



Australian Government

MEM23115 Evaluate fluid power systems

Release: 1

MEM23115 Evaluate fluid power systems

Modification History

Release 1. Supersedes and is equivalent to MEM23115A Evaluate fluid power systems.

Application

This unit of competency defines the skills and knowledge required to evaluate hydraulic and pneumatic systems and components, including automated fluid power applications characterised by two or three actuators requiring digital control of valves and pre-set flow and pressure control.

It applies to the evaluation of manual and automated fluid power systems and components and the evaluation can be undertaken as part of a design or system selection process or to assess system condition, sustainability or efficiency.

It is suitable for people working as fluid power technicians or system designers, draftspersons and maintainers, and for those pursuing careers and qualifications in engineering or related disciplines.

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

MEM23006 Apply fluid and thermodynamics principles in engineering

Competency Field

Engineering science

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine scope of fluid power system evaluation	1.1 Determine fluid power systems and components to be evaluated 1.2 Identify stakeholders to be consulted on the evaluation 1.3 Confirm that appropriate support, including technical and professional assistance, is available 1.4 Determine relevant work health and safety (WHS) and regulatory requirements, risk management and organisational procedures

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	1.5 Investigate sustainability implications of fluid power applications
2. Identify principles and techniques required for evaluation of fluid power systems and components	2.1 Review features and functions of pneumatic systems and components for relevance to evaluation 2.2 Review features and functions of hydraulic systems and components for relevance to evaluation 2.3 Determine fluid power principles and techniques required to evaluate systems and select and optimise components. 2.4 Determine appropriate analysis techniques, software and software validation techniques
3. Evaluate fluid power systems and components	3.1 Assess fluid suitability, compatibility, and treatment relative to systems 3.2 Assess features, functions and suitability of hydraulic systems and components for applications 3.3 Assess features, functions and suitability of pneumatic components for applications 3.4 Assess suitability of fluid power system and components in automated power applications using two or three actuator hydraulic or pneumatic circuits with digital fluid and electrical or electronic control elements
4. Report results	4.1 Record outcomes of evaluation 4.2 Provide documentation including calculations, component, system layouts, functional diagrams, control signal diagrams and details of fluid power process

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.	
Hydraulic applications include:	- mobile vehicles and plant - equipment for moving and positioning heavy loads - industrial machinery including presses for punching, drawing and forging - industrial and mobile braking systems.
Pneumatic applications include:	- transfer mechanisms for moving and positioning light loads - medium load clamping and stamping operations - compressed air distributed systems.
Sustainability includes:	- meeting all regulatory requirements - conforming to all industry covenants, protocols and best practice guides - minimising ecological and environmental footprint of process, plant and product - maximising economic benefit of process plant and product to the organisation and the community - minimising the negative WHS impact on employees, community and customer.
Appropriate licensed technical and professional assistance includes:	- technical support and advice relating to elements which have intrinsic dangers - professional support for technologies.
WHS, regulatory requirements and organisational procedures include:	- WHS acts, regulations and relevant standards - codes of practice from Australian and overseas engineering and technical associations and societies - risk assessments - registration requirements - safe work practices - state and territory regulatory requirements.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23115A Evaluate fluid power systems.

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 MEM23115 Evaluate fluid power systems

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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:

- determining parameters and context of evaluation task
- determining work health and safety (WHS) and regulatory requirements, and risk management and organisational procedures
- investigating and reviewing sustainability implications, features and functions of fluid power systems and components
- identifying fluid power principles and techniques, analysis techniques, software and software validation techniques
- Evaluating fluid systems and components for the following characteristics on at least two occasions:
 - suitability
 - compatibility and treatment
 - features and functions
 - digital fluid and electrical/electronic control elements
- reporting and documenting results of evaluation.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

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:

- WHS and regulatory requirements, codes of practice, standards and risk management requirements
- availability of professional and technical assistance
- fluid power systems
- current options and trends in performance analysis software, including underpinning program techniques and software validation techniques
- common applications for pneumatics and hydraulics
- comparative advantages of fluid power over mechanical and electrical power
- characteristics and properties of pneumatic and hydraulic fluids and relative compressibility of air and hydraulic fluid

- applications and selection criteria for mineral, synthetic and fire-resistant fluids and compatibility of fluids with system materials
- fluid power fundamental principles and calculations for system components including:
 - conservation of energy
 - energy measurement and units
 - energy forms
 - hydraulics fundamentals including pressure, temperature and flow rate relative to actuator force
 - pneumatic fundamentals including gas laws, pressure difference and flow rate, and flow to atmosphere
- features and functions and selection criteria of fluid power components in applications including:
 - pumps
 - valves electrical circuits and control elements actuators
 - accumulators
 - compressors (pneumatics)
 - reservoirs
 - gauges and instrumentation
 - hoses, pipes, filters and fittings
- types and requirements for fluid and electrical circuits maintenance requirements for fluid power systems
- methods of circuit presentation including standard symbols, circuit sequence and signal condition diagrams for multi-actuator circuits.
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Assessment Conditions

- Assessors must:
 - have vocational competency in evaluating fluid power systems and components 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 that 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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