



Australian Government

Department of Education, Employment and Workplace Relations

UETTDRCJ13B Install and maintain network infrastructure LV underground cables

Release: 1

UETTDRCJ13B Install and maintain network infrastructure LV underground cables

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

1)

1.1) Descriptor

This Competency Standard Unit covers the installation and maintenance of de-energised low voltage underground cables and covers the laying of cables as well as the jointing, terminating, repair and replacement of cables. It could include direct laying of cables in trenches, on racks, in troughs and/or in conduit or ducts and also includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.

Application of the Unit

Application of the Unit 4)

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

1.2) License to practice

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) 2)

2.1) CSU(s): Competencies

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

UETTDRI06B	Install and maintain network infrastructure electrical equipment
------------	--

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills

3)

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 unit of competency

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 the laying, installation and maintenance of underground cables	1.1	Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analysed and confirmed, if necessary, by site inspection.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	OHS policies and procedures related to requirements and established procedures for the laying, installing and maintenance of LV underground cables are obtained and confirmed for the purposes of the work to be performed and communicated.
	1.4	Work is prioritised and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.

ELEMENT	PERFORMANCE CRITERIA
1.5	Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
1.6	Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.
1.7	Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
1.8	Relevant personnel at work site are confirmed current in First Aid and other related work procedures according to requirements.
1.9	Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.
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 confirmed where applicable in accordance with established procedures.
1.12	Road signs, barriers and warning devices are positioned in accordance with requirements.
2 Carry out the laying, installation and maintenance of LV underground cables	2.1 OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and followed in accordance with requirements and/or established procedures.
	2.2 Lifting, climbing, working in confined spaces and working aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.

ELEMENT	PERFORMANCE CRITERIA
2.3	Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.
2.4	Essential knowledge and associated skills are applied for the safe installation and maintenance of LV underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
2.5	Electrical cables are laid in accordance with the work schedule and requirements/established procedures.
2.6	De-energised LV underground cables are installed according to the work schedule and requirements/established procedures.
2.7	Maintenance, including repair and/or replacement of de-energised LV underground cables is carried out, in accordance with the work schedule and requirements/established procedures.
2.8	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.
2.9	Unplanned events in the laying, installing and carrying out the maintenance of LV underground cables are undertaken within the scope of established procedures.
2.10	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
2.11	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3 Complete the laying, installation and maintenance of LV underground cables	3.1 Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
	3.2 Accidents and/or injuries are reported in

ELEMENT**PERFORMANCE CRITERIA**

- accordance with requirements/established procedures, where applicable.
- 3.3 Work site is rehabilitated, cleaned up and made 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 LV underground cables are returned to service in accordance with requirements
- 3.6 Works completion records, reports, drawings and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge**REQUIRED SKILLS AND KNOWLEDGE**

7) 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 laying, installing and maintaining LV underground cables.

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

The extent of the essential knowledge and associated skills required is given Volume 2 Part 2, Clauses:

- | | |
|----------|---|
| E2.8.2.2 | Alternating current circuit principles |
| E2.8.5 | Magnetism |
| E2.8.6 | Electromagnetic principles |
| T2.1.9. | Stores procedures |
| T2.2.2 | Transmission, distribution and rail power systems |

REQUIRED SKILLS AND KNOWLEDGE

T2.2.3	Substations, power transformers and reactors fundamentals
T2.2.12	Underground cable installation
T2.2.16	Fundamentals of jointing LV polymeric cables.
T2.2.17	LV polymeric cable jointing principles
T2.2.23	Underground cable construction
T2.3.1	Powerline safety practices

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 9.2)

EVIDENCE GUIDE

evidence required to demonstrate competency in this unit

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 - UET09". 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	Laying at least one of the	LV polymeric LV paper insulated

EVIDENCE GUIDE

	following:	
B	With regards to "A" incorporate at least one of the following:	Direct lay On racks In conduits
C	With regards to "A" incorporate at least one cable pulling methods of the following:	Stocking pulling Bond pulling Armour pulling Nose pull attachments
D	With regards to "A" incorporate at least two cable sealing methods of the following:	Heat shrinkable Pre-stretched materials Tin/lead wiping Pre-moulded components
E	At least one cable cutting methods of the following:	Hydraulic cutters Electric reciprocating Motorised Hand tools
F	With regards to "A" incorporate at least four of the following:	Drum jacks Winches Spindles Capstans Bollards Cable trailers Rollers Lubricants Ropes Bell mouths Draw wires/rods
G	Installation and maintenance of all of the following:	LV polymeric cable
H	With regards to "G" incorporate at two of the following:	Tee-off joints Straight through joints Parallel branch joints Parallel joints
I	With regards to "G" incorporate at	Transformers, LV switchboards

EVIDENCE GUIDE

	least one of the following:	Pillars/turrets Lighting columns Ring main units Chamber substations
J	With regards to "G" incorporate at least two of the following:	Busbar/termination boxes Links/Fuses Disconnect boxes Termination boxes Control gear UG/OH terminations Circuit breakers
K	With regards to "G" incorporate at least one of the following:	Resin filled boxes, Compound filled boxes Polymeric tape Heat shrink Slip-on' moulds Pre-stretched polymeric
L	With regards to "G" incorporate at least one of the following:	Compression lugs Welded connections Mechanical connectors Insulation piercing connectors
M	With regards to the above incorporate all of the following:	Insulation resistance testers Voltage detectors
N	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.

EVIDENCE GUIDE

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 network infrastructure low voltage underground cables.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working below ground, 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)

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

UETTDRCJ14B Install and maintain network infrastructure HV underground cables

Range Statement

RANGE STATEMENT

8) 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/may be demonstrated in relation to the installation and maintenance of de-energised low voltage underground polymeric cables and covers the laying, jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits. It includes the laying of ducts and/or conduit for electrical cables.

The unit includes the laying of cables direct in trenches, on racks, in troughs and /or in conduit or ducts.

It also encompasses cable pulling methods, pulling tensions, minimum bending radii, reduction of frictional forces, use of supporting plant (eg dynamometers, rigging, winches, etc), working on FRC, PVC, A/C ducted systems and the cutting and sealing of cables.

Test and recording equipment may include voltage detectors, tong ammeters, cable identification equipment, and insulation resistance testers.

Jointing and terminating materials may include compound and resin filled boxes, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression, welded and mechanical connectors.

Jointing and terminating equipment and locations may include links, fuses, disconnect boxes, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control points and street lighting columns.

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
- Confined space
- Diagnostic, testing and restoration.
- Documenting detail work events, record keeping and or storage of information.
- Drawings and specifications

RANGE STATEMENT

- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation.
- Environmental management documentation.
- Established procedures.
- 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

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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
---------	---	---------	---	----------	---

Competency Field

Competency Field 5)

Cable Jointing