



Australian Government

UETTDRTS32 Conduct evaluation of power systems primary plant

Release: 1

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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.

Application

This unit covers the commissioning and maintenance testing requirements for primary plant and equipment. It includes both the practical application of the tests and analysis of results, covering, but not limited to; applied high voltage (HV) testing and induced HV testing, ratio, polarity, winding resistance, impedance, dielectric loss angle, partial discharge and watts loss insulation resistance and transformer vector group. It encompasses a complete understanding of the nature of the tests being conducted and the ability to conduct the tests in a safe manner.

The application of the skills and knowledge described in this unit may require a licence/registration to practice in the workplace subject to regulations for undertaking of electrical work.

Other conditions may apply under state and territory legislative and regulatory licencing requirements which must be confirmed prior to commencing this unit.

Pre-requisite Unit

Common Unit Group

UEENEE104A Use engineering applications software on personal computers

UEENEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEE102A Fabricate, assemble and dismantle utilities industry components

UEENEE104A Solve problems in d.c. circuits

UEENEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEE124A Compile and produce an energy sector detailed report

UEENEE125A Provide engineering solutions for problems in complex multiple path circuits

UEENEE126A Provide solutions to basic engineering computational problems

UEENEE101A Solve problems in electromagnetic devices and related circuits

UEENEE102A Solve problems in low voltage a.c. circuits

UEENEE149A Provide engineering solutions to problems in complex polyphase power circuits

UETTDREL11 Apply sustainable energy and environmental procedures

UETTDREL16 Working safely near live electrical apparatus

UETTDRTS62 Implement and monitor the power system organisational WHS/OHS policies, procedures and programs

UETTDRTS63 Implement & monitor power system environmental & sustainable energy management policies & procedures

UETTDRTS29 Develop power systems secondary isolation instructional documents

Competency Field

Testing

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Plan for the testing of primary plant

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) practices/procedures and environmental and sustainable energy procedures, which may influence the testing of primary plant systems, are reviewed and determined
- 1.2** Purpose of the testing of primary plant is established after data is analysed and expected outcomes of the work are confirmed with appropriate personnel
- 1.3** Organisational established procedures on policies and specifications for the testing of primary plant are obtained or established with appropriate personnel
- 1.4** Testing procedures are discussed with/directed to appropriate personnel in order to ascertain the project brief
- 1.5** Testing parameters are established from organisational established procedures and policies and specifications
- 1.6** Equipment/tools and personal protective equipment (PPE) are selected based on specified performance

criteria and established procedures

- 1.7** Work roles and tasks are allocated according to requirements and individual competencies
- 1.8** Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe, to a quality standard and in accordance with established procedures
- 1.9** Liaison and communication issues with others/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work
- 1.10** Risk control measures are identified, prioritised and evaluated against the work schedule
- 1.11** Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
- 2 Carry out the testing of primary plant**
 - 2.1** Circuit/systems modelling is used to evaluate alternative proposals in accordance with established procedures
 - 2.2** WHS/OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
 - 2.3** Testing of primary plant decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
 - 2.4** Mathematical/engineering models of the testing of primary plant are used to analyse the effectiveness of the finished project in accordance with requirements and established procedures
 - 2.5** Technical advice is given regarding potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures
 - 2.6** Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within

- an agreed timeframe according to requirements
- 2.7** Testing of primary plant is undertaken according to requirements and established procedures
 - 2.8** Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures
 - 2.9** Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements
 - 2.10** Quality of work is monitored against personal performance agreement and/or established organisational and professional standards
 - 2.11** Strategic plans are developed incorporating organisation initiatives in accordance with established procedures
- 3 Complete the testing of primary plant**
- 3.1** Final inspections of the primary plant are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project
 - 3.2** Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned
 - 3.3** Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
 - 3.4** Approved copies of the testing of primary plant documents are issued and records are updated in accordance with established procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UETTDRTS32A Conduct evaluation of power systems primary plant.

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>

Assessment Requirements for UETTDRTS32 Conduct evaluation of power systems primary plant

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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 five (5) of the following tests on primary plant – transformers (note: at least two (2) (*) must be included):
 - *direct current (d.c.) high voltage (HV) tests
 - *alternating current (a.c.) HV tests
 - *induced HV tests
 - ratio tests
 - polarity tests
 - winding resistance tests
 - impedance tests
 - insulation resistance tests
 - transformer vector group tests
 - winding temperature indicator tests
 - alarm tests
 - neutral current transformer (CT) tests
- complete five (5) of the following tests on primary plant – circuit breakers (note: at least two (2) (*) must be included):
 - profiling and contact timing
 - *a.c. HV tests
 - function tests
 - minimum voltage operation tests
 - insulation resistance tests
 - contact resistance tests
 - auxiliary contact tests
 - alarm tests

- complete at least three (3) of the following tests on primary plant – capacitor banks
 - cell capacitance measurement
 - neutral CT tests
 - balance tests
 - insulation resistance
- 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:

- detailed operation of fundamental test equipment encompassing:
 - care and safe use
 - operating principles
 - comparison of different operating principle meters used for the same purpose
 - accuracy and loading effects of meters - measurement of voltage, current, power, resistance, insulation resistance, impedance and phase sequence, and the use of oscilloscopes
- primary plant testing encompassing:
 - transformers - d.c. HV tests, a.c. HV tests, HV tests, ratio tests, polarity tests, winding resistance tests, impedance tests, insulation resistance tests, transformer vector group test, winding temperature indicator test, alarm tests and neutral CT tests
 - circuit breakers - d.c. HV tests, a.c. HV tests, induced HV tests, function tests, operation timing, minimum voltage operation test, insulation resistance test, contact resistance test, auxiliary contact test and alarm tests
 - capacitor banks - d.c. HV tests, a.c. HV tests, induced HV tests, neutral CT tests, balance tests and insulation resistance.

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
- applicable documentation, including workplace procedures, relevant industry standards, equipment specifications, regulations, codes of practice and operation manuals.

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