



Australian Government

UEERA0034 Establish heat loads for commercial refrigeration and/or air conditioning applications

Release: 1

UEERA0034 Establish heat loads for commercial refrigeration and/or air conditioning applications

Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

Application

This unit involves the skills and knowledge required to establish heat loads for commercial refrigeration and/or air conditioning applications.

It includes determining heat loads for commercial refrigeration and air conditioning applications using quick selection, short-form paper and computer-based methods and documenting results.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

UEERA0038 Establish the thermodynamic parameters of refrigeration and air conditioning systems

UEERA0002 Analyse the psychrometric performance of HVAC/R systems
and

UEERA0003 Analyse the thermodynamic performance of HVAC/R systems
or

UEERA0094 Verify functionality and compliance of refrigeration and air conditioning installations

UEECD0007 Apply work health and safety regulations, codes and practices in the workplace

UEECD0019 Fabricate, assemble and dismantle utilities industry components

UEECD0020 Fix and secure electrotechnology equipment

UEECD0051 Use drawings, diagrams, schedules, standards, codes and specifications

UEECD0016 Document and apply measures to control WHS risks associated with electrotechnology work

UEERA0059 Prepare and connect refrigerant tubing and fittings

UEERA0036 Establish the basic operating conditions of vapour compression systems

UEERA0035 Establish the basic operating conditions of air conditioning systems

UEERA0050 Install refrigerant pipe work, flow controls and accessories

UEERA0081 Select refrigerant piping, accessories and associated controls

UEERA0031 Diagnose and rectify faults in air conditioning and refrigeration control systems

UEERA0092 Solve problems in low voltage refrigeration and air conditioning circuits

UEERL0005 Locate and rectify faults in low voltage (LV) electrical equipment using set procedures

UEERL0004 Disconnect - reconnect electrical equipment connected to low voltage (LV) installation wiring

UEERL0001 Attach cords and plugs to electrical equipment for connection to a single phase 230 Volt supply

UEERL0002 Attach cords, cables and plugs to electrical equipment for connection to 1000 V a.c. or 1500 V d.c.

Competency Field

Refrigeration and air-conditioning

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare to determine heat loads for commercial refrigeration and/or air conditioning applications

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for a given work area are identified and applied
- 1.2** WHS/OHS risk control measures and workplace procedures are followed in preparation for commercial refrigeration/air conditioning work
- 1.3** Extent of heat load analysis is determined from project specifications and discussions with appropriate person/s
- 1.4** Activities are planned to meet scheduled timelines in consultation with other person/s involved in commercial refrigeration/air conditioning work
- 1.5** Effective strategies are determined to ensure solution

		development and implementation is carried out efficiently in accordance with workplace procedures
2	Determine heat loads for commercial refrigeration and/or air conditioning applications	2.1 WHS/OHS risk control measures and workplace procedures for carrying out commercial refrigeration/air conditioning work is followed
		2.2 Specifications of commercial refrigeration and/or air conditioning system operating parameters are applied when performing heat load estimations
		2.3 Parameters, specifications and performance requirements in relation to commercial refrigeration and/or air conditioning system are set in accordance with workplace procedures
		2.4 Appropriate approaches to determine the heat loads are carried out to provide most effective solutions
		2.5 Unplanned events are dealt with safely and effectively consistent with regulatory requirements and workplace procedures in a manner that minimises risk to personnel and equipment
		2.6 Work quality is monitored in accordance with performance agreement and/or workplace or industry standards
3	Complete and report heat loads for commercial refrigeration and /or air conditioning applications	3.1 Heat load estimations are documented, including details of findings, calculations and assumptions, in accordance with workplace procedures
		3.2 Completed heat loads are submitted to appropriate person/s to be checked for accuracy and compliance with project specifications and evaluated to determine whether performance requirements are met
		3.3 Heat load estimations are reported to relevant person/s to determine appropriate action to be taken based on findings

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

Determining heat loads for commercial refrigeration and/or air conditioning applications must include at least the following:

- one quick selection short-form paper and/or one computer-based method for a refrigeration and/or air conditioning system

Unit Mapping Information

This unit replaces and is equivalent to UEENEEJ129A Establish heat loads for commercial refrigeration and/or air conditioning applications.

Links

Companion Volume implementation guides are found in VETNet - -

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

Assessment Requirements for UEERA0034 Establish heat loads for commercial refrigeration and/or air conditioning applications

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:

- establishing system parameters for heat load
- selecting appropriate head load calculation tools
- identifying heat loads accurately
- using calculation methods accurately
- documenting heat loads correctly
- dealing with unplanned events
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures and practices requirements, including using risk control measures
- applying sustainable energy principles and practices
- determining heat loads for commercial refrigeration and air conditioning applications
- planning to determine heat loads for commercial refrigeration/air conditioning applications.

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 heat load estimating commercial refrigeration applications, safe working practices and relevant standards, codes and regulations, including:
 - heat transfer:
 - factors affecting heat transfer
 - insulation material characteristics
 - vapour barriers (seals)
 - ambient conditions
 - composite walls (heat flows)
 - types of common insulation
 - thermal conductivity

- film factors
- cabinet construction and design:
 - deep freeze case
 - meat case
 - dairy case
 - fruit and vegetable case
 - drink cabinets
- air change load:
 - room volumes
 - room usage (average, medium and heavy)
 - heat removed from cooling air to refrigerated conditions
 - air curtains
 - temperature differences
 - door opening sizes
 - Tamm's equation
- product load:
 - sensible heat
 - latent heat
 - heat of respiration
 - storage temperatures
 - unit running times
 - humidity
 - air flows
 - stacking of products
 - freeze, chill and thaw times
- total freezer/cool room loads:
 - wall load
 - air change load
 - product load
 - miscellaneous
 - total load, safety factor and unit running times
 - floor loads in cool rooms
 - door opening loads (ASHRAE and RADS methods)
 - door opening loads (for trucks)
- process cooling loads
 - cooling chemical reactions
 - energy balance methods
 - sensible and latent cooling of gases
 - sensible and latent cooling of water vapour in gas streams

- computer programs
- commercial air conditioning heat load estimating
- heat load estimating for commercial air conditioning applications, safe working practices and relevant standards, codes and regulations, including:
 - heat flow in buildings:
 - conduction
 - convection
 - radiation
 - heat paths
 - thermal storage
 - different methods of calculations:
 - ASHRAE
 - carrier
 - finite difference
 - U values
 - film coefficients
 - solar heat:
 - direct
 - diffuse
 - sol air temperature
 - sun position calculations
 - design conditions:
 - outdoor
 - monthly/daily corrections
 - comfort/critical
 - indoor
 - effective temperature
 - thermal comfort
 - space characteristics
 - equipment location
 - zoning
 - internal loads:
 - lighting
 - equipment
 - people
 - load profiles
 - internal partitions
 - fresh air/AS 1668 The use of ventilation and air conditioning in buildings
 - calculation of fabric loads:
 - walls

- roofs
- floors
- windows:
 - glass types and factors
 - shade factors
 - internal and external shading
 - shading from adjacent structures
- air quantity calculation:
 - psychrometrics
 - by-pass factor
 - coil load
 - variable air volume (VAV) air quantities
- piping and other losses
- refrigeration plant load
- computer software:
 - responsible use
- relevant commercial refrigeration and air conditioning manufacturer specifications
- 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>