



Australian Government

Assessment Requirements for MEM23109 Apply engineering mechanics principles

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM23109A Apply engineering mechanics principles.

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 tasks
- applying work health and safety (WHS), regulatory requirements, risk management and organisational procedures
- reviewing sustainability implications and functions and features of devices, machines and systems
- assessing and applying engineering mechanics principles, including use of software basic analysis and graphics skills and techniques, on at least two occasions
- ensuring compatibility of units in calculations
- reporting and documenting results 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:

- engineering mechanics tasks
- mathematical techniques including arithmetic, algebra, trigonometry and geometry
- definition of typical applications of mechanics, statics, dynamics, kinematics, kinetics and strength of materials
- analytical, graphical, semi-graphical and software-assisted techniques for tasks
- physical quantities and dimensions including international system of units (SI) and fundamental dimensions and units
- 2D plane motion (only)
- basic principles of statics applicable to mechanical devices and systems
- application of force systems applied to bodies, frames and beams
- friction laws and applications in mechanical devices and systems
- stress and strain:
 - axial stress
 - shear stress

- bolted and welded joints
- torsional stress
- bending of beams
- dynamics applicable to mechanical devices and systems, including:
 - kinematics of rectilinear motion:
 - displacement, velocity and acceleration
 - equations of rectilinear motion
 - equations of simple harmonic motion
 - uniform acceleration and sinusoidal acceleration
 - kinetics of rectilinear motion including:
 - force, mass and acceleration
 - freely falling bodies
 - acceleration against resistance (accelerating force = unbalanced force)
 - acceleration against gravity and terminal velocity
 - acceleration against dry sliding friction and air resistance
 - forces diagrams
 - curvilinear motion including:
 - normal acceleration in curvilinear motion
 - centrifugal force
 - circular motion as a case of curvilinear motion
 - kinematics of rotation including:
 - rotational motion
 - angular displacement
 - angular velocity
 - angular acceleration
 - conversions of units of angular motion
 - equations of rotation with uniform acceleration
 - relation between linear and angular motion
 - kinetics of rotation including:
 - moment of inertia, second moment of mass, concept and units
 - torque due to inertia compared with torque due to winding drum rope force
- law of a machine
- work, energy and power
- specifications for engineering hardware applicable to mechanical devices and systems.
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Assessment Conditions

- Assessors must:

- have vocational competency in applying engineering mechanics principles in engineering situations 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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Links

Companion Volume implementation guides are found in VETNet -

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