



Australian Government

Assessment Requirements for MARL043
Apply basic principles of marine
engineering thermodynamics

Release: 1

Assessment Requirements for MARL043 Apply basic principles of marine engineering thermodynamics

Modification History

Release 1. This is the first release of this unit of competency in the MAR Maritime Training Package.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- identifying and applying relevant mathematical formulas and techniques to solve basic problems related to engineering thermodynamics
- identifying and interpreting numerical and graphical information, and performing basic mathematical calculations related to engineering thermodynamics, such as gas expansion and contraction, heat transfer, thermal efficiency, and the expansion of liquids and solids
- identifying, collating and processing information required to perform basic calculations related to engineering thermodynamics
- maintaining knowledge of current codes, standards, regulations and industry practices
- performing accurate and reliable mathematical calculations using a calculator
- reading and interpreting written information needed to perform basic calculations related to engineering thermodynamics
- solving problems using appropriate laws and principles.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- basic principles of engineering thermodynamics
- enthalpy
- expansion processes for metals (conduction, convection and radiation)
- forms of heat transfer (conduction, convection and radiation)
- gas laws
- heat, including relationship between temperature, heat energy and heat transfer
- internal combustion engine cycles
- methods of heat transfer
- operating cycle of reciprocating air compressors
- operating principles of two-stroke and four-stroke internal combustion engines
- principles of refrigeration
- properties of fluids (density, mass, pressure, specific volume, temperature)

- relationships between forms of energy, work and power
- International System of Units (SI)
- steam plants
- thermodynamics, including:
 - energy change
 - heat transfer
 - ideal gases
 - thermodynamic energy
 - thermodynamic principles
 - thermodynamic processes
 - thermodynamic properties
 - thermodynamic systems
 - vapours
 - work transfer
- thermal efficiency calculations.

Assessment Conditions

Assessors must satisfy applicable regulatory requirements, which include requirements in the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

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.

Practical assessment must occur in a workplace, or realistic simulated workplace, under the normal range of workplace conditions.

Simulations and scenarios may be used where situations cannot be provided in the workplace or may occur only rarely, in particular for situations relating to emergency procedures and adverse weather conditions where assessment would be unsafe, impractical or may lead to environmental damage

Resources for assessment must include access to:

- applicable documentation, such as legislation, regulations, codes of practice, workplace procedures and operational manuals
- diagrams, specifications and other information required for performing basic calculations related to engineering thermodynamics
- tools, equipment, machinery, materials and relevant personal protective equipment (PPE) currently used in industry.

Links

Companion Volume implementation guide can be found in VetNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=772efb7b-4cce-47fe-9bbd-ee3b1d1eb4c2>