



Australian Government

MEM21020 Service and repair clock chiming mechanisms

Release: 1

MEM21020 Service and repair clock chiming mechanisms

Modification History

Release 1. Supersedes and is equivalent to MEM21020A Service and repair clock chiming mechanisms

Application

This unit of competency defines the skills and knowledge required to service and repair mechanical floor, wall and shelf clocks that are fitted with chiming mechanisms.

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

Band: A

Unit weight: 6

Pre-requisite Unit

MEM13015	Work safely and effectively in manufacturing and engineering
MEM16006	Organise and communicate information
MEM21017	Service and repair clock timepieces
MEM21019	Service and repair clock striking mechanisms

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 servicing requirements and liaise with customer	1.1	Follow standard operating procedures (SOPs)
		1.2	Comply with work health and safety (WHS) requirements at all times
		1.3	Identify functions and types of chiming system
		1.4	Verify clock condition and performance concerns with

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customer

- 1.5 Prepare written and verbal quotations
- 1.6 Agree with customer on recommended service procedures
- 1.7 Prepare clock for handover
- 1.8 Record and document repair process
- 1.9 Source replacement parts from industry suppliers

2 **Service and repair chiming mechanisms**

- 2.1 Establish an appropriate clean and safe work environment
- 2.2 Select and use appropriate personal protective equipment (PPE) in accordance with SOPs
- 2.3 Remove and replace movement considering case design and chiming system employed
- 2.4 Handle components without damaging and marking
- 2.5 Use appropriate hand, bench tools and equipment in a safe and correct manner
- 2.6 Confirm design and operation of the chime corrector mechanism
- 2.7 Determine service procedure for particular movement design
- 2.8 Inspect condition of chime release, activation and sound generation, and identify wear and faults
- 2.9 Dismantle and clean chiming components
- 2.10 Verify orientation of gear trains, strike and chime detents
- 2.11 Confirm servicing and repair requirements
- 2.12 Repair and rectify faults in chiming components
- 2.13 Reassemble chiming mechanism and verify correct

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set-up, operation and performance

2.14 Select and apply lubricants to chime components

3 **Bench test and adjust chime functions**

3.1 Verify and confirm function of chiming mechanism

3.2 Verify clock operation over 24 hour period

3.3 Determine and rectify faults in chiming mechanism

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.

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Functions and types of chiming system include one (1) or more of the following:

- chiming clocks of various movement design (count wheel or locking plate, rack or combinations of control systems)
- long case and mantle clocks
- motive force (mainsprings or weights)
- gear trains (components of each train)
- chime release mechanism (control functions - chime and strike)
- chime and strike fans (control speed of trains)
- hand setting and synchronisation with chimes and strike
- winding systems in chiming clocks
- night shut-off switch types
- chime correcting mechanisms
- types of chimes by hammers and sequences for tunes (4 or 8 hammer)
- tunes played (Westminster, St. Michaels or Whittington)
- chiming media (gongs, tubes or bells)

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

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

Design and operation of chiming corrector mechanism includes one (1) or more of the following:

- double detent
- spring loaded catch
- rocking locking plate
- bell crank
- pivoted detent

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- Inspect condition includes one (1) or more of the following:**
- originality of components
 - corrosion
 - cleanliness
 - wear
 - hand setting tension
 - function and safety of winding mechanism
 - gear train end shake/backlash/lubrication
 - mainspring engagement/hooks/tension/ lubrication
 - adjustment of chime and striking functions
 - verification of chime corrector functions
 - synchronised chime release with operations of hands at the four quarters
 - amount of warning for chime train
 - strike release mechanism operation
 - sound of chimes and strike monitored
 - gong rods, bells, tubes alignment and security including attachment to case
 - hammer head inserts (condition - worn or aged)
- Chime components include one (1) or more of the following:**
- four quarter cam
 - lifter
 - chime flirt or detents
 - strike flirt or detent
 - chime locking plate
 - chime corrector
 - chime gear train
 - ratio wheel
 - chime pin barrel
 - gong rods, bells and tubes
 - hammers
- Faults in chime components include one (1) or more of the following:**
- mounting security (gong rods, bells or tubes)
 - warning and locking pin security and detent mountings
 - hammer condition
 - worn arbors and bearings
 - broken or worn chime components

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Correct set-up includes the following:

- synchronised chime release with hands
- amount of warning
- chime corrector operation
- correct tune sequence
- sounds of chime

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

- clock repairers' hand tools:
 - tweezers
 - screwdrivers
 - eyeglasses
- universal shifter, sockets and spanners
- pliers, end cutters, files and levers
- movement holders, stands and wall brackets
- stakes for supporting removal/replacement of components
- lathe for pivot and arbor repairs and finishing
- clock bushing tool and replacement bushes
- lubrication (oiler, oil pots and greases)
- cleaning brushes, peg wood, solutions, rinses and solvents

Appropriate working environment includes the following:

- clean bench and working area
- adequate lighting and ventilation
- tools and equipment organised and in good condition
- ergonomic seating, including bench height

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM21020A Service and repair clock chiming mechanisms

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 MEM21020 Service and repair clock chiming mechanisms

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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 country of origin with respect to count wheel or locking plate chiming mechanism
- liaising with customer, verifying condition and performance, identifying repair costs and preparing written and verbal quotations
- dismantling and reassembling clocks with chiming mechanisms in an appropriate work environment
- fault finding clocks with chiming mechanisms
- repairing/replacing worn or damaged components using appropriate hand tools and equipment
- performing correct set-up of chiming mechanisms
- adjusting clock chiming mechanisms for correct operation/synchronisation with hands and sound generation/tonality
- applying lubrication techniques (correct type and amount)
- diagnosing and rectifying faults relating to chime mechanisms and verifying operation of chime correctors
- 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)
- types of clock chiming systems and chime correcting mechanisms
- differences between designs from various manufacturers
- application of gong rod, bells and hammers to achieve correct resonant sound generation
- dismantling and reassembling techniques for chiming mechanisms
- correct amount of warning and chime corrector operation
- clock chiming mechanism fault-finding techniques

- fault-finding techniques for ensuring chime does not impact on clock operation
- service and repair techniques for chiming mechanisms.

Assessment Conditions

- Assessors must:
 - have vocational competency in servicing and repairing clock chiming mechanisms 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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