

		<b>Unit ID: 883</b>
<b>Domain</b>	<b>ELECTRICAL INSTALLATION AND MAINTENANCE</b>	
<b>Title:</b>	<b>Install, repair and maintain lighting systems and structures</b>	
<b>Level: 2</b>	<b>Credits: 5</b>	

### Purpose

This unit standard is intended for those who install, repair and maintain lighting systems and structures. People credited with this unit standard are able to plan and prepare for work; install lights and light control circuits; fault-find and repair electric lighting systems; maintain electric lighting systems; identify components of medium and high mast structures; lower and raise lighting structures; and clean-up work area.

This unit standard is intended for those who work in electrical and related environment.

### Special Notes

1. Entry information:

Prerequisite

- *Unit 1157 - Demonstrate basic knowledge of workplace health and safety*

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

3. Safety of personnel and plant must be a priority throughout the assessment. If the safety requirements are not met, the assessment must stop.

4. Competency under this unit standard does not entitle the candidate to perform prescribed electrical work without the supervision of a supervisor of electrical work, until the candidate has been registered and licensed.

5. This unit standard covers the following lightings: incandescent lighting, discharge lighting, recessed lighting lamps and luminaries and solid-state lighting (LED Lighting).

6. Glossary of terms:

- *'Maintain'* refers to first line maintenance including the replacement of components.
- *'Industry requirements'* refer to asset owner requirements; manufacturers' specifications; and enterprise requirements which cover the documented workplace policies, procedures, specifications, business, and quality

management requirements relevant to the workplace in which assessment is carried out.

- 'SANS' refers to South Africa National Standards
  - 'IEC' refers to International Electrotechnical Commission
  - 'ISO' refers to International Organization of Standards
  - 'OHS' refers to Occupational Health and Safety
6. Performance of all elements in this unit standard must comply with industry requirement
7. Regulations and legislation relevant to this unit standard include the following:
- Labour Act, No.11, 2007.
  - Regulations relating to the health & safety of employees at work under Schedule 1 (2) of the Labour Act No.11 of 2007.
  - SANS 10142-1 & SANS 10142-2
  - NAM/ESI LVEIWS 001: ed 1.0 2021
  - NAM/ESI 02: 2021
  - NAM/ESI 002: Ed 1.0 04-2021 Part B-02; Part B-03; Part B-04; Part B-05; Part B-06; Part B-07; Part B-08; and Part B-09
  - ISO 14001.
  - IEC 60061.
  - 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. 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: Plan and prepare for work**

#### **Performance Criteria**

- 1.1 Work instructions, including plans, specifications, job cards, quality requirements and operational details are obtained, confirmed and interpreted.
- 1.2 Installation site is prepared and secured according to procedures, policies and instructions to allow the installation task to be completed safely.
- 1.3 Safety requirements are followed in line with safety plans and policies.

- 1.4 Personal protective equipment is selected in line job and safety requirements.
- 1.5 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.
- 1.6 Signage and barricade requirements are identified and implemented, where necessary.
- 1.7 Material quantity requirements are calculated in line with plans, specifications and quality requirements.
- 1.8 Environmental protection requirements are identified and applied in line with environmental plans and regulatory obligations.

## **Element 2: Install lights and light control circuits**

### **Range**

Installation requirements may include but are not limited to electrical safety, minimum clearance, supports, moisture, thermal insulation, fire resistance rating and acoustic rating.

Control circuits may include but are not limited to adaptor plates (or 3-plate), loop-in, one-way, two-way two strap (loop-in wires), and intermediate switching.

### **Performance Criteria**

- 2.1 Installation requirement for different types of lighting is described in accordance with current regulations and standards.
- 2.2 Circuit diagrams for different lighting systems are drawn and circuit operation described in terms of current paths and starting sequence.
- 2.3 Stroboscopic effect (in discharge lighting) is described together with methods of reducing or cancelling the effect in accordance with industry practice.
- 2.4 Installation requirements for electric lighting is obtained and interpreted in accordance with current regulations and standards.
- 2.5 Lighting and lighting fittings are selected taking into account the operating and environmental conditions of the installation.
- 2.6 Calculations are made using inverse square and cosine laws to achieve the standard industry illumination level for the particular application
- 2.7 Location diagram showing the numbers and positions of light fittings and switches is obtained or produced.

- 2.8 Light circuit cabling is installed according to current regulations and standards.
- 2.9 Fittings including light and switches are installed and securely attached using fastenings appropriate to the weight of the fitting and the material of the mounting.
- 2.10 Light and light fittings are positioned and connected according to the location diagram.
- 2.11 Light circuits are tested according to current regulations and standards.
- 2.12 Light circuits and fittings are checked for correct operation.

### **Element 3: Fault-find and repair electric lighting systems**

#### **Performance Criteria**

- 3.1 Symptoms of faults in electric lighting systems are analysed using logical fault-finding techniques and measurements.
- 3.2 Faults and faulty components are located and extent of needed repairs determined.
- 3.3 Repairs are carried out safely and in accordance with current regulations and standards.
- 3.4 Materials are replaced in compliance with current regulations and standards.
- 3.5 The system is tested to ensure conformity to all requirements of current regulations and safety standards before the system is reconnected to the mains.
- 3.6 Post-repair test indicating the lighting operation is restored to almost its original condition taking in account its age.

### **Element 4: Maintain electric lighting systems**

#### **Range**

Documentation and standards may include but are not limited to company specific instructions, job card procedures, manufacturer's maintenance manuals and worksite specific standards.

Diagnostic techniques to take cognition of history and operational and/or maintenance records, fault operations, malfunction, reported problems, infrared inspection results, and mechanism failures.

Tests may include but are not limited to continuity, earth continuity and insulation resistance.

PPEs and site-specific safety standards may include but are not limited to overalls, safety boots, gloves and site-specific safe work procedures (e.g., localised switching arrangements).

### **Performance Criteria**

- 4.1 Lighting system to be maintained is identified and the work site is cleared of any hazardous conditions.
- 4.2 Documentation and worksite specific standards are used to carry out maintenance works on the system.
- 4.3 Personal Protective Equipment is used and site-specific safety standards are adhered to throughout maintenance.
- 4.4 Circuit is switched off, locked out and tested to ensure that it is dead.
- 4.5 Corrective maintenance is carried out according to appropriate practice and site-specific standards.
- 4.6 Maintained lighting systems are tested to ensure compliance to the wiring codes.
- 4.7 Lighting system is switched on and the operation of the maintained lighting systems is checked in line with company specific instruction and applicable requirements.
- 4.8 Post maintenance clean-up process and tool storing is completed safely and correctly according to industry standards, environmental requirements and site-specific standards.

### **Element 5: Identify components of medium and high mast structures**

#### **Performance Criteria**

- 5.1 Types of medium and high masts are identified.
- 5.2 Types of locking, lowering and raising mechanisms are identified and explained.
- 5.3 Types of specific tools, equipment and parts thereof, are identified and explained.
- 5.4 Types of counter balance weights are identified.

## **Element 6: Lower and raise lighting structures**

### **Performance Criteria**

- 6.1 Work area is inspected, prepared and made safe as per work standard and procedures, manufacturer's requirements and statutory requirements.
- 6.2 Work site area is barricaded in accordance with work standard procedures and statutory requirements.
- 6.3 Raising and lowering of mast lighting structure is carried out in accordance to manufactures specifications, work site procedures and OHS Act.
- 6.4 Safe utilization of assistants is maintained for the duration of the procedure in accordance to worksite procedures.
- 6.5 Equipment used for the purpose of lowering and raising of the high mast structure are correctly mounted, used and dismantled after use.

## **Element 7: Clean-up work area**

### **Performance Criteria**

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

## **Registration Data**

<b>Subfield:</b>	Electrical Engineering
<b>Date first registered:</b>	18 November 2010
<b>Date this version registered:</b>	23 November 2023
<b>Anticipated review:</b>	23 November 2028
<b>Body responsible for review:</b>	Namibia Training Authority