



Australian Government

MEM27019 Diagnose, repair and replace diesel engines in stationary and mobile plant

Release: 1

MEM27019 Diagnose, repair and replace diesel engines in stationary and mobile plant

Modification History

Release 1: New unit

Application

This unit of competency defines the skills and knowledge required to diagnose, repair and replace diesel engines used in mobile and stationary plant and equipment.

It covers the diagnosis of diesel engine operation to determine location and cause of faults and whether in situ repair, more specialist investigation or engine removal for off-site repair is required. It includes bottom and top end repair of engines and re-installing repaired or replacement engines into stationary and mobile plant.

Where repairs to fuel, coolant, electrical and starting, exhaust systems, as well as transmissions and accessories and their components are required, see the appropriate units.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Band: A

Unit Weight: 5

Pre-requisite Unit

MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12023	Perform engineering measurements
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM18001	Use hand tools
MEM18002	Use power tools/hand held operations
MEM18055	Dismantle, replace and assemble engineering components

Competency Field

Fixed and Mobile Plant

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

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|---|--|--|
| 1 | Determine job requirements | 1.1 Follow standard operating procedures (SOPs) |
| | | 1.2 Comply with work health and safety (WHS) requirements at all times |
| | | 1.3 Use appropriate personal protective equipment (PPE) in accordance with SOPs |
| | | 1.4 Identify job requirements from specifications, drawings, job sheets or work instructions |
| | | |
| 2 | Check engine performance | 2.1 Determine normal engine performance parameters from manufacturer specifications and workplace records |
| | | 2.2 Perform appropriate diagnostic tests for engine and equipment type |
| | | 2.3 Identify faults from diagnostic test results |
| | | 2.4 Determine appropriate action to rectify faults |
| | | |
| 3 | Remove engine and engine assemblies | 3.1 Remove engine and ancillary components according to manufacturer specifications, workplace procedures and WHS and environmental requirements |
| | | 3.2 Tag and record engine and ancillary components according to workplace procedures |
| | | 3.3 Prepare engine and engine assemblies for repair |
| | | |
| 4 | Repair engines | 4.1 Interpret characteristics of surface finishes and wear patterns on top and bottom end components |
| | | 4.2 Assess components for abnormal wear or defects |

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
		4.3	Remove top-end components and dismantle block assembly according to manufacturer recommendations
		4.4	Select appropriate cleaning solution and procedure, clean and store components not requiring repair ready for reassembly
		4.5	Replace or repair faulty parts to manufacturer specification
		4.6	Test engine and make any required post-repair adjustments
5	Install repaired or replacement engine	5.1	Locate and fix engine according to manufacturer specifications
		5.2	Refit ancillary components and equipment systems
		5.3	Check and adjust lubricants, coolant, fuel and other required fluids
		5.4	Test engine and make any required post-installation adjustments
6	Undertake completion tasks	6.1	Clean work area and dispose of non-recyclable material according to workplace and environmental requirements
		6.2	Collect and store recyclable material in appropriate containers
		6.3	Check and store tools and equipment
		6.4	Document and report engine repair or replacement according to workplace procedures

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

- The large diesel engines covered by this unit are used in one or more of the following:**
- mobile plant
 - agriculture
 - forestry
 - rail
 - marine
 - other transport operations
 - power generation
 - air and gas compression
 - stand by power
 - other industry sectors using large combustion engines

- Actions to rectify faults include one (1) or more of the following:**
- on-site repair, including in an on-site workshop
 - installation of a new or reconditioned engine

Unit Mapping Information

No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM27019 Diagnose, repair and replace diesel engines in stationary and mobile plant

Modification History

Release 1: New unit

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying and interpreting specifications, charts, lists, drawings and other applicable reference documents to perform engine repair or replacement
- checking engine for conformance and removing the engine and top-end components and dismantling block assembly
- undertaking calculation and numerical operations to calculate bearing clearances
- checking parts for abnormal wear or defects and identifying components for reuse or replacement
- testing of cylinder head, spring tensions, valves and guides for conformance to specifications
- replacement of worn or faulty parts
- cleaning parts using appropriate solutions and safety precautions and rack and setting out engine parts according to their original position in readiness for reassembly
- obtaining and recording measurements and interpreting readings for replacement or reuse as being under or over size
- reassembling engine bottom-end components using appropriate tools, equipment and techniques.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- characteristics of surface finishes and wear patterns as applied to crankshaft and piston assemblies
- specifications of crankshaft and piston assemblies
- reasons for identifying the components for reuse or replacement
- procedures for:
 - dismantling the block assembly and removing the engine from the plant
 - removing the top-end from the engine

- cleaning engine parts and solution to be applied
- racking and/or setting out of parts in readiness for reassembly
- recording engine measurements
- removing ridges, gaps, tapers, ovality and protrusions
- assembling engine bottom-ends and precautions to be taken
- determining bearing clearances and methods to be applied
- tools, techniques and equipment to be used and reasons for selection
- action to be taken when abnormal wear or defects are observed in the engine components
- measuring instruments to be used to measure engine components
- concept of under/over size of replacement parts and the reasons for identifying replacement parts as under or over size
- tools, techniques and equipment required to correct faults.

Assessment Conditions

- Assessors must:
 - have vocational competency in diagnosing, repairing, removing and replacing diesel engines in stationary and mobile plant at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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