



Australian Government

Department of Education, Employment and Workplace Relations

MEM21018A Service clock escapements and oscillating systems

Release: 1

MEM21018A Service clock escapements and oscillating systems

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	<p>This unit of competency covers servicing techniques for inspecting, diagnosing faults and adjusting common clock escapements (e.g. deadbeat, recoil, cylinder and verge). It also covers techniques for servicing and replacement of different types of oscillating systems, including compound and compensating pendulums, torsional pendulum (e.g. 400 day and Atmos clocks) and platform escapement and floating balances.</p>
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Application of the Unit

Application of the unit	<p>This unit of competency applies to servicing work on clock escapements and oscillating systems 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

Prerequisite units		
	MEM21017A	Service and repair clock timepieces
	MEM21013A	Service, test and adjust watch escapements
	MEM21012A	Service and repair watch oscillating systems
	MEM21009A	Inspect, diagnose, adjust and repair mechanical watches
	MEM21008A	Service mechanical watches
	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.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify escapement and oscillator type	1.1. Identify clock escapements/oscillating systems and applications 1.2. Establish the performance characteristics of the clock according to escapement and oscillating system 1.3. Record and document repair requirements
2. Diagnose clock escapements and oscillators	2.1. Select and use workshop tools and equipment appropriately 2.2. Inspect clock escapement and oscillators for correct function, engagement and performance 2.3. Record and report wear and damage to parts 2.4. Determine appropriate repair process to rectify faults
3. Repair and adjust clock escapements and oscillators	3.1. Remove and reassemble escapement/oscillators using appropriate tools, equipment and techniques 3.2. Determine theoretical length of replacement pendulum 3.3. Repair or replace escapement and oscillator components 3.4. Adjust escapement and oscillator components for correct operation
4. Service and adjust torsional pendulums	4.1. Remove and reassemble torsional pendulums and oscillator components using appropriate tools, equipment and techniques 4.2. Inspect torsional pendulum components and identify condition and wear 4.3. Repair and replace torsional pendulum 4.4. Adjust torsional pendulum for correct operation (in-beat)
5. Service and set up platform escapements	5.1. Remove and reassemble platform escapement using appropriate tools, equipment and techniques 5.2. Inspect platform escapement and identify condition/wear 5.3. Repair and replace platform escapement 5.4. Adjust platform escapement and correct depthing with contrate wheel
6. Test and adjust rate	6.1. Verify/confirm function of clock movement 6.2. Correctly set up and operate mechanical clock timing machine and interpret readings 6.3. Verify clock performance and rate testing

ELEMENT	PERFORMANCE CRITERIA
	6.4. Adjust rate, as required, according to performance and design characteristics

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 clock escapements and oscillators
- adjusting escapement function
- diagnosing faults
- adjusting rate
- setting up and operating timing machine

Required knowledge

Required knowledge includes:

- clock escapement types
- oscillator types
- performance characteristics of escapements and oscillators
- escapement adjusting techniques
- clock servicing procedures and techniques
- calculations and formulas for length of pendulum and geometry of escapements
- 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 service, inspect and adjust clock escapement and oscillating system 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"> • identify different types of clock escapements • diagnose faults in clock escapement action • repair faults in worn escapements • set up and adjust clock escapements for optimum performance • fault-find oscillating systems • calculate length of replacement pendulum • adjust rate of timepiece.
<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

EVIDENCE GUIDE	
	<p>tasks and include questioning on underpinning 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. 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>	
Clock escapements/oscillator systems	<p>Clock escapements/oscillator systems may include:</p> <ul style="list-style-type: none"> • verge • recoil escapement • deadbeat escapement • cylinder • platform (e.g. lever escapement and cylinder) • simple pendulum • compound pendulum • compensating pendulum • torsion pendulum • floating balance • suspension systems (e.g. spring blade, knife)

RANGE STATEMENT	
	edge and silk)
Record and document repair	Record and document repair may include: <ul style="list-style-type: none"> • extent and date of repair • cost of replacement part • time spent on procedure
Adjust escapement and oscillator	Adjust escapement/oscillator may include: <ul style="list-style-type: none"> • condition amount of drop • condition and extent of lockings • condition and amount of impulse • pendulum action and amplitude • in-beat
Torsional pendulums	Torsional pendulums may include: <ul style="list-style-type: none"> • 400 day and Atmos clocks • suspension spring

Unit Sector(s)

Unit sector	Horology
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Co-requisite units

Co-requisite units	

Competency field

Competency field	
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