



Australian Government

UEENEEE163A Analyse materials for suitability in electrical equipment

Release 2

UEENEEE163A Analyse materials for suitability in electrical equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers the analysis of materials for their suitable use in the construction of electrical equipment. It encompasses working safely apply extensive knowledge of materials and their properties as they relate to equipment construction and operation, gathering and analysing data, applying problem solving techniques, developing and documenting findings, solutions and providing alternatives.

Note.

Typical machine problems are those encountered in meeting performance requirements and compliance standards, revising a machine operating parameters and dealing with machine malfunctions.

Application of the Unit

Application of the Unit 2)

This unit is intended to apply to any recognised development program that leads to the acquisition of a formal award at AQF level 6.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit do not

License to practice**3)**

require a license to practice in the workplace. However, practice in this unit is subject to regulations directly related to occupational health and safety, codes of work practice and standard work procedures related to the operation of automated machinery.

Pre-Requisites**Prerequisite Unit(s)****4)****Competencies****4.1)**

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

UEENEEE1 01A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE1 61A Analyse static and dynamic parameters of electrical equipment

Literacy and numeracy skills**4.2)**

Participants are best equipped to achieve competency in 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

Employability Skills Information**Employability Skills****5)**

This unit contains Employability Skills

The required outcomes described in this unit of

Employability Skills**5)**

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 Prepare to analyse materials.

1.1 OHS processes and procedures for a given work area are identified, obtained and understood.

1.2 Established OHS risk control measures and procedures in preparation for the work are followed.

1.3 The extent of the machine analysis is determined from performance specifications and situation reports and in consultation with relevant persons.

1.4 Activities are planned to meet scheduled timelines in consultation with others involved in the work.

1.5 Strategies are identified to ensure efficient development and implementation of solution(s).

2 Analyse materials.

2.1 OHS risk control work measures and procedures for carrying out the work are followed.

2.2 Knowledge of materials is applied to developing machine parts.

2.3 Characteristics, specifications and performance requirements in relation to materials are obtained

ELEMENT**PERFORMANCE CRITERIA**

		in accordance with established procedures.
	2.4	Approaches to analysing materials are carried out so as to provide the most effective solution.
	2.5	Unplanned events are dealt with safely and effectively consistent with regulatory requirements and enterprise policy.
	2.6	Quality of work is monitored against personal performance agreement and/or established organizational or professional standards.
3	Document and report the results of the materials analysis.	
	3.1	Solutions to materials analysis are tested to determine their effectiveness and modified where necessary.
	3.2	Analysis is reported to appropriate personnel to establish action to be taken based on findings.
	3.3	Analysis is reported to appropriate personnel to establish action to be taken based on findings.
	3.4	Justification for findings and any actions to be undertaken in relation to the equipment is documented for inclusion in work/project or development records in accordance with professional standards.

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 of safe working practices and analysing materials for suitability in equipment.

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

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Materials and strengths of materials

Evidence shall show an understanding of materials used in engineering and the mechanical properties of these materials to an extent indicated by the following aspects:

- T1 Structure of metals, polymers and ceramics
- T2 Interpretation of phase equilibrium and isothermal transformation diagrams
- T3 Heat treatment processes of low carbon steel, high carbon steel and tool steel as well as non-ferrous metals such as aluminium and copper
- T4 Properties and specifications of metal and non-metal materials
- T5 Common failures in materials
- T6 Determining normal stresses, strains and deformations caused by axial load
- T7 Shear stress on bolted connections
- T8 Failures in fillet welds and determine appropriate weld size and length required on welded connections
- T9 Centroid and second moment of gyration of plain figures
- T10 Shear force and bending moment diagrams for supported and cantilever beams subjected to vertical point loads and UDLs
- T11 Bending stress in beams
- T12 Deflection of beams subjected to loads
- T13 Torque distribution diagrams and calculation of torsional shear stress and angle of twist on circular shafts subjected to torque
- T14 Coefficient of linear expansion to determine thermal stress in single members caused by restraint and changes in temperature

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the 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-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 accordance 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. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday 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 practised. 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**

Before the critical aspects of evidence are considered all prerequisites must 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 – UEE11'. 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 Occupational Health and Safety 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 this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
 - Demonstrate an appropriate level of skills enabling employment
 - Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Analyse materials for suitability in equipment as described in 8) and including:
 - A Understanding the material properties.
 - B Forming effective strategies for analysing machine performance.
 - C Obtaining machine characteristics, specifications and performance requirements appropriate to each situation.

- | | |
|---|--|
| D | Testing the results of the analysis. |
| E | Documenting instruction for implementing any actions resulting from the analysis that incorporates risk control measure to be followed. |
| F | Documenting justification of actions to be implemented in accordance with professional standards. |
| G | Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items. |

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

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 in this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions for assessment must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to analysing materials for suitability in equipment.

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

This 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 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)**

For optimisation of training and assessment effort, competency development in this unit may be arranged concurrently with unit:

UEENEEE16 Select drive components for electrical equipment
2A design

Range Statement

RANGE STATEMENT

10) This relates to the 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.

This unit shall be demonstrated in relation to analysing four (4) different types of materials.

Note.

Typical materials are those encountered in meeting performance requirements and compliance standards, characteristics and operating parameters.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field	11)
	Electrotechnology