



**NATIONAL OCCUPATIONAL
STANDARD FOR ELECTRICIAN –
LOW VOLTAGE**

APPROVING AUTHORITY

This National Occupational Standard has been prepared and published under the authority of the Zambia Qualifications Authority Board on 25th February 2021.

ZAMBIA QUALIFICATIONS AUTHORITY

The Zambia Qualifications Authority Act No. 13 of 2011 was enacted by the Government of the Republic of Zambia to ***“provide for the development and implementation of a national qualifications framework; establish the Zambia Qualifications Authority; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***. Among other functions, ZAQA is responsible for ***determining national standards for any occupation***, through various sector specific National Occupational Standards Development Teams (NOSDTs).

REVISION OF NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards shall be revised every after **5 years**, or whenever necessary, by the issue of either amendments or of revised editions. It is important that users of National Occupational Standards (NOS) should ascertain that they are in possession of the latest amendments or editions.

NOS DEVELOPMENT TEAM RESPONSIBLE

This National Occupational Standard was prepared by the Construction National Occupational Standards Development Team, upon which the following organisations were represented:

1. Association of Building and Civil Engineering Contractors
2. Association of Consulting Engineers of Zambia
3. Copperbelt University
4. Department of Public Infrastructure/ Ministry of Housing and Infrastructure Development
5. Engineering Institution of Zambia
6. Ministry of Housing and Infrastructure Development
7. National Council for Construction
8. Road Development Agency
9. Surveyors Institute of Zambia
10. Technical Education, Vocational and Entrepreneurship Training Authority
11. Thorn Park Construction Training Centre
12. University of Zambia
13. Zambia Institute of Architects
14. Zambia Qualifications Authority – Secretariat
15. ZESCO Limited

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FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Higher Education established by ZAQA Act No. 13 of 2011 to “**provide for the development and implementation of a national qualifications framework; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing**”.

Among other functions, ZAQA is responsible for “*determining national standards for any occupation*”, through various sector specific National Occupational Standards Development Teams (NOSDTs) of experts composed of representation from appropriate authorities, government departments, industry, academia, regulators, consumer associations and non-governmental organisations, etc.

This National Occupational Standard (NOS) has been developed by the Construction National Occupational Standards Development Team in accordance with the procedures and guidelines of ZAQA. All users should ensure that they have the latest edition of this publication as National Occupational Standards are revised from time to time.

This NOS shall be used by, among others, industry, employers, quality assurance bodies, awarding & professional bodies and education & training institutions, as a benchmark to identify training needs, develop job profiles/descriptions, develop curricula and learning programmes, in various sectors where the occupation exists. In the Construction sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

JUSTIFICATION

Electricians are indispensable to the Construction sector. They are responsible for installing wiring, conduits, lighting and other fixtures and electrical components in buildings/premises as well as at the construction sites. The Electrician also ensures the safety, maintenance and repair of all electrical installations at a construction site or in a building.

There has been an increase in reports of fire incidences reported in the country which have resulted in damage to homes and household goods as well as other premises. These incidences have been attributed to poor workmanship and the use of substandard materials in construction electrical works. As a result, a Construction Electrician requires a thorough knowledge and understanding of building codes and standards as well as ability to apply such codes and standards to ensure safety of dwellers/occupants, buildings/premises, electrical installations and property.

This National Occupational Standard highlights core knowledge, skills, competences and personal attributes that the Electricians handling Low Voltage (LV) electrical works must possess to be successful in their jobs.

ACRONYMS AND ABBREVIATIONS

CS	Core Skill
NOS	National Occupational Standard
ELCB	Earth Leakage Circuit Breaker
E-LV	Electrician – Low Voltage
LV	Low Voltage
MCB	Miniature Circuit Breaker
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OK	Organisational Knowledge
PC	Performance Criteria
PS	Professional Skill
RCCB	Residual Current Circuit Breaker
RPL	Recognition of Prior Learning
SLD	Single Line Diagram
TK	Technical Knowledge
ZAQA	Zambia Qualifications Authority
ZQF	Zambia Qualifications Framework

GLOSSARY OF TERMS

For the purposes of this NOS, the following terms and definitions shall apply:

Core Skills/Generic Skills: are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.

Function: is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of NOS.

Job Title: defines a unique set of functions that together form a unique employment opportunity in an organisation.

Knowledge and Understanding: are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.

National Occupational Standards (NOS): are statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. They are precise descriptions of what an individual is expected to be able to do in his/her work role.

National Occupational Standards (NOS) Code: is a unique reference code that identifies a NOS.

National Occupational Standards Development Team (NOSDT): means an established group of national stakeholders/experts responsible for the development of National Occupational Standards within a specific economic sector or occupation.

Occupation: is a set of job roles, which perform similar/related set of functions in an industry.

Organisational Context: includes the way the organisation is structured and how it operates, including the extent of operative knowledge that managers have in their relevant areas of responsibility.

Performance Criteria: are statements that together specify the standard of performance required when carrying out a task.

Scope: is the set of statements specifying the range of variables that an individual may have to deal with in carrying out the functions which have a critical impact on the quality of performance required.

Sector: is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.

Sub Sector: is derived from a further breakdown based on the characteristics and interests of its components.

Technical Knowledge: is the specific knowledge needed to accomplish specific designated responsibilities.

Unit Title: gives a clear overall statement about what the incumbent should be able to do.

Low Voltage: is the voltage normally exceeding extra low voltage (50 V a.c or 120 V d.c) but not exceeding 1000 V a.c or 1500 V d.c between conductors or 600 V a.c or 900 V d.c between conductors and earth.

1. OVERVIEW

This is an introductory section providing a brief summary and specific information or commentary about the content of the NOS and the targeted sector and occupation to help the user judge whether it is relevant to them.

NOS Code	NOS.E-LV.01
Occupation	Low Voltage Electrical Works
Job Title	Electrician – Low Voltage
Job Description	The Electrician – LV is responsible for laying and terminating LV cables, installing and maintaining construction equipment at a construction site and carrying out electrical wiring works at residential, commercial and industrial buildings/premises
Job Purpose	An Electrician – LV installs and maintains cables, electrical units and equipment required for construction activities at project sites and in buildings/premises
ZQF Level	4
Sector	Construction
Sub sector	Real Estate and Infrastructure Construction
Other Economic Sector(s) in which the Occupation is Practiced	Energy, Mining, Manufacturing, Health, Telecommunication, Education/training, etc.
Other Similar Jobs that can be Performed in the Occupation	Electrical Supervisor/Foreman, Electrical Assistant, Electrical Helper, etc.
Minimum Educational Job Entry Qualification(s)	Level 4 Certificate
Practicing License Requirements (if any)	No (But Membership with EIZ is recommended)
Training/RPL (Suggested)	<ol style="list-style-type: none"> 1. Electrical safety 2. Latest electrical equipment, systems and technologies 3. Use of ICTs (Internet, Computer packages, Email, Computer Software and Hardware necessary for the job, etc.) 4. 5S Workplace Organisation Method. 5. System Protection 6. Familiarization with Codes of practice (e.g. ZS 791 Wiring of Premises Code of Practice)
Minimum Job Entry Age	18 years
Prior Experience (Recommended)	Trained worker: 2 years site experience as an Assistant Electrician
Performance Criteria	As described in the Units under Section 4

2. SCOPE

This National Occupational Standard highlights core knowledge, skills, competences and personal attributes that Electricians handling Low Voltage (LV) electrical works must possess to be successful in their jobs.

3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)

This job requires skills in reading, writing and oral communication, ability to plan and prioritise, ability to work in a team, physique to sustain strenuous conditions, ability to use fingers, hands and feet with ease to complete the assigned task (dexterity), high precision, ability to handle the various tools and materials related to electrical work, sensitivity towards safety for self, others and equipment, willingness to work across various locations in ongoing construction work environment while working at the site, be well versed with tasks, functions, standards and specifications, codes of practice and safety norms applicable to LV electrical works, etc.

4. UNITS AND ELEMENTS

This National Occupational Standard is divided into 6 Units representing the tasks that a job holder should undertake in his/her day to day work. Each unit is further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task

UNIT 1 [This Unit covers the skills and knowledge required by an Electrician - Low Voltage to be proficient in laying and terminating of single or multicore cables for single/three phase systems and installing equipment at construction sites].

Unit No.	01
Unit Title	Lay and terminate single/multi-core cables for single/three phase systems and install equipment at construction sites
Description	This Unit describes the skills and knowledge required to lay and terminate single/multi-core cables for single/three phase systems and install equipment at construction sites
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Carry out preparatory works prior to laying and terminating of cables • Lay and terminate cables and carry out electrification of equipment
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Carry out preparatory works prior to laying and terminating of cables	To be competent, the individual must be able to: PC1. assist superior/supervisor in identifying and planning (method, material specification and time requirement) for cable laying activities at construction sites PC2. read and understand organisational procedures prior to undertaking activities PC3. read and interpret electrical drawings, specifications, manufacturer's guidelines as and when required PC4. check/inspect cables and accessories to be used according to instructions/drawings/manufacturer's specifications as per the required application PC5. inspect work area for embedded service lines, and vicinity of flammable items prior to cable laying PC6. carry out safe isolation at power source as per applicable specification/electrical safety norms and erect caution signage at appropriate location(s) PC7. execute preparatory activities such as digging of trenches, laying of conduits and erection of poles PC8. fill in necessary permits and checklists as per standard and organisational norms prior to undertaking the above mentioned activities
Lay cables and carry out electrification of equipment	To be competent, the individual must be able to: PC9. lay cables according to standard practice through trenches, conduits or by means of poles at construction sites PC10. Inspect/check for rigidity of poles, condition of exposed cables and fittings, depth and backfilling of trenches, proper barricading as per standard and safety norms PC11. connect the laid cable(s) to a power source and electrical equipment/machinery as per the manufacturer's guidelines and standard practice PC12. carry out/ensure proper termination of cables as per specification and standard practice

	<p>PC13. install circuit breakers, starters, relays, etc. of correct rating according to equipment/machinery specifications</p> <p>PC14. carry out earthing of the equipment (if applicable) using a suitable and/or specified method</p> <p>PC15. set out/read and understand test procedures, perform applicable electrical tests and carry out trial run to ensure safe and desired operation of the construction equipment/ machinery</p> <p>PC16. take preventive measures to secure exposed cables and accessories against human, vehicular movement or any other external abrasive effects by adopting suitable protective methods or industry recognised standard practices</p> <p>PC17. ensure that correct and safe tools specific to the equipment and application are used</p> <p>PC18. ensure that the correct safety components specific to equipment are installed properly as per manufacturer's guidelines</p> <p>PC19. ensure maintenance of all electrical tools and equipment/machinery under operation according to manufacturer's guidelines or standard procedures</p> <p>PC20. ensure proper housekeeping of the work area prior and post operations</p> <p>PC21. ensure labelling or tagging of embedded, exposed electrical lines, accessories and other equipment/machinery according to standard procedures or best practices</p> <p>PC22. work safely according to standard practices, manufacturers guidelines, specifications and electrical safety norms while carrying out cable laying activities or connecting equipment/machinery to the main power source</p>
Knowledge and Understanding (K)	
<p>A. Organisational Context (Knowledge of the company/ organisation and its processes)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. standard practices for establishing temporary low voltage power connection arrangements at the construction site</p> <p>OK2. safety rules and regulations for handling and storing required electrical tools, equipment/machinery and materials</p> <p>OK3. personal protection including the use of related safety gears and equipment</p> <p>OK4. processes for requesting for tools and materials as per set organisational procedures</p> <p>OK5. reporting procedures</p>
<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. guidelines and specifications provided in the relevant Zambian or recognised Standards and Codes of Practice applicable to electrical works/operations</p> <p>TK2. wiring symbols used in single and three phase installations</p> <p>TK3. how to read and interpret a Single Line Diagram (SLD), schematics and wiring diagrams of electrical installations</p> <p>TK4. manufacturer's guidelines/specifications for use of hand and power tools, as well as measuring and testing instruments</p> <p>TK5. units of measurements used in electrical works/operations (such as Watt, Ampere, Ohm and Volt) and their symbols</p>

TK6. concepts of AC and DC circuits and their respective properties
TK7. concepts about working principles of AC and DC circuits
TK8. sequencing and executing cable laying activities at construction sites as per standard practice, plans or instructions
TK9. concepts of three phase circuits, advantages of three phase over single phase installations, as well as star and delta connections
TK10. required cables and accessories (single phase/three phase) as per the equipment/machinery design
TK11. tests to be performed in balanced 3 phase circuits
TK12. checks/inspections to be conducted on the cables and identify appropriate laying locations to ensure a safe working environment at the construction site
TK13. standard procedures for safeguarding exposed cables against external damages
TK14. measuring resistance, electrical current flow and voltage as required using appropriate electrical measuring instruments
TK15. use of measuring instruments like digital multi-meter, tong tester and digital voltmeters while establishing electrical connections to the equipment/machinery at construction sites
TK16. safe methods of electrical isolation and use of tools in the operation
TK17. different methods of earthing, including measurement of earth resistance using an earth resistance tester, testing of earth leakage using an Earth Leakage Circuit Breaker (ELCB), etc.
TK18. fault finding and resolution methods using appropriate measuring instruments
TK19. standard procedure for termination of cables at the power sources and equipment/machinery connection points
TK20. use of Miniature Circuit Breaker (MCB), Residual Current Circuit Breaker (RCCB) and ELCB in equipment/machinery, their working principles, current ratings and fault levels
TK21. concepts of electrical circuits which include properties and functions of RLC (resistor-R, inductor-L and capacitor-C) circuits, inductive DC and AC circuits, details of capacitors, inductors and their use in DC and AC circuits
TK22. type of connections and tests to be carried out in capacitive and inductive AC and DC circuits
TK23. use of electrical hand and power tools as per electrical works requirements
TK24. standard procedure for storing or stacking electrical tools and equipment/machinery
TK25. Use of ICTs and relevant software.
TK26. relevant calculations
TK27. types of fire extinguishers and their use based on the sources/causes of fires

Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. communicate in writing in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site
	Reading Skills
	The individual on the job must be able to: CS2. read in English (at least working level) CS3. read and interpret manufacturer's specifications, guidelines and SLDs, as applicable CS4. read and interpret safety and general signage, tags, etc. provided at the workplace
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS5. speak in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site CS6. listen attentively and interpret communication/instructions from co-workers CS7. convey information clearly and concisely to the co-workers
	Decision Making
B. Professional Skills	The individual on the job must be able to: PS1. assess, decide and ensure that correct tools are used for a particular task PS2. assess, decide and ensure that correct safety equipment is properly installed as per manufacturer's guidelines PS3. decide the usability of available electrical materials through visual inspection PS4. identify a secure location where to place distribution boards and temporary replacement panels PS5. identify locations where lights and equipment/machinery should be placed to avoid accidents and damage to equipment/machinery PS6. decide the method and path for laying cables and secure them against damage PS7. decide the type (flexible, armoured, etc.) and core of the cable to be used PS8. decide whether to temporarily shut down operations on detection of faults or malfunctions PS9. decide whether the work place is safe for operations PS10. decide whether work front is clear, and if appropriate materials and tools for performing the work are available and adequate
	Plan and Organise
	The individual on the job must be able to: PS11. plan work and organise required resources in coordination with team members and superiors PS12. prioritise daily works as per the construction project requirements

	Customer Centricity
	The individual on the job must be able to: PS13. complete work as per agreed time schedule and quality
	Problem Solving
	The individual on the job must be able to: PS14. properly resolve malfunctions of electrical circuits, equipment/ machinery and other electrical installations after identifying the root cause by use of electrical measuring and diagnostic instruments in accordance with standard guidelines PS15. join and extend cables in confined spaces, areas with little lighting or under adverse weather conditions PS16. resolve any conflicts within the team
	Analytical Thinking
	The individual on the job must be able to: PS17. select protective devices (circuit breakers, fuses, etc.) of correct rating PS18. ensure that standard ground clearance is provided to overhead cables PS19. determine the rating of electrical fixtures such as switches, wires and fuses to be used according to the circuit load requirements PS20. determine the gauge of wires/cables to be used as per load requirements PS21. assess the proper functioning of tools/equipment and measuring instruments PS22. optimise the use of resources PS23. minimise material and time wastage in the workplace PS24. reconcile material consumption
	Critical Thinking
The individual on the job must be able to: PS25. evaluate the complexity of the task at hand, determine possible hazards related to the task and report to the superior or concerned authority for assistance PS26. inform superiors about the type, quality and quantity of resources required for the task PS27. report superiors or colleagues to the appropriate authority for any violation of safety, quality or organisational norms which may lead to accidents or any undesired situations in the work place	

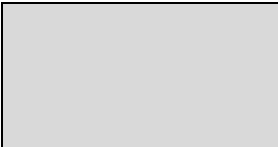
UNIT 2 [This Unit covers the skills and knowledge required by an Electrician - Low Voltage to be proficient in inspecting and maintaining construction equipment and cables as per the job requirement].

Unit No.	02
Unit Title	Inspect and maintain electrical equipment and cables as per the job requirement
Description	This Unit describes the skills and knowledge required to inspect and maintain construction equipment and cables as per the job requirement
Scope	This Unit covers the following: <ul style="list-style-type: none"> Carry out inspection, repair and maintenance of cables and construction equipment
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Carry out inspection, repair and maintenance of cables and construction equipment	<p>To be competent, the individual must be able to:</p> <p>PC1. carry out appropriate tests and diagnose electrical faults of equipment as and when necessary</p> <p>PC2. power off and isolate equipment under maintenance or take necessary precautions as per standard practice while performing tests on live circuits</p> <p>PC3. carry out safe isolation at power source as per applicable specification/electrical safety norms and erect caution signage at appropriate locations</p> <p>PC4. repair or replace faulty parts such as relays, Miniature Circuit Breakers, wires, switches, sockets etc. according to the rating and manufacturer's maintenance requirements and guidelines relevant to circuit under maintenance</p> <p>PC5. determine types of motors (DC or AC) to be repaired or installed</p> <p>PC6. select and use appropriate starters according to the specification and power rating of motors during maintenance</p> <p>PC7. carry out winding of motor armatures if required as per specification of motor</p> <p>PC8. inspect and rectify faults detected in earthing of construction equipment referring to manufacturer's guidelines</p> <p>PC9. replace faulty parts like relays, Miniature Circuit Breakers, wires, switches, sockets etc. as per maintenance requirement</p> <p>PC10. inspect and perform tests on transformers to detect faults under close supervision</p> <p>PC11. carry out maintenance of lighting arrangements installed at critical accessed locations such as tower cranes, high masts etc. and replace faulty parts, consumables as and when necessary</p> <p>PC12. join damaged armoured cables (bearing heavy electricity loads) using appropriate jointing kits</p> <p>PC13. carry out maintenance on changeover switches for switching between main power supply and standby power supply (e.g. diesel generator) at required times</p> <p>PC14. ensure safe and desired working of temporary electrical panels/distribution boards at construction sites</p>

	<p>PC15. provide proper notifications to concerned authority prior to undertaking maintenance activities following organisational norms PC16. work according to electrical safety norms and safety guidelines provided by equipment manufacturer PC17. report to senior authority or act efficiently on detection of any unsafe/hazardous condition PC18. document readings, conclusions of tests performed as and when necessary</p>
Knowledge and Understanding (K)	
<p>A. Organisational Context (Knowledge of the company/ organisation and its processes)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> OK1. standard practices and procedures for maintenance of temporary electrical works/panels OK2. safety rules and regulations for handling and storing required electrical tools, equipment and materials OK3. personal protection including the use of related safety gear and equipment OK4. processes for requesting tools and materials as per set procedures for maintenance of tools and equipment
<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <ul style="list-style-type: none"> TK1. guidelines provided in Zambian/recognised Standards and codes of practice applicable to electrical works TK2. wiring symbols used in single and three phase installations TK3. how to read and interpret drawings, circuit diagrams and/or related schematics for single and three phase wiring systems TK4. how to estimate required material quantities from electrical drawings TK5. manufacturer's guidelines/specifications for use of hand and power tools as well as measuring and testing instruments TK6. manufacturer's guidelines/specifications for use of electrical fittings and fixtures TK7. use of three phase and single phase wiring systems as per electrical drawings and specifications TK8. specifications and colour coding of cables to be used in wiring systems according to load on circuit TK9. components used in electrical earthing works TK10. different methods of earthing such as the use of earth rods, earth mats, pipes, plates, etc. TK11. measurement of earth resistance using earth resistance tester TK12. testing of earth leakage circuit breaker using an earth leakage tester TK13. application and specification of protective devices like MCB, ELCB and MCCB TK14. how to plan lighting arrangements which may enable maximum use of natural lighting TK15. current tentative market price of common electrical items TK16. common electrical brands and their products TK17. customer preferences regarding brands and trends TK18. standard wiring procedures and best practices

	<p>TK19. right procedure for handling of electrical fixtures TK20. use of ladders, scaffolds, personal protective equipment, shock resistance gloves during routine working or performing tests on a live circuit TK21. use of drilling machines and selection of correct drill bits for drilling works TK22. use of different common electrical hand/power tools and instruments such as pliers, crimping tool, drilling machine, grinder, earth resistance tester, tong tester, voltage tester, multimeter, etc. TK23. standard procedure for storing and stacking electrical material, tools and equipment at workplace TK24. Use of ICTs and relevant software TK25. basic arithmetic and use of a calculator</p>
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to: CS1. communicate in writing in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site</p>
	Reading Skills
	<p>The individual on the job must be able to: CS2. read in English (at least working level) CS3. read and interpret manufacturer’s specifications, guidelines and SLDs, as applicable CS4. read and interpret safety and general signage, tags, etc. provided at the workplace</p>
	Oral Communication (Listening and Speaking skills)
<p>The individual on the job must be able to: CS5. speak in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site CS6. listen attentively and interpret communication/instructions from co-workers CS7. convey information clearly and concisely to the co-workers</p>	
B. Professional Skills	Decision Making
	<p>The individual on the job must be able to: PS1. Assess, decide and ensure that correct tools are used for a particular task PS2. Assess, decide and ensure that correct safety equipment is properly installed as per manufacturer’s guidelines PS3. decide the usability of available electrical materials through visual inspection PS4. decide process of earthing and its components PS5. identify locations where lights and equipment/machinery should be placed to avoid accidents and damage to equipment/machinery PS6. decide the type (flexible, armoured, etc.), core and gauge of cables to be used PS7. decide the brands and models of electrical fixtures to be used, as and when necessary PS8. decide whether the work place is safe for operations</p>

	<p>PS9. decide whether work front is clear, and if appropriate materials and tools for performing the work are available and adequate</p>
	<p>Plan and Organise</p>
	<p>The individual on the job must be able to: PS10. plan work and organise required resources in coordination with team members and superiors PS11. prioritise daily works as per the construction project requirements PS12. plan location of electrical lighting fixtures to utilise natural light as much as possible</p>
	<p>Customer Centricity</p>
	<p>The individual on the job must be able to: PS13. complete work as per agreed time schedule and quality PS14. use energy efficient electrical equipment to ensure less power consumption and wastage PS15. design electrical wiring arrangement in an economical way or customer preferences while maintaining good quality PS16. use electrical fixtures which will match aesthetic appeal of the workplace</p>
	<p>Problem Solving</p>
	<p>The individual on the job must be able to: PS17. ensure upkeep of all electrical tools and equipment under operation according to manufacturer's guideline or standard practice PS18. assess quantity and quality of materials for the day's work PS19. ensure disposal of waste and debris and keep work place safe and tidy PS20. resolve any conflicts within the team</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job must be able to: PS21. select protective devices (circuit breakers, fuses, etc.) of correct rating PS22. determine the rating of electrical fixtures such as switches, wires and fuses to be used according to the circuit load requirements PS23. determine the gauge of wires/cables to be used as per load requirements PS24. assess the proper functioning of tools/equipment and measuring instruments PS25. optimise the use of resources PS26. minimise material and time wastage in the workplace PS27. reconcile material consumption</p>
	<p>Critical Thinking</p>
	<p>The individual on the job must be able to: PS28. evaluate the complexity of the task at hand, determine possible hazards related to the task and report to the superior or concerned authority for assistance PS29. inform superiors about the type, quality and quantity of resources required for the task</p>



PS30. report superiors or colleagues to the appropriate authority for any violation of safety, quality or organisational norms which may lead to accidents or any undesired situations in the work place

UNIT 3 [This Unit covers the skills and knowledge required by an Electrician – Low Voltage to be proficient in carrying out low voltage electrical wiring and buildings/premises electrification works].

Unit No.	03
Unit Title	Carry out low voltage electrical wiring and buildings/ premises electrification works
Description	This Unit describes the skills and knowledge required to carry out low voltage electrical wiring and buildings/premises electrification works
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Perform concealed/exposed wiring and electrification • Install and maintain electrical fixtures/fittings, earthing arrangements and electrical appliances
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Perform concealed/ exposed wiring and electrification	To be competent, the individual must be able to: PC1. perform visual checks on the wiring components (such as wires, flexible and rigid conduits, PVC raceways, wooden battens, clamps, etc.) prior to their use for concealed wiring purposes in order to ascertain their appropriate specifications and usability PC2. read and interpret single and three phase wiring diagrams and assist in required material quantity calculations PC3. carry out necessary measurements of cables/conduits to meet working needs and in order to carry out marking on walls PC4. mark on walls where concealed wiring is to be installed PC5. assist in planning and mark locations of raceways and electrical fixtures/fittings to be installed on walls PC6. lay conduit pipes through structures (slabs, beams, walls) or through chased wall (brick wall) surface as per instructions PC7. ensure to fasten conduit pipes in their locations by means of clamps or other standard means PC8. draw wires through conduits, raceways and ensure that the right specification and number of wires are drawn through the conduits PC9. install bends, T's and appropriate junction boxes as per recommended standard practice PC10. carry out drilling and cutting works as and when necessary
Install and maintain electrical fixtures/ fittings, earthing arrangements and electrical appliances	To be competent, the individual must be able to: PC11. calculate electrical material requirements based on electrical fittings and layouts PC12. carry out safe isolation at power source as per applicable specification/electrical safety norms and erect caution signage in appropriate locations PC13. install electrical fixtures, fittings (such as distribution boards, switch boards, switches, sockets, lights, wall brackets etc.) at specified locations and carry out termination of cables as per standard practice PC14. perform necessary tests, including all relevant and specified earthing tests, to ensure safe condition of electrical

	<p>circuits during and post wiring activity using appropriate tools and instruments</p> <p>PC15. carry out electrical earthing work adopting standard procedure and using appropriate earthing components as per instructions</p> <p>PC16. install earthing conductors by embedding in concrete, screwing, bolting or by welding in high-rise structures</p> <p>PC17. establish new low voltage connection if required as per circuit load requirement and install electrical appliances including fan, water pump, refrigerator, fire alarm system, security systems, etc.</p> <p>PC18. identify and install protective devices of correct rating, at appropriate locations of wiring</p> <p>PC19. adhere to electrical safety norms and act/report efficiently on detection of any unsafe situation</p> <p>PC20. note relevant readings and fill in checklists as per requirement</p> <p>PC21. prepare tentative budget for wiring and electrification work</p> <p>PC22. replace faulty electrical fixtures, fittings, low voltage wiring as and when necessary</p>
Knowledge and Understanding (K)	
<p>A. Organisational Context (Knowledge of the company/ organisation and its processes)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. standard practices for electrical wiring and electrification works</p> <p>OK2. safety rules and regulations for handling and storing required electrical tools, equipment/machinery and materials</p> <p>OK3. personal protection including the use of related safety gear and equipment</p> <p>OK4. processes for requesting tools and materials as per set procedures for maintenance of tools and equipment</p>
<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. guidelines and specifications provided in the relevant Zambian/recognised Standards and Codes of Practice applicable to electrical wiring works</p> <p>TK2. statutory guidelines/regulations for low voltage wiring operations</p> <p>TK3. how to read and interpret drawings, circuit diagrams and/or related schematics for single and three phase low voltage buildings/premises wiring systems</p> <p>TK4. how to estimate required material quantities from electrical drawings</p> <p>TK5. manufacturer's guidelines/specifications for use of hand and power tools as well as measuring instruments</p> <p>TK6. manufacturer's guidelines/specifications for use of electrical fittings and fixtures</p> <p>TK7. use of single phase and three phase connections as per electrical drawings and specifications</p> <p>TK8. Specifications and colour coding of cables to be used in wiring systems according to load on circuit</p>

	<p>TK9. the different components used in electrical earthing work</p> <p>TK10. different methods of earthing such as the use of earth rods, earth mats, pipes, plates, etc.</p> <p>TK11. measurement of earth resistance using the earth resistance tester</p> <p>TK12. testing of earth leakage circuit breaker using an earth leakage tester</p> <p>TK13. application and specification of protective devices like MCB, ELCB and MCCB</p> <p>TK14. how to plan lighting arrangements so as to enable maximum use of natural light</p> <p>TK15. current tentative market prices of common electrical items</p> <p>TK16. common electrical brands and their products</p> <p>TK17. customer preferences regarding brands and trends</p> <p>TK18. standard buildings/premises wiring procedures and best practices</p> <p>TK19. right procedure for handling of electrical fixtures</p> <p>TK20. use of ladders, scaffolds and personal protective equipment such as shock resistance gloves during routine working or performing tests on live circuits</p> <p>TK21. use of power drill machine and selection of drill bits for specific drilling works</p> <p>TK22. use of different common electrical hand/power tools and instruments such as pliers, crimping tool, drilling machine, grinder, earth resistance tester, tong tester, voltage tester, multimeter, etc.</p> <p>TK23. standard procedure of stacking and storing electrical materials, tools and equipment at workplace</p> <p>TK24. Use of ICTs and relevant software</p> <p>TK25. basic arithmetic and use of a calculator</p>
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Communicate in writing in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site
	Reading Skills
	The individual on the job must be able to: CS2. read in English (at least working level) CS3. read and interpret manufacturer's specifications, guidelines and electrical drawings, as applicable CS4. read and interpret safety and general signage, tags, etc. provided at the workplace
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS5. speak in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site CS6. listen attentively and interpret communication/instructions from co-workers CS7. convey information clearly and concisely to the co-workers

B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. Assess, decide and ensure that correct tools are used for a particular task PS2. Assess, decide and ensure that correct safety equipment is properly installed as per manufacturer's guidelines PS3. decide the usability of available electrical materials through visual inspection PS4. decide the type and gauge of cables to be used PS5. identify locations where lights and equipment/machinery should be placed to avoid accidents and damage to equipment/machinery PS6. decide the method of earthing and its components PS7. decide brands and models of electrical fixtures, as and when necessary PS8. decide whether the work place is safe for operations PS9. decide whether work front is clear, and if appropriate materials and tools for performing the work are available and adequate
	Plan and Organise
	The individual on the job must be able to: PS10. plan work and organise required resources in coordination with team members and the supervisor PS11. plan location of electrical lighting fixtures to utilise natural light as much as possible PS12. prioritise daily works as per the construction project requirements
	Customer Centricity
	The individual on the job must be able to: PS13. complete work as per agreed time schedule and quality PS14. use energy efficient electrical equipment so as to ensure less power consumption and wastage PS15. design the electrical wiring arrangement in an economical way or as per customer preferences, whilst maintaining good quality PS16. use electrical fixtures which will match aesthetic appeal of the workplace
	Problem Solving
The individual on the job must be able to: PS17. ensure upkeep of all electrical tools and equipment under operation according to manufacturer's guidelines or standard practice PS18. assess quantity and quality of materials for the day's work PS19. ensure safe disposal of waste and debris, and keep the work place safe and tidy PS20. resolve any conflicts within the team	
Analytical Thinking	
The individual on the job must be able to: PS21. determine and select circuit breakers of correct rating depending on the load requirements	

	<p>PS22. determine the rating of electrical fixtures such as switches, wires and fuses to be used according to the circuit load requirements</p> <p>PS23. determine the gauge of wires/cables to be used as per load requirements</p> <p>PS24. assess the proper functioning of measuring tools/equipment</p> <p>PS25. optimise the use of resources</p> <p>PS26. minimise material and time wastage in the workplace</p> <p>PS27. reconcile material consumption, as and when necessary</p>
	<p>Critical Thinking</p>
	<p>The individual on the job must be able to:</p> <p>PS28. evaluate the complexity of the task at hand, determine possible hazards related to the task and report to the superior or concerned authority for assistance</p> <p>PS29. inform superiors about the type, quality and quantity of resources required for the task</p> <p>PS30. report superiors or colleagues to the appropriate authority for any violation of safety, quality or organisational norms which may lead to accidents or any undesired situations in the work place</p>

UNIT 4 [This Unit covers the skills and knowledge required by an Electrician – Low Voltage to work effectively within a team to achieve the desired results].

Unit No.	04
Unit Title	Work effectively in a team to deliver desired results at the workplace
Description	This Unit describes the skills and knowledge required to work effectively within a team to achieve the desired results
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Interact and communicate effectively with co-workers, superiors and subordinates across different teams • Support co-workers, superiors and subordinates within the team and across interfacing teams to ensure effective execution of assigned tasks
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Interact and communicate in an effective and conclusive manner	To be competent, the individual must be able to: PC1. pass on work related information/requirements clearly to team members PC2. inform co-workers and superiors about any kind of deviations from work related requirements and procedures PC3. address work related problems effectively, and appropriately report to the immediate supervisor, if necessary PC4. receive instructions from superiors, execute them and respond effectively PC5. communicate to team members/subordinates on the appropriate work techniques or methods PC6. seek clarification and advice whenever necessary
Support co-workers to ensure effective execution of assigned tasks	To be competent, the individual must be able to: PC7. hand over the required materials, tools, equipment and work fronts timely to interfacing teams in line with company procedures PC8. work together with co-workers in a synchronised manner
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. own roles and responsibilities OK2. importance of effective communication and establishing strong working relationships with co-workers OK3. risks associated with a breakdown in teamwork, in terms of effects on project outcomes, timelines, safety at the construction site, etc. OK4. different modes of communication and their appropriate usage OK5. importance of creating healthy and cooperative work environment within and among teams

<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. different activities within his/her work area where interaction with other workers is required</p> <p>TK2. applicable techniques of work, properties of materials used, tools used, safety standards that co-workers might need as per the requirement</p> <p>TK3. importance of proper and effective communication and the expected adverse effects that can result from failure relating to quality, timelines, safety and risks at the construction site</p> <p>TK4. importance and need to support co-workers facing problems for smooth workflow</p>
<p>Skills (S)</p>	
<p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The individual on the job must be able to:</p> <p>CS1. communicate in writing in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site</p> <p>Reading Skills</p> <p>The individual on the job must be able to:</p> <p>CS2. read in English (at least working level)</p> <p>CS3. read communications from team members regarding work completed, materials and tools used, as well as support required</p> <p>Oral Communication (Listening and Speaking skills)</p> <p>The individual on the job must be able to:</p> <p>CS4. speak in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site</p> <p>CS5. listen attentively and follow instructions/communications shared by superiors and co-workers</p> <p>CS6. orally communicate with co-workers regarding support required to successfully complete work</p>
<p>B. Professional Skills</p>	<p>Decision Making</p> <p>The individual on the job must be able to:</p> <p>PS1. decide on what information is to be shared with co-workers within the team or from interfacing teams</p> <p>Plan and Organise</p> <p>The individual on the job must be able to:</p> <p>PS2. plan work and organise required resources in coordination with team members and superiors</p> <p>Customer Centricity</p> <p>The individual on the job must be able to:</p> <p>PS3. complete all assigned tasks, within agreed time schedules, in coordination with team members</p> <p>Problem Solving</p> <p>The individual on the job must be able to:</p> <p>PS4. take initiative in resolving issues among co-workers or report the same to superiors, if necessary</p>

	Analytical Thinking
	The individual on the job must be able to: PS5. employ best ways of coordination among team members PS6. communicate with co-workers taking into account their educational/social background
	Critical Thinking
	The individual on the job must be able to: PS7. evaluate the complexity of the task and determine if any guidance is required from superiors

UNIT 5 [This Unit covers the skills and knowledge required by an Electrician – Low Voltage to plan and organise work in order to meet expected quality within the established time frame].

Unit No.	05
Unit Title	Plan and organise work to meet expected outcomes
Description	This Unit describes the skills and knowledge required to plan and organise own work in order to meet expected outcome
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Prioritise work activities to achieve desired results • Organise resources prior to commencement of work
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Prioritise work activities to achieve desired results	To be competent, the individual must be able to: PC1. understand clearly the targets and timelines set by superiors PC2. plan activities as per work schedule and sequence PC3. provide guidance to subordinates to obtain desired outcomes PC4. plan housekeeping activities prior to and post completion of work
Organise resources prior to commencement of work	To be competent, the individual must be able to: PC5. list and arrange required resources prior to commencement of work PC6. select and employ correct tools and equipment for successful completion of desired work PC7. engage the allocated manpower in an appropriate manner PC8. use resources in an optimum manner to avoid wastage PC9. employ tools and equipment with care to avoid damage PC10. organise materials and tools to be used PC11. ensure that work processes adopted are in line with the specified standards and instructions
Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. importance of proper housekeeping OK2. policies, procedures and work targets set by superiors OK3. roles and responsibilities in executing own work and that of subordinates
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. standard work practices to be adopted for the assigned task TK2. how to use available resources in a judicious and appropriate manner to minimise wastage or damage

Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. communicate in writing in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site CS2. list down the assigned works and targets
	Reading Skills
	The individual on the job must be able to: CS3. read in English (at least working level) CS4. read communications from co-workers, superiors and notices from other departments as per job position/level requirements
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS5. speak in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site CS6. listen attentively and follow communications shared by co-workers regarding standard work processes, resources available, timelines, etc. CS7. communicate effectively with co-workers and subordinates within and outside one's core team
B. Professional Skills	Decision Making
	The individual on the job must be able to: PS1. decide on what sequence is to be adopted for execution of work
	Plan and Organise
	The individual on the job must be able to: PS2. plan and organise the materials, tools and equipment required to execute the work
	Customer Centricity
	The individual on the job must be able to: PS3. complete all assigned tasks with proper planning and organisation
	Problem Solving
	The individual on the job must be able to: PS4. arrange for or seek help to arrange for materials, tools and equipment in case of a shortfall
	Analytical Thinking
The individual on the job must be able to: PS5. analyse areas of work which could result in a delay of work, wastage of material or damage to tools and equipment	
Critical Thinking	
The individual on the job must be able to: PS6. evaluate potential solutions to minimise avoidable delays and wastage at the construction site	

UNIT 6 [This Unit covers the skills and knowledge required by an Electrician – Low Voltage to work according to personal health, safety and environmental rules and protocols at the construction site].

Unit No.	06
Unit Title	Work according to personal health, safety and environment rules and protocols at the construction site
Description	This Unit describes the skills and knowledge required to work according to personal health, safety and environmental rules and protocols at the construction site
Scope	This Unit covers the following: <ul style="list-style-type: none"> Follow safety norms as defined by the organisation Adopt healthy and safe work practices Implement good housekeeping and environmental protection processes and activities
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Follow safety norms as defined by the organisation	To be competent, the individual must be able to: PC1. identify and report any hazards, risks or breaches in site safety to the appropriate authority PC2. follow emergency and evacuation procedures in case of accidents, fire incidents and natural calamities PC3. follow recommended safe practices in handling construction materials, including chemical and other hazardous materials, whenever applicable PC4. participate in safety awareness programs like Tool Box Talks, safety demonstrations and mock drills conducted at the site PC5. identify and report near misses, unsafe conditions and acts
Adopt healthy and safe work practices	To be competent, the individual must be able to: PC6. correctly use appropriate Personal Protective Equipment (PPE) as per work requirements, including: <ul style="list-style-type: none"> head protection; ear protection; fall protection; foot protection; face and eye protection; hand and body protection; and respiratory protection (if required) PC7. handle all work related tools, materials and equipment safely PC8. follow safe disposal of waste, harmful and hazardous materials as per the environmental, health and safety guidelines PC9. properly install and apply all safety equipment as instructed PC10. follow safety protocol and practices as laid down by the environmental, health and safety department/team at the construction site
Implement good housekeeping practices	To be competent, the individual must be able to: PC11. collect and deposit construction waste into identified containers before disposal, clearly labelling and separating containers with toxic or hazardous wastes PC12. apply ergonomic principles wherever required

Knowledge and Understanding (K)	
A. Organisational Context (Knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. reporting procedures in cases of breaches or hazards to site safety, accidents and emergency situations as per organisational guidelines OK2. types of safety hazards at construction sites OK3. basic work ergonomic principles OK4. procedures to ensure staff compliance with health, safety and environmental rules and regulations
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. the procedure for responding to accidents and other emergencies at the construction site TK2. appropriate personal protective equipment to be used based on prevailing working conditions TK3. importance of handling tools, equipment and materials appropriately to avoid damage and injuries TK4. health and environmental effects of various types of construction materials TK5. various environmental protection methods TK6. storage of waste in appropriate locations, such as: <ul style="list-style-type: none"> • non-combustible scrap materials and debris; • combustible scrap materials and debris; • general construction waste and trash (non-toxic and non-hazardous); • any other hazardous wastes; and • any other flammable wastes. TK7. how to use hazardous materials in a safe and appropriate manner TK8. safe usage of tools and equipment TK9. housekeeping activities relevant to a particular task TK10. first aid and first aid kits
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. communicate in writing in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site CS2. fill in safety related forms for near misses, unsafe conditions and safety enhancement suggestions
	Reading Skills
	The individual on the job must be able to: CS3. read in English (at least working level) CS4. read signs and notice boards relevant to safety
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS5. speak in English (at least working level) and be able to or have the means to give simple instructions in the local language used at the site

	<p>CS6. listen attentively to instructions/communications shared by site's environmental, health and safety department/team and superiors regarding site safety CS7. communicate site conditions, hazards, accidents, etc.</p>
<p>B. Professional Skills</p>	<p>Decision Making</p>
	<p>The individual on the job must be able to: PS1. decide on a housekeeping schedule and cleaning methodology PS2. decide where to place construction materials depending on their hazard levels</p>
	<p>Plan and Organise</p>
	<p>The individual on the job must be able to: PS3. organise the safety materials, tools and equipment required to execute the work</p>
	<p>Customer Centricity</p>
	<p>The individual on the job must be able to: PS4. complete all assigned tasks safely, taking into account the safety of the end users</p>
	<p>Problem Solving</p>
	<p>The individual on the job must be able to: PS5. identify and mitigate or report safety risks that may affect one's health, safety and environment and that of others working in the vicinity</p>
	<p>Analytical Thinking</p>
	<p>The individual on the job must be able to: PS6. assess and analyse areas which may affect health, safety and environment protocols set at the construction site</p>
<p>Critical Thinking</p>	
<p>The individual on the job must be able to: PS7. behave and conduct him/herself in a safe manner PS8. respond to emergencies as soon as it is safe to do so</p>	

5. EQUIPMENT, TOOLS, AND CONSUMABLE MATERIALS

Equipment tools, and consumables include, but not limited to:

- personal protective equipment,
- electric cables and wires,
- drives and motors,
- circuit breakers,
- sockets and switches,
- test equipment,
- lighting accessories,
- lifting equipment,
- locks and lockout systems,
- toolkits,
- cutting and joining equipment and consumables,
- first aid kit,
- stretcher,
- medical kit,
- safety warning and general information signs,
- climbing ladders,
- lamp/torch,
- safety tools and equipment such as fire extinguishers and barricades,
- company's safety policy/procedure, Zambian Standards and recognised Codes of Practice applicable to the construction sector,
- company's standard operating procedures,
- incident/accident reporting templates, etc.

6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOB HOLDER

Challenges and complexities associated with the job of an Electrician – Low Voltage include: exposure to electrical power supply and high voltage, working around and with machinery having moving parts, working in dangerous areas with likelihood of sharp or falling materials, working in confined spaces and at heights, working in extreme weather such as hot and cold conditions, working in noisy, wet and dusty environments, exposure to fumes, dust, odours and chemical materials, lifting/pulling/pushing relatively heavy materials, long working hours, pressure from supervisors and colleagues, pressure from government regulators, etc.

6.1 Alternative Choices (Solutions) to Challenges and Complexities

Solutions to challenges and complexities include wearing protective clothing and ensuring their availability and use by other employees, exercising regularly to maintain physical fitness, participating in workplace safety sensitisation and awareness meetings/training sessions, adhering to statutory requirements and company's safety and standard operating procedures at all times, consulting extensively within and outside one's department/team on electrical safety issues, etc.

7. WORKING CONDITIONS/ENVIRONMENT

Working conditions include indoor and outdoor work environments, confined spaces, seasonal heat and cold or adverse weather conditions, emergency call-out, climbing heights, standing/walking for long hours, lifting objects, working in day or night shifts, areas that are noisy and dusty, areas with limited lighting and ventilation, etc.

8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE

8.1 Internal/Within the Organisation

Parties involved/interacting with the job holder who are internal to the organization include supervisors/superiors, trainers, safety team, other colleagues, etc.

8.2 External/Outside the Organisation

Parties involved/interacting with the job holder who are external to the organization include government regulators, trainers, clients, suppliers of equipment/ tools/ consumables, fellow Electricians from other companies, labour unions/ occupational health and safety associations, etc.

9. PHYSICAL DEMANDS ON THE BODY

- Physique to sustain strenuous conditions such as climbing heights;
- Walk and stand for long periods of time;
- Bend, stretch, twist, or reach out;
- Lift, carry, push and pull heavy objects;
- Use fingers, hands and feet with ease to complete the assigned task (dexterity); etc.

ANNEX A

Criteria for Assessments based on this NOS

A.1 Guidelines for Assessment

A.1.1 Criteria for assessment for curricula and learning programmes based on this NOS will be created by curricula and programmes developers. Each Performance Criteria (PC) will be assigned marks proportional to its importance in the NOS. Curricula and programmes developers will also lay down proportion of marks for theory and practical skills for each performance criteria, giving more weight to practical skills.

There shall be allocated the 'Total Mark', which will be the sum of all marks in each Unit, distributed across the number of PCs in that particular Unit. The 'out of' mark will be the mark allocated to each PC, which will be shared between theory and skills practical assessments.

A.1.2 Individual awarding/assessment bodies or institutions and other users of the NOS will create unique question papers for the theory part and evaluations for skill practical part for their respective candidates.

ANNEX B NOS Version Control

This Annex gives details necessary for the tracking of the NOS versions based on the number of revisions.

NOS Code	DNOS.E-LV.01		
ZQF Level	4	Version Number	01
Sector	Construction	Date of Approval	February 2021
Sub Sector	Real Estate and Infrastructure Construction	Date of Last Review	N/A
Occupation	Low Voltage Electrical Works	Date of Next Review	March 2026

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