



Australian Government

Department of Education, Employment and Workplace Relations

UETDRDP14A Maintain energised HV distribution overhead electrical apparatus (glove)

Release: 1

UETTDRDP14A Maintain energised HV distribution overhead electrical apparatus (glove)

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This Competency Standard Unit covers the maintenance of energised high voltage distribution overhead electrical apparatus using high voltage live line glove and barrier method and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant working documents.

Application of the Unit

Application of the Unit 2)

This Competency Standard Unit is intended to augment formally 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 may require a licence/registration to practice in the work place subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to Occupational Health and Safety, electricity/telecommunications/gas/water industry safety and compliance, industrial relations, environmental protection, anti discrimination and training. Commonwealth, State/Territory or Local Government legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s)

4)

Competencies

4.1)

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

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must have been completed.

Pathway 1

Qualified and authorised Distribution Lineworker

Pathway 2

Unit Code	Unit Title
BSBWOR402A	Promote team effectiveness
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. Circuits
UEENEEE105A	Fix and secure electrotechnology equipment

Prerequisite Unit(s)**4)**

UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c. Circuits
UETTD RDP11A	Inspect overhead poles/structures and electrical apparatus
UETTD RDP12A	Maintain overhead energised low voltage conductors and cables
UETTDREL11A	Apply sustainable energy and environmental procedures
UETTDREL12A	Operate plant and equipment near live electrical conductors and apparatus
UETTDREL16A	Working safely near live electrical apparatus
UETTD RIS42A	Maintain network infrastructure electrical equipment
UETTD RIS52A	Install and maintain poles, structures and associated hardware
UETTD RIS54A	Install and maintain poles, structures, overhead conductors and cables
UETTD RIS65A	Contribute to coordinated HV live working

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 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills 5)

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 Plan to maintain energised high voltage distribution overhead electrical apparatus (glove and barrier)	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are obtained, analysed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination. 1.2 Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures. 1.3 Risk control measures are identified, prioritised and evaluated against the work schedule. 1.4 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.

ELEMENT	PERFORMANCE CRITERIA
2 Carry out maintenance of energised high voltage distribution overhead electrical apparatus (glove and	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.
	1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
	1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order.
	1.8 Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
	1.10 Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.11 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised where applicable in accordance with established procedures.
	1.12 Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.
	2.1 OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures.
	2.2 First Aid, Rescue and other related work

ELEMENT	PERFORMANCE CRITERIA
barrier)	procedures are performed according to requirements and/or established procedures.
2.3	Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements and including the use of high voltage live line sticks.
2.4	Auto-reclose devices associated with the circuits being worked on have been rendered inoperative and necessary work documentation acquired in accordance with enterprise requirements.
2.5	Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported to the immediate authorised persons for directions according to established procedures.
2.6	Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
2.7	Maintenance of energised high voltage distribution overhead electrical apparatus is carried out, in accordance with the work schedule and requirements and/or established procedures.
2.8	Essential knowledge and associated skills are applied in the safe maintenance of energised high voltage distribution overhead electrical apparatus to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
2.9	Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
2.10	Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality like outcome is achieved for the client/customer and to a community/industry standard.

ELEMENT	PERFORMANCE CRITERIA
3 Complete the maintenance of energised high voltage distribution overhead electrical apparatus (glove and barrier)	3.1 Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures.
	3.2 Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures.
	3.3 Work site is rehabilitated, cleaned up and confirmed safe in accordance with established procedures.
	3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.
	3.5 Relevant work permit(s) are signed off and, energised high voltage apparatus is returned to service and advised to client/customer in accordance with requirements.
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) Essential Knowledge and Associated Skills (EKAS): This describes the essential skills and knowledge and their level, required for this unit.
Evidence shall show that knowledge has been acquired of maintaining energised high voltage distribution overhead electrical apparatus (glove).

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

KS01-TDP14A Live line working up to 33 kV with glove and barrier

Evidence shall show an understanding of live lines working up to 33 kV with glove and barrier to an extent indicated by the following aspects:

T1 Legislation and Regulations encompassing:

- Legislation, standards and codes
- Supply authority regulations
- Industry guidelines and enterprise requirements

T2 Safety Precautions for High Voltage Live Work associated to Glove and Barrier encompassing:

- Minimum approach distances
- OH&S hazard and precautions
- Assessing and controlling risks
- Personnel protective equipment
- High Voltage live work access
- Auto-reclose function
- Fault current protective devices
- Integrity of insulation
- Specialised equipment and tools
- Inspection of equipment and tools
- Use of specialised equipment and tools
- Work team communication
- Use of safety observers
- Emergency response, first aid and rescue

T3 Policies and procedures for glove and barrier work up to and including 33 kV encompassing:

- Policies, procedures and practices
- Definition of terms
- Responsibilities of personnel
- Types of structures
- Types of equipment and compliance

T4 Glove and barrier techniques up to and including 33 kV encompassing:

- High Voltage insulators

REQUIRED SKILLS AND KNOWLEDGE

- High Voltage cross arms
- High Voltage bridge connections
- Installation and maintenance of equipment
- Temporary Midspan switching devices
- Erection and replacement of poles
- Replacement of conductors and cables
- High voltage armour rods and line guards
- Conversion intermediate to strain construction
- Switching devices

T5 Safety precautions for plant, equipment and tools encompassing:

- Safe working clearances
- Identification of OH&S hazards
- Assessing and controlling risks and hazards
- Personal protective equipment

T6 Identification and serviceability of plant, equipment and tools encompassing:

- Identification of plant, equipment and tools
- Serviceability of plant equipment and tools

T7 Operational use of plant, equipment and tools encompassing:

- Conductor supports
- Selecting conductor support method
- Calculation of loads
- Effects of secondary loading
- Effects of resultant forces
- Conductor support rigging procedures
- Displacement of conductors utilising rigging equipment

T8 Electrical and electrostatic principles encompassing:

- Relationship with current, voltage and resistance as related to distribution lines
- Phase voltage and respective line voltages
- Production of an electric field

T9 High voltage insulation encompassing:

- Construction of disc insulators
- Construction of a polymeric insulator
- Checking integrity of insulation prior to work commencement
- Effects of electrical fields on disc insulators
- Number of disc insulators needed
- Performance of a failed disc insulator on the line and system
- Minimum number of discs per string
- Detecting a failed disc insulators

REQUIRED SKILLS AND KNOWLEDGE

T10 Effects of electrostatic Induction on the human body encompassing:

- Electrostatic induction and the human body
- Application of a faraday cage

T11 Switching surges and magnetic fields encompassing:

- Lightning and switching surges
- Magnetic fields

T12 High Voltage switching fundamentals encompassing:

- Standards and requirements - Standards, codes, legislation, supply authority regulations, industry guidelines and enterprise requirements
- Manuals system diagrams/plans and drawings
- High Voltage live work access authority/permit system - Operational forms - High voltage switching or outage requests
- Fault current protection devices - main and backup devices, components, types, categories, applications, functions, principle of operation, co-ordination, zoning, auto-reclosing suppression, paralleling and separating and ring verses radial feeders
- Disabling auto-reclose function
- Network interconnectors
- Test instruments
- Types and categories of switchgear - application, function and operating capabilities; restrictions
- Operate switching apparatus - identifying hazards, assessing risks, systematic and defensive techniques, mobile radio, double insulation
- High Voltage electrical faults: types, causes and effects

T13 High voltage SWER system encompassing:

- Components
- Circuit arrangement
- Operation principles
- Faulty SWER earth system
- SWER substations

T14 Safety Observer principles encompassing:

- Duties
- Techniques
- Minimum Approach Distances (MAD)
- Minimum safe working distance from vegetation

T15 Feeder automation system encompassing:

- Function
- Main components

REQUIRED SKILLS AND KNOWLEDGE

- Field devices
- SCADA systems, interlocks and operation

T16 System Control and Data Acquisition (SCADA) systems encompassing:

- Function and main components
- Security interlocks and access restrictions
- Switching apparatus and retrieving data operation
- Field devices operation

T17 Teamwork High Voltage Live Work

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the performance criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all component 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 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 practiced. 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 – UET12”. Evidence shall also comprise:

- A representative body of performance criteria 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; and
 - Apply sustainable energy principles and practices as specified in the performance criteria and range; and
 - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit to such an extent that the learner’s performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
 - Demonstrate an appropriate level of employability skills;

and

- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	All of the following:	Install/replace structures Install/replace hardware (e.g. crossarm and insulator) Repair conductors Install/replace/connect bridge/bonding connections
B	At least two of the following:	Install/replace pole mounted reclosers Install/repair/replace air

		brake switches Install/repair/replace high voltage links/disconnects Install/remove temporary high voltage links/high voltage fuses Install/repair/replace expulsion drop-out fuses Install/replace lightning arrestors Install/replace vibration dampers or aircraft warning markers
C	At least two of the following:	EWP Ladder Pole platform Insulated structured
D	At least one of the following:	Voltage detector Leakage detector Insulation test equipment
E	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated 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 installation and maintenance of energised high voltage overhead electrical apparatus.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, in limited spaces, with different structural/construction types and method and in a variety of environments.

**Method of
assessment**

9.4)

This Competency Standard 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 associated skills described in this unit.

**Concurrent
assessment and
relationship with
other units**

9.5)

There are no recommended concurrencies for 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 in relation to the maintenance of energised HV distribution overhead electrical apparatus and may include the following:

Types of conductor may include bare aluminium; steel cored aluminium, steel and copper conductors and insulated unscreened conductor (IUC) systems.

Maintenance work may include -

The replacement and repair or installation of structures, associated hardware and conductors, and the installation, repair, replacement or connection of bridges/bonding connections.

The repair/replacement/installation of electrical equipment and associated components whose current carrying parts are exposed, e.g. air break switches, High Voltage links or disconnects and expulsion drop-out fuses. Pole mounted reclosers, transformers, sectionalisers, lightning arresters and High Voltage cables.

The commissioning of High Voltage electrical apparatus

Distribution structures may be wood, steel, concrete or composite.

Conductor voltage will not exceed 33 kV.

Work may be performed from elevating work platform, ladder, portable pole platform or insulated scaffold and may include the use of a gin pole.

Testing and recording equipment includes phasing sticks, fault indicators, voltage detectors, leakage detectors insulation testers and test equipment for live-line tools.

The following constants and variables included in the element/performance criteria in this unit are fully described in the Definitions Section 1 of this volume and form an integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- Assessment
- Authorisation
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Environmental management documentation
- Established procedures

RANGE STATEMENT

- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**
Distribution.