



Australian Government

UEENEEG129A Overhaul and repair major switchgear and controlgear

Release 2

UEENEEG129A Overhaul and repair major switchgear and controlgear

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers the overhauling and repairing switchgear/controlgear rated in excess of 20 kA. It requires the ability to establish and document the level of work required, arranging for the overhaul/repair to be carried out, verify compliance of overhauled/repared switchgear/controlgear and complete the necessary documentation.

Application of the Unit

Application of the Unit 2)

This unit is intended to augment previously acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit require a license to practice in the workplace where plant and switchgear/control gear operate at voltage above 50 V a.c. or 120 V d.c. Other conditions related to communications, electrical work, fire protection, gas work, high voltage work, refrigeration/air conditioning and security may apply in some jurisdictions subject to regulations. Practice in the workplace and during training is also subject to

License to practice**3)**

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

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

UEENEEE10 2A Fabricate, dismantle, assemble of utilities components

UEENEEE10 4A Solve problems in d.c circuits

UEENEEE10 5A Fix and secure electrotechnology equipment

UEENEEE10 7A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEG11 1A Carry out basic repairs to electrical components and equipment

UEENEEG16 4A Repair and maintain mechanical components of electrical machines

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 4 Writing 4 Numeracy 4

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 for overhaul/repair of switchgear/control gear. | 1.1 OHS processes and procedures for a given work area are identified, obtained and understood. |
| | 1.2 Established OHS risk control measures and procedures in preparation for the work are followed. |
| | 1.3 Safety hazards that have not previously been identified are noted and established risk control measures are implemented. |
| | 1.4 Instructions on the extent of overhaul and/or repair are received and expected outcomes of the work acquired with appropriate personnel. |

ELEMENT**PERFORMANCE CRITERIA**

- | | | |
|---|-----------------------------------|--|
| | 1.5 | Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved on the work site. |
| | 1.6 | Switchgear/control gear service and repair documentation is read and understood. |
| | 1.7 | Sources of materials that may be required for the work are established in accordance with established procedures. |
| | 1.8 | Tools, equipment and testing devices needed to work are obtained in accordance with established procedures and checked for correct operation and safety. |
| 2 | Overhaul switchgear/control gear. | |
| | 2.1 | OHS risk control measures and procedures for carrying out the work 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/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures. |
| | 2.4 | Switchgear and control gear is dismantled and parts tagged and stored to prevent loss or damage. |
| | 2.5 | The state of switchgear/control gear components is determined by measurements, tests and inspections and results recorded. |
| | 2.6 | Materials/replacement parts required to complete the work are sourced and obtained in accordance with established procedures. |
| | 2.7 | Effectiveness of the repairs is tested in accordance with established procedures. |
| | 2.8 | Specifications and instructions for the overhaul/repair work are documented in accordance with requirements. |

ELEMENT	PERFORMANCE CRITERIA
3 Document overhaul/repair work.	3.1 OHS work completion risk control measures and procedures are followed.
	3.2 Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares.
	3.3 Overhaul/repair work is documented in accordance with requirements stating that the switchgear/control gear complies with the overhaul specifications.

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 overhauling and repairing major switchgear/controlgear.

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

KS01-EG129A Switchgear and controlgear – 20 kA

Evidence shall show an understanding of the switchgear and controlgear to an extent indicated by the following aspects:

T1 Types and applications of switchgear and controlgear

T2 Operating principles of switchgear and controlgear

T3 Interlocking systems encompassing:

- external interlocking systems such as Castell Key systems
- internal interlocking systems for either safety or that operate in conjunction with say Castell Key systems

T4 Control and protection of switchgear and controlgear

T5 Installation requirements encompassing:

- operating specifications for equipment
- areas requiring repairs and maintenance
- determining if repairs/maintenance are to be carried in situ or in workshop environment
- relevant legislation and Standards applicable to the installation
- OHS issues with regard to removing/ re-installing heavy equipment
- electrical safety issues with regard to removing/ re-installing equipment
- understanding of CFC units

T6 Electrical switchgear and controlgear protection methods encompassing:

- understanding of the operation of switchgear when it opens under load
- understanding on the settings and operation required for both magnetic short-circuit and thermal overload with equipment
- determining the earth fault loop impedance requirements required to keep touch voltage values within requirements
- thermal imaging techniques
- time/current curves from manufacturers specifications
- equipment to safely test switchgear after repairs or maintenance
- effectiveness of arc suppression installed within the equipment
- modern types of switchgear that are computer controlled and programmed

REQUIRED SKILLS AND KNOWLEDGE

- modern types of switchgear that are interconnected to other protective devices
- certification process for any repair or maintenance work performed
- phase-failure systems
- Verifying the correct fault-level for the installation is consistent with the kA rating of the equipment
- x-ray and ultrasonic detection systems with regard to metallurgy
- different types of lubricants required for different locations, temperatures and humidity

T7 Electrical safe working practices of working safely on or around electrical equipment encompassing:

- determining safe working Standards and codes of practice for equipment and installations over 20 kA
- OHS requirements for equipment and installations over 20 kA
- working knowledge of operating within the vicinity of live conductors, such as barriers
- procedures for working on switchgear over 20 kA
- risks and control measures associated with harmful dusts and airborne contaminants - sources include thermal insulation, fibrous cement materials and asbestos and other fibre reinforced switchboard materials
- checks and storage methods for maintaining the safety of testing devices

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:
 - Overhaul and repair major switchgear/controlgear as described in 8) and including:
 - A Interpreting service and repair documentation correctly.
 - B Determining the state of switchgear/control gear correctly.
 - C Repairing switchgear/control gear effectively.
 - D Completing documentation correctly.
 - E 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 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 overhauling and repairing major switchgear/controlgear.

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:

UEENEEC00 Maintain documentation
1B

UEENEEC00 Source and purchase material/parts for installation
2B or service jobs

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 overhauling at least two types of low voltage switchgear/control gear rated above 20 kA and any high voltage switchgear/control gear.

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