



Australian Government

**UEENEEJ131A Determine noise and
vibration encountered in HVAC/R
applications**

Release: 3

UEENEEJ131A Determine noise and vibration encountered in HVAC/R applications

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

1)

1.1) Descriptor

This unit covers the measurement of noise and vibration encountered in HVAC/R system. It encompasses working safely, problem solving procedures, including using measuring instruments, applying appropriate theorems and providing interpretations derived from measurements and calculations and justification for such interpretations.

Application of the Unit

Application of the Unit 4)

This unit is intended as an additional competency to relevant competencies previously acquired. It is suitable for employment-based programs under an approved contract of training or institutional based delivery at the aligned AQF 5 level.

Licensing/Regulatory Information

1.2) License to practice

The skills and knowledge described in this unit do not require a license to practice in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety, codes of work practice and standard work procedures related to the characteristics and behaviour of material in an engineering environment.

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.

UEENEEJ164A Analyse the operation of HVAC air and hydronic systems

UEENEEJ192A Analyse the psychrometric performance of HVAC/R systems

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,

Prerequisite Unit(s)

2)

standards, codes and specifications

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

UEENEEP017A Locate and rectify faults in low voltage composite appliances using set procedures

UEENEEP024A Attach cords and plugs to electrical 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 determine noise and vibration encountered in HVAC/R applications	1.1 OH&S procedures for a given work area are obtained and understood
	1.2 OH&S risk control work preparation measures and procedures are followed.
	1.3 The nature of the problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.
	1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.
	1.5 Sources of equipment and products that may be required for the work are established in accordance with established procedures.

ELEMENT	PERFORMANCE CRITERIA
2 Determine noise and vibration encountered in HVAC/R applications	<p>1.6 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety</p> <p>2.1 OHS risk control work measures and procedures are followed.</p> <p>2.2 The need to test or measure active systems is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures</p> <p>2.3 Systems are checked as being isolated where necessary in strict accordance OHS requirements and procedures</p> <p>2.4 Established methods are used to determine noise and vibration measurements encountered in HVAC/R application</p> <p>2.5 Unexpected situations are dealt with safely and with the approval of an authorised person.</p> <p>2.6 Measurements are taken without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices with the minimum waste and rework.</p>
3 Document noise and vibration measurements in HVAC/R applications	<p>3.1 OH&S work completion risk control measures and procedures are followed.</p> <p>3.2 Work site is cleaned and made safe in accordance with established procedures.</p> <p>3.3 Justification for alternative approach to determine noise and vibration</p> <p>3.4 Work completion is documented and an appropriate person or persons notified in accordance with established procedures.</p>

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 providing measurements to noise and vibration encountered in HVAC/R applications

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

KS01-EJ131A

Noise and vibration fundamentals

Evidence shall show an understanding of noise and vibration fundamentals, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

T1 Fundamentals of sound

- Properties of sound: Wavelength, amplitude, frequency, period, velocity, sound (intensity, pressure, power), decibels
- Sound pressure level
- Sound power level
- Addition of sound levels
- Loudness and weighting networks
- Sound spectrum and octave bands
- Single value representation of sound spectrum
- NR curves
- Sound meters

T2 Fundamentals of vibration

- Terminology: Spring-mass system, spring in series and/or parallel, stiffness, effective stiffness, viscous frictional coefficient, mass, period, frequency (angular, natural, damped, forced), amplitude, static deflection, damping ratio, damping factor, frequency ratio
- SHM (Simple Harmonic Motion)
- Damped vibration
- Forced vibration
- Maximum amplitude and resonance
- Transmissibility and isolation efficiency
- Vibration isolators

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 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

9.2)

Before the critical aspects of evidence are considered all

EVIDENCE GUIDE

to demonstrate competency in this unit

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:
 - 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:
 - Determine noise and vibration encountered in HVAC/R applications as described in 8) and including:
 - A Identifying the dynamic characteristics of systems/materials and the effects due to different operating parameters
 - B Using established measurement methods
 - C Taking relevant measurements accurately
 - D Interpreting measured values appropriately
 - E Providing correct interpretation of data taken from

EVIDENCE GUIDE

measurements and calculations

- 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

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 providing solutions to vibration problems in HVAC/R system design.

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 providing noise and/or vibration measurements in at least two HVAC/R applications.

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