



Australian Government

MEM23144A Contribute to the design of a commercial refrigeration system

Release: 1

MEM23144A Contribute to the design of a commercial refrigeration system

Modification History

Release 1 (MEM05v9).

Unit Descriptor

This unit of competency covers the skills and knowledge required to contribute to the design of commercial refrigeration systems or for less complex systems to undertake the complete design. The unit includes applying of refrigeration and food storage technology, using standard manufactured components and piping, following design specifications, documenting system design and complying with safety and regulatory requirements.

Application of the Unit

The unit applies to technicians in enterprises that design commercial refrigeration equipment. The unit applies to team situations where the technician may working with engineers and other technicians from the heating, ventilation, air conditioning and refrigeration (HVAC/R) and other disciplines on large design projects as well as individual design work that is 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
MEM23129A	Evaluate thermal loads in heating, ventilation, air conditioning and refrigeration

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 | Determine optimum system design for a given application | 1.1 | Obtain and implement work health and safety (WHS) and environmental requirements for a given work area |
| | | 1.2 | Consult appropriate personnel to determine system specifications and final confirmation is obtained |
| | | 1.3 | Plan design development work to meet scheduled timelines in consultation with others involved on the worksite |
| 2 | Design system | 2.1 | Design system taking into account safety, regulatory requirements, relevant standards, system specifications and budgetary constraints |
| | | 2.2 | Determine selected equipment required for the systems and locations in accordance with the design specifications and enterprise procedures |
| | | 2.3 | Check system design draft for compliance with the design brief, regulatory requirements and environmental standards |
| | | 2.4 | Document, validate and approve system design according to enterprise procedures |
| | | 2.5 | Consult as appropriate on any design adjustments required to meet contingencies and unexpected situations |

- 3 Validate system performance
 - 3.1 Establish operating criteria for expected ambient conditions
 - 3.2 Determine and validate likely operating characteristics for a given refrigeration load against the design specifications and standards
 - 3.3 Adjust the functional design and remap operating characteristics to achieve optimal system performance
 - 3.4 Program the control system to meet the operational requirements
 - 3.5 Document the designed system and its validation according to enterprise procedures

Required Skills and Knowledge

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

Required skills

Required skills include:

- selecting appropriate system components
- applying relevant standards and regulatory requirements to the design task
- documenting technical information and designs
- interpreting and applying manufacturers' data, tables and specifications
- using relevant software tools effectively
- interpreting drawings and specifications
- communicating effectively with others
- working in teams with others
- communicating technical and procedural requirements to others
- dealing effectively with unexpected situations

Required knowledge

Required knowledge includes:

- standards and codes relevant to commercial refrigeration systems
- calculation of capacity in heat exchangers
- commercial refrigeration systems features and components:
 - applications
 - system requirements
 - operating conditions and criteria
 - refrigerants
 - refrigeration cycle
 - evaporators
 - condensers
 - compressors
 - liquid expansion devices
 - system load balance point
 - line sizing
 - automatic controls
- commercial refrigeration and integration with an energy management system (E.M.S)
- E.M.S. control components and the function and operating parameters
- E.M.S system design, applications, operation and maintenance

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 • demonstrate essential knowledge and to design a commercial refrigeration system • demonstrate competency within a timeframe typically expected of the discipline, work function and industrial environment • demonstrate the design of commercial a refrigeration system consistently. One application must be related to food storage. The design must include standard manufactured components and piping, adherence to design specifications, documenting system design and compliance with safety and regulatory requirements.
<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

	<p>conditions (real or simulated) and require evidence of process.</p> <ul style="list-style-type: none"> • 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. 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.

WHS requirements	<p>WHS requirements include:</p> <ul style="list-style-type: none"> • 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

	<ul style="list-style-type: none"> • foreman • manager • engineer • technician • trainer • mentor • team member • customer • client
Standards	<p>Relevant standards may include:</p> <ul style="list-style-type: none"> • AS 1677 Refrigeration systems • AS 3666 Air handling and water systems of buildings – Microbial control • Ozone protection regulations • International Institute of Ammonia Refrigeration (IIAR) Ammonia Data Book • American National Standards Institute (ANSI)/International Institute of Ammonia Refrigeration (IIAR) standards • American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) and Mechanical Refrigeration standards
Enterprise procedures	<p>Enterprise procedures may include:</p> <ul style="list-style-type: none"> • use of tools and equipment • instructions, including job sheets, plans, drawings and designs • reporting and communication • manufacturer specifications • site operational procedures • references to industry standards

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.