



Australian Government

MEM09209 Detail bearings, seals and other componentry in mechanical drawings

Release: 1

MEM09209 Detail bearings, seals and other componentry in mechanical drawings

Modification History

Release 1. Supersedes and is equivalent to MEM09209A Detail bearings, seals and other componentry in mechanical drawings.

Application

This unit of competency defines the skills and knowledge required to produce detailed engineering drawings containing bearings, seals and other componentry to Australian Standard (AS) 1100.101 Technical drawing - General principles. It includes applying geometric tolerances to provide specific clearances and confirm the geometric shape of components.

This unit is suitable for those working within a drafting work environment and can be applied across all engineering disciplines. Drawings are carried out with or without the use of computer-aided design (CAD) systems.

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

Pre-requisite Unit

MEM09204 Produce basic engineering detail drawings

MEM09229 Read and interpret technical engineering drawings

Competency Field

Drawing, drafting and design

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
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 job requirements from available information 1.4 Determine purpose and scope for drawing and identify and address further information needs

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	1.5 Determine project consultation requirements 1.6 Identify and prepare equipment, organisational files, templates and symbols required to complete work
2. Identify system requirements	2.1 Determine required components from catalogues, tables, standards and specifications 2.2 Identify required bearings based on their type, features and uses 2.3 Identify required mechanical seals based on their type, features and uses 2.4 Determine method of general tolerancing, classes of fit and forms of geometric shapes from engineer, sketches or specifications 2.5 Determine other componentry and type of lubricants to be used 2.6 Apply codes, standards and symbols used for components and methods used to locate on drawings
3. Prepare detail drawing	3.1 Lay out drawing in accordance with the sketches and specifications 3.2 Apply line work in accordance with standard industry drawing practice 3.3 Produce detail and assembly drawings containing engineering bearings and mechanical seals, applying general tolerances 3.4 Produce detail drawings requiring sizing and tolerancing of keys and keyways 3.5 Produce detail drawings containing shafts and holes and fully tolerance to suit particular class of fit 3.6 Produce detail drawings of engineering components applying geometric tolerances to the shape 3.7 Apply surface texture finishes to detail drawings 3.8 Present drawing according to organisational requirements
4. Document and store drawings	4.1 Document drawings and associated technical information in accordance with project requirements and SOPs 4.2 Store drawings in accordance with SOPs

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

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.

Available information includes one or more of the following:	• construction documents • assembly and installation drawings • work specifications • information for plant services equipment • industry codes, standards and regulations • design brief.
Bearings include one or more of the following plain and anti-friction bearings:	• ball • roller • angle • self-aligning • thrust • taper.
Seals are defined as devices designed to prevent the movement of fluid from one area to another, or to exclude contaminants and include one or more of the following:	• static seals • dynamic seals • wiper • rod • piston • guide • V-packing O-rings.
Other componentry includes one or more of the following:	• engineering keys • keyways • holes • shafts.
General tolerances include one or more of the following:	• unilateral • bilateral • limits of size • direct.
Appropriate personnel include one or more of the	• designer • engineer

following:	• supervisor • contractor/consultant • builder.
Support services include one or more of the following:	• estimating department and personnel • engineering department and personnel • drafting department and personnel • project manager • factory manager or staff.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM09209A Detail bearings, seals and other componentry in mechanical drawings.

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 MEM09209 Detail bearings, seals and other componentry in mechanical drawings

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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 and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- determining purpose and scope for drawing requirements relevant to the project utilising all available information
- identifying system requirements including bearings and seals for inclusion in drawing on at least two occasions
- determining the method of general tolerance, classes of fit and forms of geometric shapes from engineer, sketches or specifications
- producing mechanical drawings which detail bearings, seals and other componentry, applying general tolerances and ensuring drawing accurately reflects specifications on at least two occasions
- verifying parameters of the design brief with appropriate personnel
- consulting with appropriate support services and presenting and explaining drawing
- documenting and storing drawings in accordance with SOPs.

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:

- safe work practices and procedures
- different approaches to drawing
- awareness of copyright and intellectual property issues and legislation in relation to drawing
- quality assurance procedures
- sources of information
- personnel and support services to consult
- organisational standards for computer-aided drawing (CAD)
- order of drawing process

- organisational checking procedures for drawings
- layout and presentation requirements
- standards applicable to the work to be undertaken
- process of storing paper drawings and electronic drawing files
- International System of Units (SI)
- different types of bearings used in the manufacture of an engineering project
- different types of seals used in the manufacture of an engineering project
- components used in the manufacture of an engineering project
- surface texture finishes and machining processes
- geometric tolerances of an engineering component
- terminology associated with the preparation of mechanical drawings.

Assessment Conditions

- Assessors must:
 - have vocational competency in detailing bearings, seals and other componentry in mechanical drawings 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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