



Australian Government

Department of Education, Employment and Workplace Relations

PMAOPS223A Operate and monitor valve systems

Release: 1

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Modification History

Not applicable.

Unit Descriptor

In a typical scenario an operator adjusts and monitors valves and ancillary equipment as part of controlling a process (e.g. hydrocarbons transport pipeline, gas distribution network). This unit may be required when **PMAOPS222A - Operate and monitor pumping systems and equipment** is appropriate. It may only be counted towards a qualification where competence in **PMAOPS201A - Operate fluid flow equipment** is unable to be obtained due to the nature of the job, but the operation of valves is relevant.

The operations technician would:

identify and report operational problems

be aware of and contribute to a safe working environment

contribute to the safe and productive operation of the valve

operate, monitor and maintain equipment using relevant procedures

Generally the operator would be part of a team and would be expected to be competent in all parts of this unit. At all times they would be liaising and cooperating with other members of the team/shift.

Prerequisites

This unit **does not** have prerequisites:

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Prerequisites

This unit **does not** have prerequisites:

Application of the Unit

Not applicable.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

Not applicable.

Elements and Performance Criteria Pre-Content

Not applicable.

Elements and Performance Criteria

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Element	Performance Criteria
1 Prepare valves for operation	1.1 Check operation of valves and valve systems by applying knowledge of valve operation and fundamental operating principles.
	1.2 Check the valves required for operation against the site specific operating pressures, temperatures, volume, velocities and materials requirements where applicable.
	1.3 Prepare or sequence valves required for operation, ensuring that they are either closed or opened as required, to regulate the flow of liquids and systems flow rates in a safe and efficient manner.
	1.4 Check the valve's operational integrity to minimise the risk of valve leakages and failures.
2 Operate valve systems	2.1 Monitor valve operation to ensure it is functioning correctly and excludes such incidents as vibration, chatter, cycling, and sticking.
	2.2 Regulate or alter valve sequences to control the flow rates of fluid during the process to meet changing production conditions and demands.

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|---|---------------------------------|--|
| 3 | Conduct operational maintenance | 3.1 Clean and lubricate valve stems, threads and other operational parts to ensure the correct operational condition of the valve is maintained. |
| | | 3.2 Evenly tighten valve bolting assemblies to prevent product leakage. |
| | | 3.3 Identify valve and regulator faults and take appropriate action. |
| | | 3.4 Isolate jammed or sticking valves from operation, report and prepare for maintenance. |
| 4 | Control hazards | 4.1 Identify hazards in work area. |
| | | 4.2 Assess the risks arising from those hazards. |
| | | 4.3 Implement measures to control those risks in line with procedures and duty of care. |
| 5 | Respond to valve problems | 5.1 Monitor plant frequently and critically throughout shift using measured/indicated data and senses (sight, hearing, etc.) as appropriate. |
| | | 5.2 Recognise operational problems. |
| | | 5.3 Analyse cause of operational problems within scope of skill level. |
| | | 5.4 Take timely and appropriate action to solve operational problems. |

Required Skills and Knowledge

Not applicable.

Evidence Guide

Assessment context and methods

Assessment for this unit of competency will be on an operating plant. The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency. Assessment will occur over a range of situations, which will include disruptions to normal, smooth operation.

Simulation may be required to allow for timely assessment of parts of this unit of competency (e.g. element 3). Simulation should be based on the actual plant and will include walk throughs of the relevant competency components. Simulations may also include the use of case studies/scenarios, role plays and 3D virtual reality interactive systems. In the case of evacuation training or of training for competencies practised in life threatening situations, simulation may be used for the bulk of the training.

This unit of competency requires an application of the knowledge contained in the use of valve systems and their integral equipment, to the level needed to maintain control and recognise and resolve problems. This can be assessed through questioning and the use of what if scenarios both on the plant (during demonstration of normal operations and walk throughs of abnormal operations) and off the plant.

Critical aspects

Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. The emphasis should be on the ability to stay out of trouble rather than on recovery from a disaster.

Consistent performance should be demonstrated. In particular look to see that:
early warning signs of equipment/processes needing attention or with potential problems are recognised

the range of possible causes can be identified and analysed and the most likely cause determined

appropriate action is taken to ensure a timely return to full performance

obvious problems in related plant areas are recognised and an appropriate contribution made to their solution.

These aspects may be best assessed using a range of scenarios/case studies/what ifs as the stimulus with a walk through forming part of the response. These assessment activities should include a range of problems, including new, unusual and improbable situations, which may have been generated from the past incident history of valves, incidents with similar valves around the world, hazard analysis activities and similar sources.

Resource implications

As a general rule assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating competence over a range of situations. A bank of scenarios/case studies/what ifs will be required as will a bank of questions which will be used to probe the reasoning behind the observable actions.

Other assessment advice

In all plants it may be appropriate to assess this unit concurrently with relevant teamwork and communication units. It will frequently also be appropriate to assess this unit concurrently with:

PMAOPS221A - Operate and monitor pumping systems and equipment

Essential knowledge

The knowledge referred to in the evidence guide for this unit includes:

identify all items on a schematic of the valve system and describe the function of each

physics related to the process
valve equipment operating parameters
process and product variables and reactions
operating pressures
operating temperatures
flow volume calculations
flow velocity calculations
fluid corrosive properties
fluid erosive properties.

Competence also includes the ability to isolate the causes of problems to an item of equipment within the valve system and distinguish between causes of problems/alarm/fault indications such as:

instrument failure/malfunction
electrical failure/malfunction
mechanical failure/malfunction
equipment design deficiencies (e.g. wrong valve type for service)
product parameters (e.g. temperature, viscosity, purity)
fouling or contamination
erosion and corrosion.

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Range Statement

Context

This unit of competency includes all such items of equipment and unit operations which form part of the valve system.

For your plant this may include (select relevant items):

globe, butterfly, ball and gate valves

control valves

isolation valves

non-return or check valves

pressure relief valves

shutdown systems

hydraulic power units.

Valve actuation may be:

pneumatic

hydraulic

electrical

manual.

Typical problems for your plant may include:

vibration/resonance

blockages/hydrates

valve seat wear

valve seal leakage

valve stem leakage

mechanical failure, e.g. plug/gate

valve sticking.

HSE

All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State 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.

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Unit Sector(s)

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