Australian Government

Department of Education, Employment and Workplace Relations

MEM18095A Maintain and repair cooling towers/evaporative condensers and associated equipment

Release: 2

MEM18095A Maintain and repair cooling towers/evaporative condensers and associated equipment

Modification History

Prerequisite unit MEM05006B updated to MEM05006C

Unit Descriptor

Unit descriptor	The unit covers performing maintenance procedures and/or repairs on cooling towers or evaporative condensers, centrifugal water pumps, valves - including bypass valves, fans, belts and controls to ensure performance to relevant codes and standards.

Application of the Unit

Application of the unit	Cooling towers and evaporative condensers form an integral part of the refrigeration system - in commercial, industrial and air conditioning fields. The towers, condensers, centrifugal water pumps, fans, valves and controls comprise the maintenance/repair work skills relevant to this field and must be assessed in this context. Demonstration of competency must be in accordance relevant Australian standards, regulations and codes. Where water treatment only is required, then revised MEM13007B (Maintain water treatment systems for cooling towers) should be considered. Where the refitting or repair/replacement of components involves the fabrication and installation of pipework and assemblies, Unit MEM10010B (Install pipework and pipework assemblies) should be accessed. Where any rectification, modification involves electrical disconnection and reconnection, then Unit MEM18049C (Disconnect/reconnect fixed wired equipment up to 1000 volts a.c./1500 volts d.c.) should also be selected. **Band**: **A** **Unit Weight**: **4**

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units		
Path 1	MEM05006C	Perform brazing and/or silver soldering
	MEM09002B	Interpret technical drawing
	MEM12002B	Perform electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18055B	Dismantle, replace and assemble engineering components
	MEM18086B	Test, recover, evacuate and charge refrigeration systems
	MEM18094B	Service and repair commercial refrigeration
Path 2	MEM05006C	Perform brazing and/or silver soldering
	MEM09002B	Interpret technical drawing
	MEM12002B	Perform electrical/electronic measurement
	MEM12023A	Perform engineering measurements
	MEM18001C	Use hand tools
	MEM18002B	Use power tools/hand held operations
	MEM18055B	Dismantle, replace and assemble engineering components
	MEM18086B	Test, recover, evacuate and charge refrigeration systems

Prerequisite units		
	MEM18088B	Maintain and repair commercial air conditioning systems and components

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Undertake preventive maintenance checks	1.1. Legislative requirements are understood. 1.2. System components are identified. 1.3. The operational function of each component is inspected and tested. 1.4. Correct operation of each component is assessed against specification. 1.5. Visual inspection and testing with appropriate test equipment is carried out according to refrigeration principles, procedures and safety requirements. 1.6. Preventative maintenance tasks are performed to manufacturers' specifications using refrigeration techniques and practices.
2. Undertake fault finding on cooling tower/evaporative condenser water systems components	2.1. System components are identified correctly. 2.2. The characteristics and operation of each component is understood. 2.3. The operational function of each component is inspected and tested. 2.4. Correct operation of each component is assessed against specification.
3. Repair/replace cooling tower/evaporative condenser components	3.1. Faulty components are localised and malfunction is confirmed by inspection and testing using refrigeration principles, procedures and safety requirements. 3.2. Faulty components are dismantled and repaired to manufactures' specifications as required. 3.3. Replacement parts are selected from manufacturers' or other catalogues according to required specifications. 3.4. Where required, refrigerant is removed/contained following refrigeration principles and procedures to all relevant standards, codes and safety standards.
4. Return to service cooling tower/evaporative condenser components.	4.1. Components are reassembled and tested for correct operation and assessed against specification. 4.2. Where required, refrigerant is added to system, following refrigeration principles and procedures to all relevant standards, codes and safety standards. 4.3. Using refrigeration principles and system application, correct operation of the equipment is verified. 4.4. Maintenance records/service reports are completed by appropriate designated means.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Look for evidence that confirms skills in:

- using tools, techniques and equipment necessary to check cooling tower/evaporative condenser fans, valves, centrifugal pumps and components for correct operation
- obtaining and interpreting specifications
- comparing system and component performance/operation against specification
- identifying faulty components and non-compliances
- making required adjustments to achieve specifications
- sourcing and using relevant catalogues/lists
- removing and replacing refrigerant
- applying safety procedures, standard operating procedures and legislative requirements to all work undertaken
- documenting results of the adjustments

Required knowledge

Look for evidence that confirms knowledge of:

- terminology of cooling towers
- psychometrics
- measuring instruments/equipment, specifications and procedures for checking temperature(s)/humidity/air flow
- operation of centrifugal water pumps
- terminology of centrifugal water pumps
- field testing centrifugal pumps
- operation of water valves including bypass valve either mechanical or electrical operation
- procedures for testing and operation of controls
- procedures for testing of fan motors
- v belts
- measuring instruments/equipment, specifications and procedures for checking component noise and vibration levels
- procedures for reporting non-conformances
- procedures and sequence for performing preventative maintenance on refrigeration and air conditioning systems
- specifications, operational characteristics and process for identifying system components
- process for localising and confirming faulty components

REQUIRED SKILLS AND KNOWLEDGE
• procedures and all legislative and regulatory requirements for safely removing the refrigerant and charging the system • procedures for dismantling, repairing, reassembling and testing components • procedure for removal/recharging refrigerant • procedures for selecting replacement parts • procedures for completing maintenance records/service reports

Evidence Guide

EVIDENCE GUIDE	
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.	
Overview of assessment	A person who demonstrates competency in this unit must be able to maintain and repair cooling towers and/or evaporative condensers, fans, centrifugal water pumps, valves and control equipment. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.
Context of and specific resources for assessment	This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. The assessment environment should not disadvantage the candidate. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with the maintenance and repair of cooling towers/evaporative condensers /pumps/ fans or valves, or other units requiring the exercise of the skills and knowledge covered by this unit.
Method of assessment	Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures,

EVIDENCE GUIDE	
	product and manufacturing specifications, codes, standards, manuals and reference materials.
Guidance information for assessment	

Range Statement

RANGE STATEMENT	
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.	
Components	Fan motor, fan blade, pump, pump motor, sprays, condenser, valves (bypass, shut-off, temperature control valves), thermostat, drift eliminators, v belt, water strainer
Operational	How it works
Test equipment	Sling psychrometer, thermometer, refrigeration gauges, vacuum pump, leak detector, multimeter, insulation resistance tester, assorted hand tools
Manufacturers' specifications	Details supplied by manufactures
Characteristics	The design and installation of the particular component
Malfunction	Could be a fault in any of the components
Application	Type of installation or equipment

Unit Sector(s)

Unit sector	

Co-requisite units

Co-requisite units		

Competency field

Competency field	Maintenance and diagnostics