

Proposals on GTR 21

- Definitions of System bench -

prepared by Japan
@EVE63

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■ Description of system bench (Draft May 2023)

6. Test procedure[↵]

6.1. General[↵]

The following test procedures determine a vehicle system power rating for a hybrid electric vehicle, or for a pure electric vehicle with more than one propulsion energy converter.[↵]

Two test procedures are described herein. [↵]

Test procedure 1 (TP1) is based on measured electrical power, estimated ICE power, and estimated electrical conversion efficiency.[↵]

Test procedure 2 (TP2) is based on measured torque and speed at the drive shaft(s) or wheel hub(s) and estimated mechanical conversion efficiency.[↵]

TP1 and TP2 are intended to be technically equivalent methods for determining a vehicle system power rating from available measurements. TP1 and TP2 are distinguished by the specific instrumentation, measurements, other inputs, and calculations necessary to determine the vehicle system power rating. [↵]

Each powered axle that provides propulsion under the maximum power condition shall be tested by chassis dynamometer or hub dynamometer.

Vehicles that are powered by two powered axles under the maximum power condition shall be tested by four-wheel-drive chassis dynamometer, or each powered axle shall be tested simultaneously by hub dynamometer. In the case of vehicles whose maximum power exceeds that of readily available dynamometers, it is permissible to use a system bench in place of a dynamometer.[↵]

System bench can be used when the maximum power output of the dynamometer is exceeded.

<Potential Concerns>

any type of system benches can be used during homologation

<Japan Proposal>

Add the following definitions to "3. Definitions".

3.6. System bench

3.6.1. "*System bench*" means a simulated vehicle powertrain on a test bench, which is a combination of the propulsion energy storage system(s), propulsion energy converter(s) and the drivetrain(s) providing the mechanical energy at the wheels for the purpose of vehicle propulsion, plus peripheral devices.

3.6.2. Simulators may be used as part of the System bench.

3.6.3. "*Simulators*" means a virtual model built to means a software reproduction of some of the powertrain elements.

3.6.4. "*Peripheral devices*" means energy consuming, converting, storing or supplying devices, where the energy is not primarily used for the purpose of vehicle propulsion, or other parts, systems and control units, which are essential to the operation of the powertrain. In addition, if the functions equivalent to the actual vehicle are satisfied, the equipment specifications may be substituted.

■ Japan proposes to delete entire Annex 3

- ✓ Japan position doesn't change during UNR154 development

Japan position on Annex B9

determination of method
Equivalency in UNR154

Fundamental philosophy (our regional regulatory structure) :

Test Procedures and/or Measurement Methods should be fair and transparent

→ All necessary procedures and methods **should be described in the regulatory text**. If not, regulatory text needs to be updated.

In real life :

e.g. Ambient temperature shall be measured and recorded, but no specific description how to measure
the general descriptions in regulatory text may leads multiple interpretations

→ the responsible authority and manufacture confirm that the specific procedure and/or methods meet the regulatory requirement whenever necessary

↳ **can be covered without Annex B9**

the regulatory text doesn't take care of new technologies and/or new requirement

→ part of regulatory activities as we have been working

↳ **should NOT be covered by Annex B9**

- ✓ Japan is OK as long as the alternative methods is clearly described in the text (i.e. system bench).