



Australian Government

Department of Education, Employment and Workplace Relations

UEPMNT422B Conduct performance testing on process plant and equipment

Release: 1

UEPMNT422B Conduct performance testing on process plant and equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit deals with the skills and knowledge required to conduct performance testing on generation plant equipment and processes to assess plant efficiency.

Application of the Unit

Application of the Unit 2)

This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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.

Common Unit Group

Unit Code	Unit Title
UEPMNT351B	Test and commission electrical equipment
UEENEEG108A	Trouble-shoot and repair faults in low voltage electrical apparatus and circuits
UEENEEE101A	Apply Occupational Health Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, dismantle, assemble of utilities industry components
UEENEEE104A	Solve problems in d.c. circuits
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, cords and specifications
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
UEENEEG101A	Solve problems in electromagnetic

Prerequisite Unit(s) 4)

devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuits

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

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 levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading 4 Writing 4 Numeracy 4

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 and prepare for performance test	1.1 Request for work is received and appropriate method of testing is determined in accordance with statutory, industry and enterprise/site standards and procedures
	1.2 Safety and plant issues are identified in accordance with enterprise/site procedures
	1.3 Specialist assistance, supplementary functions and personnel are arranged as required
	1.4 Tools and equipment are correctly identified and acquired
	1.5 Test equipment is calibrated as specified in relevant standards or manufacturer's codes and procedures
	1.6 Test procedure is determined and planned in accordance with the manufacturer's codes and procedures
	1.7 Plant is correctly identified and status prior to test is established from the appropriate personnel
	1.8 Authority to carry out work is obtained in accordance with plant operating conditions and load requirements
	1.9 Where appropriate, the teams and individuals roles and responsibilities within the team are identified and, where required, assist in the provision of the on-the-job training
2 Perform performance test and collect data	2.1 Plant co-ordinated to initial operating state ready for testing in accordance with statutory, industry and enterprise/site standards and procedures
	2.2 Tests and data collection are performed using appropriate techniques that ensure personnel safety and plant integrity
	2.3 Tests are carried out in accordance with statutory, industry and enterprise/site requirements

ELEMENT	PERFORMANCE CRITERIA
	2.4 Data is collected in accordance with statutory, industry and enterprise/site requirements 2.5 Test results are evaluated to accurately assess performance of plant 2.6 Plant availability is declared on completion of tests
3 Evaluate and analyse information	3.1 Plant efficiency is evaluated and analysed in accordance with data collected 3.2 Plant performance is measured against required criteria, in accordance with statutory, industry and enterprise/site requirements 3.3 Cause of abnormal plant performance is identified by analysing technical and operational information in a logical and sequential manner 3.4 Plant integrity is maintained through consultation with appropriate personnel and reference to plant technical and operational documentation 3.5 Test data obtained is critiqued and validated with reference to other information available and applicable test procedure documentation.
4 Complete documentation	4.1 Information and data is co-ordinated and formatted in accordance with enterprise/site requirements 4.2 Reports and documentation are produced in accordance with statutory, industry and enterprise/site requirements 4.3 Reports and documentation are presented in a manner to facilitate implementation of any defined recommendations

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the Essential Skills and Knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired conducting performance testing on process plants and equipment.

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

The extent of the Essential Knowledge and Associated Skills required follows:

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T1 Evidence shall show that knowledge has been acquired for safe working practices of:

- Relevant Environmental, Occupational Health and Safety legislation and regulations
- Relevant plant and equipment, its location and operation
- Technical drawings and manufacturers manuals
- Typical arrangements of power production plant
- Relevant state and territory regulations
- Plant operating parameters
- Performance testing and data collection techniques
- Thermodynamics
- Heat Rate and Heat balance
- Turbine performance
- Boiler performance
- Feedwater system performance
- Air heater performance
- Power Plant efficiency losses
- Enterprise recording procedures
- Plant and plant systems
- Plant performance characteristics
- plant efficiency calculations
- Mechanical and electrical processes
- Materials
- Monitoring procedures

T2 Specific skills needed to achieve the Performance Criteria:

- Apply Relevant Environmental, Occupational Health and Safety legislation and regulations
- Interpret Technical drawings and manufacturers manuals
- Apply relevant state and territory regulations
- Apply performance testing and data collection techniques
- Calculate plant efficiency

REQUIRED SKILLS AND KNOWLEDGE

- Identify plant status
- Record, analyse and use data
- Apply problem solving techniques
- Communicate effectively
- Plan and prioritise work
- Write reports
- Apply data analysis techniques and tools
- Determine plant performance.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the Range Statement of unit 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 components parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment

9.1)

Longitude 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 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. 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 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 pre-requisites 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 – UEP12". Evidence shall also comprise:

- A representative body of work performance 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 OH&S workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and Range Statement
 - Apply sustainable energy principles and practices as specified in the Performance Criteria and Range Statement
 - Demonstrate an understanding of the essential knowledge and associated skills as described in 6) of this unit
 - Demonstrate an appropriate level of employability skills
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated performance across a representative range of contexts from the prescribed items below:
 - The knowledge and application of relevant sections of: OH&S legislation; Statutory legislation; Enterprise/site safety procedures; Enterprise/site emergency procedures

- Plant operating parameters
- Plant performance characteristics
- Mechanical and electrical processes
- Dealing with an unplanned event by drawing on essential knowledge and 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 work as prescribed by this unit.

Competency Standards should be assessed in the workplace or simulated workplace and under the normal range of workplace conditions.

Assessment of this unit will be supported with documentary evidence, by means of endorsement stating type and application of work.

In addition to the resources listed above in Context of assessment', evidence should show competency working, in limited spaces, with different types of plant and equipment as well as different structural/construction types and methods and in a variety of environments.

**Method of
assessment** **9.4)**

This unit shall be assessed by methods given in 1.3.00 Assessment Guidelines.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. 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 skills described in this unit.

**Concurrent
assessment and
relationship with
other units****9.5)**

There are no recommended concurrent assessments with this unit, however in some cases efficiencies may be gained in terms of learning and assessment effort being concurrently managed with allied competency standard units where listed.

Nil

Range Statement**RANGE STATEMENT**

10) This relates to the competency standard unit 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.

Test equipment may include data loggers, calculators, vibration analysis, plant efficiency software, DCS data, personal computers, thermocouples, multimeters, flow meters, gas analysers, oscilloscopes and power factor meters.

Information and documentation sources may include verbal or written communications; enterprise safety rules documentation/form(s); equipment and alarm manuals; dedicated computer equipment; drawings, logic diagrams; testing procedures; plant records; plant failure reports; enterprise/site standing and operating instructions; enterprise/site log books; manufacturer's operation and maintenance manuals; and specialist's reports.

Specialist assistance may be sought such as: metallurgy, original equipment manufacturer personnel, chemical, operating and engineering staff.

Equipment that may be tested turbines, boilers, feedwater systems, air heaters, HRSG, mills, fans, pumps, heat exchangers, fired and unfired pressure vessels; motors, transformers, switch gear; pneumatic, hydraulic and electronic control systems.

Documentation may include enterprise safety rules, Occupational Health and Safety legislation, environmental legislation, operating and maintenance manuals, plans and diagrams, standards or codes of practise.

Work site environment may be affected by nearby plant or processes, e.g. chemical, heat, noise and gas.

Generic terms are used throughout this Training Package for vocational standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms are given in Section 2.1 Preliminary Information and Glossaries.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Maintenance.