



Australian Government

Department of Education, Employment and Workplace Relations

MEM21022A Manufacture watch and clock components

Release: 1

MEM21022A Manufacture watch and clock components

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency covers manufacturing watch and clock components using a range of general and specialist machines and engineering techniques.
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Application of the Unit

Application of the unit	<p>This unit of competency applies to the manufacture of replacement watch or clock components in a watch or clock repair and service centre. It applies when undertaking servicing and repair of watches and clocks and replacement parts are not available and there is a need to make a suitable replacement.</p> <p>This unit has been developed for watch and clock service and repair apprenticeship training and the recognition of trade-level skills in watch and clock servicing and repair. It may apply to post-trade training if not completed as part of a trade qualification.</p> <p>Band: B</p> <p>Unit weight: 6 points</p>
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
	MEM21021A	Restore clockwork mechanisms
	MEM21020A	Service and repair clock chiming mechanisms
	MEM21019A	Service and repair clock striking mechanisms
	MEM21017A	Service and repair clock timepieces
	MEM18001C	Use hand tools
	MEM12023A	Perform engineering measurements
	MEM09002B	Interpret technical drawing
	MEM07005C	Perform general machining
	MEM06007B	Perform basic incidental heat/quenching, tempering and annealing

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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Establish servicing requirements and liaise with customer	1.1. Identify the need for a replacement component 1.2. Verify availability of replacement parts and advise customer of the need to manufacture in-house 1.3. Prepare written and verbal quotations 1.4. Agree with customer on recommended procedures to remedy faults, including servicing requirements 1.5. Prepare watch or clock for handover 1.6. Record and document repair process 1.7. Source material for manufacture of parts
2. Plan and organise the project	2.1. Prepare working drawings of replacement parts 2.2. Plan suitable method of production 2.3. Select materials suitable for manufacture 2.4. Perform marking out of components 2.5. Select appropriate equipment and tools to undertake process
3. Produce components using a watch and clockmaker's lathe	3.1. Set up and mount the material to be turned in appropriate chuck 3.2. Select and prepare the appropriate cutting tool for the turning operation 3.3. Perform turning or drilling operation to produce replacement parts 3.4. Undertake measurements to task tolerances
4. Produce components using milling attachments on a clockmaker's lathe or bench-mounted mill	4.1. Set up and mount the material to be milled in appropriate fixture or chuck 4.2. Select and prepare the appropriate tool or cutter for milling operation 4.3. Perform milling operation to produce replacement parts 4.4. Undertake measurements to task tolerances
5. Produce wheels and pinions	5.1. Where appropriate, select the index head and appropriate index plate to produce the required tooth count 5.2. Set up gear blank in dividing head 5.3. Select appropriate gear cutter and mount in milling spindle ensuring cutter is on centre 5.4. Machine teeth to correct depth
6. Finish manufactured components	6.1. Cross out wheel to match original component

ELEMENT	PERFORMANCE CRITERIA
	6.2. Remove any burrs and finish with appropriate media 6.3. Carry out heat treatment to suit function of replacement part 6.4. Verify function of manufactured component

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills include:

- performing lathe operations on a watch and clockmaker's lathe
- performing milling operations using milling attachment on a watch and clockmaker's lathe or a bench mill
- selecting and preparing cutting tools
- planning of project sequence
- preparing working drawings of parts
- interpreting watch and clock drawings, manuals and other documentation that provide information of part design and tolerances
- measuring tolerances

Required knowledge

Required knowledge includes:

- typical materials used in watch and clock making
- types of watch and clockmakers' lathes and attachments
- lathe accessories and tooling
- setting up and safe operation of watch and clockmakers' lathes and attachments
- milling procedures
- occupational health and safety (OHS) regulations and procedures

Evidence Guide

EVIDENCE GUIDE	
<p>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.</p>	
<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to manufacture clock and watch components to industry standards, manufacturer specifications and in accordance with safety regulations and procedures.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>Assessors must be satisfied that the candidate can competently and consistently:</p> <ul style="list-style-type: none"> • manufacture, finish and fit replacement watch or clock components to original tolerances • select and use appropriate hand tools • use lathes and accessories to turn watch and clock components • perform milling operations using indexing and milling attachments on the lathe or bench-mounted milling machine to dimension and tolerances.
<p>Context of and specific resources for assessment</p>	<ul style="list-style-type: none"> • Assessment may occur on the job or in an appropriately simulated environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and information on workplace practices and OHS practices. • 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.
<p>Method of assessment</p>	<ul style="list-style-type: none"> • 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

EVIDENCE GUIDE	
	<p>knowledge to ensure its correct interpretation and application.</p> <ul style="list-style-type: none"> • 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

RANGE STATEMENT	
<p>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.</p>	
Replacement parts	<p>Replacement parts may include:</p> <ul style="list-style-type: none"> • wheels and pinions • arbors and pivots • click springs • ratchet wheel • setting lever springs
Record and document repair	<p>Record and document repair may include:</p> <ul style="list-style-type: none"> • date and extent of repair • cost of replacement part • time spent on procedure
Working drawings	<p>Working drawings may include:</p> <ul style="list-style-type: none"> • sketch or illustration by hand, including

RANGE STATEMENT	
	dimensions
Appropriate chuck	Appropriate chuck may include: <ul style="list-style-type: none"> • collet, three jaw and four jaw
Appropriate cutting tool	Appropriate cutting tool may include: <ul style="list-style-type: none"> • graver • cutting tool angle • parting off tool

Unit Sector(s)

Unit sector	Horology
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Co-requisite units

Co-requisite units	

Competency field

Competency field	
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