Australian Government

UEENEEH187A Solve problems in electronic musical equipment circuits

Release: 2

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

UEENEEH187A Solve problems in electronic musical equipment circuits

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit covers determining correct operation of valve instrument amplifiers and associated musical instrument circuits. It encompasses working safely, problem solving procedures, including the use of voltage, current and resistance measuring devices, providing solutions derived from measurements and calculations to predictable problems in musical equipment circuits and troubleshooting.

Application of the Unit

Application of the Unit **2)**

This competency standards unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training and approved training programs, and may also used to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice **3)**

The skills and knowledge described in this unit do not require a licence to practice in the workplace provided equipment is not connected to installation wiring at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some States and Territories

License to practice **3)**

subject to regulations related to electrical work.

Practice in the 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 and the like.

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

2. Compliance may be required in various jurisdictions relating to currency in first aid, confined space, lifting, risk safety measure and the like.

Pre-Requisites

Prerequisite Unit(s) **4)**

Competencies **4.1)**

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

UEENEEH113A	Troubleshoot amplifiers in an electronic apparatus

Literacy and numeracy skills **4.2)**

Participants are best equipped to achieve 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

Employability Skills Information

Employability Skills **5)**

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 competency standard 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 work on musical equipment circuits	1.1 OHS procedures for a given work area are obtained and understood.
	1.2 OHS risk control work preparation measures and procedures are followed.
	1.3 The nature of musical equipment circuit problems 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 co-ordinated effectively with others.

ELEMENT	PERFORMANCE CRITERIA	
	1.5	Sources of materials that may be required for the work are established in accordance with established procedures.
	1.6	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Solve musical equipment circuits' problems	2.1	OHS risk control work measures and procedures 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 are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Established methods are used to solve problems from measure and calculated values as they apply to musical equipment circuits in an electronic apparatus.
	2.5	Unexpected situations are dealt with safely and with the approval of an authorised person.
	2.6	Problems are solved without unnecessary damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3 Complete work and document problem solving activities	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	Justification for solutions used to solve circuit problems is documented.
	3.4	Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) 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 solving problems in musical equipment circuits.

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

KS01-EH187A Electronic Musical Instruments

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

T1. Vacuum tubes encompassing:

- history
- construction
- principles of thermionic emission
- advantages and disadvantages compared with solid state devices
- applications

T2 Vacuum diodes encompassing:

- schematic symbol
- terminals
- operation and typical voltages
- rectifier circuits
- typical devices and part numbers

T3 Triodes, tetrodes, and pentodes encompassing:

- schematic symbols
- terminals
- operation and typical voltages
- bias requirements
- AC parameters

T4 Small signal valve amplifier stages encompassing:

- typical devices and part numbers
- typical configurations
- quiescent conditions
- AC conditions: gain, input impedance, bandwidth

T5 Valve power amplifier stages encompassing:

- typical devices and part numbers
- typical push-pull configurations

REQUIRED SKILLS AND KNOWLEDGE

- output transformer
- reflected impedance
- parallel output arrangements
- quiescent conditions
- AC conditions
- output power

T6 Complete valve amplifiers encompassing:

- preamp stages
- coupling methods
- gain and master volume controls
- clean and "dirty" channels
- channel mixing
- valve tone controls
- spring reverb systems
- tremolo circuits
- effect sends
- foot switches
- differential amplifier
- phase splitter
- push-pull output configurations
- output transformer
- output impedance selection
- speaker connections
- local and global feedback arrangements

T7 Valve amplifier troubleshooting and servicing encompassing:

- safety considerations: high voltages, heat and glass
- testing procedures and importance of testing with a load
- troubleshooting techniques
- typical faults
- locating and replacing faulty components

T8 Electronic musical instruments encompassing:

- Electric guitar and bass wiring systems
- Active pickups
- Effects pedals and racks - principles of operation and basic circuits
- Electric keyboards, basic operation and circuits
- Troubleshooting and repairing musician instruments

T9 Advance electronic measuring instruments encompassing:

- Test/measuring devices and their application - examples are frequency counters, and synthesisers, spectrum analysers, noise and distortion meters and RF

REQUIRED SKILLS AND KNOWLEDGE

communications service monitor.

T10 Connection of test/measuring devices into a circuit encompassing:

- safety procedures
- loading and matching
- storage and delay
- circuit arrangement of test/measuring devices

T11 Taking and interpreting readings

T12 Notion of decibels including dBm, dBr, dBu, dBo

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 the 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's 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. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed 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 shall 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 – UEE11'. 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 performance across a representative range of contexts from the prescribed items below:
  - Solve problems in musical equipment circuits as described in 8) Range: and including:

  a. Using methodical problem solving methods.
  b. Taking measurements correctly and accurately.
  c. Calculating parameters correctly and accurately.
  d. Providing solution to component/circuit problems.
  e. Providing written justification for the solutions to problems.
  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.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment

9.3)

This unit contains Employability Skills

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 competency standard unit.

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

Note:

Where simulation is considered a suitable strategy for assessment

it must ensure that the conditions for assessment are authentic and as far as possible reproduce and replicate the workplace and is consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to solving problems in musical equipment circuits.

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 competency standard unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended 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)**

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with unit:

UEENEEH102A Repairs basic electronic apparatus faults by replacement of components

UEENEEH112A Troubleshoot digital sub-systems

UEENEEH114A Troubleshoot resonance circuits in an electronic apparatus

UEENEEH115A Develop software solutions for microcontroller based systems

UEENEEH116A Find and repair microwave amplifier section faults in electronic apparatus

UEENEEH139A Troubleshoot basic amplifier circuits

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational

health and safety units shall be incorporated in relation to this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency 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 competency standard unit shall be demonstrated using a representative range of musical equipment circuits in solving at least two of the following types of musical equipment circuits problems:

- Determining the operating parameters of a valve amplifier and musical instrument circuit.
- Altering an existing valve amplifier or musical instrument circuit section to comply with specified operating parameters
- Developing a valve amplifier section or musical instrument circuit to comply with a specified function and operating parameters
- Finding and repairing a fault in a valve amplifier and musical instrument circuit section of an electronic apparatus

Generic terms are used throughout this Vocational Standard shall be regarded as part of the Range of Variables 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

Competency Field **11)**

Electronics