



Australian Government

MEM23153A Contribute to the design of heat exchanger 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 contribute to the design of heat exchanger systems or for less complex systems to undertake the complete design.

Application of the Unit

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

Licensing/Regulatory Information

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

Pre-Requisites

MEM23004A	Apply technical mathematics
MEM23006A	Apply fluid and thermodynamics principles in engineering

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) 1 Establish requirements for heat exchanger design | 2) 1. Obtain and implement work health and safety (WHS) and environmental requirements for a given work area
3) 1. Determine the extent of the design from design briefs, reports and in consultations with appropriate personnel
2
4) 1. Determine and interpret relevant standards, codes or regulations applicable to the design
3
5) 1. Consult appropriate personnel to ensure that work is coordinated effectively with others
4
6) 1. Obtain equipment and resources needed for the task in accordance with enterprise procedures
5 |
| 7) 2 Determine specifications for heat exchanger design | 8) 2. Obtain parameters and performance requirements in relation to refrigeration system
1
9) 2. Model design solutions based on developed heat exchanger specifications to determine the most effective solution
2
10) 2. Establish final selection on heat exchanger design in consultation with appropriate personnel
3
11) 2. Provide solutions to unplanned situations consistent with enterprise procedures
4 |

- 12) 3 Document heat exchanger design
- 13) 3. 1 Document design, including all details of findings, calculations and assumptions in accordance with enterprise procedures
- 14) 3. 2 Notify appropriate personnel about the completion of the design task

Required Skills and Knowledge

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

Required skills

Required skills include:

- interpreting client requirements and specifications
- determining performance aspects of heat exchanger
- interpreting current codes and regulations
- selecting major system components and materials using manufacturer's data
- using relevant software tools effectively
- interpreting drawings and specifications
- communicating effectively with others
- 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:

- thermodynamic principles
- heat transfer
- refrigeration/heat pump parameters
- airflow parameters and measurement of airflow
- calorimetric measurements
- measurement of temperature

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.

<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>Assessors must be satisfied that the candidate can competently and consistently:</p> <ul style="list-style-type: none"> • 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 design heat exchanger systems • demonstrate competency within a timeframe typically expected of the discipline, work function and industrial environment • demonstrate the design of heat exchanger systems consistently.
<p>Context of and specific resources for assessment</p>	<ul style="list-style-type: none"> • 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.
<p>Method of assessment</p>	<ul style="list-style-type: none"> • 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	<p>WHS requirements include:</p> <ul style="list-style-type: none"> • relevant legislation • protective equipment • material safety management systems • hazardous substances and dangerous goods code • local safe operation procedures • awards provisions
Environmental requirements	<p>Environmental requirements include:</p> <ul style="list-style-type: none"> • 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	<p>Appropriate personnel may include:</p> <ul style="list-style-type: none"> • supervisor • leading hand • foreman • manager • engineer • technician • trainer • mentor • team member • customer • client
Resources	<p>Resources may include:</p> <ul style="list-style-type: none"> • data sheets • appropriate modelling software • manuals and tables

	<ul style="list-style-type: none"> stationery
Enterprise procedures	<p>Enterprise procedures may include:</p> <ul style="list-style-type: none"> the use of tools and equipment instructions, including job sheets, plans, drawings and designs reporting and communication manufacturer specifications operational procedures industry standards
Equipment	<p>Equipment may include:</p> <ul style="list-style-type: none"> computer workstation and software, either stand alone or networked

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.