



Australian Government

MEM27005 Tune diesel engines

Release: 1

MEM27005 Tune diesel engines

Modification History

Release 1. Supersedes and is equivalent to MEM18029B Tune diesel engines

Application

This unit of competency defines the skills and knowledge required to compression test and tune up the engine.

It applies to tune up procedures and evaluation of engine performance on compression ignition engines.

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

Band: A

Unit Weight: 4

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
MEM27002	Test and repair compression ignition systems
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.

- | | | | |
|---|-----------------------------------|-----|--|
| 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 | Compression test engine | 2.1 | Remove injectors and isolate fuel system for each cylinder |
| | | 2.2 | Select and fit appropriate adaptors |
| | | 2.3 | Obtain, interpret, record and correct readings for adaptor used |
| | | 2.4 | Use correct compression readings for adaptor |
| | | | |
| 3 | Perform tune up | 3.1 | Determine firing pressures and adjust to specification, as applicable |
| | | 3.2 | Perform air restriction, boost, back pressure and flow tests according to manufacturer recommendations using applicable test equipment |
| | | 3.3 | Record readings and determine variances from specifications |
| | | 3.4 | Determine density of exhaust smoke |
| | | 3.5 | Adjust valve clearance and/or timing to specifications |
| | | 3.6 | Adjust injection pump or injector timing to specification |
| | | 3.7 | Adjust engine parameters using methods appropriate to technology of engine |
| | | 3.8 | Determine if injector opening pressure is within specification and adjust, arrange replacement or repair if |

Elements describe the essential outcomes.

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

faulty

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.

Engine firing pressure control adjustment methods include the following:

- reflashing of electronic control module (ECM) unit where electronic control is used
- manual adjustment of:
 - governor rack travel
 - torque spring load limit
 - over speed trips
 - aneroid or fuel ratio control to specification

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM18029B Tune diesel engines

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 MEM27005 Tune diesel engines

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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 service documents for tuning diesel engines
- removing injectors from each cylinder, isolating fuel system and fitting appropriate adaptors to each of the cylinders
- obtaining, recording and correcting compression readings for adaptor used
- determining firing pressures and adjusting to specifications
- performing tune up of diesel engine 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)
- procedures for:
 - removing injectors from cylinders and reasons for isolating the fuel system
 - fitting adaptors to the cylinders
 - compression testing diesel engines and recording compression readings
 - comparing the compression readings with specifications and identifying any deviations
 - adjusting firing pressures
 - starting, operating, loading and shutting down diesel engines
 - recording test results
 - determining exhaust smoke density and equipment and techniques
 - adjusting valve clearances and/or timing
 - adjusting injector pump and injector timing
 - adjusting the governor rack travel, torque spring load limit, over speed trips, aneroid or fuel ratio control
 - adjusting injector opening pressure
- appropriate adaptors and reasons for using adaptors
- likely causes of any detected deviations from specification

- corrections required for compression readings to take account of the adaptor used
- test equipment and procedures to be used in the tuning of diesel engines
- manufacturer's recommended tests and reasons for conducting the tests
- timing and pressures to be achieved
- governor specifications.

Assessment Conditions

- Assessors must:
 - have vocational competency in tuning diesel engines 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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