Australian Government

Department of Education, Employment and Workplace Relations

MEM07021B Perform complex lathe operations

Release: 1

MEM07021B Perform complex lathe operations

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit covers setting up work, selecting and preparing tooling and performing complex turning operations.

Application of the Unit

Application of the unit	This unit applies to complex, difficult or non-standard turning e.g. single-start and multi-start thread cutting, internal blind hole thread cutting, eccentrics, copy and taper turning, counterbalancing work on face plates, mandrel work, trepanning, heavy (multi-tonne) shafts etc. requiring high precision or quality using a range of materials including non-standard metals and alloys. Work would be performed autonomously using predetermined standards of quality and safety. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM07005C	Perform general machining
	MEM07006C	Perform lathe operations

Prerequisite units		
	MEM09002B	Interpret technical drawing
	MEM12003B	Perform precision mechanical measurement
	MEM12023A	Perform engineering measurements
	MEM12024A	Perform computations
	MEM18001C	Use hand tools

Employability Skills Information

Employability skills	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

ELEMENT	PERFORMANCE CRITERIA
1. Determine sequence of operations	1.1. Sequence of operations including job set-up is determined for maximum efficiency and to meet job specifications.
2. Set up work on lathe	2.1. Work is set up on the lathe to required level of accuracy using precision instruments such as dial test indicators etc. 2.2. Work piece is balanced as required when using face plates to ensure accuracy in machining. 2.3. Work piece is set up to ensure that work piece is free of distortion following completion of machining.
3. Select and prepare tooling	3.1. Tooling, accessories and consumables are selected appropriate to task, specifications and material. 3.2. Where necessary, cutting tool modifications required to perform complex turning operations are determined. 3.3. Tooling and accessories are prepared and modified as required. 3.4. International Standard Organisation standards for cutting tools or other appropriate standards to suit cutting parameters are applied as necessary.
4. Perform complex turning	4.1. Speeds and feeds are correctly calculated using appropriate mathematical techniques and reference material. 4.2. Complex turning is undertaken to specifications and workplace procedures. 4.3. Work piece is measured and verified to be in accordance with specification using precision measuring equipment.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE
This section describes the skills and knowledge required for this unit.
Required skills
Look for evidence that confirms skills in:

REQUIRED SKILLS AND KNOWLEDGE

- setting up work to the required level of accuracy using appropriate precision measuring equipment
- setting and supporting work to avoid distortion on release of clamping devices
- selecting correct cutting tools or inserts as appropriate to turning operation
- selecting and using appropriate feeds and speeds
- performing complex turning operations - counter balancing work on face plates:
  - mandrel work
  - trepanning
  - heavy (multi-tonne) shafts
- calculating cutting parameters, speeds and feeds
- reading, interpreting and following information on written job instructions, specifications, charts, lists, drawings and other applicable reference documents
- planning and sequencing operations
- checking and clarifying task related information
- entering routine and familiar information onto proformas and standard workplace forms
- checking for conformance to specifications
- using precision measurement equipment
- measuring components to specified tolerances
- performing numerical operations, geometry and calculations/formulae within the scope of this unit
- following oral instructions
- orally reporting information

Required knowledge

Look for evidence that confirms knowledge of:

- precision measuring equipment and measuring techniques within the scope of this unit
- reasons for selecting different measuring equipment
- procedures for accurately setting up work for a variety of techniques
- ISO or other standards applicable to cutting tool inserts
- cutting parameters for the given task
- feeds and speeds for complex turning operation(s)
- formulae and data relating to feeds and speeds
- techniques and procedures for carrying out the following turning operations:
  - single-start thread cutting
  - multi-start thread cutting
  - internal blind hole thread cutting
  - eccentrics
  - copy turning

REQUIRED SKILLS AND KNOWLEDGE

• taper turning
• techniques and procedures for carrying out the following turning operations:
  • counter balancing work on face plates
  • mandrel work
  • trepanning
  • heavy (multi-tonne) shafts
• hazards and control measures, including housekeeping
• use and application of personal protective equipment
• safe work practices and procedures

Evidence Guide

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 complex lathe operations. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
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.
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. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with performing complex lathe operations 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.

EVIDENCE GUIDE	
Guidance information for assessment	

Range Statement

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.	
Lathe	Applicable to all classes of lathes used for complex turning operations
Tooling	Cutting tools, form tools, boring bars, drills, reamers, thread chasers, tapping heads, taps etc.
Complex turning	May include single-start and multi-start thread cutting, internal blind hole thread cutting, eccentrics, copy and taper turning, counterbalancing work on face plates, mandrel work, trepanning, heavy (multi-tonne) shafts etc.

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Co-requisite units		

Competency field

Competency field	Machine and process operations