

**Domain****ELECTRONICS****Title:****Produce a Printed Circuit Board****Level: 3****Credits: 8****Purpose**

This unit standard specifies the competencies required to produce a Printed Circuit Board. It includes planning to construct a PCB, simulating electronic circuits, designing a PCB layout, etching and populating the PCB and testing PCB functionality. This unit standard is intended for those who work in electronics industry.

**Special Notes**

1. Entry information:

Prerequisite

- *Unit E01 - Apply health and safety rules and regulations in electronics workplace*
- *Unit E02 - Plan and organise work in electronic work environment*

2. Assessment evidence may be collected from a real or a simulated workplace in which electronics operations are carried out.

3. To demonstrate competence, minimum evidence of the ability to plan for PCB development, simulate electronic circuits, design PCB layout, etch and populate the PCB and test PCB functionality of at least one PCB

4. Glossary of terms

- '*specifications*' refers to any, or all of the following: manufacturers' specifications and recommendations, workplace specific requirements
- PCB – Printed Circuit Board

5. Number of PCB layers is limited to one layer.

6. 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.

**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 on [www.nta.com.na](http://www.nta.com.na)

## **Elements and Performance Criteria**

### **Element 1: Plan to construct a PCB**

- 1.1 Instructions are interpreted and sequence of events is planned.
- 1.2 Tools and components are identified and selected according to diagrams and instructions.
- 1.3 Test equipment are selected and tested for functionality and safety prior to conducting test.
- 1.4 Work area is prepared according to worksite procedures

### **Element 2: Simulate electronic circuits**

**Range:** Simulation includes transient simulation, frequency simulation, analogue simulation, digital simulation, and DC and AC sweep simulation.

#### **Performance Criteria**

- 2.1 Schematic is captured using electronic design software
- 2.2 Simulation software is used to analyse circuits according to specifications and software application.
- 2.3 Simulation results are recorded and communicated to the design team.

### **Element 3: Design a PCB layout**

#### **Performance Criteria**

- 3.1 Schematic diagram is interpreted.
- 3.2 Component are identified and placed on the PCB layout editor according to design requirements/specifications, and allowing for mounting of input and output connections.
- 3.3 PCB traces are routed.
- 3.4 PCB design is documented

### **Element 4: Etch and Populate the PCB**

#### **Performance Criteria**

- 4.1 Safety measures and precautions are adhered to as per work place health and safety procedures.
- 4.2 Etching method is selected
- 4.3 PCB development resources are acquired according to the design.
- 4.4 Etching tools and materials are prepared

- 4.5 The design is transferred to the PCB, and the board etched in accordance with design specifications
- 4.6 Drilling is performed according to the job requirement.
- 4.7 Components are placed and soldered onto the PCB according to the design.
- 4.8 Appropriate coating is applied to protect tracks and pads.

**Element 5: Test PCB functionality**

**Performance Criteria**

- 5.1 Functionality checklist is prepared based on the design.
- 5.2 Functionality is verified using appropriate testing instruments.
- 5.3 Identified PCB errors are rectified.
- 5.4 Test results are documented.

**Registration Data**

<b>Subfield:</b>	Electrical Engineering
<b>Date first registered:</b>	
<b>Date this version registered:</b>	
<b>Anticipated review:</b>	
<b>Body responsible for review:</b>	Namibia Training Authority