



Australian Government

**Assessment Requirements for AURETH010
Diagnose and repair high voltage
rechargeable energy storage systems in
hybrid electric vehicles**

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Modification History

Release	Comment
Release 1	New unit of competency.

Performance Evidence

Before competency can be determined, individuals must demonstrate they can perform the following according to the standard defined in the unit's elements, performance criteria, range of conditions and foundation skills:

- diagnose and repair high voltage (HV) rechargeable energy storage systems (RESS) in two different hybrid electric vehicles (HEVs) or plug-in hybrid electric vehicles (PHEVs) to correct performance deficiencies.

Knowledge Evidence

Individuals must be able to demonstrate knowledge of:

- work health and safety (WHS) and occupational health and safety (OHS) requirements relating to diagnosing and repairing RESS in HEVs and PHEVs, including procedures for:
 - identifying hazards and controlling risks associated with:
 - working with high voltages on HEV and PHEV electrical systems
 - wearing jewellery while working around high electrical currents
 - determining appropriate procedures for minimising risk associated with hazards, including applying electrical safety precautions when:
 - using personal protective equipment (PPE), including electrical safety gloves with 1000 volt rating and Australian standards rated HV insulating mat
 - identifying and using firefighting equipment as appropriate
 - using the 'one hand' rule
 - following live system warning tags and signs
 - depowering vehicle
 - isolating HV RESS electrical supply
 - stabilising vehicle electrical system

- environmental requirements, including procedures for trapping, storing and disposing of waste released during repair procedures
- requirements of AS 5732 Electric vehicle operations - Maintenance and repair
- operating principles of HV RESS in HEVs and PHEVs, including:
 - battery pack construction, including:
 - battery types
 - battery internal resistance
 - battery pack system, including:
 - charging characteristics
 - open circuit cells
 - reverse polarisation
 - series cell configuration
 - strapping and layout
- application, purpose and operation of RESS, including:
 - HV battery charger and direct current (DC) to DC converter
 - battery management system (BMS)
 - power distribution unit (PDU)
- diagnostic testing procedures for HV RESS in HEVs and PHEVs, including:
 - accessing and interpreting scan tool system data, including:
 - diagnostic trouble codes (DTCs)
 - live data
 - freeze frame data
 - waveforms
 - using diagnostic flow charts
 - electrical system testing, including procedures for:
 - accessing electrical terminals and using test probes without damaging connectors, fuse holders or wiring
 - testing controller input and output signals and waveforms
 - vehicle dynamic and static testing procedures
 - analysing abnormal noise
 - analysing component failure
 - RESS cooling system testing
- repair procedures for RESS, including:
 - tightening connections
 - replacing faulty or damaged cable connections
 - removing and replacing faulty or damaged components
 - removing and replacing motor controller
- post-repair testing procedures for BEV, including:
 - DTC clearing procedures
 - checking for electrical connector mating

- performance testing RESS.

Assessment Conditions

Assessors must satisfy NVR/AQTF assessor requirements.

Competency is to be assessed in the workplace or a simulated environment that accurately reflects performance in a real workplace setting.

Assessment must include direct observation of tasks.

Where assessment of competency includes third-party evidence, individuals must provide evidence that links them to the RESS in HEVs and PHEVs that they have repaired, e.g. repair orders.

Assessors must verify performance evidence through questioning on skills and knowledge to ensure correct interpretation and application.

The following resources must be made available:

- automotive repair workplace or simulated workplace
- PPE, including electrical safety gloves with 1000 volt rating and Australian standards rated HV insulating mat
- manufacturer specifications for HEV or PHEV RESS
- AS 5732 Electric vehicle operations - Maintenance and repair
- two different HEVs or PHEVs RESS and associated components accessible for diagnosis and repair or replacement activities
- electrical diagnostic equipment appropriate to the HEVs or PHEVs being diagnosed and repaired, including:
 - digital multimeter with Cat III 1000 volt rating
 - insulation tester
 - residual voltage tester, if specified in original equipment manufacturer (OEM) specifications
 - scan tool
 - oscilloscope
- tools, equipment and materials appropriate for repairing HEV or PHEV RESS and their components.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b4278d82-d487-4070-a8c4-78045ec695b1>

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