



Australian Government

**Assessment Requirements for
UETTDRDS52 Design power system
transmission, sub-transmission and zone
substation buildings**

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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.

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
- completing two (2) compliant technical designs, including each of the following:
 - establishment of equipment dimensions, weights and dynamic loadings
 - suitability of building room/compartments and door opening dimensions for the equipment to be housed
 - compliance with security, fire rating and safety, pressure relief, Building Code of Australia (BCA) and BA requirements
 - compliance with electrical requirements, i.e. frame leakage and earthed metal isolation
 - appropriateness of floor reference levels
 - provision of cable supports, penetrations and pulling ring requirements
 - building light and power design and drafting
- completing designs, including all the following:
 - activities that address the correction of errors in the process
 - application of a design control checklist which lists all of the required design activities to be carried out in this process
- 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:

- electrical power circuit analysis encompassing:
 - superposition theorem
 - Kirchhoff's laws

- mesh analysis
- Thevenin's and Norton's theorems
- maximum power transfer theorem
- complex impedance
- frequency domain
- transients
- identification of basic concepts, principles and applications - application of velocity, acceleration, force, density, torque, and pressure encompassing:
 - applications of the International System of Units (SI) units
 - the relationship between work, power and energy
 - behaviour of object under force - using a block and tackle under load, concept of mechanical advantage, determination of resultant forces, and determining the sag in a catenary conductor and the force applied at each end
 - fundamentals of the basic laws of fluid mechanics
- principles to light design layout encompassing:
 - Commonwealth/state/territory and local government legislation, standards, codes, supply authority regulations and/or enterprise requirements applicable to light design principles
 - requirements for the use of street lighting system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of WHS/OHS risks
 - types of tariffs and charges
 - types of street lighting components - column types, foundations, brackets, luminaries and mounting heights
 - types of electrical street lighting circuits - types of supply, lighting circuit and control circuit
 - fundamentals of lighting production - electromagnetic spectrum, visible and non-visible radiation, spectral energy distribution, infra-red, ultra-violet (UV), radiation-safety, incandescence and phosphorescence, reflection and refraction
 - fundamentals of lighting concepts - terms and units, and purpose of reflectors and diffusers
 - factors affecting external lighting design
 - calculation of light output
 - determining illuminance - point to point method and lumen method
 - determining rated life of luminaries
 - fundamentals of street lighting design
 - considerations for special lighting situations - security lighting, hazardous street locations and emergency lighting
- layout principles for underground mains distribution extension encompassing:
 - Commonwealth/state/territory and local government legislation, standards, codes, supply authority regulations and/or enterprise requirements applicable to underground mains distribution extension
 - requirements for the use of underground mains construction manuals, system

- diagrams/plans and drawings and for plans such as work method statements for the control of WHS/OHS risks
- methods in determining material, equipment and tool lists - components types and quantity required, spacing of components and equipment, and costings of items and components
- purchasing and contractual arrangements, including requirements to eliminate WHS/OHS hazards, minimise risks and provide residual WHS/OHS risk information
- determination of conductor size, type and route length
- resources needed for the laying of conductors
- determining the appropriate excavation for the location
- determining the size and depth of excavation
- determining the trench and pit layout procedures
- minimum clearances between conductors
- estimation of the duration of underground distribution extension project
- principles of transmission, sub-transmission and zone substation building designs encompassing
 - Commonwealth/state/territory and local government legislation, standards, codes, supply authority regulations and/or enterprise requirements applicable to the substation design management principles
 - requirements for the use of the substation system construction manuals, system diagrams/plans and drawings and for plans such as work method statements for the control of WHS/OHS risks
 - types of building designs - fixed and/or portable control, switchgear, frequency injection and miscellaneous building designs
 - types of building floor construction - concrete poured in situ, pre-cast, elevated ultra-floor beams with poured in situ slab, and pre-manufactured steel framed floor
 - types of building walls construction - steel framed, masonry, pre-cast tilt-up, steel framed and lined
 - types of roof construction - steel framed and sheet steel clad
 - parameters to be considered - establishment of equipment dimensions, weights and dynamic loadings; suitability of building room/compartments and door opening dimensions for the equipment to be housed; compliance with security, fire rating and safety; pressure relief; BCA and BA requirements; and compliance with electrical requirements, i.e. frame leakage, earthed metal isolation, appropriateness of floor reference levels, provision of cable supports, penetrations and pulling ring requirements, building light and power design and drafting.

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 personal protective equipment (PPE) currently used in industry to undertake design of transmission, sub-transmission and zone substation buildings
- applicable documentation, including workplace procedures, relevant industry standards, equipment specifications, regulations, codes of practice and operation manuals.

Links

UET Training Package Companion Volume Implementation Guide is found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=229bace1-b7bc-4653-9300-dffb13ecfad7>