



Australian Government

UEENEEJ104A Establish the basic operating conditions of air conditioning systems

Release: 3

UEENEEJ104A Establish the basic operating conditions of air conditioning systems

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

1)

1.1) Descriptor

This unit covers the determination of basic operating conditions of air conditioning systems. It encompasses working safely, determining air temperature, air flow rates and relative humidity using measurement and basic calculation methods.

Application of the Unit

Application of the Unit 4)

This competency standard is suitable for employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective from the relevant schedule (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set provided that it is listed in the schedule of electives (see Qualification Framework) and all prerequisite units are undertaken or addressed through recognition processes.

Delivery and assessment of this unit should be undertaken within regard to the requirements of License to Practice (1.2 above), Prerequisite Competencies and Literacy and Numeracy skills (2 above) and the recommendations for concurrent assessment and relationship with other units (9.5 below).

Practice in the workplace and during training is also

Application of the Unit 4)

subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

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

2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting, risk safety measures etc.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit may, in some jurisdictions, require a license to practice in the workplace subject to regulations for undertaking refrigeration and air conditioning 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.

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 apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

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.

UEENEEE10 Apply Occupational Health and Safety
1A regulations, codes and practices in the
workplace

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 determine the basic operating conditions of air conditioning systems	1.1 OHS procedures for a given work area are identified, obtained and understood through established routines and procedures
	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 reported and advice on risk control measures is sought from the work supervisor
	1.4 Expected operating conditions are obtained from documentation or from work supervisor to establish the scope of work to be undertaken
	1.5 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others

ELEMENT	PERFORMANCE CRITERIA
	1.6 Sources of materials that may be required for the work are accessed in accordance with established routines and procedures
	1.7 Tools, equipment and testing devices needed to determine the basic operating conditions are obtained and checked for correct operation and safety
2 Determine the basic operating conditions of air conditioning systems	2.1 Established OHS risk control measures and procedures for carrying out the work are followed
	2.2 Measuring system operating parameters is conducted in strict accordance with OHS requirements and established safety procedures
	2.3 System is checked and isolated where necessary, in strict accordance OHS requirements and procedures
	2.4 Established procedures are used to determine actual and specified range of operating conditions from measured and calculated values as they apply to particular air conditioning systems
	2.5 Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented
	2.6 Unexpected situations are dealt with safely and with the approval of an authorised person
	2.7 Operating conditions are determined without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices
3 Complete work and report	3.1 OHS work completion risk control measures and procedures are followed
	3.2 Work site and equipment is cleaned and made safe in accordance with established procedures
	3.3 Operation conditions are documented, including identification of any parameter that is not within the specified range for the system
	3.4 Work supervisor is notified of the completion of the work 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 determining the basic operating conditions of air conditioning systems.

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

KS01-EJ104A Basic air conditioning operating conditions

Evidence shall show an understanding of basic air conditioning operating conditions, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1 The Air Conditioning Industry

- Industry classifications (Domestic, Commercial, Industrial and Transport)
- Applications (shopping centres, housing, offices) and typical equipment used in each classification (split systems, central plant, chemical production etc)
- Types of systems commonly used such as self-contained units (RAC's), split systems, ducted systems, package units and central plant systems.

T2 Working safely with air conditioning systems

- Risk management principles and processes
- Hazards and risk control measures associated with:
 - air conditioning systems and components
 - measuring and testing equipment

T3 Temperature & relative humidity measuring devices

- Thermometer types and applications (digital, stem, dial, max/min, non-contact, data loggers)
- Relative Humidity measurement devices and applications (dry bulb/wet bulb, sling, digital)
- Hazards and related safe working practices (working near rotating machinery - fans, pulleys, belts etc)
- Care and maintenance (bending stems, overheating, removing batteries after use, uncoiling capillary line)
- Calibration (boiling water, iced water, send to a specialist etc)
- Typical locations where values are commonly obtained (temp, RH %)
- Obtaining temperature and relative humidity readings
- Recording temperature and relative humidity readings (using DB/WB method and/or

REQUIRED SKILLS AND KNOWLEDGE

electronic)

T4 Air velocity measuring devices (Anemometers only)

- Anemometer types (digital vane, hot wire)
- Typical applications for each
- Air speed (velocity and its units of measurement)
- Air flow rate (volume flow rate and its units of measurement)
- Methods for setting up and using anemometers (hood, patch, sweep)
- Hazards & safe working practices (working near rotating machinery - fans, pulleys, belts / working at height)
- Care and maintenance (maintaining vane balance (bent blades), removing batteries after use etc)
- Calibration requirements (by specialists)
- Typical locations where air velocity measurements values are commonly obtained (grilles and outlets etc)
- Obtaining and recording air velocity readings (using the patch method and/or sweep method)
- Calculating volume flow rate from an outlet/grille

T5 Psychrometrics

- Composition of air
- Psychrometric chart
- Terms used in the study of air (and their units of measurement) (DB, WB, RH%, dew point, enthalpy, moisture content)
- Sensible heat, latent heat and total heat
- Sensible heat ratio
- Plotting basic points on a chart (supply air, return air)
- Reading additional information (dew point, moisture content, RH%, specific heat capacity, enthalpy)
- Values relevant to a plotted process and plotting a simple process on a psychrometric chart

T6 Basic air conditioning processes

- Factors effecting human comfort (temp, RH%, air velocity, noise, cleanliness, fresh air)
- Industry recognised human comfort conditions
- The comfort zone
- Basic processes used to obtain comfort conditions (sensible cooling, dehumidifying, humidifying etc)

T7 Ventilation

- Basic needs for ventilation (removal of stale air, removal of toxic gases e.g. car parks, welding bays etc)
- Methods used to ventilate an area (natural, supply, exhaust)

REQUIRED SKILLS AND KNOWLEDGE

- Typical applications for ventilation systems (car parks, kitchens, toilets etc)

T8 Regulations

- Covering ventilation (AS1668 parts 1 & 2)
- Common council requirements/regulations (no DA required, noise levels not exceeding 5dBA above background, fresh air in residential situations etc)
- Fresh air requirements for typical situations (calculate using floor area method and air change method)

T9 Heat loads

- Sources of sensible heat in an air conditioned space
- Sources of latent heat in an air conditioned space
- Changes in sensible/latent ratios and their effect on operating system capacity
- Industry check figures
- Basic room heat load calculation using check figures
- Basic RAC/split system unit selection

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:
 - Determine the basic operating conditions of air conditioning systems as described in 8) and including:
 - A Selecting and using appropriate measuring devices correctly
 - B Interpreting measurements
 - C Using calculation methods accurately
 - D Identifying parameters not within the specified range
 - E Documenting operating conditions correctly
 - F 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 determining the basic operating conditions of air conditioning systems.

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 determining the basic operating conditions using measurement and basic calculation methods of air side components of air conditioning systems. These conditions include air dry and wet bulb temperatures, relative humidity, air velocity and volume flow rates across a grille/register.

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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2.2) Literacy and numeracy skills

Competency Field 5)

Refrigeration and Air Conditioning

