Meeting #4 – Thursday 19 October, 2017, 14:00 – 15:00

Minutes of Meeting – Draft Version

1. Tour de table: Participants: AVL-(AM) Athanasios Mamakos; BMW-(DW) Diana Westerteicher; BMW-(KL) Katharina Lammel; BREMBO-(FR) Francesco Riccobono; BREMBO-(MA) Mattia Alemani; CARB-(SC) Sonya Collier; DEKATI-(MMD) Mikko Moisio; FORD-(MMF) Marcel Mathissen; HORIBA-(DL) Dmytro Lugovyy; JARI-(HH) Hiro Hagino; JRC-(TG) Theodoros Grigoratos; LINK-(CA) Carlos Agudelo; LINK-(RM) Radek Markiewicz; TMD-(AP) Andreas Paulus; TSI-(JS) Jurgen Spielvogel; TU Ilmenau-(DH) David Hesse; TU Ostrava-(MV) Michal Vojtisek

2. Handling of Questions and Discussions: TG proposed the creation of a living document where all questions and answers will be recorded. This would help participants keep a track of the issues discussed in the TF2 and also avoid extensive email exchange. CA proposed to categorize questions/answers based on their topic by creating different chapters in the document. FR proposed to date questions/answers so some topics can be considered closed when they remain inactive. SC suggested alternative ways, more dynamic, such as google drive. TG commented that it would be difficult to keep a track of the discussion in such a dynamic platform. For the moment it was decided to start with TG's proposal and evaluate the situation again in several weeks. The document will normally be circulated with the agenda 1-2 days before each meeting and feedback will be sent to TG in the next week.

3. Presentation of Ford: MM (Ford) presented Ford's set-up for sampling and brake dust measurement. Emphasis was put on the selected geometry. The losses of smaller particles in the sampling tube were discussed and data proving that they are minimized for the selected air flow and duct diameter were provided. Also, transport losses of bigger particles (2.0 μm – 20 μm) do not exceed 15% for selected samples. It is expected that the selected geometry results in minimized gravimetric losses for particles larger than 2 μm. Losses in the chamber – and before the particles entrance in the duct – have not been studied, however, Ford's tests showed that not more than 2 sec are required for the chamber to be cleaned from generated particles. Background emissions in the chamber never exceed 1% of the overall emissions over a "normal" braking event, therefore they are not considered important. More details can be found in Ford's presentation.

CA asked for some clarification regarding the air speed profile and tests under different environmental conditions. MM confirmed that air speed profile measurement is time averaged and clarified that no tests with different environmental conditions were performed.

SC asked whether sliding thermocouples provide accurate measurement of the brake temperature and if they could be substituted by IR systems. MM described that there are some limitations regarding the use of such systems for brake related temperature measurements. He further explained that the application of sliding thermocouples are a requirement of the EU-funded project LOWBRASYS to allow comparison between real world vehicle temperatures and dyno temperatures.

FR asked if coagulation losses have been estimated. MM responded that the calculated residence time of the particles is no higher than 0.6 sec. DL pointed out that lower flow rates would result in coagulation of the particles.

TF asked for some clarifications regarding the selected flow rate. MM explained that variable flowrate is not an option for Ford's system and explained that if real world conditions are accurately replicated then very high flowrates will be required. This could result in very high losses and practically no measurement of brake particles. More discussion will be required on this issue and real world data will be very useful to understand where we are.

4. Other business:

Please indicate if you are planning to attend the meeting planned for the 2nd of November 2017. The doodle can be found at: https://doodle.com/poll/kqd7edst3c923iab