



Australian Government

MEM09011 Apply basic engineering design concepts

Release: 1

MEM09011 Apply basic engineering design concepts

Modification History

Release 1. Supersedes and is equivalent to MEM09011B Apply basic engineering design concepts

Application

This unit of competency defines the skills and knowledge required to apply in situ design skills to determine design requirements and create a design for application within the engineering fields of mechanical, production, electrical or electronic, fabrication and fluid power. Design concepts may be applied to the fabrication and modification of structures, plant and equipment, and design of tooling and gauges, production control systems, fluid power layouts and electrical circuits.

This unit is suitable for application by personnel who are responsible for the manufacture of the design outcome, either individually or as part of a team.

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

Band: A

Unit Weight: 6

Pre-requisite Unit

MEM09002	Interpret technical drawing
MEM12023	Perform engineering measurements
MEM12024	Perform computations
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information

Competency Field

Drawing, drafting and design

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
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1	Determine job requirements	1.1	Follow standard operating procedures (SOPs)
		1.2	Comply with work health and safety (WHS) requirements at all times
		1.3	Identify design requirements from specifications, job sheets or associated work instructions
2	Determine design concepts	2.1	Establish design concepts with regard to design considerations
		2.2	Consult codes, regulations and technical documentation to establish design limitations in accordance with SOPs, where appropriate
		2.3	Identify sources of expert assistance and use, as required
3	Create design	3.1	Ensure design meets end use requirement
		3.2	Ensure design meets all legislative and regulatory requirements
		3.3	Verify design concept in accordance with SOPs
		3.4	Produce design outcome in accordance with job requirements

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

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.

Design considerations include one (1) or more of the following:

- location
- assembly requirements
- process
- material
- quantity
- cost
- outcome
- impact of the design on other equipment, processes or personnel

Design outcome includes one (1) or more of the following:

- sketch
- drawing
- prototype
- document
- model
- finished product

Unit Mapping Information

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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>

Assessment Requirements for MEM09011 Apply basic engineering design concepts

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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 on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- determining design requirements to establish design concepts
- consulting on relevant codes, regulations, and technical documentation in consultation with appropriate personnel to establish design limitations and verifying design
- creating design concepts to meet requirements
- undertaking numerical operations, geometry and formula and calculations to ensure design meets end use requirement whilst complying with all legislative and regulatory requirements
- producing design outcome to meet end use requirement.

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:

- safe work practices and procedures
- design requirements
- functional requirements of the design
- materials appropriate to the environment in which the object to be designed is to operate
- processes to be used and the costs associated in the manufacture of the object
- reasons for selecting the chosen design concept
- all relevant codes, standards and regulations applying to the object to be designed and the impact on the design requirements
- sources of expert assistance in the design process
- end-use requirements of the design
- checks to ensure the design complies with the relevant codes, standards, legislative and regulatory requirements
- procedures for verifying design concepts
- means by which the design concept is to be presented and requirements for achieving design outcome.

Assessment Conditions

- Assessors must:
 - have vocational competency in applying basic engineering design concepts 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. This must 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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