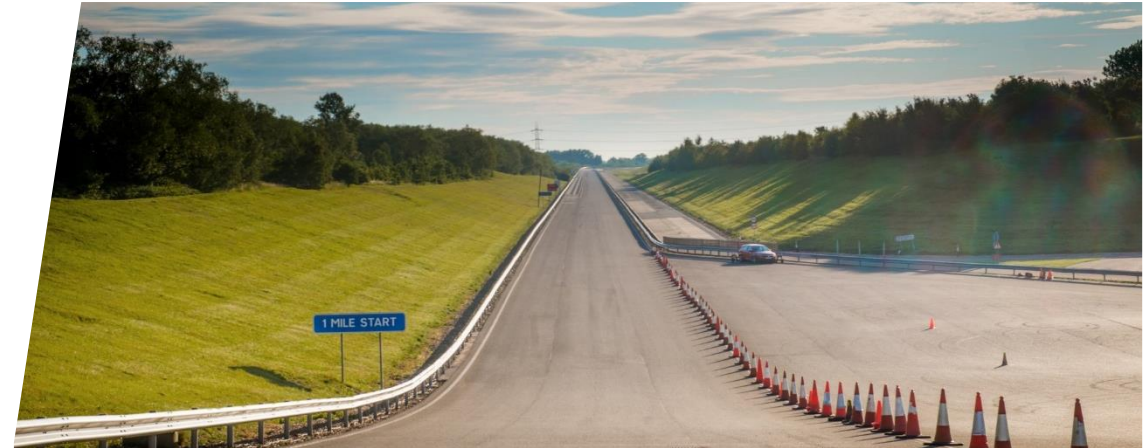




**Test Equipment
requirements: Proposal
(VIAQ-26-04)**



Following the first draft shared in VIAQ 25th session, the gas and particle to be measured are:

Purpose

Components	Requirements
PN	0 to 500000 #/cm ³
PM _{2.5}	0 to 0.5 mg/m ³ or 100 mg/m³
PM ₁₀	0 to 1 mg/m ³ or 100 mg/m³
CO	0 to 1ppm
CO ₂	0 to 5000 ppm
NO ₂	0 to 0,5 ppm

Optional

Components	Requirements
PM	NA
tVOC	NA
PAH	NA
NO _x	NA
NH ₃	NA
O ₃	NA

Two methods could be proposed



- **Real time measurement**



- **Bag measurement**

- This method require a specific cycle with specific phases
- Measurement technologies are well known and more accurate but depend on the measurement duration (Same analysers as WLTP regulation and PMP Euro 7)
- Time after the test should be defined
- Need a sampling bag covered with a black opaque film and sampling pump

For PN:

- **Technology:**
 - Optical Particle Counter (OPC): Cannot detect less than 0.3 μm
 - Condensation Particle Counter (CPC) with flow rate measurement
 - Differential mobility analyzer (DMA) and Condensation Particle Counter (CPC)
- **Specification:**
 - **Aerosol Flowrate:** 100 cc/min
 - **Accuracy:** +/- 20%
 - **Resolution time:** 1 s
 - **Particle dimension:** 0,01 et 1 μm
 - **Measuring range:** 0 to 5×10^5 particles/cm³
 - **Temperature range:** 0 to 38°C

For PM

- **Technology:**
 - Photometer method
- **Specification:**
 - **Aerosol Flowrate:** 2000 cc/min
 - **Sampling flowrate:** 3000 cc/min
 - **Measuring range:** 0.001 to 400 mg/m³
 - **Flow Accuracy:** $\pm 5\%$ of reading
 - **Resolution:** 0.1 $\mu\text{g}/\text{m}^3$

Test equipment requirements

For CO:

- **Technology:**
 - Infra-red Analysis, Electro-chemical
- **Specification:**
 - **Response time:** <60s
 - **Resolution time:** 0,1 ppm
 - **Measuring range :** 0 to 500 ppm
 - **Accuracy:** $\pm 3.0\%$ of reading or ± 3 ppm -> 2% 1 ppm

For CO₂

- **Technology:**
 - NDIR (Non-dispersive infrared)
- **Specification:**
 - **Response time:** <20s
 - **Resolution:** 1 ppm
 - **Measuring range :** 0 à 5000ppm
 - **Accuracy :** $\pm 3.0\%$ of reading or ± 50 ppm

For NO₂

- **Technology:**
 - chimiluminescence
- **Specification:**
 - **Response time:** <60s
 - **Resolution time:** 10 s
 - **Measuring range:** 0 to 150 mg/m³
 - **Accuracy :** +/- 1% FS