Australian Government

UEENEEE108A Lay wiring/cabling and terminate accessories for extra-low voltage (ELV) circuits

Release: 2

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

UEENEEE108A Lay wiring/cabling and terminate accessories for extra-low voltage (ELV) circuits

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers the laying of wiring/cabling, connection of accessories and continuity and insulation resistance testing of circuits intended to operate at extra-low voltage. Typically this includes circuits and accessories for ELV powered devices, security, controls, integrated systems, audio/video systems. It encompasses the principles of single source, single load power circuits, control circuits and communications circuits, safe working practices and following work processes that satisfy electrical principles for safety and functionality.

Application of the Unit

Application of the Unit **2)**

This unit is intended for competency development in entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice **3)**

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 and where

License to practice **3)**

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, and 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.

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.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications

Literacy and numeracy skills **4.2)**

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

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 lay wiring/cabling and connect accessories for extra-low voltage circuits.	1.1 OHS procedures for a given work area are obtained and understood through established routines.
	1.2 Established OHS risk control measures in preparation for the work are followed.
	1.3 Safety hazards not previously identified are reported and advice on risk control measures is sought from the work supervisor.
	1.4 The nature and location of the work is obtained from work supervisor or other appropriate person to establish the scope of work to be undertaken.

ELEMENT	PERFORMANCE CRITERIA	
	1.5	Advice is sought from the work supervisor or other appropriate person to ensure the work is coordinated effectively with others.
	1.6	Sources of materials that may be required for the work are established in accordance with established routines.
	1.7	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2 Lay wiring/cabling and connect accessories for extra-low voltage circuits.	2.1	Established OHS risk control measures 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	Wiring and accessories are installed to comply standards and job specifications with sufficient excess to affect terminations.
	2.4	Accessories are installed straight and square in the required locations and within acceptable tolerances.
	2.5	Cables and conductors are terminated at accessories in accordance with manufacture's specifications and regulatory requirements.
	2.6	Cables installed for future service and marked in accordance with the cable identification scheme and terminated incompliance with regulatory requirements.
	2.7	Procedures for referring non-routine events to immediate supervisor for directions are followed.
	2.8	Cable installation and termination is carried out efficiently without waste of materials or damage to apparatus, circuits or the surrounding environment and using sustainable energy practices.

ELEMENT	PERFORMANCE CRITERIA
3 Complete and report work 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 Work supervisor is notified of the completion of the installation work in accordance with established routines.

Required Skills and Knowledge

EQUIRED 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 laying wiring/cabling and terminate accessories for extra-low voltage circuits.

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

KS01-EE108A Extra low voltage wiring

Evidence shall show an understanding of extra low voltage wiring cable protection and support method and accessories to an extent indicated by the following aspects:

T1 Cable protection and support method and accessories encompassing:

- Requirements to protect and support cables adequately - protection against mechanical damage, protection from adverse temperatures and corrosion and protection from magnetic field that may affect the performance of the cable.
- Cable support and protection devices, accessories and typical applications - metallic and non-metallic conduits, duct and trunking, cable ladder and tray, cable clips and ties and related accessories.
- Installation techniques - cable installation equipment and cable drawing and hauling techniques

T2 Types of cables used in the electrotechnology industry and their application encompassing:

- Structural components of cables and their purpose - conductors and conductor material; insulation; sheathings and servings.
- Application of various cables types
- Cable variates - single cables, flexible cables, flexible cords, shielded cables, armoured cables, ribbon cables, other similar and like cables
- Typical characteristics and use of power circuit cables and control circuit cables

T3 Installing cables in buildings, structures and premises encompassing:

- Building construction method and construction sequence.
- Typical cable routes through buildings, structures and premises.
- Building codes affecting the installation of cables in buildings, structures and premises - limitation on penetration structural elements and maintenance of fire protection interiority
- Cable segregation requirements

T4 Basic cable and conductor terminations encompassing:

- Insulation removal and replacement
- Conductor handling and cable terminations encompassing:
  - General aspects and soldering involving pins on electronic components and

EQUIRED SKILLS AND KNOWLEDGE

stranded conductors carrying current up to 25 amperes.

- Application of connecting devices for conductors and terminals
- Continuity through connections and insulation resistance testing
- Stress release on cables/conductors.

T5 Technical standards, regulations and codes related to extra-low voltage work encompassing:

- Limitation imposed by regulations
- How to read and apply a standard
- Aspects of technical Standards that apply to extra-low voltage work

T6 Environmental and heritage regulation effecting electrotechnology work encompassing:

- Purpose of environmental and heritage regulation
- Typical issues affecting electrotechnology services and systems
- Meeting requirements

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-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 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 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 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 – 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 consistent performance across a representative range of contexts from the prescribed items below:
  - Lay wiring/cabling and terminate accessories for extra-low voltage in power and control circuits as described in 8) and including:

A	Understanding the nature of the work.
B	Selecting appropriate tools, cables and accessories.
C	Following appropriate cable routes.
D	Installing cable and accessories to requirements.
E	Terminating cables and accessories to manufacture's specifications and requirements.
F	Cleaning worksite.
G	Notifying completion of work using established procedures.

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 in this unit.

These should be used in the formal learning/assessment environment.

Note:

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

The resources used for assessment should reflect current industry practices in relation to laying wiring/cabling and terminate accessories for extra-low voltage 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 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, competency development in this unit may be arranged concurrently with unit:

UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications

Range Statement

RANGE STATEMENT

10) 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 shall be demonstrated in relation to laying wiring/cabling and connecting accessories for extra-low voltage power and control cabling systems circuits using:

- At least one of the following wiring/cabling systems:
  - Unenclosed thermoplastic sheathed (TPS) cable
  - Enclosed thermoplastic insulated (TPI) or sheathed cables, and
- At least three of the following wiring/cabling systems:
  - single cable,
  - flexible cable,
  - flexible cord,
  - shielded cable,
  - ribbon cable,
  - other similar and like cable

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

Competency Field **11)**

Electrotechnology