### Unit code

<table>
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<th>MEM18003C</th>
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### Competency field

<table>
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<tr>
<th>Maintenance &amp; Diagnostics</th>
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### Band

| A |

### Unit weight

| 4 |

### HSC Indicative Hours

| 15 |

### Unit descriptor

This unit covers using tools to manually produce work to precise dimensions and/or finishes.

### Prerequisites

| MEM12023A Perform engineering measurements | MEM18001C Use hand tools | MEM18002B Use power tools/hand held operations |

### Application of the competency

Work is undertaken autonomously or in a team environment, using predetermined standards of quality, safety and workshop procedures.

This unit involves using a variety of tools, instruments and power equipment to perform precision tasks on a range of metallic and non-metallic materials.

As a guide, the types of precision work covered by this unit could include:

- scraping machine beds to precise tolerances
- broaching a tapered keyway
- hand reaming the bore of a spigot or bush to a positive transition fit with shaft
- core drilling (finishing) a blind locating hole to receive a mating pin
- lapping a mechanical seal to fine finish
- filing complex angles and mating edges
- precision grinding using flex-drive attachment or similar.

Inspection and preventative maintenance of tools and equipment involves the visual checking of leads and connections, sharpening of cutting equipment and the repair of associated tools.

### Related units

Where precision measurement is required, Unit MEM12003B (Perform precision mechanical measurement) should also be selected.

Where precision marking out is required, Unit MEM12006B (Mark off/out [general engineering]) should also be selected.

Where specifications are interpreted from engineering drawings, detailed/technical sketches and associated documents, Unit MEM09002B (Interpret technical drawing) should also be selected.
**Evidence Guide**

The evidence guide specifies the evidence required to demonstrate achievement in the unit of competency as a whole. It must be read in conjunction with the unit descriptor, performance criteria, range statement and the assessment guidelines for the Metal and Engineering Training Package.

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<tr>
<th>Overview of assessment requirements</th>
<th>Context of assessment</th>
<th>Interdependent assessment</th>
<th>Method of assessment</th>
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<tr>
<td>A person who demonstrates competency in this unit must be able to use tools to fashion or shape work to high levels of precision for dimension and or finish to specifications. Competency in this unit cannot be claimed until all prerequisites have been satisfied.</td>
<td>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. The assessment environment should not disadvantage the candidate.</td>
<td>This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with using tools for precision work or other units requiring the exercise of the skills and knowledge covered by this unit.</td>
<td>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.</td>
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</tbody>
</table>
### Consistency of performance

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.

### Required skills

- Look for evidence that confirms skills in:
  - obtaining and interpreting relevant drawings, specifications, instructions etc.
  - preparing and making safe the work area(s) prior to the work being carried out
  - using appropriate tools to produce the specified outcomes
  - checking tools and equipment for safe and proper working order before, during and after use
  - where appropriate, marking unsafe or faulty tools and equipment for repair
  - where appropriate, repairing/maintaining unsafe or faulty tools
  - checking condition of all tools and equipment for conformance to specifications and safe and proper operation prior to storage
  - safely store all tools and equipment in the appropriate location.

### Required knowledge

- Look for evidence that confirms knowledge of:
  - work to be undertaken
  - specifications to be achieved
  - appropriate tools, processes and equipment required to carry out the work to the required specifications
  - reasons for selecting the chosen tools, processes and equipment
  - hazards and control measures associated with using the selected tools, processes and equipment, including housekeeping
  - safety procedures to be followed to ensure the safety of the individual and other personnel
  - procedures for using the selected tools
  - engineering principles to be applied during the use of the tools
  - manufacturers’ specifications of the tools and equipment selected
  - safe and proper function of tools and equipment selected
  - procedures for checking tools and equipment for correct and safe operation
  - common faults and/or defects in tools and equipment used/selected
  - procedures for marking unsafe or faulty tools and equipment for repair
  - repairs/operational maintenance that can be made to the tools and equipment used/selected
  - procedures for checking tools and equipment prior to storage
  - storage location of the tools and equipment used/selected
  - procedures for storing tools and equipment used/selected.

### Key Terms and Concepts

- acceptable tolerances
- accuracy
- appropriate person/s
- communication
- consumables
- cutting tool modifications
- engineering principles
- faulty tools, instrument and equipment
- maintenance, service and repair of tools, instruments and equipment
- manufacturer’s specifications
- occupational health and safety (OHS)
- personal protective equipment (PPE)
- precision outcome
- precision work
- pre-operational checks
- processes/methods/techniques
- quality assurance
- reporting and recording
- safe work practices and procedures
- safety/lockout tagging
- securing work pieces
- selection of processes/methods/techniques
- selection of tools, instruments, equipment and accessories
- signs of poor performance
- specification/s
- standard operating procedures (SOP)
- storage of tools, instruments and equipment
- task/job requirements
- work instructions and procedures
- working knowledge of tools, instruments, equipment and accessories for precision work.
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<th>Performance criteria</th>
<th>Range Statement</th>
<th>HSC Requirements and Advice</th>
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<tr>
<td>1 Determine job requirements</td>
<td>1.1 Task requirements and specifications are determined and clarified with appropriate persons.</td>
<td>The range statement provides information about the context in which the unit of competency is carried out. The variables [in bold] and scope [dot points] cater for different work requirements, work practices and knowledge between States, Territories and the Commonwealth, and between organisations and workplaces. The range statement relates to the unit as a whole and provides a focus for assessment. Text in italics in the performance criteria is explained here. The following variables may be present and may include, but are not limited to, the examples listed under the scope. All work is undertaken to relevant legislative requirements, where applicable.</td>
<td>Learning experiences for the HSC must address: A definition of: • task/job requirements • specification/s. A range of sources for work instructions and procedures including: • work schedules • job card/sheet/plans/specifications • standard operating procedures (SOP) • standard operation sheets • Material Safety Data Sheets (MSDS) • drawings/diagrams/sketches • regulations/legislation • manufacturing workplace guidelines, policies and procedures • Australian Standards. An awareness of various modes of communication to receive work instructions including: • verbal - face to face (supervisor to employee) - telephone/mobile phone - workplace meetings • written communication - work plans - drawings - memos/messages - job descriptions/statements - workplace forms - rosters • non-verbal - signage - diagrams. Reading and interpretation of a range of task requirements and specifications. Appropriate persons including: • supervisor/team leader • manufacturer/supplier</td>
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| 1.2      | Processes/techniques are selected appropriate to task, specifications and material. | Processes  
• hand tools and hand held power tools are used to fashion or shape work to high levels of precision for dimension and or finish to specifications  
• engineering techniques, methods and procedures may include cutting out, drilling, fitting, filing, reaming, lapping, broaching, burnishing, scraping, polishing, hand held grinding, chiselling. | Learning experiences for the HSC must address:  
SOP for a range of processes/methods/techniques to perform precision work on a range of metallic and non-metallic materials.  
Consideration/s for the selection of processes/methods/techniques including:  
• skills/training  
• time  
• cost  
• occupational health and safety (OHS) requirements  
• appropriateness for purpose.  
Reasons for selecting the chosen processes/methods/techniques. |
| 2        | Prepare tools and tooling to produce precision outcome | 2.1 Tools, accessories and consumables are selected appropriate to task, specifications and material.  
Tools  
• any tools or equipment required to achieve precision outcomes. |  
Precision outcomes  
• specified tolerances, allowances, fits, finishes, alignments.  
Learning experiences for the HSC must address:  
A definition of:  
• precision outcome.  
A range of tools, instruments and equipment and their accessories to perform precision work on a range of metallic and non-metallic materials including:  
• name  
• characteristics  
• use/application  
• limitations  
• hazard controls  
• maintenance.  
Consideration/s for the selection of tools, instruments, equipment and accessories for precision work including:  
• skills/training |
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<td>• time&lt;br&gt;• cost&lt;br&gt;• OHS requirements&lt;br&gt;• appropriateness for purpose.</td>
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<td>Reasons for selecting the chosen tools, instruments and equipment.</td>
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<td>Manufacturer’s specifications for the tools, instruments, equipment and accessories selected.</td>
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<td>2.2</td>
<td>Where applicable, cutting tool modifications required to produce outcome are determined using engineering principles.</td>
<td>Tool modifications • tool shape, rake angle and clearance angles.</td>
<td>Learning experiences for the HSC must address: An awareness of the following according to work task/project: • engineering principles to be considered • cutting tool modifications required. SOP for tool modifications.</td>
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<td>2.3</td>
<td>Tools/tooling are prepared and modified as required.</td>
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<td>Learning experiences for the HSC must address: Pre-operational checks including: • safety • consumables • adjustment/alignment for work task • workshop facilities.</td>
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<tr>
<td>3</td>
<td>Use tools to produce work to precise specifications</td>
<td>3.1 The work area is prepared and made safe.</td>
<td>Learning experiences for the HSC must address: Safe work practices and procedures. Hazard identification and risk control. An awareness of the project/site safety plan.</td>
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<td></td>
<td>3.2 The work piece is prepared and secured using appropriate method for selected operation/s.</td>
<td></td>
<td>Learning experiences for the HSC must address: An understanding of the importance of securing work pieces when using tools, instruments and equipment for precision work. Identification of a range of clamping/securing devices/methods and their application.</td>
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<tr>
<td>3.3</td>
<td>Tools are used according to acceptable engineering principles, methods, applications and procedures to produce specified outcome to the required accuracy.</td>
<td></td>
<td>Learning experiences for the HSC must address: Engineering principles to be applied during the use of tools, instruments and equipment for precision work. A working knowledge of a range of tools, instruments and equipment used for precision work. Safe work practices for using tools and equipment including: • following SOP and manufacturer’s specifications before, during and after use • risk management (identifying hazards and implementing control measures) • correct manual handling • safe handling, application and storage of hazardous substances • appropriate use of personal protective equipment (PPE) • regular servicing and maintenance of tools and equipment • selection of appropriate tool for use • working with electricity in a safe manner • adequate ventilation • attaching appropriate safety guards where required. Use and application of a range of PPE including: • footwear • head protection • gloves • protective clothing • respirator • face mask/shield • hearing protection • eye protection. Importance of correct fitting PPE. A basic overview of the role of employees in quality assurance to meet workplace standards. An awareness of required accuracies and acceptable tolerances specific to work task/project.</td>
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<td>3.4</td>
<td>Tools and equipment are inspected for safe and proper working order before, during and after use.</td>
<td>Learning experiences for the HSC must address: Identification of faulty tools and equipment including: • malfunctions • worn, broken or missing components • broken or missing safety guards. An awareness of the signs of poor performance and inefficiency including: • noise • quality of end product • appearance • vibration • rough running • failure to start • presence of smoke and odours • consumption of consumables • blockages • amount of maintenance required • time taken to complete the job. Identification of common faults and/or defects in tools, instruments and equipment used for precision work. Personnel to whom problems should be reported: • supervisor/manager • supplier/manufacturer. The importance of acting within level of their authority in terms of: • taking initiative • problem-solving • decision-making. Solution to a range of potential faults. Reporting of serious faults including: • verbal notification to appropriate personnel • recording on job card/maintenance log • safety/lockout tagging where appropriate.</td>
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<td>3.5</td>
<td>Unserviceable tools/equipment are identified, repaired where appropriate, or marked for repair and/or disposal, according to prescribed procedure.</td>
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| 3.6 Tools are stored and maintained to ensure serviceability. | | | Reasons for safety/lockout tagging including:  
• ease of identification  
• evidence of serviceability  
• preventing use until repaired.  
Personnel responsible for removing safety/lockout tags.  
Procedures for marking and reporting unsafe or faulty tools and equipment for repair.  
Maintenance records including:  
• manual  
• electronic.  
| Learning experiences for the HSC must address:  
An awareness of routine operational maintenance for a range of tools, instruments and equipment including:  
• lubrication  
• safety checks  
• cleaning and decontamination  
• tightening and adjustment  
• replacement of consumables/components  
• repair/replacement of worn, malfunctioning or damaged components/parts  
• sharpening (tool and tool bits).  
Issues relating to the storage of tools, instruments and equipment used for precision work including:  
• security  
• climatic effects  
• OHS considerations  
• stability  
• ease of access.  
Knowledge of methods by which tools, instruments and equipment are stored and accessed.  
Housekeeping/clean-up procedures with due consideration to OHS and the environment. |