

Unit ID: 227	
Domain	AUTOMOTIVE MECHANICS
Title:	Diagnose and service engine management system
Level: 4	Credits: 4

Purpose

This unit standard specifies the competencies required to diagnose and service the engine management system of a motor vehicle. It includes testing, diagnosing and servicing the engine management system in line with manufacturers' specifications. This unit standard is intended for those who work as automotive mechanics.

Special Notes

1. Entry information:
 - Prerequisite
 - Unit 65 - *Apply safety rules and regulations in an automotive mechanics workshop* or demonstrated equivalent knowledge and skills.
2. To demonstrate competence, at a minimum, evidence is required of testing, diagnosing and servicing the engine management system according to manufacturers' specifications. It includes the implementation of troubleshooting procedures, repairing or replacing of two (2) independent malfunctioning components and conducting a final performance test.
3. Assessment evidence may be collected from a real workplace or a simulated real workplace or an appropriate simulated realistic environment in which automotive mechanics operations are carried out.
4. All inspection, operation and maintenance procedures associated with the use of tools and equipment shall comply with manufacturers' and company guidelines, instructions and reasonable flat rate time.
5. Glossary of terms:
 - '*specifications*' refers to any, or all of the following: manufacturers' specifications and recommendations, workplace specific requirements
 - '*service operations*' refers to 'on-vehicle service' where operations can be directly performed on the vehicle and 'component repair' where the operations are done on the workbench after removing the component from the vehicle
 - '*engine management system*' refers to systems where the Electronic Control Unit incorporates control over both fuel injection and ignition system.
6. Regulations and legislation relevant to this unit standard include the following:
 - Labour Act, No. 6, 1992
 - Occupational Health and Safety Regulations No. 18, 1997
 - Road Traffic and Transport Regulations No. 266, 2000
 and all subsequent amendments.
7. This unit standard applies to passenger and light commercial vehicles with a Gross Vehicle Mass \leq 5 500 kg (Petrol).

Quality Assurance Requirements

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the Namibia Training Authority and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority and the Namibia Training Authority. All approved unit standards, qualifications and national assessment arrangements are available on the Namibia Training Authority website www.nta.com.na.

Elements and Performance Criteria

Element 1: Plan and prepare for work

Range

Planning and preparation may include but is not limited to workplace inspection, equipment defect identification, assessment of conditions and hazards and determination of work requirements.

Tools and equipment may include but are not limited to standard tool set, special tools and testing equipment (including multimeter, engine and exhaust gas analyser), scan tools, vacuum gauge, pressure gauge, vehicle lifting equipment and manufacturers' specific equipment.

Materials may include but are not limited to spare parts and cleaning materials.

Performance Criteria

- 1.1 Work instructions, including repair order forms, specifications and operational details are obtained, confirmed and applied.
- 1.2 Safety requirements are followed in accordance with safety plans and policies.
- 1.3 Tools and equipment selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults rectified or reported prior to commencement.
- 1.4 Material requirements are identified and obtained in accordance with repair order form and/or specifications.
- 1.5 Materials are safely handled and located ready for use in line with workplace procedures.
- 1.6 Technical and/or calibration requirements for tools and equipment are sourced and implemented in line with workplace procedures.
- 1.7 Environmental protection requirements are identified and applied in line with environmental plans and regulatory obligations.

Element 2: Test and diagnose engine management system

Range

Testing methods may include but are not limited to reading and interpreting wiring diagrams, operation and specification of input and output devices, interpretation of readings related to faults where the cause may be direct, indirect or intermittent, diagnosing, functional testing, measurements including fuel pressure, fault codes, visual, aural and functional assessment (including damage, corrosion, electrical short or broken circuit, wear) in line with manufacturers' specifications.

Performance Criteria

- 2.1 Procedures and information required for testing and diagnosing the engine management system of a motor vehicle are identified and sourced in line with workplace procedures.
- 2.2 Testing methods are implemented according to workplace procedures and manufacturers' specifications.
- 2.3 Testing results are compared with manufacturers' specifications.
- 2.4 Faults are diagnosed and documented with evidence and supporting information and recommendation(s) is made in line with workplace procedures.
- 2.5 Report is forwarded to appropriate personnel according to workplace procedures.

Element 3: Service engine management system and/or associated components

Range

Service operations may include but are not limited to isolation of faults, removing and installing, disassembling and assembling, inspection and evaluation, adjustments, operational testing, repair, replacement, cleaning injectors and visual inspections in line with manufacturers' specifications.

System and associated components may include but are not limited to input and output devices, Electronic Control Unit and other components as specified in the technical literature of the manufacturer.

Performance Criteria

- 3.1 Procedures and information required for service operations of an engine management system are identified and sourced in line with workplace procedures.
- 3.2 Service operations are implemented according to workplace procedures and manufacturers' specifications.
- 3.3 Adjustments made during the service operations are undertaken in line with manufacturers' specifications.

- 3.4 Unexpected or unplanned contingencies that are encountered in servicing engine management systems are addressed through applying workplace procedures, previous experience and manufacturers' technical information.
- 3.5 Fault codes are erased and final performance test is conducted and results compared with manufacturers' specifications.

Element 4: Complete work and clean up

Range

Work completion details may include but are not limited to repair order form, sign-out form for equipment, service record book and service plan form.

Performance Criteria

- 4.1 Work is completed and appropriate personnel notified in accordance with workplace procedures.
- 4.2 Work area is cleared of waste, cleaned, restored and secured in accordance with workplace procedures.
- 4.3 Reusable material is collected and stored in accordance with workplace procedures.
- 4.4 Equipment used is cleaned, checked, maintained and stored in accordance with workplace procedures.
- 4.5 Work completion details are finalised in accordance with workplace procedures.

Registration Data

Subfield:	Automotive Engineering
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