

Summary of PMP Webconference

1st December 2021, 13:00-15:00 CET

1. Introduction & Update on GRPE Nov '21

Barouch Giechaskiel (JRC, PMP chairman) welcomed about 96 participants on-line. The meeting focus was mainly on exhaust, and to a smaller extent non-exhaust particulate emissions.

The next PMP meeting will be more focussed towards non-exhaust particle emissions

a. UNR 154

All changes of GTR15 were transferred to UN154, except for 10 nm methodology. Cat stripper can be used for 23 nm systems. Some improvement were implemented (see presentation).

b. Tyres & GRBP

GRBP will create a Working Group (WG) aiming in the development of a tyre abrasion method as priority item. The COM will chair the WG. GRBP and GRPE will address issue of tyre abrasion and particles from tyre/road wear in a joint Task Force of GRBP and GRPE in collaboration with LEON-T and other on-going projects (i.e. UK DfT and German UBA). (2nd phase beyond 2023.). Theo Grigoratos (JRC) invited participants to declare their interest for participation in this small group by the end of the year

2. Exhaust emissions

a. Tailpipe sampling

i. Test results (NTSEL)

Ayumi Shimura (NTSEL) presented a study on the verification of direct measurement for HD-PN. Tests were performed with a 5193 cm³ engine and DOC+DPF+SCR (Post 2018 Japan). Effect of sampling point was negligible while a small effect of the pre-diluter (PND0) was observed. Differences to the reference on the order of $\pm 10\%$ were reported for the 23 nm systems (For details see presentation)

ii. Test results (OICA/JRC)

Literature review

- 2017 PMP comparison for 23 nm protocol: TP vs CVS or PFDS: in general differences within 30%.
- VETC/JRC China studied both 23 nm and 10 nm in comparison: on average 20% lower at TP than CVS setup.
- ACEA / JRC 2019: 23nm and 10nm resulted in:
 - + - 25% for 10 nm protocol and -6% to 41% for 23 nm protocol.
 - Calibration was found to be cause for the system with pre-diluter.
- ACEA / JRC 2021: 10nm resulted in differences of $\pm 25\%$ in most cases:
 - In general, the results (compared to PFDS or CVS) show a variability of $\pm 40\%$ (typically $\pm 25\%$).
 - Tailpipe sampling with fixed dilution for HD: Measurement is possible. Sampling at exhaust gas temperatures $>500^{\circ}\text{C}$ needs more data.
 - It was suggested to postpone the inclusion of tailpipe sampling for HD Euro-7 until more data are collected
 - Discussion and agreement on penetration for each model of pre-diluter: particle losses, PCRF, and sampling line parameters were

discussed and agreed (see JRC presentation in “green”).

b. Calibration procedures

i. C40 (SWRI)

Tetracontane size distribution and removal efficiency were discussed by Imad Khalek. Problem may occur at the larger tail end of the size distribution.

Propose GMD >30 nm instead of >50 nm and keep concentration > 1 mg/m³.

ii. Silver particle generator (Catalytic Instruments)

Data from Silver Particle Generator SPG was presented by Martin Irwin. The generator can be used for the calibration of CPCs, VPRs, PTI instruments. It was proposed to add “metal particles” in the PN regulation.

iii. Hot CPC (Beihang university)

Longfei Chen presented a newly designed wide temperature CPC. Calibration was shown done with NaCl and Ag aerosol against TSI CPC. Operating temperature range of 10- 200 C and diameter of 10 nm-1000 nm was reported (for further details see presentation).

The calibration topics will be further discussed in the next meeting

iv.

3. Non-exhaust emissions

a. Timeline for GTR

Theo Grigoratos (JRC) introduced to roadmap for the development of the brake particle emissions method, incl. ILS, Regen Braking concept method, and GTR drafting.

The GTR DRAFT informal document will be available in May 2022 for the June 2022 GRPE session.

Final Working document GTR in Oct 2022 for adoption by GRPE in Jan 2023.

Technical Report to be ready by Jan 2023.

b. Update on the ILS activities (TF3)

TG reminded of the objectives, i.e. to clarify the feasibility and applicability of minimum specs for sampling and measuring brake particle emissions.

Provide further recommendations to TF2 and to improve specifications.

Examine repeatability and reproducibility of PM, and PN.

Propose improvements.

Currently completed 34% and ongoing 9%. Until end of Dec 21 90% completion is expected.

c. Update on TF4 activities

The TF4 group is moderated by J. Grochowicz (OICA/Ford) and T.

Grigoratos (JRC). TF4 includes 125 participants from 59 entities.

Final proposal is expected by Mar 2022.

Items like powertrain type, test setup, test cycle, bedding have been resolved.

Ongoing is the replication of the recuperation strategy and its application at the brake dynamometer.

d. ACEA / OICA views on brake wear emissions
(ACEA/OICA)

Sebastian Gramstat (OICA/Audi) presented on behalf of OICA:
Variability of x2 was found for the identical brakes operated at different dynos setups following the DRAFT PMP procedure.
The average vehicle emission was found at 20 mg/km in contrast to the earlier CLOVE data.

Regen braking method development is supported by OICA – a simplified method will be presented in next PMP-TF-4 meeting.

A temperature issue for LCVs was raised with the question of which test test weight will be applied?

TG commented that temperature issue of LCVs as well as most of the items raised at the OICA presentation will be further discussed in TF2. This might lead to additional requirements/improvements in TF2.

TG reminded that an impact assessment and limit value discussion are not part of PMP

4. Any other Business

TG mentioned project of German UBA with TU Ilmenau to test different brake systems, regen braking with PMP protocol.

Time frame is 2/2021 – 1/2024.

Support of PMP activities is foreseen.

Next meeting in Feb 2022. Focus will be on Non-exhaust issues and more room for presentations and discussion.