



Australian Government

PMAOPS222 Operate and monitor pumping systems and equipment

Release: 1

PMAOPS222 Operate and monitor pumping systems and equipment

Modification History

Release 1. Supersedes and is equivalent to PMAOPS222B Operate and monitor pumping systems and equipment

Application

This unit of competency covers the skills and knowledge required to operate pumping systems, which are driven by prime movers; and ancillary equipment.

The pumps covered by this unit of competency typically are used for hydrocarbon transmission lines.

This unit of competency applies to operators who are required to start up and shut down the equipment, monitor its performance, identify operational problems and take appropriate action.

This unit of competency applies to an individual who may work alone although under routine direction and supervision. They may work as part of a team or group and will work in liaison with other shift team members and the control room operator, as appropriate.

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

Pre-requisite Unit

PMAOPS221 PMAOPS221 Operate and monitor prime movers OR

PMAOPS324 Operate a gas turbine

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.

- | | | | |
|---|-------------------------|-----|---------------------------------|
| 1 | Prepare for work | 1.1 | Receive and give shift handover |
|---|-------------------------|-----|---------------------------------|

- 1.2 Identify work requirements
 - 1.3 Identify and control hazards
 - 1.4 Coordinate with appropriate personnel
 - 1.5 Check for recent work undertaken on plant item
 - 1.6 Note any outstanding/incomplete work
 - 1.7 Check operational status of equipment
- 2 **Operate pumping systems in accordance with procedures**
 - 2.1 Identify the type of pumping system and duty
 - 2.2 Operate ancillary equipment
 - 2.3 Adjust pumping system as appropriate to type and duty
 - 2.4 Complete routine checks, logs and paperwork, taking action on unexpected observations, readings and trends
 - 2.5 Verify the operational condition of all flanges, gaskets and seals to ensure that the operational integrity of these components is maintained within stated operational tolerances and to avoid any environmental damage
- 3 **Recognise and take action on abnormal situations in accordance with procedures**
 - 3.1 Monitor pumping system, filter system and lubrication system frequently and critically throughout shift using measured/indicated data and senses
 - 3.2 Identify impacts of any changes upstream and downstream
 - 3.3 Recognise situations which may require action
 - 3.4 Resolve routine problems
 - 3.5 Take actions on other abnormal situations to make safe and have the situation resolved
- 4 **Isolate and de-isolate equipment**
 - 4.1 Complete any required pre-start checks
 - 4.2 Start up/shut down/changeover pumping system according to plant type and duty in liaison with other

personnel

- 4.3 Isolate pumping system
- 4.4 Make safe for required work
- 4.5 Check pumping system is ready to be returned to service
- 4.6 De-isolate and prepare pumping system for return to service

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.

- Procedures** All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other

form, and 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

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)
- 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

Routine problems

Routine problems must be resolved by applying known solutions.

Routine problems are predictable and include one or more of the following:

- variation in feed
- vibration
- control of level, temperature, pressure and flow
- blockages
- overheating

- overloading

Known solutions are drawn from one or more of the following:

- procedures
- training
- remembered experience

Non-routine problems must be reported according to according to relevant procedures.

Action

Action in accordance with procedures includes the following:

- determining problems needing action
- determining possible fault causes
- rectifying problem using appropriate solution within area of responsibility
- following through items initiated until final resolution has occurred
- reporting problems outside area of responsibility to designated person

Operate

Operate is to monitor, adjust/change the plant item/unit/system to meet specifications, by one or more of the following:

- manually in the plant
- using local controller in the plant
- using the process control system in the control room

Start up/shut down as required

Start up/shut down as required 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

Pumps

Pumps include one or more of the following:

- beam pumps
- electrical submersible pumps
- jet pumps
- centrifugal pumps
- positive displacement pumps (e.g. reciprocating pumps)

Ancillary equipment

Ancillary equipment includes one or more of the following:

- various drivers (e.g. diesel engine, electric motor and steam turbine)
- vibration monitors
- lubrication pumps and equipment
- gear boxes and barring gear instrumentation
- filters

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMAOPS222B Operate and monitor pumping systems and equipment

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=9fc2cf53-e570-4e9f-ad6a-b228ffdb6875>

Assessment Requirements for PMAOPS222 Operate and monitor pumping systems and equipment

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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, and include the ability to:

- start up and shut down pumping system
- monitor and operate equipment to meet specifications
- recognise early warning signs of equipment/processes needing attention or with potential problems
- determine the most likely cause of routine problems
- take appropriate action to ensure a timely return to full performance
- isolate and de-isolate equipment
- identify hazards and apply hazard control procedures.

Knowledge Evidence

Evidence must be provided that demonstrates knowledge of:

- pumping system/equipment operating parameters
- equipment terminology
- safety systems and procedures
- principles of operation of pump, ancillaries and components
- physics and chemistry relevant to the pump, ancillaries and the materials processed
- process parameters and limits, e.g. temperature, pressure, flow and pH
- relevant alarms and actions
- correct methods of starting, stopping, operating and controlling process
- function and troubleshooting of major components and their problems
- corrective action appropriate to the problem cause
- hierarchy of control
- hazards that may arise in the job/work environment, and:
 - their possible causes
 - potential consequences
 - appropriate risk controls.

Assessment Conditions

- The unit should be assessed holistically and the judgement of competence based on a holistic assessment of the evidence.
- Where competency is also required and has not been achieved in
 - PMAOPS221 Operate and monitor prime movers OR
 - PMAOPS324A Operate a gas turbine
- It may be co-delivered and co-assessed.
- The collection of performance evidence:
 - should occur over a range of situations which include typical disruptions to normal, smooth operation of an operating plant
 - will typically include a supervisor/third-party report or other evidence, focusing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
 - must include the use of an industrial pump appropriate to this unit allowing demonstration of operation
 - may use industry-based simulation for part only of the unit where safety, lack of opportunity or significant cost is an issue.
- Assessment should 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 reflecting 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.
- Assessment in a simulated environment should use evidence collected from one or more of:
 - walk-throughs
 - pilot plant operation
 - demonstration of skills
 - industry-based case studies/scenarios
 - 'what ifs'.
- Knowledge evidence may be collected concurrently with performance evidence (provided a record is kept) or through an independent process, such as workbooks, written assessments or interviews (provided a record is kept).
- 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.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.

- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- In addition, the assessor or anyone acting in subject matter expert role in assessment must demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they must assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
 - relevant VET or other qualification/Statement of Attainment
 - appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions
 - appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
 - being currently employed undertaking the type of work being assessed
 - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation's policies and procedures
 - having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
 - conducting on-the-job training/assessments of the type of work being assessed
 - being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work

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