

# Meeting Minutes PMP Webconference

15<sup>th</sup> June 2022, 13:00-15:00 CET

## DRAFT

### 1. Introduction & Welcome

ca. 90 participants were welcomed by Barouch Giechaskiel (BG, JRC, PMP Chairman) and Rainer Vogt (RV, OICA/Ford/Technical Secretary PMP). RV reviewed the meeting minutes of last PMP Meetings on 25.5.2022 which are available on the UNECE website. Comments may be sent to RV within the next two weeks.

This meeting is focussed on the presentation of the DRAFT GTR proposal by Theo Grigoratos (TG, JRC).

### 2. GTR time plan

The DRAFT time plan to develop the GTR was presented by BG. Today on June 15, 2022 the first version will be presented. The document will be distributed to the IWG PMP on June 17, 2022.

Deadline for comments from the IWG to JRC is July 1, 2022.

JRC plans to submit the informal working document to UNECE GRPE by 08.July 2022.

Francois Cuenot (UNECE GRPE) commented that during the written consultation, feedback from GRPE is requested by 19 Sep 2022.

### 3. GTR structure and presentation

TG introduced to the structure of GTR. The current version does not have annexes, however main text could be moved to annexes in a later version.

Most of the definitions are based on other GTRs and standards. IWG was requested to submit comments including a better description, if needed.

The definition of a “brake family” has not been discussed in PMP IWG. A definition is needed soon – likely like GTR15. Proposal will be shared and discussed in PMP IWG.

In general text in “red” will need update.

Sebastian Gramstat (SG, OICA) commented that engine friction reducing brake forces should also be incorporated in GTR procedure for ICE procedure.

TG responded that the method accounts for the so-called parasitic losses (rolling resistance and air-drag). Based on the input of TF1 engine drag would have minor effect and for that reason it was not considered in the development phase. If the parameter would be considered now all past work would need to be updated. Furthermore, all analysis conducted by the PMP but also other organizations (e.g. CARB, OICA, CLOVE, etc.) has not considered engine drag. For these reasons, JRC does not see any value in including it at this point.

RV commented that it might be difficult to find an agreement in IWG and it is unclear how to proceed then.

Penny Dilara (PG, EU COM) stated that the EC would be willing to proceed with the current draft GTR as an EC regulation or submit it as sponsor CP to GRPE, if there is no agreement in PMP IWG.

Heinz Bacher (HB, OICA) stated that it follows logics that the engine friction is included in ICE and regen braking procedure. OICA has no intention to delay the GTR. OICA has supported and is continuing to support, however there was not always a consensus in the TFs by all members.

TG responded that TFs operated on a majority principle. All opinions have always been considered; however, when the rest of the group did not support one member's opinion, the group had to go on and progress with the work.

David Miles (UK) suggests to proceed with the submission of the DRAFT GTR as is and without considering engine friction. OICA should present data. ICE friction could be added at later stage when the GTR is amended.

Peter Bonsac (CH) supports UK's opinion and the submission of the DRAFT GTR. A possible future amendment could incorporate engine brake if necessary.

Jarek Grochowicz (JG, OICA) commented that the initial data was underestimating engine friction. Engine drag can be higher as road loads and up to 15% and it should be included. There is no driver influence in automatic gear. With manual gear shifting could be defined as with other legislation. Not clear if there was a TF agreement, but today the technical knowledge is different.

TG (JRC): JRC agrees with SG's comment that engine brake concerns only a few percentage. Additionally, engine brake depends on the driver's behaviour at least for manual transmission vehicles (the vast majority of ICE vehicles). If OICA / ACEA shows there is difference in PM emissions, it could be included later. JRC does not want to include it now for the reasons explained previously.

SG (OICA): The contribution of engine braking was better learned during TF4 work. When we prepare the regenerative braking procedure, this should update the ICE procedure.

At this point there was no consensus in the IWG.

BG (JRC) concluded that OICA should submit data and discuss the topic for the next phase.

TG(JRC) continued with the Cooling air and brake enclosure requirements. Dimension ranges are given, with minimum and maximum dimensions are defined.

ACEA/OICA is asking for "tighter" geometrical specifications, especially to reduce duct losses and improve robustness / decrease variations in results.

TG(JRC): other TF members requested for more flexibility. The specifications in the draft GTR are much stricter than before and this would lead to less variability in the results. While on the dimensions currently no consensus exists in TF-2, there is agreement on brake temperature measurements for disc brakes and drum brakes. Brake mounting and rotation with respect to airflow is defined.

TG(JRC) continued with the WLTP Brake cycle: An attachment containing 15826 seconds is very long. A separate file with the speed profile will be submitted. The WLTP is applied for 1.) cooling adjustment, 2.) during bedding and 3.) during measurement. Interruptions during bedding are allowed – otherwise labs would have to repeat 5x WLTP bedding in case of interruption.

Quality checks are included: speed violation, number of decelerations, kinetic energy. The cooling flow adjustments based on WL/DM ratios.

SG, JG (OICA): ACEA is asking for a cooling air temperature of 23°C like for other emission tests. This is the practical climate air temperature at a chassis dynamometer. TG responded that 20°C has been used for all tests so far. JRC does not see the need to change since the proposed method has nothing to do with chassis dynamometer testing. Additionally, no validation is foreseen at the chassis dynamometer level. If group considers this could be done, when data is available and if it would not show effects on other parameters.

Carlos A. (LINK): Chapter 12.3.(e) needs to be 23°C instead of 20°C to meet general lab

conditions. Generally, 23°C is the normal temperature.

SG(OICA): Additionally, other WL/DM ratios are desirable, for example rear brakes should be a separate category.

TG(JRC) responded that other groups could be possible.

Peter Rothacher (PR, Bosch) asked if PM10/PM2.5 cascade impactors could be used?

TG(JRC): cascade impactors are not allowed because for full friction brakes the accumulated mass is much higher than 1 mg. This results in mass losses, clogging effect, bouncing of particles are observed.

Particle Emissions Measurements

TG(JRC) clarified that PM means PM10. Measure PM10 and PM2.5 in parallel. This will be clarified in the GTR document.

SG (OICA): Alternative bedding approaches still can be improved and ACEA is asking for some flexibility for the bedding: alternative approaches should be described.

SG (OICA): OICA intends to consider multiple PM measurements (switch system for PM measurement flexibility across lab working shifts etc.).

TG(JRC): No flow split is allowed – opposite to exhaust emissions. Introduction could lead to particle losses. JRC could see provision at a later state, when data is available to avoid losses. 2/3 of particle mass is in PM10 – risk of particle losses, 1/3 in PM2.5 fraction. According to JRC there is no need now – could be introduced at later stage.

HB(OICA): Relative Humidity should be replaced by absolute humidity - like it is described for exhaust PMP. Need additional requirement of absolute RH, as relative humidity is different at sea level.

TG (JRC): So far no data has been submitted and it did not appear to be important. RH has been used so far in ILS.

HB (OICA): Review positive/negative pressure requirements. Blower is always in front of the chamber. There is no check for leakage to the laboratory. Could be relevant for operators safety – negative pressure would needed to avoid leakage to outside.

TG replied that even if safety aspects are outside the scope of the GTR, there are leak checks foreseen. Additionally, the proposed method incorporates variable flow blowers which can operate at push/pull mode thus creating underpressure in the sampling tunnel if necessary.

TG(JRC) continued that PN measurement is almost identical to GTR 15. TPN is feasible, by deactivating the thermal treatment. One lab in the ILS showed higher total PN emissions, therefore both are included. TPN would be necessary to flag high-emitting brakes in the market – the SPN alone would not allow to flag these due to volatile particle removal. Legislator can decide which Total-PN, or solid-PN is used.

SG (OICA): ACEA asking to consider only solid particles. In the ILS was one lab measured high total PN, the other labs not. Solid particle number did not show this high uncertainty.

Bill Coleman (BC, OICA) pointed out that sometimes the terms PNC and sometimes PN is used.

TG (JRC): PN concentration refers to the PN emissions. PN is general term for particle number. He appreciated such comments to improve clarity if the GTR text.

PR (Bosch): There is 50 % +/-10% RH requirement for weighing the mass loss of brake components which is different from weighing filters/impactors? Normally there is only

one lab area with conditioned air and different conditions for filters and brake components would create substantial problems.

TG: Should be aligned with exhaust requirements.

BC (OICA): During the UNECE PMP meeting a large variability of PM results was observed. OICA asked for tighter specs on geometry of the chamber design which now could be dismissed. Why is this contradiction?

TG: Specifications have become more strict as compared to ILS. The protocol is much longer and way more detailed. Now more stringent, specific geometry, for example diameters of ILS were at 100-300 mm, now the specification is at 175- 225 mm.

4. Next step: submit GTR by end of the week at PMP site and email to all PMP IWG.  
Next: written comments to be considered until 01.07.2022.  
Depending on the comments an additional PMP meeting could be needed.