Informal document **GRPE-81-33**
81st GRPE, 9-12 June 2020
Agenda item 9(a)

Proposal for a new UN GTR on Determination of Electrified Vehicle Power (DEVP)

IWG on EVE

81st GRPE Virtual Meeting

9-11 June 2020

History

- Second mandate of the EVE IWG was approved in November 2014
- WLTP had stated a need for an improved procedure to determine system power for classification and downscaling of light-duty hybrid vehicles
  - Hybrid electric vehicles
  - Pure electric vehicles with more than one motor
- Part B of the mandate directed EVE to develop an Annex to GTR No. 15
- EVE consulted with organizations doing similar work (SAE, ISO, KATRI)
  - ISO 20762 was selected as basis for the procedure
  - Initial draft was developed in 2017-2018 based closely on ISO 20762
- Later, contracting parties stated a preference for a standalone GTR
- In March 2019 AC.3 approved the decision to develop a standalone GTR

Validation

- JARI validation tests
  - Commissioned by JAMA in 2016, in support of ISO 20762 development
  - JARI tested several HEVs with good results
  - JARI test report and technical expertise was provided to EVE IWG
- Phase 1
  - EVE conducted testing in 2018 using a draft based closely on ISO 20762
  - Participants: JRC, Environment Canada, KATRI, US EPA
  - Phase 1 revealed some differences in results of TP1 and TP2, and suggested other ways the procedure could be improved for use as a GTR
- EVE proposed Phase 2 validation, and one year schedule extension
  - Procedure was revised and evaluated for improved reliability of results
  - Participants: JRC, Environment Canada

Validation

- Validation program led to restructuring of procedure and provided key results
  - Further demonstrated that the method of eliciting maximum power is reliable
  - Determined relative applicability of TP1 and TP2 to diverse powertrain types
  - Strong theoretical basis for equivalence of TP1 and TP2 is now embodied in the procedure
  - Where equivalence cannot be fulfilled, TP1 or TP2 alone is now specified
  - If both are applicable, then if measurements are accurate, TP1 and TP2 should be very similar
- Any validation program has limitations
  - A fully authentic type approval situation is very difficult to duplicate
    - Dependencies on level of manufacturer involvement, support and consultation
    - Dependencies on ready availability of specific input data needed by the procedure
  - Not every current and future variation in architecture or calibration can be tested
- A strong case for validity may be based on good engineering judgment informed by the testing experience and its results
- We are confident in its technical basis, and will likely learn more from its use in practice

Status

- Proposed DEVP GTR is **Working Document GRPE/2020/12**
- Amended by informal document **GRPE-81-27e_track**
  - Section I is Statement of Technical Rationale and Justification
    - It is intended that this will serve as the “Technical Report”
      - Detailed background on the technical development of the current procedure
      - Review of validation program
      - In-depth validation test reports have previously been shared via EVE website
    - For an outline of the most significant changes from ISO 20762, see Section E.1
  - Section II is the test procedure itself
  - Annex 1 and 2 concern identification of reference points and test speed
  - Annex 3 reserved for future text on determination of method equivalency

Amendments

- Most amendments accept bracketed text in working document
  - Marked via Track Changes and comments in **GRPE-81-27e_track**
  - List of amendments: see informal document **GRPE-81-27e_list**
- New amendments concern:
  - Minor edits (added abbreviation; clarified unit ‘kph’; typos)
  - Correction of wording relating to 10-second measurement window
  - Clarification that UNR 85 is equivalent to ISO 1585 for purpose of GTR
  - Addition of RESERVED Annex 3 for determination of method equivalency
    - Placeholder for future work on candidate method or equivalent

Possible future work

- Candidate method
  - A candidate method (based on component tests rather than chassis test) could reduce test burden
  - Annex 3 is reserved for future text on method equivalency or candidate method
- WLTP expects to specify the DEVP GTR for determining a power value for classification and downscaling of hybrid vehicles
  - EVE IWG anticipates working with WLTP for this purpose

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  - U.S. EPA National Vehicle and Fuel Emissions Laboratory, Ann Arbor, USA