



Australian Government

MEM30029A Use workshop equipment and processes to complete an engineering project

Release 1

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Modification History

Release 1 (MEM05v9)

Unit Descriptor

This unit of competency covers the identification and use of a range of common workshop equipment and processes to complete a simple engineering project. It also focuses on developing and applying basic workshop skills and developing knowledge about equipment and processes and relating it to typical technical work requirements.

Application of the Unit

This unit applies to technical employees undertaking projects or operations requiring processes, techniques and workshop practices to produce items or components. The unit is broad-based and aims to assist technical workers to better integrate their roles into a manufacturing or engineering environment through exposure to basic, practical engineering workshop equipment and processes.

The unit is intended for technical workers, where practical workshop skills do not form a major part of the work role.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

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.

Elements and Performance Criteria

1	Research common engineering workshop equipment and processes	1.1	Identify sources of professional, technical and trade assistance
		1.2	Identify common processes and techniques for working, shaping and joining metal, alloys and others materials
		1.3	Identify common engineering hand and power tools and their applications
		1.4	Identify common workshop equipment and applications
2	Identify resources required to manufacture a simple engineered item	2.1	Interpret design information from drawings and instructions
		2.2	Select processes and techniques appropriate to task and level of skill
		2.3	Identify required tools, equipment, material and services
		2.4	Prepare a simple work plan showing operational sequences, work priorities and optimal use of time and resources
3	Use workshop equipment and processes to manufacture a simple engineered item	3.1	Correctly prepare materials and equipment for the required operations
		3.2	Use tools and machines safely and correctly
		3.3	Follow work health and safety (WHS) procedures, standard operating procedures and supervisor instructions are correctly

- 3.4 Obtain assistance from appropriate persons in the event of problems and difficulties
 - 3.5 Follow safe work practices and procedures
 - 3.6 Implement hazard control measures, where practicable
 - 3.7 Complete item manufacturing and check against specifications and work plan
 - 3.8 Clear work area of scrap and waste
 - 3.9 Clean work and secure equipment and work area according to standard procedures
- 4 Assess workshop equipment and processes to technical engineering activities and engineering design process
 - 4.1 Justify selected workshop processes in terms of design criteria
 - 4.2 Assess selected tools and equipment for process safety and efficiency
 - 4.3 Evaluate task and workshop processes against typical technician work activities

Required Skills and Knowledge

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

Required skills

Required skills include:

- reading, confirming and following information on written job instructions, manufacturer specifications, standard operating procedures, charts, lists, drawings and other applicable reference documents
- identifying hazards and applying safe work practices and risk control measures
- communicating with appropriate persons
- following oral instruction and standard procedures
- applying numeracy, calculations and measurements within the scope of this unit
- accurately transferring dimensions to work pieces
- planning and sequencing tasks
- safely operating machines, hand tools and power tools
- setting up machines and tooling for basic operations

Required knowledge

Required knowledge includes:

- task planning and sequencing of operations
- marking out tools, techniques and media
- common measurement tools and techniques
- allowances and tolerances
- common engineering materials
- common hand tools and their applications
- common fixed and portable power tools and their applications
- common engineering machine operation
- common workshop techniques, such as hand and machine cutting, drilling, tapping, grinding, machining, welding, bending and shaping, and assembly
- workshop and machine safety, hazard identification and hazard control
- work holding methods
- basic tooling identification
- speeds and feeds
- machine set-up and operation
- cutting fluids and basic operational maintenance of machines
- assembly and fixing techniques, tools and accessories

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 plan and safely and efficiently undertake the manufacture a simple item using a range of hand and power tools and workshop machinery.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • prepare a basic work plan • identify and prepare selected materials and equipment • apply manual workshop techniques using a range of hand and power tools • use common engineering workshop equipment and machinery to complete individual parts of a project • assemble the component parts of a given project using a range of joining techniques • complete work requirements to specification • follow WHS procedures and hazard control strategies at all times.
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, then a simulated working environment 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.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of

	workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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.

Appropriate persons	Appropriate persons will vary according to the nature of assistance and advice required and may include: • supervisor • leading hand • foreman • trainer/coach • technicians • tradespersons • engineers
Engineering processes and techniques	Engineering processes and techniques include: • hand and machine cutting • drilling • tapping • grinding • machining • welding • bending and shaping • assembly using a variety of fasteners and hand tools
Hand and power tools	Hand and power tools may include: • screwdriver • spanners • hammers • files • jigs • cutting tools • scribes • chisels • centre punches • measurement instruments • gauges • portable drills • pedestal or bench grinder
Workshop cutting and machining	Workshop machining and cutting equipment may

equipment	include: • cut-off machines • surface grinders • drills • lathes • mills • planers • fuel gas cutting torch
Fabrication equipment	Fabrication equipment may include: • nibblers • metal shears • guillotines • pedestal drills • power saws • rivet fastening equipment • pan brake • press brake • universal metal working machine
Welding equipment	Welding equipment includes: • hoses, welding leads, gas shrouds, gas regulators, liners and contact tips – gas metal arc welding (GMAW) • welding leads, welding machines and electrode holder – manual metal arc welding (MMAW) • fuel gas and handheld thermal cutting equipment (thermal cutting)
Preparation of materials and equipment	Preparation of materials and equipment may include: • marking out • preheating • cleaning • setting up jigs and fixtures • clamping • tooling preparation, including basic sharpening • machine settings
Safe work practices and procedures	Safe work practices and procedures include: • relevant legislation • personal protective equipment • material safety management systems, including use of material safety data sheets (MSDS) • hazardous substances and dangerous goods code

	• local safe operating procedures • correct disposal of: • liquid waste • solid waste • minimisation, suppression and venting of gas, fume, vapour, smoke emissions, including fugitive emissions, as appropriate • avoiding excessive energy and water use • avoiding excessive noise • awareness of safe proximity limits and shielding procedures to other personnel • working safely around machinery • working safely with tools and equipment • risk and hazard recognition • emergency procedures • awareness of electrical hazards • first aid sources and procedures for the workplace
Standard operating procedures	Standard operating procedures may include: • the use of tools and equipment • instructions, including job sheets, cutting lists, plans, drawings and designs • reporting and communication • manufacturer specifications and operational procedures • emergency procedures
Elements of the engineering project	Elements of the engineering job may include: • tool and equipment selection • sequencing of operations • techniques and processes • conformance to specifications • material types • quantities produced
Technical work activities	Technical work activities may include: • design • production • quality assurance • product testing • purchasing • commissioning • scheduling

	• planning • drafting
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Unit Sector(s)

Competency field

Unit sector Engineering technician

Custom Content Section

Not applicable.