

Domain

SOLAR INSTALLATION
Demonstrate knowledge of
Alternating Current principles

Title:

Level: 3

Credits: 4

Purpose

This unit standard specifies the competencies required to demonstrate knowledge of Alternating Current principles. It includes the following elements: define Alternating Current concepts; explain Alternating Current principles, draw and analyse Alternating Current circuit. This unit standard is intended for those who work as solar technician.

Special Note

1. This unit standard should be assessed in the context of solar system operations and should be assessed in conjunction with other relevant technical unit standards selected from this domain.
2. To demonstrate competence, at a minimum, evidence is required to demonstrate knowledge of Energy Efficiency principles, knowledge of Water use and conservation, knowledge of Material use and Recycling, and knowledge of Land use and ecology.
3. Assessment evidence may be collected from a real workplace or an appropriate simulated realistic environment in which system operations are carried out.
4. Performance of all elements in this unit standard must comply with all relevant workplace requirements and manufacturers' specifications.
5. Glossary of terms:
 - '*Specifications*' refers to any, or all of the following: manufacturers' specifications and recommendations, workplace specific requirements, national and international standards and legislations.
 - '*AC*' refers to *Alternate Current*.
 - '*RMS*' Refers to *Root Mean Square*.
 - '*Hz*' Refers to *Hertz*.
6. Regulations and legislation relevant to this unit standard include the following:
 - Labour Act No. 11 of 2007.
 - Petroleum Products and Energy Amendment Act No. 2 of 2005.
 - National Energy Fund Act of 2000.
 - Gas Act (Draft 2b).
 - Occupational Health and Safety Regulations No. 18, 1997 and all subsequent amendments.
 - ISO 14001 (Environmental Management Standard) and all subsequent amendments to any of the above.

Quality Assurance Requirements

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the Namibia Training Authority and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority on www.namqa.org and the Namibia Training Authority on www.nta.com.na.

Elements and Performance Criteria

Element 1: Define Alternating Current concepts

Range

AC components include but not limited to Impedance, phase relations, resonance and RMS quantities of the components.

Performance criteria

- 1.1. The fundamental coil and slip rings of an alternator are defined.
- 1.2. The field windings and magnetic poles are described.
- 1.3. The construction of an alternator is drawn and explained.
- 1.4. The generated sinusoidal e.m.f production is explained.
- 1.5. The frequency units in hertz are defined.

Element 2: Explain Alternating Current principles

Performance criteria

- 2.1. Electricity and Magnetism is defined.
- 2.2. Electrostatic and electromagnetism is defined.
- 2.3. The rotating Vector (Phaser) is defined.
- 2.4. The length of the phaser representing the maximum root mean square and instantaneous values are explained.
- 2.5. The calculations of the above mention values are performed.
- 2.6. The production of a pure sine wave is drawn to scale.

Element 3: Draw and analyse an Alternating Current circuit

Range

AC circuits may include but are not limited to single phase sub-circuits, single way switching, two ways switching, intermediate switching, switch and relay, rotary switches and socket outlets.

Performance criteria

- 3.1 Components in alternating current circuit are explained.
- 3.2 Symbols representing the components are defined.
- 3.3 The ac circuit drawing is performed.
- 3.4 A difference between a pure resistor and a pure inductor is explained.
- 3.5 Reactance and the impedance of the circuit are explained.

Registration Data

Subfield:	Electrical Engineering
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