



Australian Government

MEM23153 Contribute to the design of heat exchanger systems

Release: 1

MEM23153 Contribute to the design of heat exchanger systems

Modification History

Release 1. Supersedes and is equivalent to MEM23153A Contribute to the design of heat exchanger systems.

Application

This unit of competency defines the skills and knowledge required to contribute to the design of heat exchanger systems or to undertake the complete design for less complex systems.

The unit applies to heating, ventilation, air conditioning and refrigeration (HVACR) technicians in manufacturing, servicing and maintenance organisations who are required to undertake design work on heat exchangers. It applies to design work undertaken as part of a design team comprising engineers and other technicians and to individual design tasks within the scope of the technician's skill and knowledge.

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. Establish requirements for heat exchanger design	1.1 Obtain and implement work health and safety (WHS) and environmental requirements for the work area 1.2 Determine scope of the design from design brief, reports and in consultation with appropriate personnel 1.3 Determine and interpret relevant standards, codes or regulations applicable to the design 1.4 Consult appropriate personnel to ensure that work is coordinated effectively with others

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	1.5 Obtain equipment and resources needed for the task in accordance with organisational procedures
2. Determine specifications for heat exchanger design	2.1 Obtain parameters and performance requirements in relation to refrigeration system 2.2 Model design solutions based on developed heat exchanger specifications to determine the most effective solution 2.3 Establish final selection on heat exchanger design in consultation with appropriate personnel 2.4 Provide solutions to unplanned situations consistent with organisational procedures
3. Document heat exchanger design	3.1 Document design, including all details of findings, calculations and assumptions in accordance with organisational procedures 3.2 Notify appropriate personnel about the completion of the design task

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:	- data sheets - appropriate modelling software - manuals and tables - stationery.
Organisational procedures include:	- use of tools and equipment - instructions, including job sheets, plans, drawings and designs - reporting and communication - manufacturer specifications - operational procedures - industry standards.
Equipment includes:	computer workstation and software, either stand alone or networked.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23153A Contribute to the design of heat exchanger 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 MEM23153 Contribute to the design of heat exchanger 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, current codes and regulations and client requirements appropriate to the design task
- implementing work health and safety (WHS) procedures and practices including the use of risk control measures
- demonstrate the use of software tools related to design heat exchanger systems
- determining performance aspects of heat exchanger and selecting major system components and materials on at least two occasions using manufacturer data
- communicating technical and procedural requirements to others
- dealing with unexpected situations
- documenting technical information and designs 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:

- WHS requirements
- appropriate personnel to consult
- thermodynamics principles
- heat transfer
- refrigeration and heat pump parameters
- airflow parameters and measurement of airflow
- calorimetric measurements
- measurement of temperature
- environmental requirements
- organisational procedures
- resource and equipment requirements.

Assessment Conditions

- Assessors must:
 - have vocational competency in contributing to the design of heat exchanger 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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