

PMP – Particle Measurement Program Informal Working Group Task Force 2– Brake Dust Sampling and Measurement

Meeting #31 – Wednesday 13 MAY 2021 15:00 – 16:00 CEST

Minutes of Meeting – Final Version

1. Participants: As in the file “*31th TF2 Meeting Attendance*” uploaded in TEAMS.

2. Background: This is the 5th meeting related to the PM mass measurement approach. TG introduced the meeting and provided a brief summary of the previous discussions on the topic. A quick update on the group’s future targets was also given. TG will share a first version of the recommendations for the mass measurement within Week 19. The PN discussion is expected to be initiated at the 32nd TF2 Meeting.

3. Mass Discussion: MF presented Brembo’s experience with PM measurement. The presentation focused on Brembo’s testing setup and instrumentation, the applied weighing system and procedure, some high-level internal statistical checks for the PM measurement, and some open points for consideration. The Brembo’s setup is based on a newly designed dyno which aims in minimizing losses both in the enclosure and the duct. Both cyclones and impactors are employed for the brake PM mass measurement – with the cyclone functioning as a pre-classifier. A fully automated weighing system is located into an ISO-6 certified clean room. A methodology which includes periodic testing of a certain brake system to ensure the proper functioning of the overall system was introduced. Brembo highly recommends that all labs apply a similar method to identify possible flaws or malfunctions in their systems. Also, a question on what would be an acceptable variability in the PM mass measurement was introduced by MF.

MM asked for some clarifications related to the duct diameter (148 mm) and the applied cooling air flowrate (50-100 m³/h). Al grease was applied to aluminum foils to avoid bouncing phenomena when sampling with the inertial impactors. MF clarified that impactors are placed within the cyclone, with the latest practically acting as a pre-classifier. TM noted that the overall efficiency of the system is reduced when the two combined instruments have the same cut-off point (10 µm). FR proposed either to change the sampling point or use cyclones with higher cut-off points (≥13 µm). MF explained that filter overloading was observed in some cases; therefore, the proposed configuration was considered as the best available solution. A discussion on the PM₁₀ emission levels presented in Slide 7 followed. GP explained that the reference brake used for the statistical analysis is a low emissions brake developed by Brembo. MF noted that PM_{2.5} emissions data are also available with emission levels being approximately one third of the overall PM₁₀ emissions. FR pointed out that when referring to impactors it is better not to describe the impaction substrates as filters because the particles are collected by impaction. More recommendations on the use of substrates will be provided by TSI.

4. Next Meetings: The next meeting will take place on Thursday 27.05.2021. The topic of PN measurements will be discussed. The schedule of the next meetings will be announced shortly.