



Australian Government

MEM27021 Maintain, fault find and repair stationary plant gas turbine engines

Release: 1

MEM27021 Maintain, fault find and repair stationary plant gas turbine engines

Modification History

Release 1: New unit

Application

This unit of competency defines the skills and knowledge required to maintain gas turbine engines used in stationary plant applications.

It covers scheduled servicing, preventative maintenance, fault finding and repair or rectification of faulty operation and components undertaken on gas turbine engines up to 5 GJ/hr (1300 kw) capacity, including ancillary equipment that may be associated with the engine operation.

The application of the skills and knowledge described in this unit in some states/territories may require an authority to practice in the workplace. Other conditions may apply under state and territory legislative and regulatory requirements.

Band: A

Unit Weight: 6

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 and work instructions |
| 2 | Inspect gas turbine engine system and components | 2.1 Determine normal gas turbine engine performance parameters from manufacturer specifications and workplace records |
| | | 2.2 Prepare engine for engine safe system inspection and operation in accordance with manufacturer specification |
| | | 2.3 Check gas turbine engine components visually for external and internal signs of defects |
| | | 2.4 Check pipes, cables and connections for wear and damage |
| | | 2.5 Perform appropriate diagnostic tests for engine and equipment type |
| | | 2.6 Identify faults from diagnostic test results |
| | | 2.7 Determine appropriate action to rectify faults |
| 3 | Test gas turbine engine system | 3.1 Identify test ports and connectors and connect test equipment |
| | | 3.2 Follow specified test procedure or run diagnostic program to access data on engine performance |
| | | 3.3 Test safety systems and emergency shut offs |
| | | 3.4 Identify faults and determine if related to engine, associated systems or control fault |
| | | 3.5 Trace fault to root cause |

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
		3.6	Obtain specialist advice, where required, to assist with the troubleshooting process
4	Service gas turbine engine	4.1	Check and replace air and oil filters if required or to manufacturer schedule
		4.2	Test and adjust regulator, operation and safety controls
		4.3	Pressure test gas, oil, and air pipes and hoses and purge, as required
		4.4	Lubricate engine and components according to maintenance schedule
		4.5	Document engine service to workplace requirements
5	Rectify faults according to manufacturer specifications	5.1	Assess components for abnormal wear or defects
		5.2	Replace faulty or worn components
		5.3	Remove corrosion where required
		5.4	Finish or re-finish metal surfaces through polishing, lapping and blending of damage area or other specified process
		5.5	Apply required surface treatments
		5.6	Test engine and make any required post-repair adjustments
6	Install new, repaired or replacement engine	6.1	Locate and fix engine according to manufacturer specifications
		6.2	Refit ancillary components and equipment systems
		6.3	Check and adjust lubricants, coolant, fuel and other required fluids
		6.4	Test run engine and make any required post-installation adjustments

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
7	Complete repair or installation	7.1	Clean work area and dispose of non-recyclable material according to workplace and environmental requirements
		7.2	Collect and store recyclable material in appropriate containers
		7.3	Check and store tools and equipment
		7.4	Document and report engine repair or replacement according to workplace procedure

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.

Ancillary equipment includes one (1) or more of the following:

- pumps
- compressors
- fluid power equipment
- metering equipment
- electrical controls
- electronic controls

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Gas turbine engine and components include one (1) or more of the following:

- engine change unit, main components and accessories/drives
- control components, including valves, meters and regulators
- ignition and starter system components
- fuel system components, including:
 - manifold and nozzles
 - combustion chambers
 - filters
- oil system components
- air system components, including:
 - air inlet structures
 - fans
 - guide vanes
 - centrifugal or axial flow compressor assemblies (low and high pressure)
 - compressor bleed valves if fitted
- exhaust system components, including:
 - high and low pressure turbine assemblies
 - free turbine (where fitted)
 - exhaust outlet flues and shafts

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.

Actions to rectify faults include one (1) or more of the following:

- on-site repair, including in an on-site workshop
- removal of engine to a specialist engine repair facility
- 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 MEM27021 Maintain, fault find and repair stationary plant gas turbine engines

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
- testing of turbine engine operation with and without fuel
- checking gas turbine engine performance against specifications for conformance
- purging of gas turbine and associated equipment
- checking components and parts for abnormal wear or defects and identifying whether to reuse, repair or replace components and parts
- replacing 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
- assembly and disassembly of gas turbine 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)
- tools, techniques and equipment to be used and reasons for selection
- characteristics of surface finishes and wear patterns as applied to gas turbine engine components
- criteria for identifying the components for reuse or replacement
- gas turbine engine layout and operation, including:
 - types of gas turbine
 - operating principles and power output
 - gas path
 - intakes

- compressors
- combustion chambers
- turbine blades
- air intake path
- exhaust path
- bearings and seals
- lubrication system
- starting system
- ignition system
- safety systems, including safety shut off systems, leak detection systems and vents
- controls and instrumentation, including systems and controls for remote operation and monitoring
- action to be taken when abnormal wear or defects are observed in the engine components
- test instruments and tools used for gas turbine service and maintenance
- purging procedure for the stationary gas turbine and associated equipment
- gas turbine engine fuel types, properties and applications
- relevant standards and regulations including AS 3814:2015 Industrial and commercial gas-fired appliances and AS/NZS 5601 Gas installation
- 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 maintaining, fault finding and repairing stationary plant gas turbine 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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