



Australian Government

**Assessment Requirements for UEERA0022
Design heating, ventilation and air
conditioning (HVAC) systems and select
components**

Release: 1

Assessment Requirements for UEERA0022 Design heating, ventilation and air conditioning (HVAC) systems and select components

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:

- understanding required operating functions and parameters from the design specification
- developing the design within the safety, regulatory and functional requirements and budget limitations
- documenting and presenting design effectively
- successfully negotiating design alteration requests
- obtaining approval for final design
- dealing with unplanned events
- applying relevant work health and safety (WHS)/occupational health and safety (WHS/OHS) requirements, including using risk control measures
- designing heating, ventilation and air conditioning (HVAC) systems
- preparing to design HVAC systems.

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:

- commercial HVAC system design, safe working practices and relevant standards, codes and regulations, including:
 - design parameters for single-storey buildings (e.g. offices, restaurants, hotels and bars):
 - customer and objective
 - customer concept of environment desired
 - economics
 - client brief
 - relevant design criteria:
 - building purpose, location, orientation and shape

- external environment ambient conditions
- internal load diversity
- thermal capacity behaviour
- thermal load (full and partial)
- zoning and building usage:
 - space and building
 - occupancies, single purpose and multi-purpose
- system selection criteria:
 - economics
 - environment
 - control requirements
 - existing structures
 - new structures
 - system components
 - space for equipment and system
 - selection of appropriate system, equipment, ductwork and components
- systems and applications:
 - design features, engineering and selection procedures for direct expansion air conditioning systems:
 - air conditioning split systems and package units
 - free blow and ducted fan coil units
 - cooling, heat pump and electric heating
 - air conditioning system components and piping selection
- air conditioning system components and piping selection, safe working practices and relevant standards, codes and regulations, including:
- relevant industry practices:
 - AS/NZS 1677 Refrigerating systems SAA refrigeration code
 - AS/NZS 3666 Air-handling and water systems of buildings
 - ozone protection regulations
 - ANSI/IIAR standards
 - ANSI/ASHRAE mechanical refrigeration and IIAR
 - bulletins and standards
 - equipment manufacturer's specifications and practices
- calculation of capacity in heat exchangers:
 - $Q = UA \text{ (LMTD)}$
 - $Q = mc\Delta t$
 - $Q = m \Delta h$
- evaporators
 - commercial types and applications
 - coil bypass factor

- effects of evaporator TD on space humidity
- effects of air circulation on product conditions
- selection criteria and selection tables
- condensers:
 - commercial types and applications
 - effects of ambient conditions
 - condenser control
 - heat rejection factor
 - condenser TD
 - selection criteria and selection tables
- compressors
 - types and applications
 - capacity
 - displacement
 - volume flow rate
 - theoretical capacity
 - total volumetric efficiency
 - effect of operating conditions, including suction
 - pressure drop and superheating
 - actual capacity
 - power
 - theoretical requirement
 - effects of operating conditions
 - actual requirements
 - post defrost loads
 - pull down torque requirements, high and medium
 - and low back pressure compressors
 - selection tables and motor selection
- liquid expansion devices:
 - types, operation and applications
 - effects from sub-cooling
 - distributor types, operation and applications
 - selection tables
 - system load balance point encompassing:
 - graphical representation
 - line sizing and design
 - velocity tables
 - pressure drop in lines and fittings
 - oil migration stabilisation

- refrigerant velocity
- effect of varying system capacity
- oil traps
- risers
- double risers
- liquid migration
- design for parallel components and multiplex systems
- automatic controls:
 - fin spacing, suction temp to evaporator suction
 - hot-gas bypass valves
 - electronic control of valves and programmable logic controllers (PLC)
 - refrigerant regulating valves
 - solenoid valves
 - condenser pressure regulating valves
 - evaporator pressure regulating valves
 - crankcase pressure regulating valves
 - cycling controls
 - pressure-stats
 - thermostats
 - defrost controls
 - monitoring and alarm controls
 - refrigeration automation systems
 - control strategies
 - control modes
- problem-solving techniques
- relevant job safety assessments or risk mitigation processes
- relevant WHS/OHS legislated requirements
- relevant workplace budget, quality, policies and procedures
- relevant workplace documentation.

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>