



Australian Government

MEM23151A Commission and optimise performance of HVACR systems

Release: 1

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Modification History

Release 1 (MEM05v9)

Unit Descriptor

This unit of competency covers the skills and knowledge required to commission and optimise a heating, ventilation, air conditioning and refrigeration (HVAC/R) system and associated plant and equipment.

Application of the Unit

The unit applies to HVAC/R technicians in manufacturing, servicing and maintenance enterprises who are required to commission HVAC/R systems, and as part of the commissioning process, ensure optimal performance.

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

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23006A	Apply fluid and thermodynamics principles in engineering
MEM23154A	Analyse and service HVAC/R control systems
MEM23140A	Determine operational parameters for building HVAC hydronic systems

Employability Skills Information

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.

Elements and Performance Criteria

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| 1 | Prepare HVAC/R system for commissioning | 1.1 Obtain and implement work health and safety (WHS) and environmental requirements for a given work area |
| | | 1.2 Determine system operating parameters by reviewing system specifications and component technical data |
| | | 1.3 Identify correct building codes and local government regulations using appropriate resources |
| | | 1.4 Prepare industry standard report on system performance levels using enterprise procedures |
| | | 1.5 Consult appropriate personnel to ensure the work is coordinated effectively with others involved on the work site |
| | | 1.6 Obtain equipment, resources and testing devices needed for the work in accordance with enterprise procedures |
| 2 | Commission and optimise complex HVAC/R systems | 2.1 Set up and connect testing and measuring devices appropriately for task and to manufacturer specifications |
| | | 2.2 Measure and adjust equipment components and controls, as required |
| | | 2.3 Undertake required measurements and tests and analyse results to provide optimum system performance in accordance with system specifications and regulatory requirements |
| | | 2.4 Provide solutions to unplanned situations consistent with enterprise procedures |

- 2.5 Ensure commissioning is carried out efficiently without waste of materials or damage to equipment and surroundings
- 3 Complete and report commissioning activities
 - 3.1 Verify that plant and equipment are operating to specification
 - 3.2 Document adjustment settings and notify appropriate personnel in accordance with enterprise procedures

Required Skills and Knowledge

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

Required skills

Required skills include:

- interpreting commissioning requirements and system specifications
- determining performance aspects of system
- using appropriate test equipment effectively
- devising a commissioning schedule and plan
- setting up commissioning tests and documenting them
- interpreting drawings and specifications
- communicating effectively with others involved in the commissioning task
- communicating technical and procedural requirements to others
- documenting technical information and designs
- dealing effectively with unexpected situations
- working in teams and with others

Required knowledge

Required knowledge includes:

- fundamentals of HVAC/R systems, including:
 - air systems
 - hydronic systems
 - control systems
 - chillers
 - boilers and furnaces
 - cooling towers
 - heat exchangers
 - piping
 - ducts
- plant and equipment commissioning techniques and procedures, including:
 - set up
 - measuring and testing
 - fault-finding
 - adjustments
 - reporting and documenting
 - commissioning schedules

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.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently: • implement WHS workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range • demonstrate essential knowledge and skills to commission a HVAC/R system • demonstrate competence within a timeframe typically expected of the discipline, work function and industrial environment • demonstrate commissioning of HVAC/R systems consistently. This includes: • identifying system design operating parameters • measuring and adjusting system components and controls to provide optimum system performance • ensuring system operates within regulatory requirements • documenting adjustment settings with established procedures.
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, 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.
Method of assessment	• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application.

	- Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. - Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. - Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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. 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.

WHS requirements	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	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	Appropriate personnel may include: supervisor

	• leading hand • foreman • manager • engineer • technician • trainer • mentor • team member • customer • client
Plant and equipment	Plant and equipment may include: • control system • chiller • boiler • cooling tower • heat exchanger
Resources	Resources may include: • reference manuals • scientific calculator • appropriate manuals • stationery
Enterprise procedures	Enterprise procedures may include: • the use of tools and equipment • instructions, including job sheets, plans, drawings and designs • reporting and communication • manufacturer specifications • operational procedures • industry standards
Equipment	Equipment may include: • computer workstation and software, either stand alone or networked • test apparatus • appropriate tools of trade, equipment and materials

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.