



Australian Government

MEM30029 Use workshop equipment and processes to complete an engineering project

Release: 1

MEM30029 Use workshop equipment and processes to complete an engineering project

Modification History

Release 1. Supersedes and is equivalent to MEM30029A Use workshop equipment and processes to complete an engineering project.

Application

This unit of competency defines the skills and knowledge required to identify and use of a range of common workshop equipment and processes to complete a simple engineering project. It focuses on the development and application of basic workshop skills and developing knowledge of equipment and processes and relating the knowledge to typical technical work requirements.

This unit applies to technical employees, where practical workshop skills do not form a major part of the work role, 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.

This unit applies to all types of manufacturing and engineering environments.

All work is carried out under supervision.

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

Pre-requisite Unit

MEM13015 Work safely and effectively in manufacturing and engineering

Competency Field

Engineering technician

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. Research common engineering workshop equipment and processes	1.1 Follow standard operating procedures (SOPs) and comply with work health and safety (WHS) requirements at all times 1.2 Identify sources of professional, technical and trade assistance

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	1.3 Identify common processes and techniques for working, shaping and joining metal, alloys and other materials 1.4 Identify common engineering hand and power tools and their applications 1.5 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 Obtain assistance from appropriate persons in the event of problems and difficulties 3.4 Follow safe work practices and procedures 3.5 Implement hazard control measures 3.6 Complete item manufacturing and check against specifications and work plan 3.7 Clear work area of scrap and waste in accordance with SOPs 3.8 Clean work and secure equipment and work area in accordance with SOPs
4. Assess workshop equipment and processes	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 workplan objectives

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.	
Standard operating procedures (SOPs) include one or more of the following:	• 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.
Appropriate personnel include one or more of the following:	• supervisor • leading hand • foreman • trainer/coach • technicians • tradespersons • engineers.
Engineering processes and techniques include one or more of the following:	• hand and machine cutting • drilling • tapping • grinding • machining • welding • bending and shaping • assembly using fasteners and hand tools.
Hand and power tools include one or more of the following:	• screwdriver • spanners • hammers • files • jigs • cutting tools • scribes • chisels • centre punches • measurement instruments • gauges • portable drills • pedestal or bench grinder.

Workshop cutting and machining equipment includes one or more of the following:	• cut-off machines • surface grinders • drills • lathes • mills • planers • fuel gas cutting torch.
Fabrication equipment includes one or more of the following:	• nibblers • metal shears • guillotines • pedestal drills • power saws • rivet fastening equipment • pan brake • press brake • universal metal working machine.
Welding equipment includes one or more of the following:	• hoses, welding leads, gas shrouds, gas regulators liners and contact tips for gas metal arc welding (GMAW) • welding leads, welding machines and electrode holder for manual metal arc welding (MMAW) • fuel gas and handheld thermal cutting equipment for thermal cutting.
Preparation of materials and equipment includes one or more of the following:	• marking out • preheating • cleaning • setting up jigs and fixtures • clamping • tooling preparation, including basic sharpening • machine settings.
Safe work practices and procedures include one or more of the following:	• relevant legislation • personal protective equipment • material safety management systems, including use of safety data sheets (SDS) • 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.
Elements of the engineering project include one or more of the following:	• tool and equipment selection • sequencing of operations • techniques and processes • conformance to specifications • material types • quantities produced.
Technical work activities include one or more of the following:	• design • production • quality assurance • product testing • purchasing • commissioning • scheduling • planning • drafting.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM30029A Use workshop equipment and processes to complete an engineering project.

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 MEM30029 Use workshop equipment and processes to complete an engineering project

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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:

- using workshop equipment and processes to complete an engineering project on at least two occasions
- preparing a basic work plan
- identifying and preparing selected materials and equipment
- applying manual workshop techniques using hand and power tools
- using common engineering workshop equipment and machinery to complete individual parts of a project on at least two occasions
- assembling component parts using joining techniques
- following WHS procedures and hazard control strategies at all times.

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 working practices and procedures including workshop and machine safety, hazard identification and hazard control
- task planning and sequencing of operations
- elements of engineering projects
- technical work activities
- marking out tools, techniques and media
- common measurement tools and techniques
- allowances and tolerances
- material preparation
- common engineering materials
- common engineering tools and equipment including:
 - hand tools and their applications
 - fixed and portable power tools and their applications

- machines
- fabrication and welding machines
- fixing tools and accessories
- common workshop techniques including:
 - hand and machine cutting
 - drilling
 - tapping
 - grinding
 - machining
 - welding
 - bending and shaping
 - assembly and fixing
- work holding methods
- basic tooling identification
- speeds and feeds
- machine set-up and operation
- cutting fluids and basic operational maintenance of machines.

Assessment Conditions

- Assessors must:
 - have vocational competency in using workshop equipment and processes to complete an engineering project 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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