



Australian Government

MEM19022 Perform precision micro-mechanism diagnosis and servicing

Release: 1

MEM19022 Perform precision micro-mechanism diagnosis and servicing

Modification History

Release 1. Supersedes and is equivalent to MEM19022B Perform precision micro-mechanism diagnosis and servicing

Application

This unit of competency defines the skills and knowledge required to diagnose and service precision micro-mechanisms, including chronometer watch and clock components, to achieve performance to original specifications. It includes precision adjustment and testing to achieve timekeeping and water resistance specifications of completed timepieces.

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

Band: A

Unit Weight: 6

Pre-requisite Unit

MEM07005	Perform general machining
MEM09002	Interpret technical drawing
MEM11011	Undertake manual handling
MEM12003	Perform precision mechanical measurement
MEM12023	Perform engineering measurements
MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM18001	Use hand tools
MEM18002	Use power tools/hand held operations
MEM18003	Use tools for precision work
MEM18055	Dismantle, replace and assemble engineering components
MEM19020	Fault find and maintain micro-mechanisms

MEM19021

Diagnose and service micro-mechanisms

Competency Field

Jewellery and horological

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	Use appropriate personal protective equipment (PPE) in accordance with SOPs
		1.4	Identify job requirements from specifications, drawings, job sheets or work instructions
2	Adjust timing of precision micro-mechanisms	2.1	Analyse and interpret data for precision timing of micro-mechanisms
		2.2	Make adjustments to achieve a constant rate to specifications
3	Diagnose precision micro-mechanisms	3.1	Select and use required high tolerance and precision tools and equipment
		3.2	Apply detailed inspection and testing techniques to diagnose and identify performance faults, condition and repair or servicing requirements
4	Carry out precision micro-mechanism servicing	4.1	Remove precision components and service and replace, as appropriate
		4.2	Adjust components to precision tolerances and specifications

Elements describe the essential outcomes.

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

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| 5 | Repair and adjust chronograph mechanisms | 5.1 | Adjust functional elements and test to ensure specifications are achieved |
| | | 5.2 | Examine chronograph components and re-finish, as required |

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.

Micro-mechanisms include one (1) or more of the following:

- mechanical watches and clocks
- electric watches and clocks
- pieces of recent manufacture
- restoration pieces
- chronometer timepieces
- day and date systems
- automatic winding systems
- generating systems
- alarm mechanisms
- striking and chiming mechanisms
- calendar mechanisms
- balance spring
- dynamic poising
- static poising
- truing balance (flat and round)
- chronograph mechanisms

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.

Assembly and subassembly components include one (1) or more of the following:

- balance staff
- pallet staff
- pallet jewels
- wheel trains
- power source
- mechanical oscillating systems
- motion work
- calendar systems
- escapement
- balance spring

Tools and equipment include one (1) or more of the following:

- mechanical hand tools
- electronic equipment to measure amplitude and rate
- electronic timing equipment
- diagnostic equipment and tools
- high-tolerance testing equipment
- specialist service tools for adjusting oscillating systems and chronograph mechanisms

Precision components include one (1) or more of the following:

- timekeeping elements, including:
 - balance staff
 - pallet staff
 - pallet jewels
 - wheel trains
- power source
- mechanical oscillating systems
- motion work
- calendar systems

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.

Inspections include one (1) or more of the following:

- high-tolerance clearances
- fits and adjustments
- functioning
- systems analysis
- performance analysis

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM19022B Perform precision micro-mechanism diagnosis and servicing

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 MEM19022 Perform precision micro-mechanism diagnosis and servicing

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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
- eliminating or minimising effects of internal and external influences and adjusting timing of micro-mechanisms
- making detailed observations using high magnification optics
- testing functioning of components to high tolerances, including functioning of escapement and oscillating system
- using appropriate tools and equipment for detailed observation diagnosis and servicing
- removing and replacing assembly and subassembly components and other precision components
- making adjustments to minimise error of performance
- repairing and adjusting chronograph mechanisms, including tensioning chronograph wheel and minute wheel, to ensure correct operation of seconds, minute and hour recording systems
- observing and adjusting depth of engagement and operating sequence of functioning elements
- applying lubricant, as required
- re-finishing and matching components to existing components to ensure correct functioning, including alignment of hands with dials
- fitting and adjusting new and repaired components to function within existing system
- determining influences in design, internal and external influences on rating variation.

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)
- physical limitations and condition of system and control factors influencing isochronism
- inherent influences in design, internal and external influences on rating variation
- adjustment procedures and techniques

- detailed inspection and analysis techniques for diagnosing precision micro-mechanisms
- acceptable tolerances, clearances and limits for precision components
- components suitable for precision outcomes
- effects of adjustment on performance and operation
- criteria for correct adjustment of balance spring and regulating system
- types of chronograph mechanisms and their functioning
- adjustment procedures for chronograph operation, including minute and hour recording systems.

Assessment Conditions

- Assessors must:
 - have vocational competency in performing precision micro-mechanism diagnosis and servicing 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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