



Australian Government

MEM21018 Service clock escapements and oscillating systems

Release: 1

MEM21018 Service clock escapements and oscillating systems

Modification History

Release 1. Supersedes and is equivalent to MEM21018A Service clock escapements and oscillating systems

Application

This unit of competency defines the skills and knowledge required to apply service and repair techniques to inspect, diagnose faults, repair and adjust common clock escapements and oscillating systems.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Band: A

Unit weight: 4

Pre-requisite Unit

MEM11011	Undertake manual handling
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM18001	Use hand tools
MEM21008	Service mechanical watches
MEM21009	Inspect, diagnose, adjust and repair mechanical watches
MEM21012	Service and repair mechanical watch oscillating systems
MEM21013	Service, test and adjust watch escapements
MEM21017	Service and repair clock timepieces

Competency Field

Horology

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- | | | | |
|---|--|-----|---|
| 1 | Determine job requirements | 1.1 | Follow standard operating procedures (SOPs) |
| | | 1.2 | Comply with work health and safety (WHS) requirements at all times |
| | | 1.3 | Select and use appropriate personal protective equipment (PPE) in accordance with SOPs |
| | | 1.4 | Identify job requirements from specifications, job sheets or work instructions |
| | | | |
| 2 | Identify escapement and oscillator type | 2.1 | Identify clock escapements/oscillating systems and applications |
| | | 2.2 | Establish the performance characteristics of the clock according to escapement and oscillating system |
| | | 2.3 | Record and document repair requirements |
| | | | |
| 3 | Diagnose clock escapements and oscillators | 3.1 | Select and use appropriate workshop tools and equipment |
| | | 3.2 | Inspect clock escapement and oscillators for correct function, engagement and performance |
| | | 3.3 | Record and report wear and damage to parts |
| | | 3.4 | Determine appropriate repair process to rectify faults |
| | | | |
| 4 | Repair and adjust clock escapements and oscillators | 4.1 | Remove and reassemble escapement/oscillators using appropriate tools, equipment and techniques |
| | | 4.2 | Determine theoretical length of replacement pendulum |
| | | 4.3 | Repair or replace escapement and oscillator components |
| | | 4.4 | Adjust escapement and oscillator components for correct operation |

Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
5	Service and adjust torsional pendulums	5.1	Remove and reassemble torsional pendulums and oscillator components using appropriate tools, equipment and techniques
		5.2	Inspect torsional pendulum components and identify condition and wear
		5.3	Repair and replace torsional pendulum
		5.4	Adjust torsional pendulum for correct operation (in-beat)
6	Service and set up platform escapements	6.1	Remove and reassemble platform escapement using appropriate tools, equipment and techniques
		6.2	Inspect platform escapement and identify condition/wear
		6.3	Repair and replace platform escapement
		6.4	Adjust platform escapement and correct depthing with contrate wheel
7	Test and adjust rate	7.1	Verify and confirm function of clock movement
		7.2	Set up and operate mechanical clock timing machine and interpret readings
		7.3	Verify clock performance and rate testing
		7.4	Adjust rate, as required, according to performance and design characteristics

Foundation Skills

This section describes those required skills (reading, writing, oral communication and numeracy) that are essential to workplace performance in this unit of competency.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

**Clock escapements/
oscillator systems
include one (1) or more
of the following:**

- verge
- recoil escapement
- deadbeat escapement
- cylinder
- platform (lever escapement or cylinder)
- simple pendulum
- compound pendulum
- compensating pendulum
- torsion pendulum
- floating balance
- suspension systems (spring blade, knife edge or silk)

**Record and document
repair includes one (1)
or more of the
following:**

- extent and date of repair
- cost of replacement part
- time spent on procedure

**Adjust escapement and
oscillator includes one
(1) or more of the
following:**

- condition amount of drop
- condition and extent of lockings
- condition and amount of impulse
- pendulum action and amplitude
- in-beat

**Torsional pendulums
include one (1) or more
of the following:**

- 400 day clocks
- Atmos clocks
- suspension spring

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM21018A Service clock escapements and oscillating systems

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM21018 Service clock escapements and oscillating systems

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria on at least two (2) occasions and include:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- identifying different types of clock escapements/oscillating systems
- liaising with customer, verifying condition and performance, and identifying repair costs
- diagnosing and repairing faults in clock escapement action and fault finding oscillating systems
- calculating length of replacement pendulum and repairing, replacing and adjusting pendulum
- repairing, replacing and adjusting escapement and oscillator components
- setting up and adjusting clock escapements for optimum performance
- adjusting platform escapement and correct dephasing with contrate wheel
- verifying and confirming function of clock movement and adjusting rate of timepiece using appropriate timing machine in accordance with procedures
- recording and documenting repairs.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- safe work practices and procedures and use of personal protective equipment (PPE)
- clock escapement types
- oscillator types
- torsional pendulums and oscillator components
- 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.

Assessment Conditions

- Assessors must:
 - have vocational competency in servicing clock escapements and oscillating systems at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015* or its replacement and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

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