



Australian Government

UETTDRTS46A Verification and certification of revenue metering/energy measurement instruments

Release: 1

UETTDRTS46A Verification and certification of revenue metering/energy measurement instruments

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This Competency Standard 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.

Application of the Unit

Application of the Unit 2)

This competency standard is suitable for employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective from the relevant schedule (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set provided that it is listed in the schedule of electives (see Qualification Framework) and all prerequisite units are undertaken or addressed through recognition processes.

Delivery and assessment of this unit should be undertaken within regard to the requirements of License

to Practice (1.2 above), Prerequisite Competencies and Literacy and Numeracy skills (2 above) and the recommendations for concurrent assessment and relationship with other units (9.5 below).

Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting, risk safety measures etc.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit requires 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.

Pre-Requisites

Prerequisite Unit(s) 4)

Competencies 4.1)

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

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

Common Unit Group

Unit Code	Unit Title
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

Prerequisite	Unit(s)	4)
	UEENEEG101A	Solve problems in electromagnetic devices and related circuits
	UEENEEG102A	Solve problems in electromagnetic devices and related 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
	UETTDREL11A	Apply sustainable energy and environmental procedures
	UETTDREL15A	Respond to power systems technical enquiries and requests
	UETTDREL16A	Working safely near live electrical apparatus
	UETTDRTS37A	Perform current injection testing using phantom load
	UETTDRTS38A	Install and replace high voltage

Prerequisite Unit(s) 4)

	metering and associated equipment
UETTDRTS39A	Maintain compliance with national electricity market metrology practices and procedures
UETTDRTS40A	Test and maintain energy/revenue metering schemes
UETTDRTS41A	Install and replace complex energy/revenue metering schemes and associated equipment
UETTDRTS42A	Management of energy registration data errors for revenue billing purposes
UETTDRTS43A	Commission energy/revenue metering schemes

Literacy and numeracy skills 4.2)

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	5	Writing	5	Numeracy	5
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Employability Skills Information

Employability Skills 5)

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.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit
Performance Criteria describe the required performance needed to demonstrate achievement of the element.
Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan for the verification and certification of revenue metering/energy measurement instruments	1.1 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 the 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 the appropriate personnel. 1.4 Verification and certification of revenue metering/energy measurement instruments procedures are discussed with/directed to the 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 are selected based on specified Performance Criteria and established procedures. 1.7 Work roles and tasks are allocated according to requirements and individuals' competencies.

ELEMENT

PERFORMANCE CRITERIA

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| | 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 other/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 | <p>2.1 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.</p> <p>2.2 First Aid, Rescue and other related work procedures are performed according to requirements and/or established procedures.</p> <p>2.3 Lifting, climbing, and use of powertools/equipment, techniques and practices are safely exercised according to requirements.</p> <p>2.4 Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorised persons for directions according to established procedures.</p> <p>2.5 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.</p> <p>2.6 Testing equipment is used in accordance with the work schedule and requirements and/or established procedures.</p> <p>2.7 Verification and certification of revenue</p> |

ELEMENT	PERFORMANCE CRITERIA
	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 are updated in

ELEMENT

PERFORMANCE CRITERIA

accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) 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 the verification and certification of revenue metering/energy measurement instruments.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-TTS46A Verification and certification of revenue metering/energy

Evidence shall show an understanding of the verification and certification of revenue metering/energy measurement instruments to an extent indicated by the following aspects:

T1 Enterprise specific — policy and procedure instructions encompassing:

- Responsibilities and duty of care of employer and employee relationship
- Methods of obtaining the up-to-date information on enterprise policy and procedures
- Rules and regulations
- Induction into workplace - location of work area and storage area, timetable, uniform, personal well-being, housekeeping rules, emergency procedures, evacuation procedures
- Techniques when deal with others - working in teams, customer relation, complaint and issues procedures.
- Overview of enterprise professional development - fire fighting procedures, fatigue management, training and competency development - understanding and promotion

T2 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, LCD digital and screen readouts), role of a microprocessor/controller in measuring instrument.
- Measuring low voltages and direct and alternating currents - low voltage and current measurement techniques embodied in microprocessor based instruments, causes of inaccuracies and overcoming them, test instrument set up and safety procedures, interpreting test readings.
- Measuring high voltages and direct and alternating currents - high voltage and current measurement techniques embodied in microprocessor based instruments, causes of inaccuracies and overcoming them, test instrument set up and safety procedures, interpreting test readings.

REQUIRED SKILLS AND KNOWLEDGE

- 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, 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, 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, interpreting test readings (power quality measurement includes waveform distortion, harmonics, power factor and transients).

T3 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

Evidence Guide

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 – UET12". 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:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	Perform, on at least three (3) occasions, the following activity:	Development and evaluation of procedures and routines to verify and certify the accuracy, traceability and uncertainty of Metering Standards and Test equipment
B	Perform, on at least one (1) occasions, the following activity:	Evaluation and implementation of procedures and practices to ensure traceability of test equipment to NATA requirements

C	Perform, on at least one (1) occasions, the following activity:	Development of test procedures for new hardware and analysis of performance against required outcomes
D	Perform, on at least one (1) occasions, the following activity:	Evaluation of test equipment capability and design of hardware interfaces
E	Demonstrate, on at least one (1) occasion, the following:	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 verification and certification of revenue metering/energy measurement instruments.
- Operational access to relevant plant, drawings, manufacture's specifications/manuals and specialised testing equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working in realistic environment and a variety of conditions.

**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 Transmission, Distribution and Rail Traction Industry. 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)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) 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 be demonstrated in relation to the verification and certification of revenue metering/energy measurement instruments and may include the following:

Development and evaluation of procedures and routines to verify and certify the accuracy, traceability and uncertainty of Metering Standards and Test equipment.

Calculation and application of uncertainty measurements to meet the requirements of the “ISO Guide to Estimation of Measurement Uncertainty”.

Evaluation and implementation of procedures and practices to ensure traceability of test equipment to NATA requirements

The development of test procedures for new hardware and analysis of performance against required outcomes.

Developing PC controlled test sequences that may include the evaluation of test equipment capability and design of hardware interfaces.

These processes must ensure compliance with Metering Industry Regulations.

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

RANGE STATEMENT

- 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

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Testing Units