



**UET09**  
Electricity Supply Industry  
Transmission, Distribution and Rail Sector Training  
Package

**Volume 2 — Part 2.1**  
**Competency Standard Units**  
**CJ – Cable Jointing**

**Volume 2 of 2**



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## **UETTDRCJ01B Lay electrical cables**

### **Unit Descriptor**

1)

#### **1.1) Descriptor**

This Competency Standard Unit covers the laying of cables for electrical purposes and includes the laying of ducts and/or conduit for such cables. It could include direct laying of cables 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 (e.g. dynamometers, rigging, winches), working on FRC, PVC, A/C ducted systems and the sealing of cables.

#### **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.

### **Prerequisite Unit(s)**

2)

#### **2.1) Competencies**

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

	UETTDREL01B	Apply environment and sustainable energy procedures
and	UETTDREL02B	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTDREL04B	Working safely near live electrical apparatus as a non-electrical worker
and	UEENEEE001B	Apply OHS practices in the workplace
and	UEENEEE002B	Dismantle, assemble and fabricate electrotechnology components

- and UEENEEE004B Solve problems in multiple path d.c. circuits
- and UEENEEE005B Fix and secure equipment
- and UEENEEE007B Use drawing, diagrams, schedules and service manuals
- and UEENEEG001B Solve problems in electromagnetic circuits
- and UEENEEG002B Solve problems in single and three phase low voltage circuits

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

### 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 3 Writing 3 Numeracy 3

### 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.

### 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.

### Competency Field

#### 5)

Cable Jointing

### ELEMENT

6) Elements describe the essential outcomes of a unit of competency

1 Prepare to lay electrical cables

### PERFORMANCE CRITERIA

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received and confirmed, if necessary, by site inspection

- |   |      |   |
|---|------|---|
|   | 1.2  | Relevant requirements and established procedures for the work are discussed with other personnel and identified for all work sites  |
|   | 1.3  | OHS policies and procedures related to requirements and established procedures for the laying of electrical 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  |
|   | 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 | Traffic management plan is identified and implemented.  |
| 2 | 2.1  | Carry out the laying of electrical cables<br>OHS, sustainable energy and environmental principles and practices to reduce the incidents of accidents and minimise waste are followed in accordance with requirements and/or established procedures. |

- |   |  |  |   |
|---|--|--|---|
|   | 2.2                                      | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.                             |   |
|   | 2.3                                      | Essential knowledge and associated skills are applied in the safe laying of electrical cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |   |
|   | 2.4                                      | Electrical cables are laid in accordance with the work schedule and requirements/established procedures.   |   |
|   | 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                                      | Unplanned events in the laying of electrical cables are undertaken within the scope of established procedures.   |   |
|   | 2.7                                      | Known solutions to a variety of problems are applied using routine procedures.   |   |
|   | 2.8                                      | On going checks of quality of the work are undertaken in accordance with instructions and established procedures.  |   |
| 3 | Complete the laying of electrical 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 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 or disposed of in accordance with established procedures. |
|   |  | 3.5  | Relevant work permit(s), works completion records, reports, drawings and/or documentation and information are actually completed and appropriate personnel notified.                |

- 3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified

## 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 electrical 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:

- |         |  |
|---------|--|
| T2.1.9. | Stores procedures  |
| T2.2.1  | Generation power systems                                   |
| T2.2.2  | Transmission, distribution and rail power systems          |
| T2.2.3  | Substations, power transformers and reactors fundamentals. |
| T2.2.12 | Underground cable installation                             |
| T2.2.23 | Underground cable construction                             |

## 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 laying of cables for electrical purposes and 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 (e.g. dynamometers, rigging, winches, etc), working on FRC, PVC, A/C ducted systems and the cutting and sealing of cables.

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
- 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
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel

## **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 – 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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	At least one of the following:	HV polymeric HV paper insulated
B	At least one of the following:	LV polymeric LV paper insulated
C	At least one of the following:	Direct lay On racks In conduits
D	At least one cable pulling methods of the following:	Stocking pulling Bond pulling Armour pulling Nose pull attachments
E	At least two cable sealing methods of the following:	Heat shrinkable Pre-stretched materials Tin/lead wiping Pre-moulded components
F	At least one cable cutting methods of the following:	Hydraulic cutters Electric reciprocating Motorised Hand tools
G	At least four of the following:	Drum jacks Winches Spindles Capstans Bollards Cable trailers Rollers Lubricants Ropes Bell mouths Draw wires/rods
H	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.
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**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 Competency Standard Unit.

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:

- UETTDRCJ02B    Install and maintain de-energised LV underground paper insulated cables
- UETTDRCJ03B    Install and maintain de-energised HV underground paper insulated cables
- UETTDRCJ06B    Install and maintain de-energised LV underground polymeric cables

## **UETTDRCJ02B      Install and maintain de-energised LV underground paper insulated cables**

### **Unit Descriptor                      1)**

#### **1.1) Descriptor**

This Competency Standard Unit covers the installation and maintenance of de-energised low voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning tests and the updating of system data/maintenance records.

#### **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.

### **Prerequisite Unit(s)                      2)**

#### **2.1) Competencies**

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

UETTDRCJ01B      Lay electrical cables

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

#### **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	3	Writing	3	Numeracy	3
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### **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.

**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.

**Competency Field 5)**

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare for the installation and maintenance of de-energised LV underground paper insulated 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 installation and maintenance of de-energised LV underground paper insulated 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
- 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   | Traffic management plan is identified and implemented.   |  |
| 2 | Carry out installation and maintenance of de-energised LV underground paper insulated cables | 2.1  | OHS, sustainable energy and environmental 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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed  |
|   |  | 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 in the safe installation and maintenance of de-energised LV underground paper insulated cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements |
|   |  | 2.5  | De-energised LV underground paper insulated cables are installed according to the work schedule and requirements/established procedures  |

- |   |   |   |   |
|---|---|---|---|
|   | 2.6   | Maintenance, including repair and/or replacement of de-energised LV underground paper insulated cables is carried out, in accordance with the work schedule and requirements/established procedures |   |
|   | 2.7   | 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.             |   |
|   | 2.8   | Unplanned events in the installation and maintenance of de-energised LV underground paper insulated cables are undertaken within the scope of established procedures                                |   |
|   | 2.9   | Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills   |   |
|   | 2.10  | On going checks of quality of the work are undertaken in accordance with instructions and established procedures  |   |
| 3 | Complete the installation and maintenance of de-energised LV underground paper insulated cables | 3.1   | Work undertaken is visually checked/tested against works schedule for confirmation of phasing and conformance with requirements and, anomalies reported in accordance with established procedures |
|   |   | 3.2   | Accidents and/or injuries are reported in 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 or disposed of in accordance with established procedures                |
|   |   | 3.5   | Relevant work permit(s) are signed off and, the LV underground paper insulated cables are returned to service in accordance with requirements   |
|   |   | 3.6   | Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified                             |

## **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 installing and maintaining de-energised LV underground paper insulated 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 principles - power
E2.8.5	Magnetism
E2.8.6	Electromagnetic principles
T2.2.19	LV Paper lead cable jointing principles
T2.2.24	Aluminium and lead sheathed cable - jointing procedures
T2.3.1	Powerline safety practices.

## 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 paper insulated cables and covers the jointing, terminating, repair and replacement of cables.

Installation and Maintenance may include the repair and replacement of cables and associated hardware.

Types of cables includes: Paper-Insulated which refers to LV solid paper insulated metal sheathed.

Underground equipment 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 gear and street lighting columns.

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

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

Jointing and terminating 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
- 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

## **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 – 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:

<b>Range of tools, equipment, materials, procedures, workplaces or other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	At least one of the following:	LV paper/lead sheathed LV paper/aluminium sheathed
B	At least two of the following:	Tee-off joints Straight through joints Parallel branch joints Parallel joints
C	At least two of the following:	Transformers LV switchboards Pillars/turrets Lighting columns Ring main units Chamber substations UG/OH terminations Circuit breakers
D	At least one of the following:	Busbar/termination boxes Links/Fuses Disconnect boxes Termination boxes Control gear
E	At least one of the following:	Resin filled boxes Polymeric tape

		Heat shrink 'slip-on' moulds Pre-stretched polymeric Compound filled boxes
F	At least one of the following:	Compression lugs Soldered lugs Mechanical connectors
G	At least one of the following:	Voltage detectors Insulation resistance testers
H	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 work as prescribed by this Competency Standard Unit.

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:

UETTDRCJ01B Lay electrical cables

UETTDRCJ03B    Install and maintain de-energised HV  
underground paper insulated cables

## **UETTDRCJ03B**

# **Install and maintain de-energised HV underground paper insulated cables**

### **Unit Descriptor**

1)

#### **1.1) Descriptor**

This Competency Standard Unit covers the installation and maintenance of de-energised high voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation and earthing of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning tests as per enterprise established procedures and the updating of system data/maintenance records.

#### **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.

### **Prerequisite Unit(s)**

2)

#### **2.1) Competencies**

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

UETTDRCJ01B Lay electrical cables

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

#### **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 3 Writing 3 Numeracy 3

**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.

**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.

**Competency Field**

5)

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare for the installation and maintenance of de-energised HV underground paper insulated 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 installation and maintenance of de-energised HV underground paper insulated 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

- |   |  |   |
|---|--|---|
|   | 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   | Traffic management plan is identified and implemented.  |
| 2 | Carry out installation and maintenance of de-energised HV underground paper insulated cables |   |
|   | 2.1  | OHS, sustainable energy and environmental 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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed                           |
|   | 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 in the safe installation and maintenance of de-energised HV underground paper insulated cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements
  - 2.5 De-energised HV underground paper insulated cables are installed according the work schedule and requirements/established procedures
  - 2.6 Maintenance, including repair and/or replacement of de-energised HV underground paper insulated cables is carried out, in accordance with the work schedule and requirements/established procedures
  - 2.7 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
  - 2.8 Unplanned events in the installation and maintenance of de-energised HV underground paper insulated cables are undertaken within the scope of established procedures
  - 2.9 Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills
  - 2.10 On going checks of quality of the work are undertaken in accordance with instructions and established procedures
- 3 Complete the installation and maintenance of de-energised HV underground paper insulated cables
- 3.1 Work undertaken is visually checked/tested against works schedule for confirmation of phasing and conformance with requirements and, anomalies reported in accordance with established procedures
  - 3.2 Accidents and/or injuries are reported in 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 or disposed of in accordance with established procedures

- 3.5 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures
- 3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified

## 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 installing and maintaining de-energised HV underground paper insulated 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
- T2.2.20 HV Paper lead cable jointing principles
- T2.2.24 Aluminium and lead sheathed cable - jointing procedures
- T2.3.1 Powerline safety practices.

## 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 high voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables.

Installation and Maintenance may include the repair and replacement of cables and associated hardware.

Types of cables includes: Paper-Insulated which refers to HV solid paper insulated metal sheathed.

Underground equipment may include links, fuses, , ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, busbar/termination boxes.

Test and recording equipment includes voltage detectors, tong ammeters, cable identification equipment, Cable spiking equipment and insulation resistance testers.

Jointing and terminating materials include compound and resin filled boxes, paper tape materials, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression, mechanical and solder lugs and ferrules.

Jointing and terminating locations include links, fuses, , ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, , busbar/termination boxes.

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
- 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.

## 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

#### 9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

**demonstrate  
competency in  
this unit**

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:

<b>Range of tools, equipment, materials, procedures, workplaces or other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	At least one of the following:	Paper/lead sheathed HV Paper/Aluminium sheathed
B	At least one of the following:	Straight through joint Parallel branch joint
C	At least one of the following:	Transformers Ring main units Chamber substations
D	At least one of the following:	Busbar/termination boxes Links/ Fuses Termination boxes Control gear
E	At least two of the following:	Resin filled boxes

		Polymeric tape Heat shrink Slip-on' moulds Pre-stretched polymeric Compound filled boxes
F	At least two of the following:	Lugs, Ferrules Compression joints Soldered joints Mechanical Connectors
G	All of the following:	Cable Identification devices Cable Spiking Devices
H	All of the following:	Insulation resistance testers Moisture testing equipment
I	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 work as prescribed by this Competency Standard Unit.

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**

**9.5)**

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**assessment and  
relationship  
with other units**

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

UETTDRCJ01B Lay electrical cables

UETTDRCJ02B Install and maintain de-energised LV underground paper insulated cables

## **UETTDRCJ04B      Joint and maintain energised LV underground paper insulated cables**

### **Unit Descriptor**

1)

#### **1.1) Descriptor**

This Competency Standard Unit covers the jointing and maintenance of energised low voltage underground paper insulated cables according to established enterprise procedures. It covers the use of specialised live working equipment, tools and devices, the issuing and/or accepting electrical access permits and/or relevant working documentation and the undertaking of authorised cable testing procedures. It also encompasses the pre-commissioning tests and the updating of system data/maintenance records.

#### **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.

### **Prerequisite Unit(s)**

2)

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

UETTDRCJ02B      Install and maintain de-energised LV underground paper insulated cables

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

#### **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	3	Writing	3	Numeracy	3
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**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.

**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.

**Competency Field**

5)

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare for the jointing and maintenance of energised LV underground paper insulated 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 jointing and maintenance of energised LV underground paper insulated 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
- 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   | Specialist equipment for live working is inspected and confined in working order as per requirements and established procedures  |   |
|   | 1.9   | Relevant personnel at work site are confirmed current in First Aid and other related work procedures according to requirements   |   |
|   | 1.10  | Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.   |   |
|   | 1.11  | Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures                                       |   |
|   | 1.12  | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures |   |
| 2 | Carry out jointing and maintenance of energised LV underground paper insulated cables | 2.1  | OHS, sustainable energy and environmental 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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed   |
|   |   | 2.3  | Essential knowledge and associated skills are applied in the safe jointing and maintenance of energised LV underground paper insulated cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements |
|   |   | 2.4  | Cable(s), underground equipment, associated hardware and surrounds are prepared in accordance with established procedures   |

- |   |  |   |  |
|---|--|---|--|
|   | 2.5  | Joint and termination procedures of energised LV cable(s) are carried out in accordance with the work schedule and requirements/established procedures  |  |
|   | 2.6  | Authorised cable testing procedures and fault identification and location process are implemented in accordance with requirements and established procedures  |  |
|   | 2.7  | Maintenance, including repair and/or replacement of energised LV underground paper insulated 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 jointing and maintenance of energised LV underground paper insulated 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  |  |
|   | 2.12   | OHS, sustainable energy and environmental principles and practices to reduce the incidents of accidents and minimise waste are monitored and followed in accordance with requirements and/or established procedures |  |
| 3 | Complete the jointing and maintenance of energised LV underground paper insulated 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 accordance with requirements/established procedures, where applicable.   |
|   |  | 3.3   | Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures |

- 3.4 Relevant work permit(s) are signed off and, jointing and maintenance of energised LV underground paper insulated cables are returned to service in accordance with requirements
- 3.5 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified

## **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 jointing and maintaining energised LV underground paper insulated 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:

- T2.2.13 Low voltage - energised working practices for substations
- T2.3.1 Powerline safety practices

## **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 jointing and maintenance of energised low voltage underground paper insulated cables and covers the jointing, repair and replacement of cables using specialised live working equipment, tools and devices.

Installation and Maintenance may include the repair and replacement of cables and associated hardware.

Types of cables includes: Paper-Insulated which refers to LV solid paper insulated metal sheathed.

Underground equipment may include straight and branch joints, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control gear and street lighting columns.

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

Jointing and terminating materials include compound and resin filled boxes, paper tape materials, polymeric tape materials, polymeric heat shrink materials, "slip-on" moulded components and pre-stretched polymeric materials, compression and solder lugs and ferrules

and mechanical connectors.

Jointing and terminating locations include, 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
- 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.

## 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

#### 9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

**demonstrate  
competency in  
this unit**

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:

<b>Range of tools, equipment, materials, procedures, workplaces or other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	At least one of the following:	LV paper/lead LV paper/aluminium
B	At least two of the following:	Tee-off joints Straight through joints Parallel branch
C	At least one of the following:	Transformers LV switchboards Pillars/turrets Lighting columns Ring main units Chamber substations Busbar/termination boxes Links

		Termination boxes Control gear
D	At least one of the following:	Resin filled boxes Compound filled boxes Polymeric tape Heat shrink 'slip-on' moulds Pre-stretched polymeric
E	At least two of the following:	Compression joints Soldered joints Mechanical connectors Soldered lugs Compression lugs
F	All of the following:	Voltage detecting instruments Insulation resistance testers Cable identification equipment Moisture testing equipment Phase rotation instruments Specialised live working equipment/tools
G	All of the following:	Temporary earth bonding/bridging, Insulating covers/matting Insulating tooling/ gloves
H	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 work as prescribed by this Competency Standard Unit.

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:

UETTDRCJ08B    Joint and maintain energised LV underground polymeric cables

## **UETTDRCJ05B      Perform straight through HV paper insulated to polymeric transition joints**

### **Unit Descriptor**

1)

#### **1.1) Descriptor**

This Competency Standard Unit covers the formation of a HV/LV transition joint(s) from paper insulated to polymeric cable on belted and screened cables and covers the; determination of electrical values of belt papers and core insulation, protection of core and belt papers prior to setting, core setting, termination of belt papers, construction of bell mouth and moisture testing. It 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.

#### **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.

### **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:.

UETTDRCJ07B      Install and maintain de-energised HV underground polymeric cables

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

#### **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 3 Writing 3 Numeracy 3

**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.

**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.

**Competency Field**

5)

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare for the formation of a paper insulated to polymeric transition joint.

- 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 formation of a paper insulated to polymeric transition joint 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
- 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 formation of a paper insulated to polymeric transition joint | 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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed  |
|   |  | 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 in the safe formation of a transition paper insulated to polymeric cable joint to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements |

- |   |   |   |   |
|---|---|---|---|
|   | 2.5   | A transition paper insulated to polymeric cable joint is formed according the work schedule and requirements/established procedures   |   |
|   | 2.6   | 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. |   |
|   | 2.7   | Unplanned events in the formation of a transition paper insulated to polymeric cable joint are undertaken within the scope of established procedures                                    |   |
|   | 2.8   | Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills   |   |
|   | 2.9   | On going checks of quality of the work are undertaken in accordance with instructions and established procedures  |   |
| 3 | Complete the formation of a paper insulated to polymeric transition joint | 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 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, HV/LV underground paper insulated/polymeric cables are returned to service in accordance with requirements                |
|   |   | 3.6   | Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified |

## 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 performing straight through HV paper insulated to polymeric transition joints.

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:

- T2.2.18 HV polymeric underground cable jointing principles
- T2.2.20 HV paper lead cable jointing principles
- T2.2.24 Aluminium and lead sheathed cable - jointing procedures

## **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 creation of a transition joint for paper insulated to polymeric cables and covers the jointing, repairing and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

Types of cables includes: Polymeric cables (i.e. HV/LV de-energised – rigid or flexible) and Paper-Insulated Lead and Aluminium sheathed cables (screened or unscreened) (copper or aluminium conductors).

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

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

- 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

## **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 – 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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	At least two of the following:	HV polymeric to PLY HV polymeric to Paper/Al sheathed LV Transition
B	At least two of the following:	Straight through joint Straight through trifurcating joint Parallel branch joint Parallel Trifurcating Transition Parallel Transition
C	At least two of the following:	Polymeric tape Heat shrink 'Slip-on' moulds Pre-stretched polymeric resin
D	At least two of the following:	Compression joints Soldered joints Mechanical connectors Welding conductors Insulating piercing connectors
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 work as prescribed by this Competency Standard Unit.

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:

UETTDRCJ07B    Install and maintain de-energised HV underground polymeric cables

## **UETTDRCJ06B      Install and maintain de-energised LV underground polymeric cables**

### **Unit Descriptor**

1)

#### **1.1) Descriptor**

This Competency Standard Unit covers the installation and maintenance of de-energised low voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables. It 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.

#### **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.

### **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:.

UETTDRCJ01B      Lay electrical cables

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

#### **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	3	Writing	3	Numeracy	3
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### **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.

**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.

**Competency Field 5)**

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare for the installation and maintenance of de-energised LV underground polymeric 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 installation and maintenance of de-energised LV underground polymeric 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
- 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 installation and maintenance of de-energised LV underground polymeric 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   |
|   | 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 de-energised LV underground polymeric cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements |
|   | 2.5  | De-energised LV underground polymeric cables are installed according to the work schedule and requirements/established procedures   |

- |   |   |   |   |
|---|---|---|---|
|   | 2.6   | Maintenance, including repair and/or replacement of LV underground polymeric cables is carried out, in accordance with the work schedule and requirements/established procedures        |   |
|   | 2.7   | 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. |   |
|   | 2.8   | Unplanned events in the installation and maintenance of de-energised LV underground polymeric cables are undertaken within the scope of established procedures                          |   |
|   | 2.9   | Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills   |   |
|   | 2.10  | On going checks of quality of the work are undertaken in accordance with instructions and established procedures  |   |
| 3 | Complete the installation and maintenance of de-energised LV underground polymeric 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 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 polymeric 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

**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 installing and maintaining de-energised LV underground polymeric 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
T2.2.12	Underground cable installation
T2.2.16	Fundamentals of jointing LV polymeric cables.
T2.2.17	LV polymeric cable jointing principles
T2.3.1	Powerline safety practices

## **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 jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

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
- 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

## **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 – 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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	All of the following:	LV polymeric cable
B	Any two of the following:	Tee-off joints Straight through joints Parallel branch joints Parallel joints
C	At least one of the following:	Transformers, LV switchboards Pillars/turrets Lighting columns Ring main units Chamber substations
D	At least two of the following:	Busbar/termination boxes Links/Fuses Disconnect boxes Termination boxes Control gear UG/OH terminations Circuit breakers
E	At least one of the following:	Resin filled boxes, Compound filled boxes Polymeric tape Heat shrink Slip-on' moulds Pre-stretched polymeric
F	At least one of the following:	Compression lugs Welded connections Mechanical connectors Insulation piercing connectors

G	All of the following:	Insulation resistance testers Voltage detectors
H	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 on de-energised low voltage underground polymeric 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:

- |             |   |
|-------------|---|
| UETTDRCJ02B | Install and maintain de-energised LV underground paper insulated cables     |
| UETTDRCJ07B | Install and maintain de-energised HV underground polymeric insulated cables |

## **UETTDRCJ07B      Install and maintain de-energised HV underground polymeric cables**

### **Unit Descriptor**

1)

#### **1.1) Descriptor**

This Competency Standard Unit covers the installation and maintenance of de-energised high voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables. It 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.

#### **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.

### **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:.

UETTDRCJ06B      Install and maintain de-energised LV underground polymeric cable

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

#### **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	3	Writing	3	Numeracy	3
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**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.

**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.

**Competency Field**

**5)**

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

**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.

1 Prepare to the installation and maintenance of de-energised HV underground polymeric 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 installation and maintenance of de-energised HV underground polymeric 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.
- 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 installation and maintenance of de-energised HV underground polymeric 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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.
  - 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 in the safe installation and maintenance of de-energised HV underground polymeric cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.

- |   |   |  |  |
|---|---|--|--|
|   | 2.5   | De-energised HV underground polymeric cables are installed according the work schedule and requirements/established procedures.  |  |
|   | 2.6   | Maintenance, including repair and/or replacement of de-energised HV underground polymeric cables is carried out, in accordance with the work schedule and requirements/established procedures. |  |
|   | 2.7   | 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.        |  |
|   | 2.8   | Unplanned events in the installation and maintenance of de-energised HV underground polymeric cables are undertaken within the scope of established procedures.                                |  |
|   | 2.9   | Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.   |  |
|   | 2.10  | On going checks of quality of the work are undertaken in accordance with instructions and established procedures.  |  |
| 3 | Complete the installation and maintenance of de-energised HV underground polymeric 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 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, HV underground polymeric cables are returned to service in accordance with requirements.                                   |
|   |   | 3.6  | Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified. |

## 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 installing and maintaining de-energised HV underground polymeric 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:

T2.2.18 HV polymeric underground cable jointing principles

## 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 high voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

Underground equipment may include links, fuses, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations and busbar/termination boxes.

Test and recording equipment includes voltage detectors, cable identification equipment, cable spiking equipment and insulation resistance testers.

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

Jointing and terminating locations include circuit breakers, links, fuses, , ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations and busbar/termination boxes.

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
- 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

## **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 – 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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	All of the following:	HV polymeric cables
B	At least two of the following:	Tee-off joints Straight through joint Parallel branch joint Parallel joint
C	At least one of the following:	Transformers Ring main units Chamber substations
D	At least one of the following:	Busbar/termination boxes Links/Fuses Termination boxes Control gear Circuit breakers
E	At least two of the following:	Resin filled boxes Compound filled boxes Polymeric tape Heat shrink 'slip-on' moulds Pre-stretched polymeric
F	All of the following:	Insulation resistance testers Voltage detectors
G	All of the following;	Cable identification devices Cable spiking devices
H	At least two of the following:	Mechanical connectors Compression connectors Lugs
I	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.
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**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 de-energised underground HV polymeric 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:

UETTDRCJ06B      Install and maintain LV underground polymeric cables

# **UETTDRCJ08B      Joint and maintain energised LV underground polymeric cables**

## **Unit Descriptor**

1)

### **1.1) Descriptor**

This Competency Standard Unit covers the jointing and maintenance of energised low voltage underground polymeric cables according to established enterprise procedures. It covers the use of specialised live working equipment, tools and devices, the issuing and/or accepting electrical access permits and or relevant working documentation and the undertaking of authorised cable testing procedures. It also encompasses the pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records.

### **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.

## **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:.

UETTDRCJ06B      Install and maintain de-energised LV underground polymeric cables

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

### **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	3	Writing	3	Numeracy	3
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**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.

**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.

**Competency Field**

**5)**

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare for the jointing and maintenance of energised LV underground polymeric 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 jointing and maintenance of energised LV underground polymeric 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.
- 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   | Specialist equipment for live working is inspected and confirmed in working order as per requirements and established procedures.  |
|   | 1.9   | Relevant personnel at work site are confirmed current in First Aid, Pole Top Rescue and other related work procedures according to requirements.   |
|   | 1.10  | Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.   |
|   | 1.11  | Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.  |
|   | 1.12  | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.  |
|   | 1.13  | Road signs, barriers and warning devices are positioned in accordance with requirements.   |
| 2 | Carry out jointing and maintenance of energised LV underground polymeric 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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.   |
|   | 2.3   | Essential knowledge and associated skills are applied in the safe jointing and maintenance of energised LV underground polymeric cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |

- |   |  |   |  |
|---|--|---|--|
|   | 2.4  | Cable(s), underground equipment, associated hardware and surrounds are prepared in accordance with established procedures.  |  |
|   | 2.5  | Joint and termination procedures of energised LV cable(s) are carried out in accordance with the work schedule and requirements/established procedures.                                     |  |
|   | 2.6  | Authorised cable testing procedures and fault identification and location process are implemented in accordance with requirements and established procedures.                               |  |
|   | 2.7  | Maintenance, including repair and/or replacement of energised LV underground polymeric 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 jointing and maintenance of energised LV underground polymeric 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 jointing and maintenance of energised LV underground polymeric 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 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 polymeric cables are returned to service in accordance with requirements.
- 3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

## 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 jointing and maintaining energised LV underground polymeric 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:

- T2.2.13 Low voltage - energised working practices for substations
- T2.3.1 Powerline safety practices

## 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 jointing and maintenance of energised low voltage underground polymeric cables and covers the jointing, repair and replacement of cables using specialised live working equipment, tools and devices

Maintenance may include the repair and replacement of cables and associated hardware.

Underground equipment may include, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations, LV switchboards, pillars/turrets, busbar/termination boxes, street lighting control gear and street lighting columns.

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

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

Jointing and terminating locations include, 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
- 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

## **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**

**9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

**demonstrate  
competency in  
this unit**

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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	All of the following:	LV polymeric cables
B	At least two of the following:	Tee-off joints Straight through joints Parallel branch joints Parallel joints
C	At least one of the following:	Transformers LV switchboards Pillars/turrets Lighting columns Ring main units Chamber substations
D	At least one of the following:	Busbar/termination boxes

		Links/fuses Termination boxes Control gear
E	At least one of the following:	Resin filled boxes Polymeric tape Heat shrink 'slip-on' moulds Pre-stretched polymeric
F	At least two of the following:	Compression joints/lugs Insulation piercing connectors Mechanical connectors
G	All of the following:	Voltage detecting instruments Insulation resistance testers Cable identification equipment Phase rotation instruments Specialised live working equipment/tools.
H	All of the following:	Temporary earth bonding/bridging Insulating covers/matting Insulating tooling /gloves
I	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 jointing and maintenance of energised underground LV polymeric 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:

UETTDRCJ04B	Joint and maintain energised LV underground paper insulated cables
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## **UETTDRCJ09B      Install oil and gas filled specialised underground cables**

### **Unit Descriptor                      1)**

#### **1.1) Descriptor**

This Competency Standard Unit covers the installation, jointing and termination of oil and gas filled specialised underground cables from 33kV and higher. It includes the laying of the specialised underground ground cable, the preparation of the cables and phasing out jointing and terminating and the preparation of the cable jointing bay. It also encompasses the relevant safety procedures to ensure installation of the specialised cable is undertaken according to established enterprise requirements.

#### **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.

### **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:.

	UETTDRCJ03B	Install and maintain de-energised HV underground paper insulated cables
and	UETTDRCJ07B	Install and maintain de-energised HV underground polymeric cables

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

#### **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

**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.

**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.

**Competency Field**

5)

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare/Plan to install oil and gas filled specialised underground cables

- 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 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
- 1.3 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.
- 1.4 Risk control measures are identified, prioritised and evaluated against the work schedule.
- 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  | 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. |   |
|   | 1.11  | Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.  |   |
|   | 1.12  | Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements.  |   |
| 2 | Carry out the installation of oil and gas filled specialised underground cables | 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 procedures are performed according to requirements and/or established procedures.  |
|   |   | 2.3  | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.                                   |
|   |   | 2.4  | 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.               |

- 2.5 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
  - 2.6 Installation of oil and gas filled specialised underground cables is carried out, in accordance with the work schedule and requirements and/or established procedures.
  - 2.7 Essential knowledge and associated skills are applied in the safe installation of oil and gas filled specialised underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
  - 2.8 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
  - 2.9 On going 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.
- 3 Complete the installation of oil and gas filled specialised underground cables
- 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, underground cables are 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

**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 installing oil and gas filled specialised 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:

T2.2.12	Underground cable installation
T2.2.23	Underground cable construction
T2.2.40	Jointing and terminating oil and gas filled specialised cable
T2.2.43	Installing oil and gas filled specialised underground cables
T2.2.47	Oil and gas filled specialised underground cable principles
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents

## 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 of oil and gas filled specialised underground cables and may include the following:

Cable type includes: Pressurised oil filled and gas filled cables 33kV and above.

Testing and recording equipment may include voltage detectors, cable identification equipment, insulation resistance testers.

Jointing and terminating materials: compound and resin filled boxes, paper tape/roll materials, polymeric tape materials, heat shrink materials, “slip on” moulded components, molten solders and gas/oil piping and fittings. compression, mechanical , solder lugs and ferrules and welded connections.

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
- 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

## **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 – 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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	All of the following:	Oil filled cables Gas filled cables
B	All of the following:	Specialised cable installation equipment Winches Caterpillars Rollers Bond lines Drum jacks Install cable end caps/nose pull assemblies
C	At least two of the following:	Straight through joint Straight stop joint Trifurcating joint Splitter joint Trifurcating/transition/stop
D	At least one of the following:	Box termination Gas filled termination Compound filled termination
E	At least two of the following:	Welded connectors Mechanical connectors Compression connectors
F	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 of oil and gas filled specialised underground cables.

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)**

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

UETTDRCJ10B	Maintain oil and gas filled specialised underground cables
UETTDRCJ11B	Install and maintain polymeric specialised underground cables

## **UETTDRCJ10B      Maintain oil and gas filled specialised underground cables**

### **Unit Descriptor**

1)

#### **1.1) Descriptor**

This Competency Standard Unit covers the maintenance and repair of oil and gas filled specialised underground cables. It includes testing, diagnosing faults, repairing and replacing the specialised cables. It also encompasses the processes for preliminary pressure control and leak repair, as well as working under induced voltages, cable identification and cable freezing.

#### **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.

### **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:

UETTDRCJ09B      Install oil and gas filled specialised underground cables

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

#### **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
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### **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.

**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.

**Competency Field 5)**

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare/Plan to maintain oil and gas filled specialised underground cables

- 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.
- 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 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.
  - 1.11 Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
  - 1.12 Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
- 2 Carry out the maintenance of oil and gas filled specialised underground cables
- 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 procedures are performed according to requirements and/or established procedures.
  - 2.3 Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
  - 2.4 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.
  - 2.5 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.

- |   |   |   |   |
|---|---|---|---|
|   | 2.6   | Maintenance of oil and gas filled specialised underground cables is carried out, in accordance with the work schedule and requirements and/or established procedures.   |   |
|   | 2.7   | Essential knowledge and associated skills are applied in the safe maintenance of oil and gas filled specialised underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |   |
|   | 2.8   | Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.   |   |
|   | 2.9   | On going 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.                                 |   |
| 3 | Complete the maintenance of oil and gas filled specialised underground cables | 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, underground cables are 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**

**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 maintaining oil and gas filled specialised 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:

T2.2.45      Maintaining oil and gas filled specialised  
underground cables

## **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 maintenance and repair of oil and gas filled specialised underground cables and may include the following:

Cable type includes: Pressurised oil filled and gas filled cables 33kV and above.

Testing and recording equipment may include voltage detectors, cable identification equipment, insulation resistance testers.

Jointing and terminating materials: compound and resin filled boxes, paper tape/roll materials, polymeric tape materials, heat shrink materials, “slip on” moulded components, molten solders and gas/oil piping and fittings. compression, mechanical, solder lugs and ferrules and welded connections.

This unit also encompasses the preparation for cable freezing and preliminary pressure control and leak repair activities.

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
- 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

## **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 – 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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	All of the following:	Oil filled cables Gas filled cables
B	At least two of the following:	Straight through joint Straight stop joint, Trifurcating joint Splitter joint Trifurcating/transition/stop joint
C	At least one of the following:	Air box terminator Gas filled terminator Compound filled terminator
D	At least two of the following:	Welded connectors Mechanical connectors Compression connectors
E	All of the following:	Voltage detectors Cable identification equipment and spiking Insulation resistance testers
F	All of the following:	Leak repair and pressure control cable freezing equipment Application of pressure control tapes Fittings and seals
G	All of the following:	Oil filled cables Gas filled cables
H	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 maintenance of oil and gas filled specialised underground cables.

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)**

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

UETTDRCJ11B      Install and maintain polymeric specialised underground cables

# **UETTDRCJ11B      Install and maintain polymeric specialised underground cables**

## **Unit Descriptor**

1)

### **1.1) Descriptor**

This Competency Standard Unit covers the installation, maintenance and repair of polymeric specialised underground cables including XLPE and EPR above 33kV. It includes jointing and terminating, as well as working under induced voltages and undertaking the relevant tests required for jointing. It also encompasses the preparation of the cable jointing bay, the preparation of cables and phasing out, cable identification and spiking, the treatment/handling of, but not jointing fibre optical cables.

### **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.

## **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:.

UETTDRCJ03B      Install and maintain de-energised HV underground paper insulated cables

and UETTDRCJ07B      Install and maintain de-energised HV underground polymeric cables

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

### **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

**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.

**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.

**Competency Field 5)**

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare/Plan to install and maintain polymeric specialised underground cables

- 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 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
- 1.3 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.
- 1.4 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.
- 1.5 Risk control measures are identified, prioritised and evaluated against the work schedule.

- |   |  |  |
|---|--|--|
|   | 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 | Carry out the installation and maintenance of polymeric specialised underground cables |  |
|   | 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 procedures are performed according to requirements and/or established procedures.   |
|   | 2.3  | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.  |
|   | 2.4  | 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.                                  |

- |   |   |  |   |
|---|---|--|---|
|   | 2.5   | Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.  |   |
|   | 2.6   | Installation and/or maintenance of polymeric specialised underground cables is carried out, in accordance with the work schedule and requirements and/or established procedures.   |   |
|   | 2.7   | Essential knowledge and associated skills are applied in the safe installation and/or maintenance of polymeric specialised underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |   |
|   | 2.8   | Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.  |   |
|   | 2.9   | On going 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.  |   |
| 3 | Complete the installation and maintenance of polymeric specialised underground cables | 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 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, underground cables are 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

**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 installing and maintaining polymeric specialised 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:

T2.2.12	Underground cable installation
T2.2.23	Underground cable construction
T2.2.41	Polymeric specialised underground cables principles
T2.2.42	Jointing and terminating specialised polymeric underground cables
T2.2.44	Installing and maintaining specialised polymeric underground cables
T2.8.1	Enterprises specific - policies and procedure instructions
T2.8.2	Enterprises specific - OHS instructions
T2.8.3	Enterprises specific - technical drawing and documents

## 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 polymeric specialised underground cables including XLPE and EPR above 33kV, and covers the installation, jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

It also encompasses the preparation of the cable jointing bay, the preparation of cables and phasing out, the treatment/handling, but not jointing of fibre optical cables. Also cable identification and spiking are included.

Underground equipment may include switchgear, transformers, specialised cable joints and termination kits, specialised cable installation equipment, specialised cable heating equipment and tooling.

Test and recording equipment includes voltage detectors, cable identification equipment, cable

spiking equipment and insulation resistance testers.

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

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
- 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

## 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 – 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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	Install and maintain at least one of the following:	Specialised XLPE cables above 33kv Specialised EPR cables above 33kv
B	All of the following:	Straight through joints. Terminations
C	Use of at least three of the following specialised cable installation equipment:	Winches Caterpillars Rollers Bond lines Nose pull devices Drum jacks
D	At least two of the following:	Connectors Mechanical connectors

		Compression connectors
E	At least two of the following:	Air boxes Compound filled boxes Gas filled boxes
F	At least two of the following:	Polymeric tape materials Heat shrink materials Moulded components
G	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 polymeric specialised underground cables.

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)**

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

UETTDRCJ09B     Install oil and gas filled specialised underground cables

UETTDRCJ10B     Maintain oil and gas filled specialised

underground cables

UETTDRCJ12B    Install and maintain oil & gas pressure systems  
for specialised underground cables



## 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

### 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.

### 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.

### Competency Field

#### 5)

Cable Jointing

## ELEMENT

## PERFORMANCE CRITERIA

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.

1 Prepare/Plan to install and maintain oil and gas pressure systems for specialised underground cables

- 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 to all personnel and identified for all work sites.

- 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 Carry out the installation and maintenance of oil and gas pressure systems for specialised underground cables
- 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 procedures are performed according to requirements and/or established procedures.
  - 2.3 Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.

- 2.4 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.
- 2.5 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
- 2.6 Installation and/or maintenance of oil & gas pressure systems for specialised underground cables is carried out, in accordance with the work schedule and requirements and/or established procedures.
- 2.7 Essential knowledge and associated skills are applied in the safe installation and/or maintenance of oil & gas pressure systems for specialised underground cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
- 2.8 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.
- 2.9 On going 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.
- 3 Complete the installation and maintenance of oil and gas pressure systems for specialised underground cables
  - 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, underground cables are 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

**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 installing and maintaining oil & gas pressure systems for specialised 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:

- T2.2.12 Underground cable installation
- T2.2.23 Underground cable construction
- T2.2.40 Jointing and terminating oil & gas filled specialised cable
- T2.2.43 Installing oil & gas filled specialised underground cables
- T2.2.45 Maintaining oil & gas filled specialised underground cables
- T2.2.46 Install & maintain oil & gas pressurised systems
- T2.2.47 Oil & gas filled specialised underground cable principles.
- T2.8.1 Enterprises specific - policies and procedure instructions
- T2.8.2 Enterprises specific - OHS instructions
- T2.8.3 Enterprises specific - technical drawing and documents

## 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 oil and gas pressure systems for specialised underground cables. It covers the installation of pressure control cubicles, pressure lines, oil and gas tanks/cylinders and flow control equipment. Maintenance of pressure systems including routine maintenance activities and equipment testing. Leak location activities including cable freezing and flow rate comparison tests.

It also encompasses the processing of cable oil and basic testing and sampling of oil.

Oil processing and control equipment may include: Oil de-gasification units, oil trays and pumps, vacuum pumps, accessory impregnation equipment, RGP meters & equipment, manometers, vacuum meters, flow boards, oil sampling flasks and extraction plant, liquid nitrogen cylinders and associated cable freezing equipment, oil pressure tanks, oil piping, fittings and valves, oil control cubicles

Gas processing & control equipment may include: Dry nitrogen cylinders, gas piping, fittings and valves, pressure meters and transducers, gas control cubicles.

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
- 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

## 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 – 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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	All of the following:	Oil filled pressure systems Gas filled pressure systems
B	All of the following:	Gas analyser/detector Manometers Flow boards Cable freezing equipment
C	All of the following:	Accessory impregnation equipment Oil degasification plant Manometers

		Flowboards Vacuum pumps Site bottles Gas cylinders Pressure/vacuum meters Oil evacuation pumps RGP equipment Oil sampling equipment
D	All of the following:	Gas control cubicles Oil control cubicles Cable joints and terminations Oil degasification units Oil pressure tanks
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 oil and gas pressure systems for specialised underground cables.

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**

**9.5)**

**assessment and  
relationship  
with other units**

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

UETTDRCJ09B    Install oil and gas filled specialised underground cables

UETTDRCJ11B    Install and maintain polymeric specialised underground cables

# **UETTDRCJ13B    Install and maintain network infrastructure LV underground cables**

## **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.

### **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.

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

### **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
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## **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.

**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.

**Competency Field 5)**

Cable Jointing

**ELEMENT**

**6)** Elements describe the essential outcomes of a unit of competency

**PERFORMANCE CRITERIA**

Performance criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

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.
- 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.
  - 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 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

**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
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

## **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
- 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.

## 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

#### 9.2)

Before the critical aspects of evidence are considered all prerequisites shall be met.

**demonstrate  
competency in  
this unit**

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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	Laying at least one of the following:	LV polymeric LV paper insulated
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	Heat shrinkable Pre-stretched materials Tin/lead wiping

	the following:	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 least one of the following:	Transformers, LV switchboards 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	Compression lugs Welded connections

	following:	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.

**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



Reading 4 Writing 4 Numeracy 4

**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.

**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.

**Competency Field**

5)

Cable Jointing

**ELEMENT**

**PERFORMANCE CRITERIA**

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.

1 Prepare to the laying, installation and maintenance of de-energised HV 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 HV 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.
- 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 HV 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 aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.   |
|   |   | 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 in the safe installation and maintenance of HV underground polymeric 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 HV underground cables are installed according the work schedule and requirements/established procedures.   |  |
|   | 2.7  | Maintenance, including repair and/or replacement of de-energised HV 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 installation and maintenance of HV 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 HV 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 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, HV underground cables are returned to service in accordance with requirements.   |
|   |  | 3.6   | Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified. |

## **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 installing and maintaining de-energised HV underground polymeric 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:

T2.2.12	Underground cable installation
T2.2.18	HV polymeric underground cable jointing principles
T2.2.23	Underground cable construction
T2.3.1	Powerline safety practices

## 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 high voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits.

Underground equipment may include links, fuses, ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations and busbar/termination boxes.

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 includes voltage detectors, cable identification equipment, cable spiking equipment and insulation resistance testers.

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

Jointing and terminating locations include circuit breakers, links, fuses, , ring main units, distribution fuse boxes, pad mount and ground transformers, chamber substations and busbar/termination boxes.

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
- 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

## **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.

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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**

**9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

**demonstrate competency in this unit**

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:

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  - 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:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be demonstrated</b>	<b>Item List</b>
A	Laying at least one of the following;	HV polymeric HV paper insulated
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	With regards to “A” incorporate 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	Install and maintain all of the following:	HV polymeric cables
H	With regards to “G” incorporate at least two of the following:	Tee-off joints Straight through joint Parallel branch joint Parallel joint
I	With regards to “G” incorporate at least one of the following:	Transformers Ring main units Chamber substations
J	With regards to “G” incorporate at least one of the following:	Busbar/termination boxes Links/Fuses Termination boxes Control gear Circuit breakers
K	With regards to “G” incorporate at least two of the following:	Resin filled boxes Compound filled boxes Polymeric tape Heat shrink 'slip-on' moulds Pre-stretched polymeric
L	With regards to the above incorporate at all of the following:	Insulation resistance testers Voltage detectors
M	With regards to the above incorporate all of the following;	Cable identification devices Cable spiking devices
N	With regards to “G” incorporate at least two of the following:	Mechanical connectors Compression connectors Lugs

O	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.
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**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 network infrastructure HV 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:

UETTDRCJ13B      Install and maintain network infrastructure LV underground cables