



Australian Government

Assessment Requirements for UEERA0038 Establish the thermodynamic parameters of refrigeration and air conditioning systems

Release: 1

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Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology 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, performance criteria and range of conditions on at least one occasion and include:

- selecting and using appropriate measuring devices correctly
- interpreting measurements
- using calculation methods accurately
- identifying parameters not within the specified range
- documenting thermodynamic parameters correctly
- dealing with unplanned events
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) workplace procedures requirements, including the use of risk control measures
- applying sustainable energy principles and practices
- planning to determine thermodynamic parameters of refrigeration and air conditioning system.

Knowledge Evidence

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

- thermodynamic parameters of refrigeration and air conditioning systems, engineering mathematics fundamentals and refrigeration science, including:
 - arithmetic:
 - rational and irrational numbers, surds
 - International System of Units (SI) units and conversion using unity brackets
 - laws of indices (base 10), scientific and engineering notation
 - estimations, errors and approximations, and significant figures
 - algebra:
 - substitution

- +, -, x on simple polynomials and simple indices
- expanding brackets
- factorising quadratics, common factors and difference of two squares
- simplifying algebraic fractions
- transposition of engineering formulae
- solving one variable equations
- simple algebraic division
- geometry:
 - Pythagoras Theorem
 - angles: degrees, radians and parallel lines cut by a transverse
 - triangles: sum of angles, and properties of equilateral and isosceles triangles
 - congruent triangles
 - similar triangles: ratio of corresponding sides
 - sin, cos, tan: ratios of a right-angled triangle
 - sine and cosine rules
 - circles: circumference, arcs, chords, tangents and circle theorems
 - area and perimeter mensuration on above figures
- coordinate geometry:
 - 2-D plane; x-y axes and s-t axes
 - graph of linear function, $y = ax + b$ and functional notation, $y = f(x)$
 - straight line given slope and one point or given two points
 - linear equations: solving algebraically and geometrically
 - solving two linear functions simultaneously, algebraically and geometrically
 - line segment: length and mid-point
- engineering mechanics:
 - mass/density
 - weight
 - forces
 - specific gravity
 - equilibrium
 - momentum
 - friction loss
 - velocity and speed
 - energy in all forms
 - mechanical advantage
 - efficiency
 - pressure/stress
- molecular theory:
 - changes of state

- sublimation
- expansion and contraction
- electron flow
- state of aggregation
- internal potential energy
- phase change diagrams
- thermodynamics:
 - temperature scales
 - conservation of energy
 - specific heat
 - sensible, latent and super heat
 - properties of steam
 - enthalpy
 - heat energy/temperature relationship
 - heat balance on a body
 - heat transfer
 - conductivity
 - calorimetry
 - peltier effect
 - 1st and 2nd law of thermodynamics
- gas laws and liquids:
 - pressure
 - Boyles law
 - Charles law
 - volumetric relationship
 - psychrometrics
 - latent heat of vaporisation
 - relative humidity
 - air conditioning processes
 - dynamic pressure loss
 - velocity and static pressure
 - bourdon tubes
 - density and relative density
 - Archimedes principle
 - Bernoulli's equation
 - manometers
 - absorption refrigeration
 - centrifugal compression
 - external work of a liquid

- pressure volume diagrams
- isothermal and adiabatic processes
- polytropic processes
- Dalton's law of partial pressure
- vapour compression:
 - pressure/enthalpy relationship
 - entropy
 - characteristics of evaporation and condensation
 - compression and pressure drop phases
 - co-efficient of performance
 - theoretical/practical cycles
 - characteristics of refrigerants
 - theoretical power input
 - pressure losses
 - heat exchange
 - effects of condensing condition changes
 - sub-cooling and superheating
- relevant job safety assessments or risk mitigation processes
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace policies and procedures.

Assessment Conditions

Assessors must hold credentials specified within 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 must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated workplace operational situations that replicate workplace conditions.

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.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>