



**Australian Government**

**Assessment Requirements for MEM23006  
Apply fluid and thermodynamics principles  
in engineering**

**Release: 1**

# Assessment Requirements for MEM23006 Apply fluid and thermodynamics principles in engineering

## Modification History

Release 1. Supersedes and is equivalent to MEM23006A Apply fluid and thermodynamics principles in engineering.

## 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:

- reviewing sustainability implications, functions and features of fluid, thermodynamic and vacuum devices, machines and systems
- interpreting system designs for industrial applications
- selecting components for specified technical performance on at least two occasions
- calculating energy use in fluid, thermodynamic and vacuum system
- assessing and applying fluid, thermodynamic and vacuum principles and software skills and techniques to engineering tasks on at least two occasions
- reporting and documenting results of investigation, evaluation and application, calculations, diagrams, programs and files in accordance with procedures.

*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:

- fluid mechanics and thermodynamics and their applications
- analytical, graphical, semi-graphical and software assisted techniques for applications for fluid and thermodynamic principles in engineering
- energy and sustainability concepts relevant to fluid and thermodynamic applications
- principles of turbines and heat engines
- static and hydrodynamic devices or systems
- thermodynamic devices or systems
- basic properties and concepts common to fluids and thermodynamics including:
  - atoms, molecules, inter-molecular forces, molecular motion, states of matter, solids, liquids, gases, basic properties and units
  - ideal or perfect gases and liquids
  - definitions
- energy types and concepts including:
  - potential energy, kinetic energy and internal energy

- chemical energy = energy content of a fuel
- work, constant and variable force, relationship to pressure and volume changes
- sensible heat and specific heat capacity ( $C_p$  and  $C_v$ )
- phase change, latent heat, enthalpy and enthalpy diagram
- heat transfer processes
- concepts and properties of gases
- energy transfer in closed and open systems including:
  - definition of a closed system
  - non-flow energy equation definition of an open system
  - mass and volume flow rate and the continuity equation
- fluid mechanics, system components, statics, dynamics and power
- vacuum technology including:
  - definition of vacuum
  - states of matter
  - purposes of vacuums
  - degrees of vacuum
- methods of lowering pressure including:
  - displacement or transfer of gas
  - sorption or condensation
- barometric pressure including:
  - inverted mercury tube
  - variation of atmospheric pressure with altitude
- quantity of gas including mole, Avogadro's number and molar mass
- types of vacuum pumps for evacuating volumes
- description of typical vacuum vessels, features and functions
- applications of vacuum technology in industry
- when to seek licensed technical and professional assistance.
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## Assessment Conditions

- Assessors must:
  - have vocational competency in applying fluid and thermodynamics principles in engineering 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.

## Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>