



Australian Government

Assessment Requirements for UEERA0029 Develop heat exchanger design specifications

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:

- interpreting compliance documents
- setting up and conducting appropriate examinations and tests
- identifying non-compliance defects
- reporting examination and test results and non-compliance issues clearly and accurately
- applying relevant work health and safety (WHS)/occupational health and safety (WHS/OHS) requirements, including using risk control measures
- developing specifications for exchanger designs
- documenting specifications for exchanger designs
- identifying analysis, findings, calculations and assumptions
- preparing to develop specifications for exchanger designs
- reporting findings and actions.

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:

- heat exchanger design, safe working practices and relevant standards, codes and regulations, including:
 - advanced thermodynamics:
 - heat transfer:
 - modes of heat transfer
 - conduction through a flat plate, series flat plates, thick and thin wall pipe, and composite pipes (e.g. lagged pipes and drums)
 - convection at a flat surface or tube
 - radiation from a flat surface or tube for black or grey bodies
 - combined conduction and convection through single or multiple flat plates or thin wall tubes

- combined convection and radiation
- combined conduction, convection and radiation such as fluid in a tank (convection to wall), through wall and/or insulation
- (conduction) to outside air (convection and radiation)
- heat exchangers - parallel, counter flow and cross flow
- refrigeration/heat pump:
 - basic principles and terminology
 - vapour compression cycle
 - performance criteria
 - types of refrigerant - designation, properties advantages and disadvantages
 - refrigerant properties using the p-h diagram
 - ideal vapour compression cycle on the p-h diagram
 - energy balance and heat transfers in compressor, evaporator and condenser
 - actual vapour compression cycle and variations from the ideal
 - pressure loss in lines and non-ideal compression
 - superheating and subcooling with or without suction/liquid heat exchanger
 - Carnot principle applied to refrigerator and heat pump
 - principles of evaporative refrigeration, absorption refrigeration, air cycle refrigeration and thermo-electric refrigeration
- heat exchanger design:
 - concepts
 - design parameters and limitations
 - construction material and components
 - testing requirements
- problem-solving techniques
- relevant job safety assessments or risk mitigation processes
- relevant manufacturer specifications
- relevant WHS/OHS legislated requirements
- relevant workplace documentation
- relevant workplace quality, 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 suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated suitable 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 simulations
- relevant and appropriate materials, tools, facilities and equipment 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>