Australian Government

Department of Education, Employment and Workplace Relations

MEM09208A Detail fasteners and locking devices in mechanical drawings

Release: 1

MEM09208A Detail fasteners and locking devices in mechanical drawings

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit of competency covers the skills and knowledge required to produce detailed engineering drawings containing fastening and locking devices.

Application of the Unit

This unit is suitable for those working within a drafting work environment and can be applied across all engineering disciplines. Drawings will usually be carried out with the use of computer-aided design (CAD) systems but may also be done manually. Drawings are produced to Australian Standard (AS) 1100.101–1992 Technical drawing – General principles, from predetermined critical dimensions and specifications.
If CAD systems are to be used, the unit MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements, should also be selected.

Licensing/Regulatory Information

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

Pre-Requisites

MEM09002B	Interpret technical drawing
MEM09204A	Produce basic engineering detail drawings

Employability Skills Information

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

1	Determine drawing requirements	1.1	Check purpose, scope and information requirements for drawing
		1.2	Interpret available information relevant to project and work requirements, and identify and address further information needs
		1.3	Identify and prepare equipment required to complete work
		1.4	Identify and access organisational files, templates and symbols as required for work
2	Identify system requirements	2.1	Access catalogues, tables, standards and specifications to determine required components
		2.2	Identify types of fasteners, their features, uses and thread types
		2.3	Identify mechanical location and locking devices, their features, uses and thread types
		2.4	Identify and apply relevant 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 using a range of different line types and media in accordance with standard industry drawing practice
		3.3	Produce detail and assembly drawings containing engineering fasteners and location devices

		3.4	Ensure drawing accurately reflects specifications, is presented according to organisational requirements and contains all relevant information, including full notation and dimensioning
		3.5	Apply workplace occupational health and safety (OHS) and environmental procedures
4	Document and store drawings	4.1	Document drawings and associated technical information in accordance with project requirements and organisational procedures
		4.2	Store drawings according to organisational procedures

Required Skills and Knowledge

Required skills

Required skills include:

- literacy skills sufficient to read and interpret instructions, relevant codes of practice and specifications for drawing work
- using computer technologies and navigating software
- numeracy skills sufficient to interpret technical information and conduct mathematical problem solving as required in the scope of this unit
- using and maintaining drawing equipment
- applying spatial principles to achieve scale and proportion
- interpersonal skills to consult with other disciplines
- drafting skills
- applying symbols, schedules and legends to the drawing
- arranging the views in a logical manner and in accordance with AS 1100.101–1992 Technical drawing – General principles
- correctly using line thickness and construction to identify parts
- using correct method for identifying thread forms on detail and assembly drawings
- using engineering and manufacturer catalogues, tables, standards and specifications
- filing drawings according to workplace procedures

Required knowledge

Required knowledge includes:

- general knowledge of different approaches to drawing
- awareness of copyright and intellectual property issues and legislation in relation to drawing
- environmental and OHS issues associated with the tools and materials used for drawing
- quality assurance procedures
- company standards for CAD
- order of drawing process
- company checking procedures for drawings
- layout and presentation
- the standards applicable to the work to be undertaken
- the process of checking the completed drawing
- the process of storing paper drawings and electronic drawing files
- the International System of Units (SI)
- the different types of fasteners used in the manufacture of an engineering project
- lubrication components and systems and lubricants
- terminology associated with the preparation of mechanical drawings
- different types of thread forms, types and sizes
- types of nuts and uses for locking purposes
- manufacturing processes required to create a drilled and tapped hole and a threaded

feature
- grades of bolts and their applications

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 interpret and apply drawing specifications and industry standards in the production of mechanical drawings which detail fasteners and locking devices.
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. Specifically the candidate must be able to: • work within typical site/teamwork structures and methods • apply worksite communication procedures • comply with organisational policies and procedures, including quality requirements • participate in work meetings • comply with quality requirements • use industry terminology • apply appropriate safety procedures • produce drawings to AS 1100.101–1992 Technical drawing – General principles, detailing fasteners and locking devices.
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. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where

	applicable, physical resources should include equipment modified for people with disabilities. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with drafting 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.

Range Statement

Available information	Available information may include: • construction documents • building and coordination information • work specifications • information for plant services equipment • industry codes, standards and regulations • design brief

Fasteners	Fasteners may include:
	• any mechanical device for joining or affixing two or more components together, such as:
	  • bolts, machine screws, screws, nuts, washers, rivets, locating devices, circlips and masonry anchors
	• threaded fastening devices:
	  • bolts
	  • hex head
	  • square head
	  • carriage
	  • countersunk square neck
	• machine screws:
	  • square head
	  • hex. head
	  • round head
	  • countersunk head
	  • cheese head
	  • pan head
	  • raised head countersunk
	• set screws:
	  • square head
	  • hex. socket
	  • spline socket
	  • slotted (screwdriver)
	• studs
	• self tapping screws
	• drive screws
	• cap screws:
	  • hex. socket
	  • spline socket

	• hex. socket countersunk • nuts • square • hex • slotted • castle • cap or acorn • wing • ring • thread types (metric - imperial) • sizes • grades • thread forms: • vee • square • acme • buttress • round • rivets: • button head • high button • cone head • pan head • flat-top countersunk head • round-top countersunk head • swell neck • pop rivets • huck bolts • cotter pins (split pins) • circlips: • internal • external • round • snap • masonry anchors: • loxin • dynabolt • ramset

Mechanical location devices	Mechanical location devices may include:
	• pins:
	  • dowel pins
	  • taper pins
	  • split taper pins
	  • split pins (roll pin)
	  • grooved pins
	• keys and keyseats:
	  • parallel
	  • plain taper
	  • gibhead taper
	  • feather
	  • saddle
	  • round
	  • scotch
	  • woodruff (full radius/flat bottom)

Locking devices	Locking devices may include:
	• lock nuts (double nuts)
	• nyloc nuts
	• split nuts
	• deformed
	• washers:
	  • plain washers
	  • tab washers
	  • tapered washers
	  • internal tooth lockwashers
	  • external tooth lockwashers
	  • internal and external lockwashers
	  • split spring washers
	  • double coil spring washers
	• wiring
	• chemical methods of thread locking

Appropriate personnel	Appropriate personnel may include: • designer • engineer • supervisor • contractor/consultant • builder

Support services	Support services may include: • estimating department and personnel • engineering department and personnel • drafting department and personnel • project manager • factory manager or staff

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.