

Domain

ELECTRICAL INSTALLATION

Title:

Demonstrate knowledge of earthing, under voltage and over current protection

Level: 3

Credits: 6

Purpose

This unit standard is intended for those who demonstrate knowledge of earthing, under voltage and over current protection. People credited with this unit standards are able to plan and prepare for work; install earthing systems; describe under/over voltage and over current in an electrical circuit; and clean-up work area.

This unit standard is intended for those who work as electricians.

Special Notes

1. Pre-requisite
 - *Unit 1157 - Demonstrate basic knowledge of workplace health and safety*
2. This unit standard is to be assessed in the context of electrical operations and should be assessed in conjunction with other relevant technical unit standards selected from this domain.
3. Assessment evidence may be collected at a real workplace or a simulated workplace environment in which electrical operations are carried out.
4. Glossary of terms:
 - *'Isolation and lockout procedures'* refer to isolating an electrical circuit from the source of supply
 - *'Specifications'* refers to any, or all of the following: manufacturers' specifications and recommendations, workplace specific requirements, national and international standards and legislations
 - *'ISO'* refers to International Organization for Standards
 - *'SANS'* refers to South African National Standards
 - *'TT system'* refers to terra and terra where terra is a direct connection point to earth
 - *'TN-S system'* refers to terra and neutral separate
 - *'TN-C-S system'* refers to terra and neutral combined from the supply and then separated in an installation
 - *'TN-C system'* refers to terra and neutral combined.
5. Performance of all elements in this unit standard must comply with industry standards and workplace requirements.

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)
 - Regulations relating to the health & safety of employees at work under Schedule 1 (2) of the Labour Act No.11 of 2007
 - ISO 14001 (Environmental Management Standard)
 - Electricity Act No.4 of 2007
 - SANS 10142-1 and SANS 10142-2 electrical wiring codes 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: Plan and prepare for work

Performance criteria

- 1.1 Work instructions, including plans, specifications, quality requirements and operational details are obtained, confirmed and interpreted.
- 1.2 Signage and barricade requirements are identified and implemented, where necessary.
- 1.3 Personal Protective Equipment are selected in line job and safety requirements
- 1.4 Tools and equipment selected to carry out tasks are consistent with job requirements, checked for serviceability, and any faults are rectified or reported prior to commencement.
- 1.5 Material quantity requirements are calculated in line with plans, specifications and quality requirements.
- 1.6 Environmental protection requirements are identified and applied in line with environmental plans and regulatory obligations.

Element 2: Install earthing systems

Range

Bonding methods may include but not limited to soldering, welding and glued.

Earthing systems may include but not limited to TT system, TN-S system, TN-C-S system and TN-C system.

Performance Criteria

- 2.1 Duties, tools, equipment and materials are organised in line with workplace procedures.
- 2.2 Work area is arranged to minimise accidents and injury.
- 2.3 Earth electrode or earth mat is installed and tested according to industry procedures.
- 2.4 Minimum circuit protective conductor cable size and earthing conductor cable size are calculated according to industry procedures.
- 2.5 Earthing conductors and bonding conductors are connected to the main earthing terminals in line with industry procedures.
- 2.6 Earth loop impedance is tested according to industry procedures and results recorded.

Element 3: Describe under/over voltage and over current in an electrical circuit

Range

Over current protective devices include but not limited to fuses and circuit breakers.

Performance Criteria

- 3.1 An effect of over current to the electrical installation is described.
- 3.2 Different methods of protecting a circuit against under / over voltage and over current are identified and explained.
- 3.3 Different operational characteristics of fuses and circuit breakers are explained.
- 3.4 Calculations for selection of fuse or circuit breaker are done according to manufacturer's procedures.

Element 4: Clean-up work area

Performance Criteria

- 4.1 Work area is cleared, cleaned, restored and secured in line with workplace procedures.
- 4.2 Tools and equipment are cleaned, checked and stored in line with manufacturer specifications and workplace procedures.
- 4.3 Materials and wastes are disposed of, reused, or recycled in accordance with legislation, regulations, codes of practice and job specifications.

Registration Data

Subfield:	Electrical Engineering
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