



Australian Government

PMAOPS324 Operate a gas turbine

Release: 1

PMAOPS324 Operate a gas turbine

Modification History

Release 1. Supersedes and is equivalent to PMAOPS324A Operate a gas turbine

Application

This unit of competency covers the skills and knowledge required to operate a gas turbine in a power generation, compression or similar operation. It applies to a gas turbine that is a complex, independent item of equipment. Typically it will have a specialised start-up and shutdown procedure. It may have its own control panel and inbuilt vibration monitoring equipment.

This unit of competency includes all such items of equipment and unit operations which form part of the turbine's operating system. A unit/system comprises two or more components of plant/equipment that are operated together to produce product, including one or more of:

- gas turbine engines
- electric motors
- governing systems
- power supply
- safety and shutdown systems
- cooling systems.

This unit of competency applies to operations technicians who are required to demonstrate a significant understanding of the process and the equipment operation in order to identify and rectify operational problems, operate and monitor the gas turbine and ancillary equipment to ensure output meets all requirements.

This unit of competency applies to an individual operating independently in a plant with local control or in liaison with the control room operator in a plant with a centralised control panel, such as distributed control system (DCS) type controls. In the case of large complex plant, the operations technician would be part of a team during start-up and shutdown procedures.

This unit of competency applies to an individual working alone or as part of a team or group and working in liaison with other shift team members and the control room operator, as appropriate.

Some jurisdictions may require the holder of this unit to be licensed or certified and users should check with the relevant authorities.

Pre-requisite Unit

Nil

Competency Field

Operations

Unit Sector

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 Prepare for work | <ul style="list-style-type: none">1.1 Receive and give shift handover1.2 Identify work requirements1.3 Identify and control hazards1.4 Coordinate with appropriate personnel1.5 Check for recent work undertaken on gas turbine1.6 Note any outstanding/incomplete work1.7 Check operational status of gas turbine |
| 2 Start the gas turbine | <ul style="list-style-type: none">2.1 Check that the turbine is not subject to maintenance or that other permitted activities are not taking place near the equipment2.2 Check the control panel to ensure that all indications support the safe starting of the turbine2.3 Conduct required safety checks and pre-starts to determine or verify the operational condition of the equipment2.4 Commission turbine protection devices prior to the start-up of equipment2.5 Achieve operational flows and temperatures of ancillary equipment before bringing the system on line for use2.6 Start the gas turbine according to procedures |

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| 3 | Monitor and assess gas turbine systems | 3.1 | Complete routine checks, logs and paperwork taking action on unexpected readings |
| | | 3.2 | Change rate, smoothly as required |
| | | 3.3 | Monitor and correct fuel and energy systems and flows to ensure that the system provides the proper operational mixture for turbine use |
| | | 3.4 | Ensure adequate supplies of clean air at the stated rate or temperature are delivered to the turbine to allow for successful operation to be achieved |
| | | 3.5 | Check exhaust gas and turbine operating temperatures to ensure correct temperature gradients in the turbine |
| | | 3.6 | Monitor lubrication systems to verify that operational parts are functioning efficiently and effectively, and to ensure that all moving parts are operating in a friction free and clean environment |
| | | 3.7 | Monitor and adjust cooling systems to allow for the most efficient operating temperature to be maintained throughout all operating conditions |
| | | 3.8 | Monitor governing systems to allow correct operational speeds of equipment to be maintained and regulated |
| | | 3.9 | Adjust turbine and its component plant items as appropriate to their type and duty to maximise performance |
| 4 | Check maintenance requirements | 4.1 | Conduct routine inspections and checks to ensure normal or stated turbine operation is maintained |
| | | 4.2 | Identify equipment faults through observation of the operational equipment and periodic sampling and testing |
| | | 4.3 | Determine action and communicate maintenance requirements to appropriate personnel |
| | | 4.4 | Record operational data to provide a historical record of the operating condition of equipment |

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| 5 | Respond to gas turbine problems | <div style="padding-left: 20px;">5.1 Monitor turbine and its component plant items frequently and critically throughout shift using measured/indicated data and senses</div> <div style="padding-left: 20px;">5.2 Describe impacts of any changes upstream and downstream</div> <div style="padding-left: 20px;">5.3 Recognise actual and developing situations which may require action</div> <div style="padding-left: 20px;">5.4 Apply operational knowledge to resolve problems</div> <div style="padding-left: 20px;">5.5 Take other appropriate actions on abnormal situations which cannot be resolved during the shift to ensure safety and the resolution of the situation</div> <div style="padding-left: 20px;">5.6 Follow through items initiated until final resolution has occurred</div> |
| 6 | Isolate and de-isolate turbine and its component plant items | <div style="padding-left: 20px;">6.1 Shut down turbine according to the turbine type and duty in liaison with other personnel</div> <div style="padding-left: 20px;">6.2 Shut down/changeover component plant items within unit according to their type and duty in liaison with other personnel</div> <div style="padding-left: 20px;">6.3 Isolate entire turbine system and/or any component plant item</div> <div style="padding-left: 20px;">6.4 Make safe for required work</div> <div style="padding-left: 20px;">6.5 Check turbine/plant item is ready to be returned to service</div> <div style="padding-left: 20px;">6.6 De-isolate and prepare turbine/plant unit/plant item for return to service</div> |

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

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.

Regulatory framework

The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used, and include one or more of the following:

- legislative requirements, including work health and safety (WHS)
- industry codes of practice and guidelines
- environmental regulations and guidelines
- Australian and other standards
- licence and certification requirements

All operations to which this unit applies are subject to stringent health, safety and environment (HSE) requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and HSE requirements, the HSE requirements take precedence.

Hazards

Hazards include one or more of the following:

- electricity
- gas
- gases and liquids under pressure
- structural hazards
- structural collapse
- equipment failures
- industrial (machinery, equipment and product)
- equipment or product mass
- noise, rotational equipment or vibration
- plant services (steam, condensate and cooling water)
- limited head spaces or overhangs
- working at heights, in restricted or confined spaces, or in environments subjected to heat, noise, dusts or vapours
- flammability and explosivity
- hazardous products and materials
- unauthorised personnel
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- extreme weather
- other hazards that might arise

Situations requiring action

Situations requiring action include one or more of the following:

- variation in power/fuel supply
- vibration
- overheating
- fouling of turbine/engine/exchangers
- lubrication quality
- ancillary equipment failures

Non-routine problems

Non-routine problems are unexpected problems, or variations of previous problems and must be resolved by applying operational knowledge to develop new solutions, either individually or in collaboration with relevant experts, to:

- determine problems needing action
- determine possible fault causes
- develop solutions to problems which do not have a known solution
- follow through items initiated until final resolution has occurred
- report problems outside area of responsibility to designated person

Operational knowledge includes one or more of the following:

- procedures
- training
- technical information such as journals, engineering specifications
- remembered experience
- relevant knowledge obtained from appropriate people

Start up/shut down

Start up/shut down includes the following:

- start up and shut down to/from normal operating conditions
- start up and shut down to/from isolated, cold or empty
- start up and shut down to/from other conditions/situations experienced on the plant

Procedures

All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, include one or more of the following:

- emergency procedures

- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant

Operate Operate is to monitor, adjust/make change to the production unit and/or its component items to meet specifications, by one or both of the following:

- manually in the plant
- using local controller in the plant

This competency does not require the operation of a central control panel.

Product Product includes anything produced by a process step and so includes:

- intermediate products, such as the product from one process step, which then becomes the feed for another

Unit Mapping Information

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Links

MSA Training Package Implementation Guides - <http://mskills.org.au/training-packages/info/>