

Examination of requirements for testing xEVs on a chassis dynamometer with the road load equivalent to actual driving conditions

- (1st Report) Problems in chassis dynamometer testing caused by vehicle losses in xEVs -

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This report outlines the challenges associated with measuring vehicle losses during chassis dynamometer testing of electrified vehicles. While the number of electrified vehicles—such as EVs and HEVs—has risen in recent years, chassis dynamometer testing remains crucial for evaluating fuel and electricity efficiency due to its high levels of fairness and reproducibility.

However, many electrified vehicles feature designs where the electric motor and axle cannot be mechanically decoupled; consequently, treating vehicle losses using the same approach applied to conventional internal combustion engine vehicles could compromise measurement accuracy.

Figure 1 shows the results of vehicle loss measurements conducted on two EVs and one PHEV using a chassis dynamometer. For vehicles F and G, the results showed that they exhibited a trend where vehicle losses increased almost monotonically with speed, similar to the behavior observed in internal combustion engine vehicles. In contrast, vehicle E exhibited discontinuous behavior, with a marked decrease in vehicle losses in the 80–90 km/h speed range. Such variations present a challenge for accurately replicating real-world driving conditions on the test bench and are considered likely to have a significant impact on electricity power consumption evaluation. This result suggests that it is not necessarily easy to precisely generate the specific low-torque conditions required for testing, such as states equivalent to the motor's internal losses or zero-torque operation.

Based on these findings, the immediate priority is to quantify how variations in vehicle losses affect fuel and electricity efficiency and to establish testing conditions that ensure accuracy remains within acceptable limits. In the long term, it may also be necessary to reconsider the fundamental methods used to measure driving resistance.

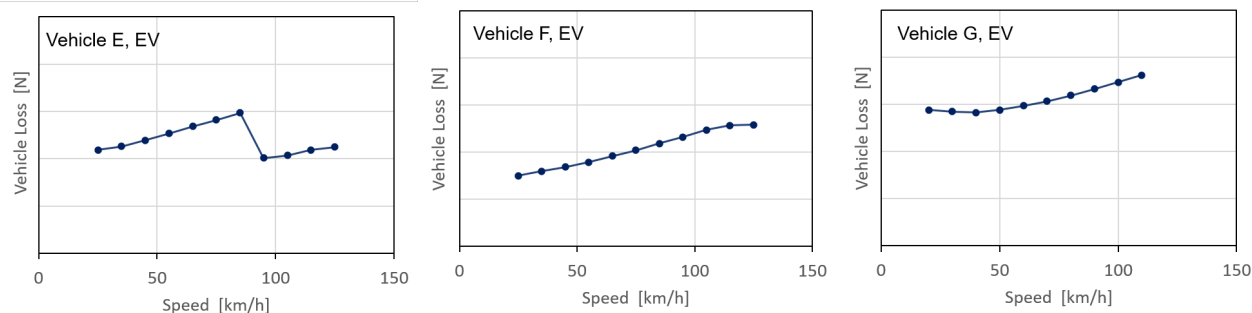


Figure 1. Vehicle Loss Measurement results of Various Vehicles Measured on Chassis-dynamometer