Australian Government

Department of Education, Employment and Workplace Relations

MEM09141A Represent mechanical engineering designs

Release: 1

MEM09141A Represent mechanical engineering designs

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit defines the competencies required to represent the design of mechanical and manufacturing engineering products, processes, systems or services using appropriate graphical techniques, specifications and documentation. Work would typically be carried out as part of a design team.

Application of the Unit

Application of the unit	Competency in this unit includes contribution to the full design process by the creation of documentation, graphics and specifications representing products, processes, systems or services in support of the planning and design processes within mechanical and manufacturing engineering. Graphics may be produced using manual or CAD software and techniques. This unit only has application in qualifications that are not points based. **Band**: **Unit Weight**:

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM16008A	Interact with computing technology
	MEM30007A	Select common engineering materials
	MEM30012A	Apply mathematical techniques in manufacturing, engineering or related situations

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. Clarify product, process, system or service design requirements	1.1. The design specification of the required product, process, system or service is discussed and clarified with the client and design team.
2. Apply graphical techniques to produce the initial product, process, system or service design representation	2.1. The initial graphical representation satisfies the design specification, manufacturing and operational requirements, safety and related standards. 2.2. Engineering calculations were made, engineering references, standards and codes used appropriately to determine dimensions, limits and fits, surface textures, datum references and geometric tolerances. 2.3. Initial design representation identifies materials, manufacturing methods and processes. 2.4. Initial production graphics, specifications and operating and maintenance instructions/manuals are prepared in accordance with the agreed design concept and organisational requirements using chosen graphical techniques.
3. Validate the product, process, system or service representation	3.1. The suitability of the product, process, system or service design graphical representation is confirmed with the client, other team members and organisational requirements.
4. Develop, validate, implement and file design graphics and specifications and procedural documentation	4.1. Design graphics, specifications and instructions for the product, process, system or service are prepared in accordance with the agreed design concept and organisational requirements and incorporate feedback on initial design graphics and documents. 4.2. The production graphics, specifications and instructions for the product, process, system or service are checked with the client, design team and other affected persons for suitability prior to implementation. 4.3. Implementation installation and commissioning feedback is responded to in accordance with organisational requirements. 4.4. The validated production graphics, specifications and instructions for the product process, system or service are maintained throughout the implementation, installation and commissioning processes, processed and filed in accordance with organisational requirements.

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:

- appropriate communication skills for contacting and confirming specifications with the client
- discussing the alternative options and their relative strengths and weaknesses with the client and selecting the most acceptable option chosen
- applying graphical techniques correctly
- addressing design specification, manufacturing and operational requirements, safety and related standards appropriately in the initial graphical representations
- presenting the graphical representations the dimensions, limits and fits, tolerances and surface textures, datum references and geometry tolerances as determined by design calculations and in accordance with engineering references, standards and codes
- producing initial graphical representation and documentation materials, manufacturing methods and processes and design functional specification sufficient for client, design team and interested party consultation and validation
- producing initial graphical representation/s to organisational requirements using suitable graphical techniques
- producing initial production graphics, technical specifications and operational and maintenance instructions/manuals in accordance with work site procedures and client's needs
- using appropriate communication skills in confirming that the design graphical representation meets the needs of the client and the expectations of other team members and interested parties
- completing organisational procedures and "sign off" documentation
- preparing production graphics, specifications and instructions in accordance with the agreed design concept and organisational requirements and incorporating feedback on initial design graphics
- contacting the client, design team and other affected persons and the production graphics, technical specifications and verifying operational and maintenance instructions/manuals prior to implementation
- incorporating feedback from the implementation, installation and commissioning phases into final graphics, specifications
- processing, filing and saving all graphics, specifications, instructions and related documentation in correct format and location in accordance with work site procedures

REQUIRED SKILLS AND KNOWLEDGE

Required knowledge

Look for evidence that confirms knowledge of:

- the procedures for collaborating with the client and other staff in the selection of the preferred option
- significance of graphical representations of designs in terms of procedural requirements, design objectives and client or contractual requirements
- relevant manufacturing and operational requirements, safety and related standards
- the functional operation of the component/assembly to be drawn
- surfaces that are to be in contact or separated
- the appropriate type of fit for contacting surfaces
- the reasons for selecting the chosen type of fit
- the effect of surface finish on the performance/operation of surfaces
- appropriate datum points
- the procedures for determining tolerances
- design functional specification
- choice of components, materials, methods and processes in terms of the range of options available and the manner in which the design specification is satisfied
- options for graphical methods of representation
- scientific principles and mathematical techniques underpinning design element choices and decisions
- required graphical representation procedures for the preparation of production drawings, specifications and operating and maintenance instructions/manuals
- clients and other people affected by the design
- organisational procedures and required communication techniques
- organisational requirements for the preparation of production drawings, specifications and operating and maintenance instructions/manuals for products and systems
- persons to be consulted and procedures for verifying and implementing production graphics, technical specifications and operational and maintenance instructions/manuals
- work site procedures for acting on implementation, installation and commissioning feedback
- work site procedures for the processing and filing of production graphics, specifications and operating and maintenance instructions/manuals
- use of file storage and archiving

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 represent the design of mechanical and manufacturing engineering products, processes, systems or services for a range of general engineering applications. 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 represent the design of mechanical and manufacturing engineering products, processes, systems or services 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,

EVIDENCE GUIDE	
	product and manufacturing specifications, codes, standards, manuals and reference materials.
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.	
Graphical representation	Manual or CAD software and techniques include sketching and layout techniques, reading, interpreting of drawings, documentation and design briefs, use of organisation protocols for graphics development, use of industry standards and codes of practice, multimedia presentation techniques, basic software customisation techniques, 3D and orthographic techniques, basic file management techniques
Design graphics, **specifications and instructions**	May include those prescribed within the organisation's policies and procedures and those required by relevant statutory regulations and requirements

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Drawing, drafting and design