EVE Update

WLTP Session #28

Bern, Switzerland

EVE Update – WLTP #28

- Power Determination Status
- Electrified Vehicle Durability Topics
  - Background
  - Objectives
  - Durability Requirements
  - Next steps

Status of power determination GTR

- History
  - Second mandate of the EVE IWG was approved in November 2014
  - WLTP had stated a clear demand for an improved procedure to determine system power of HEVs (for classification and downscaling)
  - Part B of the mandate therefore included a task to develop an Annex to GTR No. 15 for system power determination
  - EVE consulted with several organizations doing similar work (SAE, ISO, KATRI)
  - ISO 20762 was selected as basis for power determination procedure
  - Drafting group was formed to convert ISO 20762 into an Annex to GTR No. 15
  - Later, contracting parties stated a preference for a standalone GTR.

Status of power determination GTR

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- Drafting group drafted procedure based on ISO 20762 in 2017-2018
- Validation testing was conducted in 2018
- Significant differences seen between TP1 and TP2
- IWG proposed additional testing, and extension of schedule
- Proposed schedule:
  - June 2019: Approval of authorization by GRPE to extend timeline
  - October 2019: Completion of testing, review of results, and draft GTR changes
  - November 2019: Approval of new timelines in formal document by AC.3
  - January 2020: Preliminary draft of GTR text to be available
  - June 2020: Recommendation of draft GTR by GRPE
  - November 2020: Establishment of the GTR by AC.3 in Global Registry

Status of power determination GTR

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- Drafting group: “Determination of Electrified Vehicle Power” (DEVP)
- Recent meetings:
  - DEVP #8: At EVE 30 in Stockholm (April 2019)
  - DEVP #9: At EVE 31 in Geneva (May 2019)
  - DEVP #10: Teleconference (planned)
- Limited opportunity for drafting during Summer 2019
  - Open issues were identified at EVE 30/31 (not simple drafting issues)
  - Several revisions to the procedure were proposed
  - Draft text developed
- Revisions will be evaluated via validation program Phase 2 (in progress)

Status of power determination GTR

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- Recent progress
  - JRC and Environment Canada are testing additional vehicles
  - Draft of technical report completed and circulated to drafting group
    - Nature of power determination problem, and approaches considered
    - Analysis of open issues
    - Results of validation testing (forthcoming)
    - Differences from ISO 20762 and their justification
- Next steps
  - Validation testing to be completed by October
  - Technical report and test results will be discussed at EVE 32 (Brussels)
  - Will seek consensus on open technical issues at EVE 32

Electrified Vehicle Durability Background

- GRPE has tentatively approved a new mandate for the EVE to develop a GTR for electrified vehicle durability
- Overall support for the GTR is mixed and the exact timing is not yet determined
  - European Commission wants the GTR completed as soon as possible
  - Japan will provide their position at the EVE meeting in Brussels next month
- EVE IWG has done considerable research and is prepared to propose several alternatives

EVE Conclusions Regarding Durability

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- Every manufacturer is currently performing some type of battery durability for their electrified vehicles
- All manufacturers are assessing durability differently
  - … but, they are looking at the same parameters
    - Calendar aging
    - Discharge rates
    - Charging frequency and rates
    - Temperature exposure
- However, the electrified vehicle market is still developing and customer usage profiles are changing with vehicle technologies and infrastructure.
  - Durability GTR should not interfere with the development of xEV's

Durability Alternatives

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- Four alternatives were identified for assessing electrified vehicle durability:
  1. Pre-aged battery
     - prescribed test cycle
  2. Software emulation of an aged battery
     - make the battery look aged with software changes
  3. Aging simulation
     - Simulate battery aging (as demonstrated by JRC)
  4. Pre-defined deterioration factors
- In the US, vehicle manufacturers have reported that they use all four methods for deterioration

GTR Goals

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- EVE concluded that a GTR should:
  - Begin a process which provide “rock screening” – establish minimum durability requirement
  - Prohibit substandard products from entering the market
  - Allow room for technology development
  - Allow for data collection to inform future regulations regarding durability

Durability Requirements

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- If the EVE direction is to establish durability requirements, some input from WLTP would be helpful
- Electrified Durability requirements could be based on a set deterioration factor
  - Should the DF be additive or multiplicative?
    - Is one alternative more appropriate based on criteria or architecture?
    - Is there a data set which exists which could help inform the selection of a DF?
  - Would alternatives be acceptable?
    - Could a manufacturer adopt the defined DF or present data to establish a different DF?
    - Does EVE need to prescribe a method for determining alternative DF's?
- Should the durability requirements be added to the existing GTR or should it be a stand alone GTR?

Durability Requirements – yes or no?

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Vehicle Type	Criteria Pollutants	CO2/Energy Consumption	Electric Range
HEV	Yes – already part of WLTP	Yes	No – not required
PHEV	Maybe - High load cold starts could become more frequent with battery power fade	Yes	??
PEV	No – not required	??	??

Next Steps

- Next EVE meeting will be in Brussels on October 7th and 8th (EVE 32)
- Japan is expected to make a formal proposal for durability
- Feedback from the WLTP will be communicated to the EVE working group
- Establish recommendation and plan for electrified durability to be presented to GRPE in January 2020