

Draft

EVE28-05e

GTR draft open issue

of system power determination for HEVs

Japan

(28th EVE Meeting – 16-18th Oct. , 2018)

5.2.1 Measurement item and accuracy

Measurement devices shall be of certified accuracy as shown in Table 1 traceable to an approved regional or international standard.

Item [↕]	Units [↕]	Accuracy [↕]	Remarks [↕]
Engine speed [↕]	min ⁻¹ , _s	± 0.5 % [↕]	↕
Intake manifold pressure [↕]	Pa [↕]	± 50 Pa [↕]	Intake manifold pressure means inlet depression in ISO1585:1992. [↕]
Barometric Atmospheric pressure [↕]	Pa [↕]	±0.3 kPa. <u>(with a measurement frequency of at least 0.1 Hz ± 100 Pa[↕]</u>	↕
Fuel flow rate [↕]	g/s [↕]	± 3 % [↕]	<u>Only used for compression-ignition engines, and for other internal combustion engines if the confirmation of air-fuel ratio according to ISO 1585:1992 is necessary.</u> [↕]
Voltage Electrical voltage [↕]	V [↕]	±0.3 per cent FSD or ±1 per cent of full range [↕]	Whichever is greater. Resolution 0.1 V. [↕]

for instance for electric measurements see Annex 8 Table A8/1 Parameters, units and accuracy of measurements.

コメント [MJS50]: Revised accordingly, see GTR 15 Amdt 3 p. 262.

コメント [MJS51]: WLTP measurement accuracy for dynamometer on p. 108 Annex 4.

コメント [MJS52]: Revised to GTR 15 Annex 4 p. 108.

コメント [MJS53]: Added per Matthias comment

コメント [MJS54]: Several comments by Matthias were discussed at Geneva, June 2018 and are awaiting resolution in Ottawa October 2018.

Fuel flow rate g/s

For compression-ignition engines, and for other internal combustion engines **if** the confirmation of air-fuel ratio according to ISO 1585:1992 is **necessary**.

6.9.2 Calculation for TP1

The HEV system power is calculated as the sum of ICE power and converted REESS power:.

HEV system power [kW]=ICE power [kW]+converted REESS power [kW]

- a) ICE power [kW] shall be determined as follows: The test results of measurements according to ISO 1585:1992 are necessary . ICE power is based on the measured engine speed, intake manifold pressure in inlet system and **fuel flow rate if the confirmation of air fuel ratio according to ISO 1585:1992 is necessary.**,

It shall be determined by an engine dynamometer test specified in other international standards, or regional or national regulations . The engine dynamometer test fuel shall be the same as in 6.3.

The engine dynamometer test to obtain the ICE power can be conducted under the conditions specified in ISO 1585:1992 using the above- measured engine speed, intake manifold pressure in inlet system and **fuel flow rate if the confirmation of air fuel ratio according to ISO 1585:1992 is necessary** . If the intake manifold pressure or fuel flow rate deviates significantly from ISO 1585:1992, conduct ISO 1585:1992 under the conditions using the above- measured engine speed and intake manifold pressure in inlet system or fuel flow rate, ask the vehicle manufacturer, or conduct TP 2.

Comment on Paragraph 6.9.2. □ Rewording + striking out of the sentence “if (...) necessary”

a) ICE power (in kW):

ICE power is based on the measured engine speed, intake manifold pressure in inlet system and fuel flow rate ~~if the confirmation of air fuel ratio according to ISO 1585 is necessary.~~ It shall be determined by **comparison of data with a relevant engine dynamometer test results according to ISO 1585.**

If the intake manifold pressure or fuel flow rate deviates significantly from **relevant ISO 1585 measurement results**, conduct a **separate ISO 1585 measurement** under the conditions using the above-measured engine speed and intake manifold pressure in inlet system or fuel flow rate, ask the vehicle manufacturer or conduct TP2. **The engine dynamometer test fuel shall be the same as in 6.3.**

Justification:

- Rewording to make text clearer
- Striking out of “if...necessary” because:
 - o only comparing engine speed and manifold pressure with R85 measurements gives you no indication about the influence of the atmospheric pressure
 - o Example: TP1 performed at 3000 meters above sea, R85 measurement at sea level
 - Due to the thinner air, the power of combustion engine at 3000 meters lower than at sea level
 - If hybrid system is compensation that less ICE power with a higher E-Power, TP1 would end up in a higher power value than the system has
 - o Solution: always measure fuel flow rate in addition to engine speed and intake manifold pressure □ then you know if the ICE power you assume in TP1 is really the power you have
 - o Measuring the fuel flow rate should be possible without big efforts

<Propose>

6.9.2 Calculation for TP1

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HEV system power [kW]=ICE power [kW]+converted REESS power [kW]

a) ICE power [kW] shall be determined as follows: The test results of measurements according to ISO 1585:1992 are necessary . ICE power is based on the measured engine speed, and intake manifold pressure in inlet system .~~and if the confirmation of air fuel ratio according to ISO 1585:1992 is necessary,~~

~~fuel flow rate: The equivalency between the Engine certification result (R 85 or ISO 1585) and the result of TP 1 may be proved (or demonstrated) by the manufacture if necessary (after the consultation with the Technical authority.)~~

It shall be determined by an engine dynamometer test standards, or regional or national regulations . The engine dynamometer test fuel shall be the same as in 6.3.

Need to be discussed

The engine dynamometer test to obtain the ICE power can be conducted under the conditions specified in ISO 1585:1992 using the above- measured engine speed, intake manifold pressure in inlet system and fuel flow rate ~~if the confirmation of air fuel ratio according to ISO 1585:1992 is necessary~~ . If the intake manifold pressure or fuel flow rate deviates significantly from ISO 1585:1992, conduct ISO 1585:1992 under the conditions using the above- measured engine speed and intake manifold pressure in inlet system or fuel flow rate, ask the vehicle manufacturer, or conduct TP 2.