



Australian Government

**UEENEEK144A Install, configure and
commission LV wind energy conversion
systems rated up to 10 kW**

Release: 2

UEENEEK144A Install, configure and commission LV wind energy conversion systems rated up to 10 kW

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This competency standard unit covers the installation, configuration and commissioning of LV wind energy conversion systems rated up to 10 kW. It encompasses working safely and to installation standards, matching components with that specified for a given location, placing and securing system components accurately, making required circuit connections and completing the necessary installation documentation.

Application of the Unit

Application of the Unit **2)**

This competency standard 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 require a licence to practice in the workplace.

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

License to practice

3)

training such as apprenticeships and the like.

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, lifting equipment and the like. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus, site rehabilitation and the like.

2. Compliance may be required in various jurisdictions relating to currency in first aid, confined space, lifting, risk safety measure and the like.

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.

UEENEEG1 Install low voltage wiring and accessories
03A

UEENEEK1 Solve problems in wind energy conversion
30A systems rated up to 10 kW

Literacy and numeracy
skills

4.2)

Participants are best equipped to achieve this unit if they have reading, writing and maths skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 "Literacy and Numeracy"

Reading 3 Writing 3 Numeracy 3

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 Prepare to install LV wind energy conversion systems.	1.1 OHS procedures for a given work area are obtained and understood. 1.2 Health and safety risks are identified and established risk control measures and procedures in preparation for the work are followed. 1.3 Safety hazards that have not previously been identified are noted and established risk control measures are implemented. 1.4 Installation of the system is prepared in consultation with others affected by the work and sequenced appropriately. 1.5 The nature and location of the work is determined from documentation or appropriate person to establish the scope of work to be undertaken.

ELEMENT

PERFORMANCE CRITERIA

- | | |
|------|--|
| 1.6 | Sitting limitations and customer system requirements are identified by consultation with the customer. |
| 1.7 | Suitable system components are specified and selected. |
| 1.8 | Location of system components is planned within the constraints of the building structure and regulations. |
| 1.9 | Advice is sought from appropriate persons to ensure the work is co-ordinated effectively with others. |
| 1.10 | Materials and components needed for the installation work are obtained in accordance with established procedures, pre-assembled where necessary, and checked against job requirements. |
| 1.11 | Materials and components are prepared for transport to the site and transport is arranged. |
| 1.12 | Tools, equipment and testing devices needed for the installation work are obtained in accordance with established procedures and checked for correct operation and safety. |
| 1.13 | Preparatory work is checked to ensure no unnecessary damage has occurred previously and complies with requirements. |
| 2 | Install LV wind energy conversion systems. |
| 2.1 | OHS risk control measures and procedures for carrying out the work are followed. |
| 2.2 | Equipment is transported safely to the site. |
| 2.3 | The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures. |
| 2.4 | Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures. |
| 2.5 | System components are installed to comply with |

ELEMENT

PERFORMANCE CRITERIA

- technical standards and job specifications and requirements with sufficient access to affect terminations, adjustment and maintenance.
- 2.6 Wiring is terminated at components and associated equipment in accordance with manufacture's specifications and functional and regulatory requirements.
- 2.7 Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.
- 2.8 Unexpected situations are dealt with safely and with the approval of an authorised person.
- 2.9 On-going checks of the quality of installed apparatus are undertaken in accordance with established procedures.
- 2.10 System installation is carried out efficiently without unnecessary waste of materials or damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles.
- 3 Complete installation and report installation activities.
- 3.1 OHS work completion risk control measures and procedures are followed.
- 3.2 Work site is cleaned and made safe in accordance with established procedures.
- 3.3 Final checks are made to that the installed apparatus conforms to requirements.
- 3.4 System operation is tested and installation verified to be compliant with standards and work specifications.
- 3.5 'As-installed' apparatus and associated equipment is documented and an appropriate person or persons notified in accordance with established procedures.
- 3.6 Customer is informed of the system operation, routine maintenance and limitations.

ELEMENT

PERFORMANCE CRITERIA

- 3.7 Appropriate documentation as required by standards or job specifications is provided to the customer.

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 installing LV wind energy conversion systems.

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

KS01-EK144 Installation and maintenance of LV WECS

A

Evidence shall show an understanding of installation and maintenance of small LV WECS to the extent indicated by the following aspects:

Installation of a LV WECS encompassing:

- selection of an appropriate tower for the installation of a WECS taking into consideration: soil type and footings, local council approvals, appropriate codes such as AS1170.2, transport of tower.
- appropriate methods, using appropriate safety procedures, for: raising tower and WECS, lightning protection, tower maintenance, safety in the erection and maintenance of the tower and WECS, site management to minimise environmental impacts.
- appropriate electrical transmission voltage and cable size from the WECS to the load or energy storage.
- appropriate installation, commissioning, fault diagnosis and rectification, using appropriate safety procedures. This will include: WECS power output, voltage regulation, and transmission cable voltage drop, manual and automatic furling, shut-down.
- schematic and wiring diagrams for the WECS showing the general circuit layout and protection between the WECS, energy storage, inverter and loads according to AS/NZS3000,

REQUIRED SKILLS AND KNOWLEDGE

AS4509 and lightning protection requirements.

- suitable layout for the location of energy storage to meet AS/NZS 3000, AS 3011.1 and AS4509.
- safety procedures for the installation, commissioning, fault diagnosis of system components.

Maintenance of a LV WECS encompassing:

- appropriate methods, using appropriate safety procedures tower maintenance, safety.
- appropriate maintenance methods using appropriate safety procedures. This will include: WECS power output, voltage regulation, and transmission cable voltage drop, manual and automatic furling, shut-down.
- safety procedures for the maintenance of system components.
- maintenance schedule for the system.

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 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, 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.

The evidence on which competency in this unit is based shall be considered holistically for each element on at least two occasions comprising:

- 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; 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. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements. and

- Demonstrate an appropriate level of skills enabling employment; 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:
 - Install and set up WECS for LV applications as listed in the Range statement⁷ and including:

- A Assessing customer energy requirements, efficiency improvements and site limitations.
- B Reading and interpreting drawings related to and apparatus locations and circuit connections.
- C Placing and securing system components accurately.
- D Maintaining fire integrity.
- E Connecting system LV components to comply with requirements.
- F Testing and commissioning system operation and verifying compliance with standards and job specifications.
- G Completing necessary documentation including handing over system operational documents to the customer
- H 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

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 competency standard unit.

Resources required to assess this unit are listed above in Context of assessment', which should also be used in the formal learning/assessment environment.

Note:

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

The resources used for assessment should reflect current industry practices in relation to installing wind energy conversion systems for LV applications.

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 Industry to which this competency standard 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:

UEENEEK13 Solve problems in wind energy conversion
0A systems rated up to 10 kW

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 by completing the installation of wind energy conversion systems for LV applications for one mainstream type of WECS on at least two occasions.

Generic terms are used throughout this Vocational Standard shall be regarded as part of the Range of Variables 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)**

Renewable and Sustainable Energy