



Australian Government

UETDRTS027 Verification and certification of revenue metering/energy measurement instruments

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 Release 2.0.

Application

This unit covers the evaluation and development of procedures and routines to certify the accuracy, traceability and uncertainty of measurement of metering standards and test equipment. This encompasses developing test procedures, PC controlled and software driven test sequences and includes the evaluation of test equipment capability and design of hardware interfaces. These processes must ensure compliance with metering industry regulations to ensure traceability of all measurement.

The application of the skills and knowledge described in this unit requires 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 licensing requirements which must be confirmed prior to commencing this unit.

Pre-requisite Unit

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, assemble and dismantle utilities industry components

UEENEEE104A Solve problems in d.c. circuits

UEENEEE105A Fix and secure electrotechnology equipment

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEE137A Document and apply measures to control OHS risks associated with electrotechnology work

UEENEEG006A Solve problems in single and three phase low voltage machines

UEENEEG033A Solve problems in single and three phase low voltage electrical apparatus and circuits

UEENEEG063A Arrange circuits, control and protection for general electrical installations

UEENEEG076A Install and replace low voltage current transformer metering

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuits

UEENEEG103A Install low voltage wiring and accessories

UEENEEG104A Install appliances, switchgear and associated accessories for low voltage electrical installations

UEENEEG105A Verify compliance and functionality of low voltage general electrical installations

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

UEENEEG107A Select wiring systems and cables for low voltage general electrical installations

UEENEEG108A Trouble-shoot and repair faults in low voltage electrical apparatus and circuits

UEENEEG109A Develop and connect electrical control circuits

UEENEEG171A Install, set up and commission interval metering

UETDREL001 Apply environmental requirements

UETDREL005 Work safely in the vicinity of live electrical apparatus

UETDRTS002 Commission energy/revenue metering schemes

UETDRTS012 Install and replace complex energy/revenue metering schemes and associated equipment

UETDRTS013 Install and replace high voltage metering and associated equipment

UETDRTS016 Maintain compliance with national electricity market metrology practices and procedures

UETDRTS020 Management of energy registration data errors for revenue billing purposes

UETDRTS022 Perform current injection testing using phantom load

UETDRTS024 Test and maintain energy/revenue metering schemes

UETTDREL15 Respond to power systems technical enquiries and requests

Competency Field

Testing

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

PERFORMANCE CRITERIA

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

1 Plan for the verification and certification of revenue metering/energy measurement instruments

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) practices/procedures and environmental and sustainable energy procedures, which may influence verification and certification of revenue metering/energy measurement instruments, are reviewed and determined
- 1.2** Purpose of the verification and certification of revenue metering/energy measurement instruments is established after data is analysed and expected outcomes of the work are confirmed with appropriate personnel
- 1.3** Organisational established procedures, policies and specifications for the verification and certification of revenue metering/energy measurement instruments are obtained or established with appropriate personnel
- 1.4** Verification and certification of revenue metering/energy measurement instruments procedures are discussed with/directed to appropriate personnel in order to ascertain the project brief
- 1.5** Verification and certification parameters are established from organisational established procedures 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 customers 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 internal/external work permits are obtained to coordinate the performance of work according to requirements and/or established procedures

- 2 Carry out the verification and certification of revenue metering/energy measurement instruments**
- 2.1** WHS/OHS and sustainable energy principles, functionality and practices to prevent the incidents of accidents and minimise waste are incorporated into the project 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 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 WHS/OHS risks are reported to immediate authorised personnel 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** Testing equipment is used in accordance with the work schedule and requirements and/or established procedures
 - 2.7** Verification and certification of revenue metering/energy measurement instruments is carried out in accordance with the work schedule
 - 2.8** 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
 - 2.9** Essential knowledge and associated skills are applied in the safe verification and certification of revenue metering/energy measurement instruments to ensure completion in an agreed timeframe according to requirements
 - 2.10** Solutions to non-routine problems are identified and actioned, using essential knowledge and associated skills, according to requirements
 - 2.11** Quality of work is monitored against personal performance agreement and/or established organisational and professional standards

- 3 Complete the verification and certification of revenue metering/energy measurement instruments**
- 3.1** Final inspections of the verification and certification of revenue metering/energy measurement instruments using routine tests and acceptance tests are undertaken to ensure they comply with all requirements and include all specifications and documents needed to complete the project
 - 3.2** Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned according to established procedures and timeframes
 - 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 routine testing and acceptance testing procedures/activities/results, for the verification and certification of revenue metering/energy measurement instruments, documents are issued and records 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 UET Transmission, Distribution and Rail Sector Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UETTDRTS46 Verification and certification of revenue metering/energy measurement instruments.

Links

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

Assessment Requirements for UETDRTS027 Verification and certification of revenue metering/energy measurement instruments

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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
- performing, on at least three (3) occasions, the following activity:
 - developing and evaluating procedures and routines to verify and certify the accuracy, traceability and uncertainty of metering standards and test equipment
- performing, on at least one (1) occasion, the following activity:
 - evaluating and implementing procedures and practices to ensure traceability of test equipment to National Association of Testing Authorities (NATA) requirements
- performing, on at least one (1) occasion, the following activity:
 - developing test procedures for new hardware and analysing performance against required outcomes
- performing, on at least one (1) occasion, the following activity:
 - evaluating test equipment capability and design of hardware interfaces
- 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:

- enterprise-specific policies and procedure instructions encompassing:
 - responsibilities and duty of care of employer and employee relationship
 - methods of obtaining the up-to-date information on enterprise policies and procedures
 - rules and regulations
 - induction into workplace - location of work area and storage area, timetable, uniform, personal wellbeing, housekeeping rules, emergency procedures and evacuation procedures

- techniques when dealing with others - working in teams, customer relation, and complaint and issues procedures
- overview of enterprise professional development - firefighting procedures, fatigue management, and training and competency development - understanding and promotion
- electrical field testing and measurement encompassing:
 - measurement concepts - notion of error, accuracy, resolution, sources of measurement error and uncertainties, instrument specifications and calibration certificates, test and measuring instrument safety certification levels and their application
 - types of field measuring instruments and their application - instrument meter movements and readouts (moving coil, moving iron and dynamometer meter movements, liquid crystal display (LCD) digital and screen readouts), and role of a microprocessor/controller in measuring instrument
 - measuring low voltages (LV) and direct current (d.c.) and alternating currents (a.c.) - LV and current measurement techniques embodied in microprocessor-based instruments, causes of inaccuracies and overcoming them, test instrument set-up and safety procedures, and interpreting test readings
 - measuring HV and d.c. and a.c. - HV and current measurement techniques embodied in microprocessor-based instruments, causes of inaccuracies and overcoming them, test instrument set-up and safety procedures, and interpreting test readings
 - measuring fault levels and (earth) fault loop impedance - fault and fault loop impedance measurement techniques embodied in microprocessor based instruments, causes of inaccuracies and overcoming them, test instrument set-up and safety procedures, and interpreting test readings
 - measuring power, energy, reactive power, power factor and maximum demand - power measurement techniques embodied in microprocessor-based instruments, causes of inaccuracies and overcoming them, test instrument set-up and safety procedures, and interpreting test readings
 - measuring power quality - power measurement techniques embodied in microprocessor based instruments, causes of inaccuracies and overcoming them, test instrument set-up and safety procedures, and interpreting test readings (power quality measurement, including waveform distortion, harmonics, power factor and transients)
- calibration techniques encompassing:
 - principles of common calibration techniques
 - purpose of standards and calibration certification
 - minimising error during calibration - source and type of errors, techniques to minimise errors during measurements, calculating the degree of error and calibration factors
 - determining the parameters to which the device will be calibrated
 - need for normal performance check
 - purpose of calibration documentation.

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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