Specification of Competency Standards
for the Automotive
Unit of Competency

Functional Area - Vehicle Servicing

Title	Optimise the performance of the power systems on electrified vehicles
Code	111768L5
Range	This unit of competency is applicable to the engineering staff in the vehicle service and technical departments. Practitioners should be able to master the structure, control methods and operating principles of the power systems of electrified vehicles, including fuel cell electric, battery electric and hybrid electric vehicles, and optimise the system efficiency with reference to the manufacturer's service updates and respective instructions.
Level	5
Credit	6 *(For Reference Only)*
Competency	**Performance Requirements** 1. Knowledge (Electrified vehicle system performance and related technology) • Master the structure, functions, control methods, operating principles and standard parameters (e.g., manufacturer standard, approved international standard, and respective regulations) of various electrified vehicle systems and associated components. • Master vehicle performance tuning and testing equipment application techniques. • Master the control system update techniques for the vehicle system performance optimisation with reference to the manufacturer's service updates and respective instructions. 2. Performance (Optimise the performance of electrified vehicle systems) • Research and make improvements to the degraded electrified vehicle systems according to the released recommendations and respective instructions on the electrified vehicle system performance optimisation, such as: ◦ Electrical energy control and modulation, including but not limited to battery charging control, inverter and converter ◦ Power output and regeneration efficiencies of traction motor ◦ Traction battery efficiency and the state of health ◦ Thermal management systems for fuel cell unit, traction battery, and electronic control modules ◦ Abnormal degradation of traction battery energy capacity and fuel cell output ◦ Abnormal operating noise of the system components, including but not limited to air and water pumps, humidifier, traction motors and control electronics ◦ Power output and transient response of fuel cell system, as well as the hydrogen consumption rate (fuel cell electric vehicle specific) ◦ Degraded engine efficiency of hybrid electric vehicles, including power deficiency, rough running, acceleration hesitation, noisy operation and high fuel consumption rate (hybrid electric vehicle specific) ◦ Effectiveness of operation mode switching of hybrid electric vehicles (hybrid electric vehicle specific) • Review the effectiveness of performance optimisation of the electrified vehicle systems, compile report with improvement suggestions and submit to senior.

Assessment Criteria	The integrated outcome requirements of this unit of competency are that the practitioner being assessed shall prove that he/she is: • Capable of mastering the structure, control methods, operating principles and standard parameters of various electrified vehicle systems; • Capable of researching and improving the performance of degraded electrified vehicle systems with reference to the manufacturer's service updates and respective instructions; and • Capable of submitting report with work improvement methods with reference to the effectiveness review of the electrified vehicle system optimisation.
Remark	The credit value of this competency unit assumes that the practitioner has possessed a proficient understanding of the electrified vehicle structure, the working principle and performance of each system of various vehicle types. The practitioner concerned should be a recognised competent person in electrified vehicles, such as a registered vehicle mechanic who has completed an electric vehicle – high voltage training course, or equivalent; be a competent person in hydrogen fuel cell electric vehicles recognised by the authority concerned (fuel cell system specific). The major ordinance involved in this unit of competency is as follows: • Road Traffic (Construction and Maintenance of vehicles) Ordinance • Gas Safety Ordinance • Occupational Safety and Health Ordinance