



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MEM21019A Service and repair clock striking mechanisms**

**Release: 1**

## MEM21019A Service and repair clock striking mechanisms

### Modification History

Not Applicable

### Unit Descriptor

<b>Unit descriptor</b>	This unit of competency covers servicing of mechanical floor, wall and shelf clocks which are fitted with rack or count wheel striking mechanisms.
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### Application of the Unit

<b>Application of the unit</b>	<p>This unit of competency applies to servicing and repair work on mechanical clock striking mechanisms undertaken in clock service and repair workshops.</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.</p> <p>Band: A</p> <p>Unit weight: 4 points</p>
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### Licensing/Regulatory Information

Not Applicable

### Pre-Requisites

<b>Prerequisite units</b>		
	MEM21017A	Service and repair clock timepieces

## Employability Skills Information

<b>Employability skills</b>	This unit contains employability skills.
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## 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 function and type of striking mechanism 1.2. Verify clock condition and performance concerns with customer 1.3. Prepare written and verbal quotations 1.4. Agree with customer on recommended service procedures 1.5. Prepare clock for handover 1.6. Record and document repair process 1.7. Source replacement parts from industry suppliers
2. Service and repair strike mechanisms	2.1. Remove and replace movement from case, considering case design and strike mechanism employed 2.2. Confirm operation of strike mechanism 2.3. Dismantle and reassemble strike components in correct sequence 2.4. Verify orientation of gear trains and strike detents 2.5. Inspect strike release, activation and sound generation, and identify wear, condition and faults 2.6. Confirm servicing and repair requirements 2.7. Repair and rectify faults in strike components 2.8. Clean and reassemble mechanism and verify correct set-up, operation and performance 2.9. Select and apply lubricants to strike components
3. Bench test and adjust striking mechanism	3.1. Verify correct operation and function of striking mechanism 3.2. Verify clock operation over 24 hour period 3.3. Determine and rectify striking faults
4. Apply industry workshop standards to perform work	4.1. Use hand, bench tools and equipment safely and correctly 4.2. Establish appropriate working environment 4.3. Handle components without damaging or marking 4.4. Establish a clean and safe work environment

## Required Skills and Knowledge

**REQUIRED SKILLS AND KNOWLEDGE**

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

**Required skills**

Required skills include:

- identifying country of origin with respect to count wheel striking
- identifying various mechanical striking clocks by features (e.g. count wheel or rack)
- dismantling and reassembling striking clock assemblies and components
- identifying and rectifying wear and faults in striking mechanisms
- ensuring correct alignment of detents in striking mechanism and adjustment of function
- lubrication, including selecting and applying correct amount, type, cleanliness and point of application

**Required knowledge**

Required knowledge includes:

- types of clock striking systems
- difference between designs from various manufacturers
- application of gong rods, bells and hammers to achieve correct resonant sound generation
- fault-finding techniques for ensuring strike does not impact on clock operation
- dismantling and reassembling techniques for striking mechanisms
- occupational health and safety (OHS) regulations and procedures

## Evidence Guide

<b>EVIDENCE GUIDE</b>	
<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><b>Overview of assessment</b></p>	<p>A person who demonstrates competency in this unit must be able to service and repair clock striking mechanisms to industry standards, manufacturer specifications and in accordance with safety regulations and procedures.</p>
<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>Assessors must be satisfied that the candidate can competently and consistently:</p> <ul style="list-style-type: none"> <li>• dismantle and reassemble clocks with count wheel striking mechanisms</li> <li>• dismantle and reassemble clocks with rack striking mechanisms</li> <li>• perform operation and performance testing of striking clocks</li> <li>• adjust striking clock mechanisms for correct operation and synchronisation with hands and sound generation and tonality</li> <li>• apply lubrication techniques (e.g. correct type and amount)</li> <li>• diagnose faults relating to strike mechanisms.</li> </ul>
<p><b>Context of and specific resources for assessment</b></p>	<ul style="list-style-type: none"> <li>• Assessment may occur on the job or in a simulated working environment. Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and information on workplace practices and OHS practices.</li> <li>• Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.</li> <li>• 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.</li> </ul>
<p><b>Method of assessment</b></p>	<ul style="list-style-type: none"> <li>• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package.</li> <li>• Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with</li> </ul>

<b>EVIDENCE GUIDE</b>	
	<p>application of underpinning knowledge.</p> <ul style="list-style-type: none"> <li>• Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure its correct interpretation and application.</li> <li>• Assessment may be applied under project-related conditions (real or simulated) and require evidence of process.</li> <li>• 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.</li> <li>• Assessment may be in conjunction with assessment of other units of competency where required.</li> </ul>
<b>Guidance information for assessment</b>	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

<b>RANGE STATEMENT</b>	
<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>	
<b>Function and type of striking mechanism</b>	<p>Function and type of striking mechanism may include:</p> <ul style="list-style-type: none"> <li>• motive force (e.g. mainspring or weight driven )</li> <li>• gear train (e.g. transmits power)</li> <li>• ways of producing striking sound (e.g. metal gongs, chime rods, bells and air bellows)</li> <li>• count wheel striking movements (e.g. European and American manufacture)</li> <li>• rack striking movements (e.g. European and American manufacture )</li> </ul>

<b>RANGE STATEMENT</b>	
<b>Record and document repair process</b>	Record and document repair process may include: <ul style="list-style-type: none"> <li>• date and extent of repair</li> <li>• cost of replacement parts</li> <li>• time spent on procedure</li> </ul>
<b>Operation of strike mechanism</b>	Operation of strike mechanism may include: <ul style="list-style-type: none"> <li>• hour struck corresponds with hands</li> <li>• release mechanism synchronised with hands</li> <li>• warning set-up correctly</li> <li>• function of release mechanism</li> <li>• sound generation (e.g. gongs, rods and hammer engagement)</li> </ul>
<b>Striking mechanism components</b>	Striking mechanism components may include: <ul style="list-style-type: none"> <li>• release mechanism</li> <li>• gathering pallet</li> <li>• detents</li> <li>• counting mechanism (e.g. snail and count wheel)</li> <li>• rack</li> <li>• gongs, chime rods and bells</li> <li>• hammers</li> </ul>
<b>Faults in striking mechanism components</b>	Faults in striking mechanism components may include: <ul style="list-style-type: none"> <li>• incorrect striking</li> <li>• continuous striking</li> <li>• striking mechanism stops clock or impacts on timekeeping</li> <li>• warning set-up</li> <li>• gong security</li> <li>• pin security</li> <li>• gathering pallet engagement with rack teeth, tightness and positioning</li> <li>• rack tail engagement position with snail</li> <li>• hammer inserts (e.g. condition - worn or aged)</li> <li>• security of gongs, rods and attachment to case</li> </ul>
<b>Correct set-up</b>	Correct set-up may include: <ul style="list-style-type: none"> <li>• synchronised strike release with hands</li> <li>• amount of warning</li> <li>• correct sequence</li> </ul>



<b>RANGE STATEMENT</b>	
	<ul style="list-style-type: none"> <li>• sound of strike</li> </ul>
<b>Lubricants to striking mechanism components</b>	<p>Lubricants to striking mechanism components may include:</p> <ul style="list-style-type: none"> <li>• correct lubricants for cams and detents</li> <li>• techniques for lubricating</li> </ul>
<b>Hand and bench tools and equipment</b>	<p>Hand and bench tools and equipment may include:</p> <ul style="list-style-type: none"> <li>• clock repairers' hand tools (e.g. tweezers, screwdrivers and eyeglass)</li> <li>• universal shifter, sockets and spanners</li> <li>• pliers, end cutters and files</li> <li>• stakes for supporting removal or replacement of gathering pallet and cannon pinions</li> <li>• oilers and oil pots and greases</li> <li>• hand cleaning (e.g. pith, peg wood and rodico solvents jar)</li> </ul>
<b>Appropriate working environment</b>	<p>Appropriate working environment may include:</p> <ul style="list-style-type: none"> <li>• clean bench and working area</li> <li>• adequate lighting and ventilation</li> <li>• tools and equipment organised and in good condition</li> <li>• ergonomic seating, including bench height</li> </ul>
<b>Clean and safe work environment</b>	<p>Clean and safe work environment may be specified through:</p> <ul style="list-style-type: none"> <li>• relevant legislation and regulations</li> <li>• enterprise operating procedures</li> <li>• 5S housekeeping related principles and procedures (e.g. sort, straighten, shine, standardise, sustain)</li> </ul>

## Unit Sector(s)

<b>Unit sector</b>	Horology
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## Co-requisite units

<b>Co-requisite units</b>		

## Competency field

<b>Competency field</b>	
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