Australian Government

Department of Education, Employment and Workplace Relations

MEM09011B Apply basic engineering design concepts

Release: 1

MEM09011B Apply basic engineering design concepts

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers applying in situ design skills by personnel who are then responsible for the manufacture of the design outcome either individually or as part of a team.

Application of the Unit

Application of the unit	This unit includes the determination of requirements such as location, assembly or other parts of the manufacturing or engineering process and where the designer must consider the impact of the design on other equipment, process or personnel, for example safety aspects of the design. Design tasks undertaken include the application of design concepts to, for example, the fabrication and modification of structures, plant and equipment, and design of tooling and gauges, production control systems, fluid power layouts, electrical circuits etc. The unit applies to the fields of mechanical, production, electrical/electronic, fabrication, and fluid power. **Band**: **A** **Unit Weight**: **6**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM09002B	Interpret technical drawing

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine design requirements	1.1. Design requirement is established from job sheets, instructions or in consultation with appropriate people. 1.2. Design concepts are established and may include consideration of process, material, quantity, cost and outcome. 1.3. Where appropriate, codes, regulations and technical documentation are consulted to establish design limitations in accordance with standard operating procedures. 1.4. Sources of expert assistance are identified and used as required.
2. Create design	2.1. Design meets end use requirement. 2.2. Design meets all legislative and regulatory requirements. 2.3. Design concept is verified in accordance with standard operating procedures. 2.4. Design outcome is produced as per job requirements and may include sketch, drawing, prototype, document, model or finished product.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- obtaining all relevant drawings, job sheets, instructions and specifications
- consulting, where appropriate, relevant personnel as to the design requirements
- inspecting, where appropriate, the object, plant or equipment to which engineering design concepts are to be applied
- determining, where appropriate, design limitations imposed by relevant codes, standards and regulations
- where appropriate, seeking assistance from relevant sources
- verifying the design concept.

REQUIRED SKILLS AND KNOWLEDGE

- presenting the design object in a form appropriate to the job requirements
- reading, interpreting and following information on written job instructions, specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- checking and clarifying task related information
- planning and sequencing operations
- checking for conformance to specifications
- undertaking numerical operations, geometry and calculations/formulae within the scope of this unit

Required knowledge

Look for evidence that confirms knowledge of:

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

Evidence Guide

EVIDENCE GUIDE	
The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.	
Overview of assessment	A person who demonstrates competency in this unit must be able to apply basic engineering design concepts. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with applying basic engineering design concepts or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.

EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Drawing, drafting and design