



**Australian Government**

# **MEM23146A Contribute to the design of industrial refrigeration systems**

**Release 1**

# **MEM23146A Contribute to the design of industrial refrigeration systems**

## **Modification History**

Release 1 (MEM05v9).

## **Unit Descriptor**

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

## **Application of the Unit**

The unit applies to technicians in enterprises 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. 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

1	Determine design specification and select components for an industrial refrigeration system	1.1	Obtain and implement work health and safety (WHS) and environmental requirements for a given work area
		1.2	Determine design requirements from client requirements, job 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 enterprise 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 to 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 enterprise procedures for compliance and regulatory requirements         |
|   |                        | 4.2 | Document final system design using appropriate equipment to industry standards for client approval |

## 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 systems
- interpreting current refrigeration codes and regulations
- selecting of 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 with others

### Required knowledge

Required knowledge includes:

- 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

## 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><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>Assessors must be satisfied that the candidate can competently and consistently:</p> <ul style="list-style-type: none"> <li>• implement WHS workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range</li> <li>• demonstrate essential knowledge and skills relating to designing industrial refrigeration systems</li> <li>• demonstrate competency within a timeframe typically expected of the discipline, work function and industrial environment</li> <li>• demonstrate the design of industrial a refrigeration system consistently. The design must include standard manufactured components and piping, adherence to design specifications, documenting system design and compliance with safety and regulatory requirements.</li> </ul>
<p><b>Context of and specific resources for assessment</b></p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>
<p><b>Method of assessment</b></p>	<ul style="list-style-type: none"> <li>• Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package.</li> <li>• 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.</li> <li>• Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application.</li> <li>• Assessment may be applied under project-related conditions (real or simulated) and require evidence of process.</li> <li>• Assessment must confirm a reasonable inference that</li> </ul>

	<p>competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances.</p> <ul style="list-style-type: none"> <li>• Assessment may be in conjunction with assessment of other units of competency where required.</li> </ul>
<b>Guidance information for assessment</b>	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.

<b>WHS requirements</b>	<p>WHS requirements include:</p> <ul style="list-style-type: none"> <li>• relevant legislation</li> <li>• protective equipment</li> <li>• material safety management systems</li> <li>• hazardous substances and dangerous goods code</li> <li>• local safe operation procedures</li> <li>• awards provisions</li> </ul>
<b>Environmental requirements</b>	<p>Environmental requirements include:</p> <ul style="list-style-type: none"> <li>• relevant legislation, regulations and codes</li> <li>• correct handling and disposal of liquid and solid waste</li> <li>• elimination or minimisation of gas, fume, vapour and smoke emissions, including fugitive emissions</li> <li>• dust elimination, minimisation and control</li> <li>• minimisation of energy and water use</li> <li>• elimination or control of excessive noise</li> <li>• use and recycling of refrigerants</li> </ul>
<b>Appropriate personnel</b>	<p>Appropriate personnel may include:</p> <ul style="list-style-type: none"> <li>• supervisor</li> <li>• leading hand</li> <li>• foreman</li> <li>• manager</li> </ul>

	<ul style="list-style-type: none"> <li>• engineer</li> <li>• technician</li> <li>• trainer</li> <li>• mentor</li> <li>• team member</li> <li>• customer</li> <li>• client</li> </ul>
<b>Resources</b>	<p>Resources may include:</p> <ul style="list-style-type: none"> <li>• scientific calculator</li> <li>• technical charts and tables</li> <li>• design brief</li> <li>• suitable software</li> </ul>
<b>Enterprise procedures</b>	<p>Enterprise procedures may include:</p> <ul style="list-style-type: none"> <li>• the use of tools and equipment</li> <li>• instructions, including job sheets, plans, drawings and designs</li> <li>• reporting and communication</li> <li>• manufacturer specifications</li> <li>• operational procedures</li> <li>• industry standards</li> </ul>
<b>Equipment</b>	<p>Equipment may include:</p> <ul style="list-style-type: none"> <li>• computer workstation and software, either stand alone or networked</li> <li>• test apparatus</li> <li>• appropriate tools of trade, equipment and materials</li> </ul>

## Unit Sector(s)

### Competency field

**Unit sector**      Engineering science

## Custom Content Section

Not applicable.