



Australian Government

UEERA0009 Audit energy use for commercial HVAC/R systems

Release: 1

UEERA0009 Audit energy use for commercial HVAC/R systems

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 audit energy use for commercial heating, ventilation and air conditioning/refrigeration (HVAC/R) systems.

It includes assessing the energy used by commercial HVAC/R systems in relation to its performance for improving efficiency and/or certification as meeting energy efficiency industry standards. It also includes safe working practices, determining efficiency requirements, setting up performance and energy tests, evaluating results and documenting test outcomes.

The skills and knowledge described in this unit require a licence or permit to practice in the workplace where work is carried out on electrical installations which are designed to operate at voltages greater than 50 volt (V) alternating current (a.c.) or 120 V direct current (d.c.).

Competency development activities in this unit are subject to regulations directly related to licensing. Where a licence or permit to practice is not held, skills and knowledge described in this unit require a relevant contract of training, such as an Australian Apprenticeship.

Additional and/or other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to work health and safety (WHS)/occupational health and safety (OHS) regulations.

Permits may also be required for some work environments, such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.

Pre-requisite Unit

UEERA0039 Evaluate and report on building services energy management systems

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 audit energy use for a commercial HVAC/R application

PERFORMANCE CRITERIA

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

- 1.1** WHS/OHS processes 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 the work
- 1.3** HVAC/R system assessment and testing area are checked for safety hazards and risk control measures implemented in accordance with safety policy and workplace procedures

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| | 1.4 | Relevant documentation is obtained and read to determine performance/certification assessment requirements |
| | 1.5 | Advice is sought from the work supervisor to ensure work is coordinated effectively with others |
| | 1.6 | Tools, testing devices and materials needed to carry out the work are obtained and checked for correct operation and safety |
| 2 | Audit energy use for a commercial HVAC/R application | |
| | 2.1 | WHS/OHS risk control measures and workplace procedures for carrying out the work are followed |
| | 2.2 | Circuits/apparatus/plant are checked and isolated in accordance with WHS/OHS requirements and workplace procedures |
| | 2.3 | HVAC/R system performance and energy efficiency requirements and assessment methods are applied to the audit process |
| | 2.4 | HVAC/R apparatus assessment and tests are set up in accordance with established test methods and workplace procedures for each parameter being audited |
| | 2.5 | HVAC/R system assessment and tests are carried out methodically and results and required actions systematically noted |
| | 2.6 | Unexpected situations are dealt with safely in accordance with workplace procedures with the approval of an authorised person/s in a manner that minimises risk to personnel and equipment |
| | 2.7 | Auditing is carried out without damage to systems, circuits, the surrounding environment or services using sustainable energy practices |
| 3 | Document auditing activities and results | |
| | 3.1 | WHS/OHS work completion risk control measures and workplace procedures are followed |
| | 3.2 | Worksite is cleaned and made safe in accordance with workplace procedures |
| | 3.3 | Assessment and test results are evaluated, non-compliance issues identified, and appropriate actions determined and documented |

- 3.4** Assessment test results and recommendations on non-compliance issues are documented and reported to appropriate person/s in accordance with workplace procedures

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.

Auditing energy use must include at least the following:

- two different commercial HVAC/R systems

Unit Mapping Information

This unit replaces and is equivalent to UEENEEJ147A Audit energy use for commercial HVAC/Refrigeration systems.

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 UEERA0009 Audit energy use for commercial HVAC/R systems

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 performance/certification requirements correctly
- setting up and conducting appropriate system assessments and tests
- identifying non-compliance issues
- reporting assessment and test results and non-compliance issues and recommendations appropriately
- dealing with unplanned events
- analysing results from test data, including:
 - analysing electricity tariffs and implications
 - analysing total consumption versus peak load
 - comparing against industry standards
 - reviewing current practices against ideal
- applying relevant work health and safety (WHS)/occupational health and safety (WHS/OHS) workplace procedures and practices, including using risk control measures
- applying sustainable energy principles and practices
- auditing energy use for commercial heating, ventilation and air conditioning/refrigeration (HVAC/R) system, including:
 - documenting auditing activities results and appropriate actions
- planning audit energy use for a commercial HVAC/R application.

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:

- HVAC/R energy audits, safe working practices and relevant standards, codes and regulations, including:
 - identification of major energy consuming plant:
 - review of HVAC/R system components

- methods of energy conservation:
 - review of energy conserving strategies
 - house keeping
 - time schedules
 - good maintenance practices:
 - filters, fans, appropriate set points and dead bands
 - HVAC/R system control:
 - night cycle
 - optimum stop/start
 - purge cycles
 - chiller/boiler/cooling tower sequencing
 - economy cycles (based on temperature or enthalpy)
 - supply air reset
 - condenser water temperature reset
 - electrical load control:
 - power demand control
 - load limiting
 - load shedding
 - set point relaxation
 - ventilation cycles
- tests and data collection procedures:
 - use of building management system for data collection (trending)
 - use of data recorders (loggers)
 - monitoring of building operations generally
- analysis of results from test data:
 - comparison against standards (BOMA)
 - revision of current practices against ideal
 - total consumption vs. peak load
 - electricity tariffs and implications
- methods of reducing energy usage:
 - plant retrofits
 - controls - application of strategies
 - plant - fixed OA to economy, boiler to electric reheat, constant volume to variable air volume (VAV) and cost-benefit (payback)
- relevant manufacturer specifications
- relevant safe work method statements (SWMS)/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

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