



Australian Government

Department of Education, Employment and Workplace Relations

UEPMNT424B Monitor efficiency of thermal steam cycle power plant

Release: 1

UEPMNT424B Monitor efficiency of thermal steam cycle power plant

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit deals with the skills and knowledge required for the collection of data and the calculation of the efficiency of plant associated with the thermal steam cycle.

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
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 devices and related circuits
UEENEEG102A	Solve problems in low voltage a.c.

Prerequisite Unit(s) 4)

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 Collect data	1.1 Information is co-ordinated/collected in accordance with statutory, industry and enterprise/site requirements
	1.2 Plant is correctly identified and status established
	1.3 Tools and equipment are correctly identified and acquired
	1.4 Specialist assistance/equipment is sort when required
	1.5 Information is recorded in accordance with statutory, industry and enterprise/site requirements
	1.6 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 calculations	2.1 Availability and performance calculations are performed in accordance with statutory, industry and enterprise/site requirements
	2.2 Information input/output is checked for accuracy
	2.3 Performance is measured and calculated in accordance with appropriate statutory requirements and standards
3 Evaluate and analyse information	3.1 Analyse technical and operational information in a logical and sequential manner, and identify if abnormal plant operating condition/performance exists
	3.2 Causes of any abnormal plant efficiency are identified
	3.3 Plant integrity is maintained through consultation and operational documentation
	3.4 Specialist assistance is sought as required

ELEMENT	PERFORMANCE CRITERIA
4 Produce report and complete work	4.1 Information and data are co-ordinated and documented in accordance with requirements
	4.2 Reports are produced in accordance with statutory, industry and enterprise/site requirements
	4.3 Recommendations are made to appropriate personnel
	4.4 Implementation of recommendations are monitored to ensure plant efficiency

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 monitoring efficiency of thermal steam cycle power plants

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
- Introduction to and typical arrangements of power production plant
- 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
- Plant status
- Plant operating parameters
- Plant and plant systems
- Plant performance characteristics
- Mechanical and electrical processes
- 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 performance testing and data collection techniques
- Identify plant status

REQUIRED SKILLS AND KNOWLEDGE

- 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**

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
- Evaluating and analysing information
- 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 and 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, plant efficiency software, personal computers, flow meters, thermocouples, multimeters and flow meters.

Information source may be verbal, written, computer, unit computer logs, enterprise standards, operating and maintenance standards.

Specialist assistance may be sought such as metallurgy, chemical, operating and engineering staff.

Reports may be daily, weekly, quarterly and yearly; electronic, written or verbal.

Documentation may include site instructions, enterprise standing instructions, enterprise safety procedures, operating instructions, Occupational Health and Safety legislation, environmental legislation, operating and maintenance manuals, plans and diagrams.

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

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.