

Unit ID: 877

**Domain**

**ELECTROTECHNOLOGY**

**Title:**

**Conduct insulation resistance tests**

**Level: 2**

**Credits:2**

### **Purpose**

This unit standard specifies the competencies required to conduct insulation resistance testing. It includes knowledge of insulation resistance theory and operation of an insulation resistance tester, carry out insulation resistance tests on electrical equipment and cables and carry out test on electrical insulating oil. This unit standard is intended for those who work in electrotechnology work environment.

### **Special Notes**

1. Entry information:

Prerequisite

- Unit 864 - *Apply safety rules and regulations in an electrotechnology environment* or demonstrated equivalent knowledge and skills.

2. Assessment evidence may be collected from a real workplace or an appropriate simulated realistic environment in which insulation resistance tests on electrical equipment and cables are carried out.

3. Performance of all elements in this unit standard must comply with manufacturers' specifications, workplace specific requirements and industry standards.

4. Glossary of terms:

- 'SANS' refers to South Africa National Standards

5. Regulations and legislation relevant to this unit standard include the following:

- Labour Act, No. 11, 2007
- Occupational Health and Safety Regulations No. 18, 1997 and all subsequent amendments.
- SANS 10142-1
- SANS 10142-2

### **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 and the Namibia Training Authority. All approved unit standards, qualifications and national assessment arrangements are available on the Namibia Training Authority website [www.nta.com.na](http://www.nta.com.na).

## **Elements and Performance Criteria**

### **Element 1: Demonstrate knowledge of insulation resistance theory and operation of an insulation resistance tester.**

#### **Range**

Insulation materials may include but are not limited to PVC (poly vinyl chloride), paper and other cellulose type materials, XLPE (cross-linked polyethylene), insulation oil and mica.

Properties of materials may include but are not limited to ability to withstand applied voltage, ration of insulation resistance to length and amount of conductor material in proximity.

Electrical circuit of insulation equivalence is limited to a parallel resistor/capacitor circuit in this unit standard.

#### **Performance Criteria**

- 1.1 The function of electrical insulation is identified and explained in terms of separation of conductors and isolation of components from earth.
- 1.2 Insulation materials and their physical properties are explained.
- 1.3 Variation of insulation resistance with temperature is explained.
- 1.4 Equivalence of electrical circuits to insulations is described.
- 1.5 The operation of an electrical insulation resistance tester is explained.
- 1.6 The use of Ohms Law to determine insulation resistance values from the application of a known direct current voltage is explained.
- 1.7 Measurement of current through insulation material is explained.

### **Element 2: Carry out insulation resistance tests on electrical equipment and cables.**

#### **Range**

Test may include but are not limited to tests on transformers, cables, switchgear, electrical installations, bushings and surge arrestors.

Specific tests are limited to one minute spot checks, step voltage tests and polarisation index tests in this unit standard.

#### **Performance Criteria**

- 2.1 Technical specification and performance standard of the item to be tested are selected and interpreted.
- 2.2 Insulation resistance tester is rendered ready for use.

- 2.3 Insulation resistance tester is connected, operated and performance verification carried out.
- 2.4 Specific insulation resistance tests are conducted using required test procedures.
- 2.5 Test results are analysed to determine the condition of equipment and/or identify faults.
- 2.6 Insulation test results are recorded.

**Element 3: Carry out test on electrical insulating oil.**

**Range**

Oil testing may include but are not limited to dissolved gas analysis (DGA), dielectric breakdown, interfacial tension, Carl Fisher test, acidity and colour moisture content test.

**Performance Criteria**

- 3.1 Technical specifications, test specifications and performance standards are selected and interpreted.
- 3.2 The required tests and testing procedures are identified.
- 3.3 The test equipment is set up, calibrated and the certification and compliance status is verified.
- 3.4 Any hazards associated with the testing are identified and safety measures are applied.
- 3.5 Oil sample tests and relative humidity tests are carried out and recorded using approved standard procedures
- 3.6 Test results are interpreted for compliance with the standard required.
- 3.7 Compliance or non-compliance documentation is completed for each sample tested.

**Registration Data**

<b>Subfield:</b>	Electrical Engineering
<b>Date first registered:</b>	18 November 2010
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