



Australian Government

MEM23154 Analyse and service HVACR systems

Release: 1

MEM23154 Analyse and service HVACR systems

Modification History

Release 1. Supersedes and is equivalent to MEM23154A Analyse and service HVACR systems.

Application

This unit of competency defines the skills and knowledge required to analyse and evaluate heating, ventilation, air conditioning and refrigeration (HVACR) control system requirements for a specific application.

This includes evaluation of existing automatic control systems, interpreting and producing control diagrams, commissioning, fault-finding and repairing existing HVACR control systems. However, this unit does not cover the design of a new HVACR system.

This unit applies to HVACR technicians in manufacturing, servicing and maintenance organisations.

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

MEM23006 Apply fluid and thermodynamics principles in engineering

Competency Field

Engineering science

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Prepare for analysis and service task	1.1 Obtain and implement work health and safety (WHS) and environmental requirements for the work area 1.2 Identify essential elements of the control system 1.3 Determine the function of electrical, pneumatic and electronic control and flow devices using control circuit diagrams and/or specifications or other specialised resources 1.4 Obtain sequence of control, specify settings and adjust control

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	devices from system's specifications 1.5 Consult appropriate personnel to ensure that work is coordinated effectively with others 1.6 Obtain equipment and resources needed for the task in accordance with organisational procedures and check for correct operation and safety
2. Analyse performance of control system	2.1 Identify HVACR system operating parameters and system features 2.2 Use appropriate equipment and HVACR energy management principles to evaluate the operating economy of the system 2.3 Produce control diagrams according to applicable standards and practices 2.4 Report analysis to appropriate personnel and establish action to be taken based on findings
3. Adjust and service control system	3.1 Confirm plant control compliance with desired conditions through measurements and recording of system performance 3.2 Select and use appropriate personal protective equipment (PPE) 3.3 Adjust system to required specification 3.4 Isolate, replace or repair components not performing to specification 3.5 Arrange appropriate tests and measurements on an electrically live system in accordance with WHS and regulatory requirements 3.6 Provide solutions to unplanned situations consistent with organisational procedures
4. Make recommendations to improve the performance of plant	4.1 Document analysis including details of all findings, calculations and assumptions 4.2 Prepare recommendations on control system modifications and discuss with appropriate personnel 4.3 Ensure work area is cleaned and made safe in accordance with organisational procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

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.

WHS requirements include:	• relevant legislation • protective equipment • material safety management systems • hazardous substances and dangerous goods code • local safe operation procedures • awards provisions.
Environmental requirements include:	• relevant legislation, regulations and codes • correct handling and disposal of liquid and solid waste • elimination or minimisation of gas, fume, vapour and smoke emissions, including fugitive emissions • dust elimination, minimisation and control • minimisation of energy and water use • elimination or control of excessive noise • use and recycling of refrigerants.
Appropriate personnel include:	• supervisor, leading hand, foreman or manager • engineer • technician • trainer or mentor • team member • customer.
Resources include:	• reference manuals • scientific calculator • appropriate manuals • stationery • suitable computer software.
Organisational procedures include:	• use of tools and equipment • instructions, including job sheets, plans, drawings and designs • reporting and communication • operational procedures • industry standards.
Equipment includes:	• computer workstation and software (either stand alone or networked) • tools • test equipment

	• spare parts • cables and connectors • consumables • software licences • manufacturer specifications and manuals • diagnostics software • personal computer.
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Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23154A Analyse and service HVACR systems.

Links

Companion Volume Implementation Guides are available on VETNet -

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

Assessment Requirements for MEM23154 Analyse and service HVACR 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 and include:

- identifying and interpreting drawings, specifications, standards, codes and regulations relevant to heating, ventilation, air conditioning and refrigeration (HVACR) control systems
- implementing work health and safety (WHS) procedures and practices including the use of risk control measures
- demonstrate the use of software tools related to analyse and service HVACR control systems
- using tools and equipment to evaluate automatic control systems and determine control requirements on at least two occasions
- producing control diagrams
- analysing, adjusting and servicing HVACR control systems through appropriate measurements on at least two occasions
- communicating technical and procedural requirements to others
- dealing with unexpected situations
- documenting analysis and preparing recommendations in accordance with procedures.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

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:

- appropriate personnel to consult
- thermodynamics principles relevant to HVACR controls
- control fundamentals
- types of control equipment including microprocessors and sensors
- direct data control (DDC) systems
- supervisory control systems
- safe work practices and procedures and use and application of personal protective equipment (PPE)

- hazards and control measures associated with analysing and servicing HVACR systems including housekeeping
- environmental requirements
- organisational procedures
- resource and equipment requirements.
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Assessment Conditions

- Assessors must:
 - have vocational competency in analysing and servicing HVACR 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 that 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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