



Australian Government

UEENEEG153A Rewind three phase low voltage induction machines

Release 2

UEENEEG153A Rewind three phase low voltage induction machines

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers preparing, placing and connecting coils and insulating three phase stators and rotors. It encompasses working safely, using hand and powered tools, measuring, applying knowledge of electrical circuits and stator windings, using testing devices, applying technical and quality standards and keeping winding records.

Application of the Unit

Application of the Unit 2)

This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit do not require a license to practice 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.

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 02A	Fabricate, assemble and dismantle utilities industry components
UEENEEE1 04A	Solve problems in d.c. circuits
UEENEEE1 05A	Fix and secure electrotechnology equipment
UEENEEE1 07A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEG0 06A	Solve problems in single and three phase low voltage machines
UEENEEG1 01A	Solve problems in electromagnetic devices and related circuits
UEENEEG1 02A	Solve problems in low voltage a.c. circuits
UEENEEG1 06A	Terminate cables, cords and accessories for low voltage circuits
UEENEEG1 50A	Wind electrical coils
UEENEEG1 51A	Place and connect electrical coils

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 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills 5)

This unit contains Employability Skills

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 Prepare to rewind three phase induction machines.	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Established OHS risk control measures for work preparation are followed.
	1.3 The extent of the work is determined from job sheets, specifications and regulatory requirements.
	1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively

ELEMENT**PERFORMANCE CRITERIA**

with others.

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|---|--|--|--|
| | 1.5 | Induction machine is dismantled and parts tagged and stored to prevent loss or damage. | |
| | 1.6 | Winding data is obtained from winding data records or directly from measurements of stator and recorded in accordance with established procedures. | |
| | 1.7 | Winding is stripped from stator in accordance with established procedures. | |
| | 1.8 | Materials required for the work are obtained in accordance with established procedures and procedures. | |
| | 1.9 | Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety. | |
| 2 | Rewind three phase induction machines. | 2.1 | Established OHS risk control work measures are followed. |
| | | 2.2 | Machines/equipment are checked as being isolated where necessary in strict accordance OHS requirements and procedures. |
| | | 2.3 | Induction machine is dismantled and parts tagged and stored to prevent loss or damage. |
| | | 2.4 | Winding is stripped from stator in accordance with established procedures. |
| | | 2.5 | Stator is wound and insulated in accordance with winding data and established procedures. |
| | | 2.6 | Machine is assembled and prepares for final testing in accordance with established procedures. |
| | | 2.7 | Prescribed solutions are used to resolve work completion issues. |
| | | 2.8 | Routine quality checks are conducted to ensure coils are correctly wound with correct wire, number of turns and shape. |

ELEMENT	PERFORMANCE CRITERIA
3 Complete work report.	2.9 Work is completed in acceptable timeframe given environment and workplace conditions.
	3.1 OHS measures work completion risk control is followed.
	3.2 Work report forms/data sheets are completed accurately in accordance with established procedures.

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 rewinding three phase induction machines rated for low voltage.

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

KS01-EG153A Low voltage three phase motor winding techniques

Evidence shall show an understanding of single phase machine winding to an extent indicated by the following aspects:

T1 Alternator windings encompassing:

- Elementary single-phase stator winding
- Elementary three-phase stator winding
- Half-coil and whole-coil windings
- Concentrated and distributed windings
- Chain, lap and wave windings
- Pole-pitch and coil-span
- Half-coil winding for a three-phase alternator
- Whole-coil stator winding for a three-phase alternator

T2 Rating, cooling and regulation encompassing:

- Rating of alternators
- Cooling of alternators
- The voltage regulator

T3 Testing techniques encompassing:

- Continuity
- Insulation testing
- Use of 'growler'
- Magnetic field testing

T4 Techniques of winding three phase motors.

- Electrical machine insulation types and applications
- Coil placement techniques
- Coil connection arrangements and terminations
- Winding insulation methods

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 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 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 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 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 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 – 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:
 - Rewind three phase induction machines rated for low voltage as described as described in 8) and including:
 - A Dismantling machine and storing parts securely.
 - B Preparing stator for winding.
 - C Following winding specifications.
 - D Selecting correct coils and insulation.
 - E Winding and connecting stator correctly.

- F Assembling machine and preparing for testing.
- G Adhering to quality procedures.
- H Completing work report/forms accurately.
- I Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the 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 by this unit.

These should be part of the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions 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 rewinding three phase induction machines rated for low voltage.

**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 assessment 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:

UEENEEG15 Conduct electrical tests on LV electrical machines 7A

The critical aspects of occupational health and safety covered in unit UEENEEE101A and other discipline specific occupational health and safety units shall be incorporated in relation to this unit.

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 dismantling and winding stators for at least three different three-phase induction machines in an environment designed specifically for the purpose.

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)
Electrical