



Australian Government

MEM23146 Contribute to the design of industrial refrigeration systems

Release: 1

MEM23146 Contribute to the design of industrial refrigeration systems

Modification History

Release 1. Supersedes and is equivalent to MEM23146A Contribute to the design of industrial refrigeration systems.

Application

This unit of competency defines the skills and knowledge required to contribute to the design of industrial refrigeration systems or to undertake the complete design for less complex systems. It includes the determination of the specific type of system and selection of major system components and materials using manufacturer data to determine performance aspects of systems for a given application.

The unit applies to technicians in organisations that design whole refrigeration systems or design modifications to existing systems, including systems incorporating multiple evaporators and compressors, moderate and low temperature, indirect refrigeration and flooded systems.

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. Determine design specification and select components for an	1.1 Obtain and implement work health and safety (WHS) and environmental requirements for the work area 1.2 Determine design requirements from client requirements, job

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
industrial refrigeration system	specifications, briefings and/or discussions with appropriate personnel 1.3 Identify and interpret relevant codes and standards 1.4 Consult with appropriate personnel to ensure that work is coordinated effectively with others 1.5 Obtain equipment and resources needed for the task in accordance with organisational procedures and check for correct operation and safety
2. Design system	2.1 Select the most suitable design for an industrial refrigeration system to meet the specified requirements 2.2 Plan design development work to meet scheduled timelines 2.3 Check system design draft for compliance with the design brief, regulatory requirements and environmental standards
3. Analyse and adjust system performance	3.1 Analyse system performance under variable conditions against client design brief and adjust component selection to meet performance criteria 3.2 Determine fulfilment of required capacity under full and partial load conditions using appropriate resources
4. Validate system design	4.1 Verify final design using organisational procedures for compliance and regulatory requirements 4.2 Document final system design for client approval, using appropriate equipment to industry standards

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:	• scientific calculator • technical charts and tables • design brief • suitable software.
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 • test apparatus • appropriate tools of trade, equipment and materials.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23146A Contribute to the design of industrial refrigeration 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 MEM23146 Contribute to the design of industrial refrigeration 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 refrigeration codes and regulations, drawings, specifications 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 designing industrial refrigeration systems
- contributing to the design of industrial refrigeration systems on at least two occasions including using standard manufactured components and piping
- adhering to design specifications
- documenting system design and compliance on at least two occasions
- 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
- standards and codes of practice
- design criteria
- moderate and low temperature industrial refrigeration systems
- multiple evaporators and multiple compressors
- indirect refrigeration systems
- flooded systems
- cryogenic systems
- basic control sequences
- environmental requirements
- organisational procedures

- resource and equipment requirements.
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Assessment Conditions

- Assessors must:
 - have vocational competency in contributing to the design of industrial refrigeration 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 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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