



Australian Government

UEERA0010 Commission complex heating, ventilation and air conditioning (HVAC) systems

Release: 1

UEERA0010 Commission complex heating, ventilation and air conditioning (HVAC) 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 set up, adjust and commission complex heating, ventilation and air conditioning (HVAC) and refrigeration systems for optimum performance.

It includes working safely, testing and analysing system parameters, adjusting equipment and controls, following procedures and documenting final operating parameters and settings.

To undertake this unit, the learner must have a Trainee Refrigerant Handling Licence as it includes work on refrigeration and air conditioning equipment that carries the risk of a fluorocarbon refrigerant being emitted.

The skills and knowledge described in this unit require a national Refrigerant Handling Licence as it includes work on refrigeration and air conditioning equipment that carries the risk of a fluorocarbon refrigerant being emitted while decanting the refrigerant or manufacturing, installing, commissioning, servicing, maintaining or decommissioning refrigeration and air conditioning equipment.

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 refrigeration, air conditioning or 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

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

UEERA0094 Verify functionality and compliance of refrigeration and air conditioning installations

UEERA0081 Select refrigerant piping, accessories and associated controls

UEERA0032 Diagnose and rectify faults in complex air conditioning/refrigeration systems

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 commission

PERFORMANCE CRITERIA

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

1.1 WHS/OHS procedures are obtained and implemented in

complex HVAC systems		accordance with workplace procedures
	1.2	WHS/OHS risk control measures and procedures for work are followed
	1.3	Safety hazards not previously identified are risk assessed and documented and risk control measures implemented
	1.4	Appropriate person/s is consulted to ensure the work is coordinated effectively with others involved on the worksite
	1.5	System operating parameters are identified by reviewing system specifications and component technical data
	1.6	Tools, equipment and testing devices required for the work are obtained and checked for correct operation and safety in accordance with workplace procedures
	1.7	Preparatory work is checked to ensure damage has not occurred and is compliant with requirements
	1.8	Need to test or measure live work is determined in accordance with workplace procedures and WHS/OHS requirements
	1.9	Circuits are checked as being isolated in accordance with WHS/OHS requirements and workplace procedures
2 Commission complex HVAC systems	2.1	WHS/OHS risk control measures and workplace procedures for carrying out the work are followed
	2.2	Testing/measuring devices are connected and set up in accordance with requirements for a particular system
	2.3	Measurements and adjustments are made to equipment components and controls to provide optimum system performance in accordance with system specifications and regulatory requirements
	2.4	Decisions for dealing with unexpected situations are made from discussions with appropriate person/s, job specifications and requirements
	2.5	Unplanned situations are responded to in accordance with workplace procedures in a manner that minimises risk to personnel and equipment
	2.6	Commissioning is carried out efficiently without waste

		of materials or damage to apparatus, the surrounding environment or services applying sustainable energy principles
3	Complete and report commissioning activities	3.1 WHS/OHS risk control work completion measures and procedures are followed
		3.2 Worksite is cleaned and made safe in accordance with workplace procedures
		3.3 Adjustment settings and results of commissioning work are documented and appropriate person/s notified 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.

Commissioning complex HVAC systems must include at least at least the following:

- two different types of complex HVAC systems incorporating multiple major components (i.e. compressors, condenser or evaporators), circuits or systems and associated components and controls

Unit Mapping Information

This unit replaces and is equivalent to UEENEEJ123A Commission complex (HVAC) heating, ventilation and air conditioning 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 UEERA0010 Commission complex heating, ventilation and air conditioning (HVAC) 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:

- identifying system design operating parameters
- measuring and adjusting system components and controls to provide optimum system performance
- ensuring system operates within regulatory requirements
- documenting adjustment settings with established procedures
- dealing with unplanned events
- applying relevant legislations, industry standards, codes of practice and regulations
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including:
 - applying safe working practices
 - applying sustainable energy principles and practices
 - hazard identification and reporting
 - implementing risk control measures
- commissioning complex heating, ventilation and air conditioning (HVAC) systems
- completing and reporting on commissioning activities
- determining need to test or measure live work
- isolating circuits
- preparing to commission complex HVAC systems
- using relevant tools, equipment, testing and measuring devices.

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:

- complex HVAC system commissioning, safe working practices and relevant standards, codes and regulations, including:
 - commissioning fundamentals:

- building specifications/requirements/responsibilities
- design and as installed drawings
- building codes
- local government regulations
- design conditions
- pre-commissioning checks
- calibration of instruments
- commissioning procedures
- data collection, recording and documentation
- reporting procedures
- air systems:
 - factors affecting the design of ductwork systems
 - types of ductwork systems
 - static, velocity and total pressure
 - air testing and balancing
 - air flow
 - pressure
 - temperature
- fans:
 - types and characteristics
 - fan laws
 - fan and system curves
 - fan testing
- air balancing:
 - equipment, instruments and procedures
 - leakage testing
- overview of noise in duct systems:
 - noise sources in duct systems
 - attenuation
 - methods of control
- system capacity calculations
- hydronic systems:
 - hydronic instruments
 - fluid flow
 - pumps: pump curves and system curves
 - pump testing
 - capacity calculations
- plant and equipment:
 - controls

- heat exchangers
- chillers
- boilers
- cooling towers
- relevant manufacturer specifications
- relevant safe work method statements (SWMS)/job safety assessments or risk mitigation processes
- relevant tools, equipment and testing devices
- relevant WHS/OHS legislated requirements, including:
 - environmental and sustainable energy principles and practices
- relevant workplace documentation
- relevant workplace policies and procedures
- system operating parameters.

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>