



PROPOSED APPROACH FOR TECHNICAL ASSESSMENT OF PEMS-PN INSTRUMENTATION FOR LIGHT DUTY VEHICLES

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Objective of the technical assessment

To assess and to validate the application and performance of portable PN instrumentation relative to each other and to a standard instrument.

On-board tests {
Phase 1: intercomparison on dyno
Phase 2: (one at a time) instrument on-road



Minimum technical characteristics

The candidate PEMS-PN instruments should include:

- Proportional partial flow sampling system or constant dilution system
- Real time detector for PN (km^{-1}) determination
- Temperature control of the sampling system
- Ability to be used on-board: No safety issue, low mass and power consumption

The candidate PEMS-PN instruments should to come along with their calibration data.



Evaluation criteria Phase 1-dyno tests

- Linearity of the portable system with the reference system (PMP, at tailpipe or CVS)
- Ability to calculate the MAW results, with associated uncertainty

Under:

- 1) Stationary conditions: Performance at different PN concentrations, diameters (different engine loads)
Assessment of Limit of Detection (probably not an issue)
- 2) Transient conditions: Cold and hot WLTP conditions



Evaluation criteria Phase 2-On-road tests

- Capability of transport the raw or diluted sample to the instrument
- Evaluation of on-board installation and design requirements
 - dimension: fit in A-segment cars
 - weight: < ~30 kg
 - power consumption: low enough to run with one battery of 100 Ah for at least 3 hrs
- Stability and performance for long sampling time (up to 3 hrs)



Critical issues

Nucleation particles interference - treatment

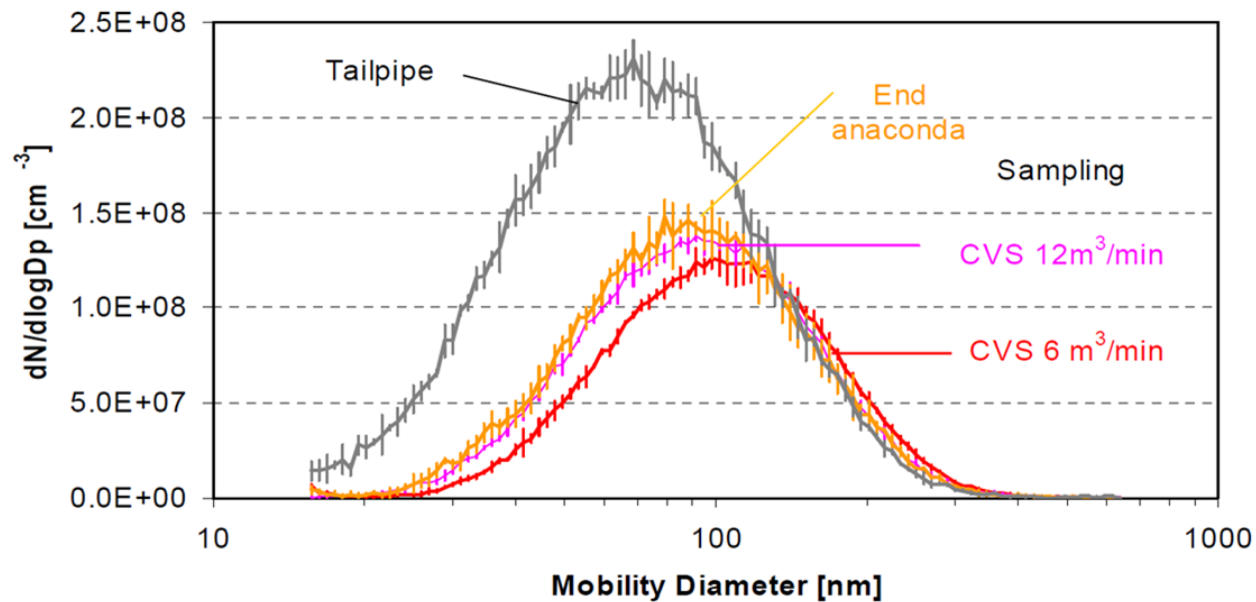
Effect of dilution system

Estimation of sampling losses: thermophoretic and diffusion

Measurements at Particle Filter (Diesel or Gasoline) regeneration conditions

Measurement at cold start conditions

Example of sampling losses



Small influence on PM (volatile particles?), what on PN?



Thank you for your attention!