



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **UEENEEJ148A Audit HVAC/R control systems for compliance with regulations and standards**

Release: 2

## UEENEEJ148A Audit HVAC/R control systems for compliance with regulations and standards

### Modification History

Not Applicable

### Unit Descriptor

#### Unit Descriptor

1)

##### 1.1) Descriptor

This unit covers control safety and performance evaluation of heating, ventilating, air conditioning and refrigeration control systems across their operating range. It encompasses working safely, setting up and conducting evaluation measurements, evaluating performance from measured parameters and documenting results and recommending any resulting corrective actions.

### Application of the Unit

#### Application of the Unit 4)

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training or institutional based delivery. It applies to any formal recognition for this standard at the aligned AQF 6 level.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control, lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical devices, site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures

## Licensing/Regulatory Information

### 1.2) License to practice

The skills and knowledge described in this unit may require a license to practice in the workplace subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

## Pre-Requisites

Prerequisite Unit(s) 2)

### 2.1) Competencies

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEJ135A Design control systems for refrigeration or heating, ventilation and air conditioning systems

UEENEEJ130A Produce HVAC/R control system diagrams

UEENEEJ164A Analyse the operation of HVAC air and hydronic systems

UEENEEJ192A Analyse the psychrometric performance of HVAC/R systems

and

UEENEEJ193A Analyse the thermodynamic performance of HVAC/R systems

or

UEENEEJ109A Verify functionality and compliance of refrigeration and air conditioning installations

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, assemble and dismantle utilities industry components

UEENEEE003B Solve problems in extra-low voltage single path circuits

UEENEEE105A Fix and secure electrotechnology equipment

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

## **Prerequisite Unit(s)**

**2)**

UEENEEE137A Document and apply measures to control OHS risks associated with electrotechnology work

UEENEEJ102A Prepare and connect refrigerant tubing and fittings

UEENEEJ103A Establish the basic operating conditions of vapour compression systems

UEENEEJ104A Establish the basic operating conditions of air conditioning systems

UEENEEJ106A Install refrigerant pipe work, flow controls and accessories

UEENEEJ107A Install air conditioning and refrigeration systems, major components and associated equipment

UEENEEJ108A Recover, pressure test, evacuate, charge and leak test refrigerants

UEENEEJ110A Select refrigerant piping, accessories and associated controls

UEENEEJ111A Diagnose and rectify faults in air conditioning and refrigeration systems and components

UEENEEJ113A Commission air conditioning and refrigeration systems

UEENEEJ153A Find and rectify faults motors and associated controls in refrigeration and air conditioning systems

UEENEEJ170A Diagnose and rectify faults in air conditioning and refrigeration control systems

UEENEEJ194A Solve problems in low voltage refrigeration circuits

UEENEEP012A Disconnect / reconnect composite appliances connected to low voltage installation wiring

For the full prerequisite chain details for this unit please refer to Table 2 in Volume 1, Part 2

## **Employability Skills Information**

### **Employability Skills**

**3)**

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

## Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a unit      Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

## Elements and Performance Criteria

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
1    Prepare to audit HVAC/R control systems	1.1    OHS processes and procedures for a given work area are identified, obtained and understood
	1.2    Established OHS risk control measures and procedures are followed in preparation for the work.
	1.3    Examination and testing area is checked for safety hazards and risk control measures implemented in strict accordance with safety policy and procedures.
	1.4    Relevant documentation is obtained and read to determine the performance/certification requirements against which the system is to be assessed. Note: Examples of documentation are those specifying safety requirements, technical standard and as marketed technical performance, product quality endorsement standards.
	1.5    Advice is sought from the work supervisor to ensure the 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 HVAC/R control systems for compliance with regulations and standards.	2.1    OHS risk control measures and procedures for carrying out the work are followed.
	2.2    The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3    Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
	2.4 In depth knowledge of the performance and energy efficiency requirements of HVAC/R system and assessment methods are applied to the audit process.
	2.5 Control system examination and tests are set up in accordance with established test methods and procedures for each particular parameter under scrutiny.
	2.6 Control system examination and tests are carried out methodically and results and comments systematically noted.
	2.7 Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.8 Assessment is carried out without damage to systems, circuits, the surrounding environment or services and using sustainable energy practices.
3 Complete auditing work and document results	3.1 OHS work completion risk control measures and procedures are followed.
	3.2 Work site is cleaned and made safe in accordance with established procedures.
	3.3 Examination and test results are evaluated and non-compliance issues identified.
	3.4 Examination, test results and comments on non-compliance issues are documented and reported to appropriate person(s) in accordance with established procedures

## **Required Skills and Knowledge**

### **REQUIRED SKILLS AND KNOWLEDGE**

7) This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of safe working practices and auditing HVAC/R control systems for compliance with standards and regulations.

## REQUIRED SKILLS AND KNOWLEDGE

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

### **KS01-EJ148A HVAC/R control system audits**

Evidence shall show an understanding of HVAC/R control system audits, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

- T1 review of HVAC/R system components
- T2 performance requirements of particular control applications from available system specifications, design briefs etc
- T3 descriptions of operation
- T4 measurements, recordings, etc. of system performance, as required to confirm plant control compliance with desired conditions.
- T5 comparison of system specifications, control strategies, design briefs, and recorded test results with current HVAC/R energy management principles to establish the economy of operation of HVAC/R plant.
- T6 preparation a detailed report outlining the results of investigation and stating suggested control system adjustments, alterations and modifications to improve the performance of the plant.

## Evidence Guide

### EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package. .

The Evidence Guide forms an integral part of this Unit. It must be used in conjunction with all parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

#### **Overview of Assessment**

##### **9.1)**

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. In some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced

## EVIDENCE GUIDE

by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work influence decisions about how/how much the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

### **Critical aspects of evidence required to demonstrate competency in this unit**

#### **9.2)**

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:



## EVIDENCE GUIDE

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Audit HVAC/R control systems for compliance with standards and regulations as described in 8) and including:
    - A Interpreting compliance documents
    - B Setting up and conducting appropriate examinations and tests
    - C Identifying non-compliance defects
    - D Reporting examination and test results and non-compliance issues clearly and accurately

## EVIDENCE GUIDE

### **Context of and specific resources for assessment**

#### **9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

Evidence should show demonstrated competency in auditing HVAC/R control systems for compliance with standards and regulations.

### **Method of assessment**

#### **9.4)**

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is intended primarily for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

### **Concurrent assessment and relationship with other units**

#### **9.5)**

There are no concurrent assessment recommendations for this unit.

## Range Statement

### RANGE STATEMENT

8) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit must be demonstrated in relation to at least two different types of HVAC/R control systems encompassing at least four different control scenarios.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

## Unit Sector(s)

Not Applicable

## Competency Field

### 2.2) Literacy and numeracy skills

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading	5	Writing	5	Numeracy	5
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### 2.2) Literacy and numeracy skills

Competency Field 5)

Refrigeration and Air Conditioning