



Australian Government

MEM07041A Perform production machining

Release 1

MEM07041A Perform production machining

Modification History

Release 1 (MEM05v9).

Unit Descriptor

This unit of competency covers production machining using a range of engineering machinery, such as lathes, milling machines and grinders. It includes determining the job requirements and sequence of operations, selecting and mounting tools, performing the machining, measuring the components, and adjusting and maintaining a range of standard machine tools.

Application of the Unit

The unit of competency applies to the use of workshop machines in a volume production environment to shape metal, including lathes, mills, planers, shapers, radial arm drills, slotters and grinders.

This unit will typically apply to senior operators undertaking volume production who have responsibility for machine set up to defined parameters, selection of materials and lubricants, establishment of datum points and basic marking out, as well as setting speeds, feeds and other machining parameters.

This unit has application in the MEM20205 Certificate II in Engineering - Production Technology and MEM30105 Certificate III in Engineering - Production Systems and other qualifications requiring production machining skills.

Where machining is undertaken without the need for any set up, including mounting of tools, setting of speeds, feeds and other operational parameters, then either MEM07024B Operate and monitor machine/process or MEM07025B Perform advanced machine/process operation should be selected. Drilling operations in this unit exclude those covered by MEM18002B Use power tools/hand held operations. For set up and operation of electro-discharge (EDM) machines, refer to MEM07014B Perform electro-discharge (EDM) machining operations.

Band: A

Unit weight: 8

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

- MEM09002B Interpret technical drawing
- MEM12023A Perform engineering measurements
- MEM18001C Use hand tools

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 | Determine job requirements | 1.1 | Review drawings or charts, instructions and specifications for details of item to be produced |
| | | 1.2 | Confirm number of items to be produced |
| 2 | Follow required sequence of operations | 2.1 | Identify appropriate standard operating procedure (SOP) for machining operation |
| | | 2.2 | Plan operation for required run rate, efficiency and minimisation of waste |
| | | 2.3 | Select correct material for operation from pre-determined stock range |
| | | 2.4 | Establish starting point on stock for operation |
| | | 2.5 | Maintain process and quality logs |

- | | | | |
|---|---|-----|---|
| 3 | Select and mount tools | 3.1 | Select appropriate tooling from pre-selected range |
| | | 3.2 | Select appropriate stock and grind to required tool shape using pre-set jigs and fixtures to achieve pre-determined angles and clearances |
| | | 3.3 | Monitor tooling and sharpen tools and drills, as required, to pre-determined specifications |
| 4 | Perform production machining operations | 4.1 | Use basic marking out techniques to pre-determined specifications on stock or components |
| | | 4.2 | Set machining parameters for job requirements |
| | | 4.3 | Monitor tool or cutter performance life |
| | | 4.4 | Clamp or hold work without damage to product and ensuring all safety requirements are met |
| | | 4.5 | Perform machining utilising all guards, safety procedures and personal protective clothing and equipment |
| 5 | Perform production grinding operations | 5.1 | Select appropriate grinding wheel for required operation from pre-selected options |
| | | 5.2 | Mount and tighten grinding wheels to required sequence and specification |
| | | 5.3 | Position dressing tool correctly |
| | | 5.4 | Dress and true grinding wheel using given range of dressing tools |
| | | 5.5 | Check grinding wheel for balance and safety |
| | | 5.6 | Adjust coolant flow and position |
| | | 5.7 | Undertake grinding operation utilising all guards, safety procedures and personal protective clothing and equipment |
| | | 5.8 | Monitor grinding wheel performance and life according to SOP |

- | | | | |
|---|-----------------------------|-----|---|
| 6 | Measure components | 6.1 | Select instruments or gauges appropriate to the measurement requirements |
| | | 6.2 | Check machined or ground items for compliance with specifications |
| | | 6.3 | Identify out of specification items and check if settings or tooling require adjustment |
| | | | |
| 7 | Adjust and maintain machine | 7.1 | Carry out routine maintenance and adjustments, as required, which may include slide and collar adjustment, cleaning and lubrication |
| | | 7.2 | Report and log malfunctions according to enterprise procedures |

Required Skills and Knowledge

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

Required skills include:

- reading and interpreting routine information on written job instructions, specifications and standard operating procedures which may include drawings
- following oral instruction
- planning and sequencing operations
- preparing operational work plan
- drill sharpening
- sharpening and shaping cutting tools
- identifying worn or damaged cutting tools
- correct mounting and positioning of cutting tools
- basic marking out of materials
- setting machining parameters to achieve the job requirements and maximise tool life
- using appropriate and sufficient clamping/mounting of the work piece
- using coolant/lubricant correctly
- checking for conformance to specifications
- measuring to specified tolerances and dimensions

Required knowledge includes:

- reasons for selecting the chosen sequence of operations
- methods of work holding
- basic marking out techniques, including datum points/lines
- benefits of using correctly sharpened cutting tools
- machine operation
- selection of feeds and speeds to SOPs
- correct methods of mounting selected cutting tools to SOPs
- safety issues with regard to correct clamping, guards and shields
- tolerances and limits of size
- situations indicating the need for machine adjustment, lubrication and cleaning
- techniques, tools and equipment to measure materials and machined components
- use and application of personal protective equipment
- safe work practices and procedures
- hazards and control measures associated with general machining
- types and features of industrial grinding wheels, including:
 - international grinding wheel identification system

- grinding wheel make-up, including bonds and grits
- purpose and procedure for grinding wheel trueing
- indicators of a need for grinding wheel dressing, including:
 - wheel glazing
 - wheel loading
 - wheel dresses
 - wheel drilling
- difference between centred and centreless grinding
- indicators of need for dressing, including:
 - loading
 - dulling
 - glazing
 - burn/thermal damage
 - surface finish
- grinding wheel storage and handling
- wheel safety checking, including checks for:
 - cracks
 - defects (e.g. holes, moisture and deterioration)
- grinding wheel blotters
- typical range of industrial drills and classification
- drilling machines
- drill sharpening procedures
- drill clamping arrangements
- common reasons for machining failure, including:
 - incorrect speed
 - faulty positioning of work
 - incorrect feed
 - rotation
 - incorrect coolant selection and positioning

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 perform production machining.
-------------------------------	---

	including responsibility for selecting and mounting tooling, and setting of machine within defined parameters.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently apply the skills covered in this unit of competency in new and different situations and contexts. Critical aspects of assessment and evidence include: • correct job planning, including identifying job requirements from drawings, instructions or specifications, and sequence of operations • selecting appropriate tooling, measuring equipment, material and accessories from a predetermined range • selecting and mounting required tooling or grinding wheels • setting machining parameters • checking machined components for conformance to specifications.
Context of and specific resources for assessment	Assessment should emphasise a workplace context and procedures found in the candidate's workplace. 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.
Method of assessment	Assessment should occur on a variety of machines and across a range of machining tasks. Assessment must include consideration of performance evidence as demonstrated in a volume production environment. The candidate must be able to demonstrate performance across a sufficient range of appropriate tasks and materials to cover the scope of application for this unit. 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, manuals and reference materials.
Guidance information for assessment	This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing general machining or other units requiring the exercise of the skills and knowledge covered by 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.

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.

Production machining	Production machining refers to use of workshop machines for volume production of parts or components made of metal or other machinable materials where the machine operator has responsibility for the setting up of the machine, including tooling, grinding wheels, and other accessories within defined parameters. It does not include one-off jobbing on workshop machines or complex calculations. Tolerances and tool paths will
-----------------------------	--

	normally have been set in advance
Operations	Operations may include: • parallel cutting • slotting • drilling • knurling • cutting flats • centred and centreless grinding operations
Materials	Materials may include ferrous and non-ferrous metals as well as other machinable materials
Tooling	Tooling may include: • carbide, ceramic and high speed steel machine tooling cutting tool accessories and holding devices
Measuring devices	Measuring devices may be: • rulers • gauges • verniers and micrometers (digital or analog)
Marking out techniques	Marking out techniques may include: • basic marking out techniques using calipers, steel rules, dividers and scribes
Machining parameters	Machining parameters may include: • speeds • feeds • stops • coolant and cutting lubricants
Machines	Machines may include:

	• lathes • mills • planers • shapers • radial and pedestal drills • slotters • grinders
Maintenance and adjustments	Maintenance and adjustments may include: • slide and collar adjustment • cleaning and lubrication
Types and features of industrial grinding wheels	Types and features of industrial grinding wheels refers to: • wheel make-up • wheel hubs • wheel classification • types of grits and bonds
Dressing tools	Dressing tools for this unit are limited to: • industrial diamond • dressing wheels • dressing sticks
Balancing of grinding wheels	Balancing for this unit is limited to checks and identification for balance. Correction of out of balance wheels is not covered by this unit

Unit Sector(s)

Competency field

Unit sector

Custom Content Section

Not applicable.