



Australian Government

**Assessment Requirements for
UETDRDU005 Install and maintain
network infrastructure LV underground
cables**

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Modification History

Release 1. This is the first release of this unit of competency in the UET Transmission, Distribution and Rail Sector Training Package Release 2.0.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including the use of risk control measures
- applying sustainable energy principles and practices
- laying at least one (1) of the following low voltage (LV) cable types:
 - LV polymeric
 - LV paper insulated
- laying LV cables using at least one (1) of the following installation types:
 - direct lay
 - on racks
 - in conduits
- laying LV cables using at least one (1) of the following cable pulling methods:
 - stocking pulling
 - bond pulling
 - armour pulling
 - nose pull attachments
- sealing LV cables using at least two (2) of the following cable sealing methods:
 - heat shrinkable
 - pre-stretched materials
 - tin/lead wiping
 - pre-moulded components
- cutting LV cables using at least one (1) of the following cable cutting methods:
 - hydraulic cutters
 - electric reciprocating
 - motorised
 - hand tools
- laying LV cables using at least four (4) of the following supporting plant and equipment:

- drum jacks
- winches
- spindles
- capstans
- bollards
- cable trailers
- rollers
- lubricants
- ropes
- bell mouths
- draw wires/rods
- joining LV cables using at least two (2) of the following jointing methods:
 - tee-off joints
 - straight through joints
 - parallel branch joints
 - parallel joints
- terminating LV cables in/on at least two (2) of the following locations:
 - transformers
 - LV switchboards
 - pillars/turrets
 - lighting columns
 - ring main units
 - chamber substations
- terminating LV cables using at least two (2) of the following types of equipment:
 - busbar/termination boxes
 - links/fuses
 - disconnect boxes
 - termination boxes
 - control gear
 - underground/overhead terminations
 - circuit breakers
- jointing and terminating LV cables using at least one (1) of the following material types:
 - resin filled boxes
 - compound filled boxes
 - polymeric tape
 - heat shrink
 - 'slip-on' moulds
 - pre-stretched polymeric
- terminating LV cables using at least one (1) of the following connectors:

- compression lugs
- welded connections
- mechanical connectors
- insulation piercing connectors
- testing LV cables using all of the following testing and recording equipment:
 - insulation resistance testers
 - voltage detectors
- dealing with unplanned events on at least one (1) occasion.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- transmission, distribution and rail systems encompassing:
 - relationship between the transmission, distribution and rail/tram system within an overall power system - different organisations responsible for generation, transmission, distribution and rail/tram; how they correlate and their functions
 - characteristics of a transmission, distribution and rail system - principal components; typical voltage levels and methods of transmission and distribution, including grid type transmission systems, radial, parallel and ring main feeders
 - relationship between an overhead and underground supply systems within an overall power system - advantages/disadvantages, applications and the basic steps for planning and installing an overhead and underground distribution system
 - single line drawings and layouts - drawings and layouts of transmission and distribution systems, including, radial, parallel and ring main feeders and the HV equipment associated with substations
- substations, power transformers and reactors encompassing:
 - relationship between the substations within an overall power system - purpose, location in relation to load centres, layout of high voltage (HV) equipment within the substation and auxiliary equipment
 - characteristics of a power transformer - basic construction of distribution transformers; operation under load/no-load conditions; types and basic operation of tap changing switches, including solid state types, efficiency and cooling
 - auxiliary equipment used on transformers - function and basic operation of equipment
 - maintenance of a power transformer - basic connections, restrictions to parallel operation, problems and remedies associated with harmonics, and testing and fault-finding procedures
 - description, purpose and characteristics of a reactors
- powerline safety practices encompassing:
 - protective apparatus and apparel for linework - responsibilities for the selection, use, maintenance and storage of protective apparatus and apparel and the types of protective apparatus and apparel used for the line worker
 - requirements for the use of ladders - carrying, erecting, collapsing and lowering different

types of extension ladder against a standing pole; maintenance checks on different types of ladders; renewal of extension ropes and the safety issues relating to clearances from overhead conductors

- requirements for climbing and working aloft - methods used to identify a pole is safe to climb; methods used to inspect a line worker's body belt; application of knots and hitches appropriate to the requirements of a line worker; height safety principles, including personal fall protection, prevention and related requirements; and the practical procedures of climbing an overhead structure and fitting a pole chair
- traffic management - purpose of traffic management and a line worker's responsibilities in accordance with relevant statutory requirements and electricity supply industry (ESI) requirements, demonstration of the procedure used to provide an effective traffic management scheme and the use of a two-way radio
- control of small fires - identification, selection and operation of the appropriate extinguishing mediums for various types of fires, general fire prevention methods and the precautions for personal protection when fighting small fires
- rescue victims from heights and confined spaces - planning and identifying procedures; establishing responses; developing techniques; involvement of external emergency services; and emergency procedures for the rescue of an electric shock victim, including cardiopulmonary resuscitation (CPR)
- requirements for aerial linework - planning, establishing and implementing relevant aviation authority clearances; determining system requirements; aircrew familiarisation with network operations and equipment; and requirements for effective communications operations for aerial work
- procedures in providing store support encompassing:
 - classification and identification of equipment, components and tools
 - procedures for purchasing/ordering items, removing/dispatching items, stocktaking, security and bookkeeping/record keeping
 - material handling - warehouse/depot storage techniques, handling equipment, pallet lift trucks and forklifts
 - cable drum handling equipment
 - safety procedures - storage and care of safety equipment; handling hazardous materials; storage of hazardous substances and dangerous goods; depot safety procedures; manufacturer and supplier information, including material safety data sheets (MSDS)
- installation of underground cable encompassing:
 - requirements for the use of enterprise construction manuals, system diagrams/plans and drawings
 - safety precautions specific to the installation of underground cable - excavation and trench safety regulations, gas detection procedures, working in confined spaces, personal protective equipment (PPE), hazards for the use of liquid petroleum gas (LPG) equipment for jointing of underground cable, gas bottle testing procedures, permit to work systems and isolation procedures
 - trench excavation and reinstatement procedures
 - installation of underground cable procedures - types of tools and equipment, methods of installing conduits, methods of installing cables and sealing cable ends (direct buried,

- ducts cleated and racked)
- procedures for the safe use of LPG equipment for cable jointing
- LV polymeric cable jointing principles encompassing:
 - techniques in jointing LV cross-linked polyethylene (XLPE) cables - straight through joint, jointing different types of cable and service and street light cable joints
 - techniques in terminating LV XLPE - pole top terminations, substation terminations, distribution pillar /column/cubicle terminations and service and street light cable terminations
 - techniques in repairing LV XLPE cable - different types of damage, repairs to sheath and repairs to cores
 - methods of testing cable after jointing
- jointing and termination of LV polymeric cable encompassing:
 - standards, codes, legislation, supply authority regulations and/or enterprise requirements pertaining to the jointing of LV polymeric cables
 - types of cables - single core, multi-core and XLPE insulation
 - methods of cable handling - direct laid cables, duct laid cables, solid laid cables and cables supported in cleats or hangers
 - corrosion protection
 - minimum bending radius of cables
 - methods of cable sealing - shorting of cables cores and core of un-terminated cables
 - methods of protection from corrosion
 - polymeric sheathed cables sealing with mastic lined
 - heat shrink caps buried sealed ends
 - types of jointing tools - general hand tools and compression tools
 - techniques in the use of LPG - safety precautions, PPE, general maintenance and repair
 - safety precautions when cable jointing -working in confined spaces; permit to work systems and isolation procedures; and emergency rescue/response, including first aid
- underground cables construction and types encompassing:
 - safety precautions specific to handling underground cables
 - requirements for the use of enterprise manuals, system diagrams/plans and drawings
 - types and applications of underground cables
 - construction types and structures of underground cables
 - characteristics of different types of underground cables
 - ratings.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the

time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated conditions involving realistic and authentic activities that replicate operational workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, facilities, equipment and PPE currently used in industry
- applicable documentation, including workplace procedures, relevant industry standards, equipment specifications, regulations, codes of practice and operation manuals.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=229bace1-b7bc-4653-9300-dffb13ecfad7>