km} / \mathrm{h}$ | $\begin{aligned} & 1^{\mathrm{T} \cdot} 60 \mathrm{mins} @-20 \%-7 \mathrm{kPa} \\ & 2^{\text {nd }}: 60 \mathrm{mins} @-20 \%-7 \mathrm{kPa} \\ & 3^{\text {rd }}: 60 \mathrm{mins} @-25 \%-7 \mathrm{kPa} \\ & \hline \end{aligned}$ | ALL | C |
| D-04 | 1 | R64 Homologation cycle with short mileage ageing ( +400 kms ) | 20 mins @ $80 \mathrm{~km} / \mathrm{h}$ constant with 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}(5 \mathrm{~s})$ | Constant speed @ $80 \mathrm{~km} / \mathrm{h}$ 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}$ (5s) after 1-3 mins pause |  | ALL | D |
| D-05 | 1 | R64 Homologation cycle with medium mileage ageing ( +800 kms ) | 20 mins @ $80 \mathrm{~km} / \mathrm{h}$ constant with 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}(5 \mathrm{~s})$ | Constant speed @ $80 \mathrm{~km} / \mathrm{h}$ <br> 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}$ (5s) <br> after $1-3$ mins pause | $\begin{aligned} & 11^{\mathrm{EF}}: 60 \mathrm{mins} @-20 \%-7 \mathrm{kPa} \\ & 2^{\text {rid }}: 60 \mathrm{mins} @-20 \%-7 \mathrm{kPa} \\ & 3^{\text {rd }}: 60 \mathrm{mins} @-25 \%-7 \mathrm{kPa} \\ & \hline \end{aligned}$ | ALL | D |
| D-06 | 2 | Calibration with 4 Tyres @ 1.4 bar | 20 mins @ $80 \mathrm{~km} / \mathrm{h}$ constant with 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}(5 \mathrm{~s})$ | Constant speed @ $80 \mathrm{~km} / \mathrm{h}$ <br> 1 x speed peak above $100 \mathrm{~km} / \mathrm{h}$ (5s) <br> after $1-3$ mins pause | $\begin{aligned} & 1^{1^{\mathrm{EH}}} \begin{array}{l}  \\ 2^{\mathrm{di}} \\ 3^{\mathrm{did}}: 60 \mathrm{minins} \\ 60 \mathrm{mins} \end{array} \end{aligned}$ | ALL | E |
| M-01 | 2 | Calibration set with 1 Tyre @ 1.4 bar and Drive | No Learning Phase | Drive car between $40 \mathrm{~km} / \mathrm{h}$ and 100 $\mathrm{km} / \mathrm{h}$ | $\begin{aligned} & 1^{\mathrm{tg}} 10 \text { mins } \\ & 2^{\text {did }}: 20 \text { mins } \end{aligned}$ | $\begin{aligned} & \text { Rear } \\ & \text { right } \end{aligned}$ | F |
| M-02 | 2 | Calibration set with 4 Tyres @ 1.4 bar and Drive | No Learning phase | Drive car between $40 \mathrm{~km} / \mathrm{h}$ and 100 $\mathrm{km} / \mathrm{h}$ | $\begin{aligned} & 1^{\mathrm{tg}} 10 \text { mins } \\ & 2^{\mathrm{md}}: 20 \text { mins } \end{aligned}$ | ALL | G |

b. Single Tyre Under-Inflation Test Profile (Test Sequence A)

c. Single Tyre Under-Inflation Test Profile with 1 Tyre @ 1.4 bar (Test Sequence B)

Tyre Pressure Detection for Incident-related Pressure Loss (Puncture test with 1 Tyre @

d. Multi Tyre Under-Inflation Test Profile (Test Sequence C)

Detection for a tyre pressure level significantly below the recommended pressure for optimum performance including fuel consumption and

e. Multi Tyre Under-Inflation + Mileage Ageing Test Profile (Test Sequence D)

f. Multi Tyre Under-Inflation Test Profile with 4 Tyres @ 1.4 bar (Test Sequence E)

Detection for a tyre pressure level significantly below the recommended pressure for optimum performance including fuel consumption and Detection for a tyre pressure ievel signincanty (Diffusion test with 4 tyres @ 1.4 bar )
safet

g. TPMS Malfunction Detection with 1 Tyre @ 1.4 bar (Test Sequence F)

h. TPMS Malfunction Detection with 4 Tyres @ 1.4 bar (Test Sequence G)


TEST RESULTS SUMMARY VW GOLF 7

| Test ID | Test Profile | Tyre deflation Detection Phases | Deflated Tyre(s) | RESULTS |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Iteration | Warning Time [min.] | Total Driving Time (if No Warning) [min.] | Tyre Deflation [bar] |
| P-00 | R64 <br> Homologation cycle | 1st: 10mins @ - $20 \%$ 2nd: 10mins @-20\% <br> 3rd: 50mins @ $-25 \%$ | Rear Right | \#1 | 1 | - | 1,87 |
|  |  |  |  | \#2 | 2 |  | 1,83 |
| P-01 | Calibration with 1 Tyre @ 1.4 bar | 70 mins | Rear Right | \#1 | - | 70 | 1,54 |
|  |  |  |  | \#2 | - | 70 | 1,51 |
| D-00 | R64 <br> Homologation cycle | 1st: 60 mins @ $-20 \%-7 \mathrm{kPa}$ 2nd: 60mins @ -20\%-7kPa 3rd: 60mins @ -25\%-7kPa | ALL | \#1 | 8 | - | 1,86 |
|  |  |  |  | \#2 | 7 | - | 1,83 |
| D-01 | R64 calibration LSL / detection USL | 1st: 60 mins @ $-20 \%-7 \mathrm{kPa}$ 2nd: 60mins @ -20\%-7kPa 3rd: 60mins @ $-25 \%-7 \mathrm{kPa}$ | ALL | \#1 | 18 | - | 1,79 |
|  |  |  |  | \#2 | 9 | - | 1,77 |
| D-02 | R64 calibration city / detection USL | 1st: 60mins @ - $20 \%-7 \mathrm{kPa}$ 2nd: 60mins @ - $20 \%-7 \mathrm{kPa}$ <br> 3rd: 60mins @ $-25 \%-7 \mathrm{kPa}$ | ALL | \#1 | - | 180 | 1,77/1,66 |
|  |  |  |  | \#2 | - | 180 | 1,80/1,68 |
| D-03 | R64 <br> average calibration Speed / Detection Max Speed | 1st: 60mins @ -20\% - 7kPa <br> 2nd: 60mins @ - 20\% - 7kPa <br> 3rd: 60mins @ $-25 \%-7 \mathrm{kPa}$ | ALL | \#1 | - | 180 | 1,84/1,72 |
|  |  |  |  | \#2 | - | 180 | 1,79/1,68 |
| D-04 | R64 Homologation cycle with short mileage ageing ( +400 kms ) | 1st: $60 \mathrm{mins} @-20 \%-7 \mathrm{kPa}$ 2nd: 60mins @ - $20 \%-7 \mathrm{kPa}$ 3rd: 60mins @-25\%-7kPa | ALL | \#1 | 78 | - | 1,79 |
| D-05 | R64 Homologation cycle with medium mileage ageing (+800 kms) | 1st: 60mins @ -20\% - 7kPa <br> 2nd: 60mins @-20\%-7kPa <br> 3rd: 60mins @-25\%-7kPa | ALL | \#1 | 71 | - | 1,79 |
| D-06 | Calibration with 4 Tyres @ 1.4 bar | 1st: 60 mins 2nd: 60mins 3rd: 60 mins | ALL | \#1 | - | 180 | - |
|  |  |  |  | \#2 | - | 180 | - |
| M-01 | Calibration with 1 Tyre@ 1.4 bar and Drive | 1st: 10 mins 2nd: 20 mins | Rear Right | \#1 | - | 30 | - |
|  |  |  |  | \#2 | - | 30 |  |
| M-02 | Calibration with 4 Tyres @ 1.4 bar and Drive | 1st: 10 mins 2nd: 20 mins | ALL | \#1 | - | 30 | - |
|  |  |  |  | \#2 | - | 30 |  |

TEST RESULTS SUMMARY FIAT 500L

| Test ID | Test Profile | Tyre deflation Detection Phases | Deflated Tyre(s) | RESULTS |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Iteration | Warning Time [min.] | Total Driving Time (if No Warning) [min.] | Tyre Deflation [bar] |
| P-00 | R64 <br> Homologation cycle | 1st: 10mins @ -20\% 2nd: 10mins @ -20\% <br> 3rd: 50mins @ -25\% | Rear Right | \#1 | 4 | - | 1,72 |
|  |  |  |  | \#2 | 3 |  | 1,72 |
| P-01 | Calibration with 1 Tyre @ 1.4 bar | 70 mins | Rear Right | \#1 | - | 70 | 1,52 |
|  |  |  |  | \#2 | - | 70 | 1,50 |
| D-00 | R64 <br> Homologation cycle | 1st: 60mins @ -20\%-7kPa 2nd: 60mins @ -20\% - 7kPa 3rd: 60mins @ -25\% - 7kPa | ALL | \#1 | 10 | - | 1,81/1,63 |
|  |  |  |  | \#2 | 9 | - | 1,78/1,64 |
| D-01 | R64 calibration LSL / detection USL | 1st: 60mins @ -20\%-7kPa <br> 2nd: 60mins @-20\%-7kPa <br> 3rd: 60mins @ -25\%-7kPa | ALL | \#1 | - | 180 | 1.66/1.53 |
|  |  |  |  | \#2 | - | 180 | 1,68/1,53 |
| D-02 | R64 calibration city / detection USL | 1st: 60mins @ -20\%-7kPa 2nd: 60mins @ -20\%-7kPa <br> 3rd: 60mins @ -25\%-7kPa | ALL | \#1 | - | 180 | 1,67/1,54 |
|  |  |  |  | \#2 | - | 180 | 1,68/1,54 |
| D-03 | R64 <br> average calibration <br> Speed / Detection <br> Max Speed | 1st: 60mins @ -20\% - 7kPa <br> 2nd: 60mins @ -20\% - 7kPa <br> 3rd: 60mins @ -25\% - 7kPa | ALL | \#1 | - | 180 | 1,68/1,56 |
|  |  |  |  | \#2 | - | 180 | 1,66/1,51 |
| D-04 | R64 Homologation cycle with short mileage ageing (+400 kms) | 1st: 60mins @ -20\%-7kPa <br> 2nd: 60mins @ -20\% - 7kPa <br> 3rd: 60mins @ -25\%-7kPa | ALL | \#1 | 151 | - | 1,68/1,56 |
| D-05 | R64 Homologation cycle with medium mileage ageing ( +800 kms ) | 1st: 60mins @ -20\% - 7kPa <br> 2nd: 60mins @ -20\% - 7kPa <br> 3rd: 60mins @ -25\%-7kPa | ALL | \#1 | 137 | - | 1,67/1,52 |
| D-06 | Calibration with 4 Tyres @ 1.4 bar | 1st: 60 mins 2nd: 60mins 3rd: 60mins | ALL | \#1 | - | 180 | - |
|  |  |  |  | \#2 | - | 180 | - |
| M-01 | Calibration with 1 Tyre @ 1.4 bar and Drive | 1st: 10 mins 2nd: 20 mins | Rear Right | \#1 | - | 30 | - |
|  |  |  |  | \#2 | - | 30 | - |
| M-02 | Calibration with 4 Tyres @ 1.4 bar and Drive | 1st: 10 mins 2nd: 20 mins | ALL | \#1 | - | 30 | - |
|  |  |  |  | \#2 | - | 30 |  |

