



**Australian Government**

# **UEENEEJ109A Verify functionality and compliance of refrigeration and air conditioning installations**

Release 3

## **UEENEEJ109A Verify functionality and compliance of refrigeration and air conditioning installations**

### **Modification History**

Not Applicable

### **Unit Descriptor**

#### **Unit Descriptor**

1)

#### **1.1) Descriptor**

This unit covers testing and visual inspection for verifying that a refrigeration and air conditioning system and components are safe, comply with requirements and functions as intended. It encompasses working safely, conducting compliance tests, conducting visual inspections, identifying non-compliance defects and mandatory reporting requirements.

### **Application of the Unit**

#### **Application of the Unit** 4)

This unit is intended to augment previously acquired competencies. It is suitable for employment-based programs under an approved contract of training.

## Licensing/Regulatory Information

### 1.2) License to practice

The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. In some States/Territories a licence is required to practise this unit in the workplace subject to regulations for undertaking refrigeration and air conditioning work and in particular working with refrigerants. 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.

- UEENEEE101A    Apply Occupational Health and Safety regulations, codes and practices in the workplace
- UEENEEE102A    Fabricate, assemble and dismantle electrotechnology components
- UEENEEE003B    Solve problems in extra-low voltage single path circuits
- UEENEEE105A    Fix and secure electrotechnology equipment
- UEENEEE107A    Use drawings, diagrams, schedules, codes and manuals
- UEENEEE137A    Document occupational hazards and risks in an electrotechnology environment
- UEENEEJ102A    Prepare and connect refrigeration

<b>Prerequisite Unit(s)</b>	<b>2)</b>
	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 in 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
UEENEEP017A	Locate and rectify faults in low voltage composite appliances using set procedures
UEENEEP024A	Attach cords and plugs to electrical

**Prerequisite Unit(s)** 2)

equipment for connection to a single phase 230 Volt supply

UEENEEP025A Attach cords, cables and plugs to electrical equipment for connection to 1000 Va.c. or 1500 Vd.c. supply

## 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

**ELEMENT**

**PERFORMANCE CRITERIA**

1 Prepare to verify refrigeration and air conditioning installations	1.1	OHS procedures for a given work area are identified, obtained and understood
	1.2	Established OHS risk control measures and procedures in preparation for the work are followed
	1.3	Safety hazards which have not previously been identified are noted and established risk control measures are implemented

**ELEMENT**

**PERFORMANCE CRITERIA**

- |                                   |     |  |
|-----------------------------------|-----|--|
|                                   | 1.4 | Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved on the work site  |
|                                   | 1.5 | Location of system components is determined from specifications and diagrams   |
|                                   | 1.6 | Inspection and tests are appropriately sequenced in accordance with job schedule   |
|                                   | 1.7 | Materials needed for the tests and verification are obtained in accordance with established procedures and checked against job requirements                          |
|                                   | 1.8 | Tools, equipment and testing devices needed to verify compliance are obtained in accordance with established procedures and checked for correct operation and safety |
| Visually inspect the installation | 2.1 | OHS risk control measures and procedures for carrying out the work are followed  |
|                                   | 2.2 | Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures   |
|                                   | 2.3 | Pipe work is checked for appropriate type and size   |
|                                   | 2.4 | Pipe work, accessories and components are validated as being suitably located, securely fixed and suitably protected from damage or corrosion                        |
|                                   | 2.5 | System components and accessories are validated as being appropriately rated per manufacture and design specifications   |
|                                   | 2.6 | Evidence that equipment complies with safety and functional requirements is cited  |
|                                   | 2.7 | Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented   |
|                                   | 2.8 | Unexpected situations are dealt with safely and with the approval of an authorised person  |
|                                   | 2.9 | Inspection is carried out efficiently without waste of materials, damage to, or contamination of apparatus   |

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
	and the surrounding environment or services and using sustainable energy practices
2 Conduct tests	3.1 OHS risk control measures and procedures for carrying out the work are followed
	3.2 Testing or measuring on a live and operating system in strict accordance with OHS requirements and within established safety procedures
	3.3 Circuits/machines/plant are checked as being isolated in strict accordance OHS requirements and procedures
	3.4 Electrical tests are conducted to verify that the electrical circuit within the refrigeration installation are safe and function as intended
	3.5 Refrigeration tests are conducted to verify that the refrigeration equipment and pipe work within the refrigeration installation is safe and functions as intended
	3.6 Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented
	3.7 Unexpected situations are dealt with safely and with the approval of an authorised person
	3.8 Testing is carried out efficiently without waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices
4 Report inspection and verification findings	4.1 OHS work completion risk control measures and procedures are followed
	4.2 Work site and equipment is cleaned and made safe in accordance with established procedures
	4.3 Non-compliance defects are identified and reported in accordance with established procedures
	4.4 Recommendations for rectifying defects are made in accordance with established procedures

**ELEMENT**

**PERFORMANCE CRITERIA**

- 4.5 Work completion is documented and an appropriate person or persons notified 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 verifying compliance and functionality of refrigeration and air conditioning installations.

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

#### **KS01-EJ109A Refrigeration and air conditioning installation functionality testing and verification methods**

Evidence shall show an understanding of refrigeration and air conditioning installation functionality testing and verification methods, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1 Refrigeration and air conditioning installations, testing and verification methods

- Mandatory testing and verification requirements.
- Optional testing and their appropriate use
- Testing techniques
- Visual inspection methods

T2 Electrical safe working practices

- Hazards associated with low-voltage, extra-low voltage and high-currents
  - Arrangement of power distribution and circuits in an electrical installations
  - Risks and control measures associated an electrical system and equipment that operate at low-voltage and extra-low voltage, and where high-currents are likely.
  - Risks and control measures associated fault finding, maintenance and repair.
  - Isolation and tagging-off procedures.
  - Risks, restrictions and control measures in testing live.
- Risks and control measures associated with harmful dusts and airborne contaminants.

Note: Sources include thermal insulation, fibrous cement materials and asbestos and other fibre reinforced switchboard materials.

- Safety, selection, use, maintenance and care of test equipment:
  - Safety characteristics of electrical testing devices,
  - Safe use of electrical testing device, and
  - Checks and storage methods for maintaining the safety of testing devices.

## REQUIRED SKILLS AND KNOWLEDGE

### T3 Refrigeration and air conditioning safe working practices

- Hazards and risk control measures associated with refrigeration/air conditioning components and systems
- Harmful effects of refrigerants
- Control measures for the use, handling and storage of refrigerants
- Risks associated with modifying refrigeration/air conditioning installations, fault finding, maintenance and repair.
- Control measures before, while and after working on refrigeration/air conditioning components and systems.
- Safety, selection, use, maintenance and care of test equipment encompassing:
  - Safety characteristics of refrigeration/air conditioning testing/measuring devices,
  - Safe use of testing/measuring device, and
  - Checks and storage methods for maintaining the safety of testing/measuring devices.

## 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 by

## EVIDENCE GUIDE

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, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Verify compliance and functionality of refrigeration and air conditioning installations as described in 8) and including:
    - A Identifying visual defects
    - B Conducting all electrical tests safely and correctly
    - C Conducting all refrigeration tests safely and correctly
    - D Identifying non-compliant defects from test results
    - E Recommending appropriate corrective actions
    - F Acting within regulatory limits
    - G Reporting legibly and accurately
    - H Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

## 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 verifying compliance and functionality of refrigeration and air conditioning installations.

### 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 new or existing refrigeration and air conditioning installations.

Verification shall include:

- Visual inspection of the system, its components pipe work controls and accessories
- Conducting all electrical tests

Note:

1. Electrical testing include isolation testing; insulation resistance of equipment; resistance of the internal circuits of equipment; polarity of supply and equipment; continuity of earthing; correct electrical connections load current.

2. Electrical testing may be limited by the scope permitted under restricted electrical work

- Conducting all refrigeration tests

Note:

Refrigeration testing includes pressure test apparatus/circuits; leak test apparatus/circuits; evacuation test apparatus/circuits; compressor efficiency; controls tests; refrigerant charge; operating pressures; system operation system capacity

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	3	Writing	3	Numeracy	3
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## Custom Content Section

Competency Field 5)

Refrigeration and Air Conditioning