



**Australian Government**

**UEENEEG127A Design electrical  
installations with a low voltage demand  
greater than 400 A per phase**

Release 2

## **UEENEEG127A Design electrical installations with a low voltage demand greater than 400 A per phase**

### **Modification History**

Not applicable.

### **Unit Descriptor**

#### **Unit Descriptor**

#### **1) Scope:**

##### **1.1) Descriptor**

This unit covers the design of supply and distribution arrangements, control, protection and selection of equipment for electrical installations with low voltage demand greater than 400 amperes per phase. This encompasses designing schemes for protection of persons and property and correct functioning, compatibility with the supply, and arrangement of circuits, determination of fault levels, effective switchgear, control gear, and protection against over current and over and under voltage and wiring based on calculations to meet required safety and performance standards and functional requirements.

### **Application of the Unit**

#### **Application of the Unit 2)**

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training. It applies to any formal recognition for this standard at the aligned AQF 5 level or higher.

### **Licensing/Regulatory Information**

#### **License to practice 3)**

The skills and knowledge described in this unit do not require a license to practice in the work place. However

## License to practice

3)

practice in this unit is subject to regulations directly related to occupational health and safety and contracts of training such as new apprenticeships.

## 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.

UEENEEE101    Apply Occupational Health and Safety  
A                    regulations, codes and practices in the  
                          workplace

UEENEEE102    Fabricate, dismantle, assemble of  
A                    utilities components

UEENEEE104    Solve problems in d.c circuits  
A

UEENEEE105    Fix and secure electrotechnology  
A                    equipment

UEENEEE107    Use drawings, diagrams, schedules,  
A                    standards, codes and specifications

UEENEEG006    Solve problems in single and three  
A                    phase low voltage machines

UEENEEG033    Solve problems in single and three  
A                    phase electrical apparatus and circuits

UEENEEG063    Arrange circuits, control and protection  
A                    for general electrical installations

UEENEEG101    Solve problems in electromagnetic  
A                    devices and related circuits

UEENEEG102    Solve problems in low voltage a.c.  
A                    circuit

**Prerequisite Unit(s) 4)**

UEENEEG106 A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG107 A	Select wiring systems and cables for low voltage general electrical installations
UEENEEG125 A	Plan electrical installations with a low voltage demand up to 400 A per phase

**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	5	Writing	5	Numeracy	5
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## **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.
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## Elements and Performance Criteria

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
1 Prepare to plan electrical installations.	1.1 OHS processes and procedures for a given work area are identified, obtained and understood.
	1.2 The extent and nature of the electrical installation is determined from design brief.
	1.3 Safety and other regulatory requirements to which the electrical installation shall comply are identified, obtained and understood.
	1.4 Design development work is planned to meet scheduled timelines in consultation with others persons involved in the installation or associated work.
2 Develop installation design.	2.1 Knowledge of electrical installation performance standards, compliance methods and electrical equipment and is applied to designing the installation.
	2.2 Alternative arrangements for the installation design are considered based on the requirements outlined in the design brief.
	2.3 Safety, functional and budgetary considerations are incorporated in the installation design.
	2.4 Installation design draft is checked for compliance with the design brief and regulatory requirements.
	2.5 Installation design is documented for submission to appropriate person(s) for acceptance and approval.
	2.6 Solutions to unplanned situation are provided consistent with organisation's policy.
3 Obtain approval for installation design.	3.1 Installation design is presented and explained to client representative and/or other relevant person(s).
	3.2 Requests for alterations to the design are negotiated with relevant person(s) within the

**ELEMENT**

**PERFORMANCE CRITERIA**

constraints of organisation's policy.

- 3.3 Final design is documented and approval obtained from appropriate person(s).
- 3.4 Quality of work is monitored against personal performance agreement and/or established organizational or professional standards.

## 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 designing electrical installations with a LV demand greater than 400 A per phase.

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

#### **KS01-EG127A Electrical installations, advanced methods of cable and protection selection**

Evidence shall show an understanding of designing low voltage electrical installations with a demand greater than 400 A per phase to an extent indicated by the following aspects:

T1 Electrical installations, determination of demand encompassing:

- Acceptable methods for determining demand in mains and submains
- Applying calculation and assessment methods of determining demand in mains and submains

T2 Electrical installations, overcurrent protection encompassing:

- Application of acceptable methods for determining prospective fault current.
- Relationship between prospective fault current and characteristics of protective devices.
- Relationship between overcurrent protections at various points in an electrical distribution system.

T3 Electrical installations, overvoltage and undervoltage protection encompassing:

- Application of acceptable methods for determining the need for overvoltage and undervoltage protection
- Methods and devices providing overvoltage and undervoltage protection

## 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'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 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 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, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Design electrical installations with a LV demand greater than 400 A per phase as described in 8) and including:
    - A Developing outlines of alternative designs.
    - B Developing the design within the safety and functional requirements and budget limitations.
    - C Documenting and presenting design effectively.

- D Successfully negotiating design alteration requests.
- E Obtaining approval for final design.
- 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.

The resources used for assessment should reflect current industry practices in relation to designing electrical installations with a LV demand greater than 400 A per phase.

**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 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:

UEENEE10 Use computer applications relevant to a workplace  
1A

## **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 designing electrical installations with a LV demand in excess of 400 A per phase. The installation shall comprise main switchboard, multiple tenancies, distribution boards and single and three-phase final sub circuits.

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)**  
  
Electrical