



Australian Government

MEM234006 Evaluate and select thermodynamic systems or subsystems

Release: 1

MEM234006 Evaluate and select thermodynamic systems or subsystems

Modification History

Release 1. Supersedes and is equivalent to MEM234006A Evaluate and select thermodynamic systems or subsystems.

Application

This unit of competency defines the skills and knowledge required to evaluate the performance and efficiency of thermodynamic plant and equipment and select systems to meet specifications. It includes the use of thermodynamic principles, including the law of entropy and the second law of thermodynamics, as applied to gas cycles and vapour cycles, flow-through nozzles and blade passages, impulse and reaction stages of turbines. It includes generation and transfer of heat energy using solid, liquid and gas mediums and application of software.

The client may be internal or external to the designer's organisation.

It is suitable for Principal Technical Officers and people in equivalent positions working with heat transfer, air conditioning, solar, geo-thermal and other power generation applications involving thermal energy transfer.

Individuals completing this work either already have or are developing skills and experience in scientific principles, evaluation of thermodynamic system components, mathematics and computer techniques.

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

Pre-requisite Unit

Nil

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. Clarify the specifications required	1.1 Establish features of plant and equipment and thermodynamic performance and efficiency parameters

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
for thermodynamic system	1.2 Confirm technical, commercial and environmental parameters of specifications 1.3 Determine stakeholders to be consulted in evaluation and selection process 1.4 Assess work health and safety (WHS), regulatory, sustainability or environmental regulations and issues relevant to the evaluation and selection task 1.5 Confirm selection requirements, including budget and schedule, and provide preliminary advice on feasibility
2. Evaluate thermodynamic system options and prepare concept proposals	2.1 Appraise initial qualitative and quantitative analysis of the evaluation and efficiency task 2.2 Carry out required modelling and calculations using appropriate software and validation techniques 2.3 Generate thermodynamic system solutions in response to selection requirements, including choice of equipment, layout, fluid source and delivery 2.4 Check feasibility and evaluate solutions against selection requirements, ensuring conformity to standards and codes, technical, economic and WHS requirements 2.5 Determine social and sustainability implications of solutions 2.6 Present concept proposals to client
3. Select thermodynamic system	3.1 Evaluate concept proposals with client and select preferred solution 3.2 Finalise selection, including equipment, layout, fluid source and delivery, and other features desired by client 3.3 Ensure preparation of all required documentation, drawings, specifications and instructions 3.4 Consult with client and stakeholders to obtain sign-off on selection 3.5 Monitor installation and commissioning with stakeholders and make any necessary adjustments to design

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

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.

Parameters of the selection requirements include:	- determination of the degree of innovation and creativity expected by the client - selection process and product cost limits and budgets - performance and efficiency specifications - equipment availability, capacities and restrictions - specified administrative, communication and approval procedures - other special features and limits in the requirements.
WHS, regulatory requirements, codes of practice and enterprise procedures include:	- WHS acts, regulations and relevant standards - codes of practice from Australian and overseas engineering and technical associations and societies - risk assessments - registration requirements - safe work practices - state and territory regulatory requirements.
Initial qualitative and quantitative analysis includes:	- a hazard and risk analysis related to existing or proposed plant or equipment - routine noise and vibration monitoring data or investigative measurements.
Appropriate software and validation techniques include:	- performance analysis and modelling - the use of finite element analysis (FEA) and numerical methods within object-oriented modelling techniques - comparison of traditional solutions for simple thermodynamic system performance problems with software solutions to the same problems - review of previously implemented system performance challenges which were completed using the software.
Sustainability includes:	- meeting all regulatory requirements - conforming to all industry covenants, protocols and best practice guides - minimising ecological and environmental footprint of process,

	plant and product • maximising economic benefit of process plant and product to the organisation and the community • minimising the negative WHS impact on employees, community and customer.
--	--

-
-

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM234006A Evaluate and select thermodynamic systems or subsystems.

Links

Companion Volume Implementation Guides are available on VETNet -
<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>