



Australian Government

Assessment Requirements for UEERA0016

Design commercial refrigeration systems and select components

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:

- 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 (OHS) requirements, including using risk control measures
- designing commercial refrigeration systems
- preparing to design commercial refrigeration 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 refrigeration system design, safe working practices and relevant standards, codes and regulations, including:
 - food spoilage and possible causes:
 - physical damage
 - animal activity
 - chemical breakdown
 - enzyme activity
 - microorganisms
 - effects of temperature change
 - effects of humidity change

- effects of freezing on fresh produce
- effects of slow freezing time
- effect of refreezing
- food preservation:
 - removing or taking out a reactant
 - removing or inactivating the catalyst
 - reducing temperature
 - changing the reaction system
 - irradiation
- microorganisms:
 - conditions for growth
 - potentially hazardous foods
 - cross-contamination
- identification of food spoilage:
 - recognition and suggest possible cause
 - physical damage
 - animal activity
 - chemical breakdown
 - enzyme activity
 - microorganisms
- types of heat processing techniques:
 - heat processing using steam and water
 - blanching
 - pasteurisation
 - sterilisation
 - evaporation
 - heat processing using hot air
 - dehydration
 - baking and roasting
- types of chilling processing techniques:
 - chilling and controlled atmosphere storage
 - freezing
 - freeze drying and freeze concentration
 - modified atmosphere combined with low temperature cryovac
- equipment manufactures specifications and practices
- refrigeration 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
- IIR ammonia data book
- ANSI/IIR standards
- ANSI/ASHRAE mechanical refrigeration and IIR
- bulletins and standards
- equipment manufacturer's specifications and practices
- calculation of capacity in heat exchangers:
 - $Q = UA (LMTD)$
 - $Q = mc\Delta t$
 - $Q = m \Delta h$
- 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, motor selection
- liquid expansion devices:
 - types, operation and applications
 - effects from sub-cooling
 - distributor types, operation and applications
 - selection tables
 - system load balance point
 - 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
- 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>