

REPUBLIC OF



KENYA

NATIONAL OCCUPATIONAL STANDARDS

FOR

ELECTRICAL OPERATOR (POWER OPTION)

KNQF LEVEL 5

ISCED CODE: 07130554 B



TVET CDACC
P.O BOX 15745-00100
NAIROBI

PERFORM ELECTRICAL INSTALLATION

UNIT CODE: ENG/OS/PO/CR/01/5/B

UNIT DESCRIPTION

This unit specifies the competencies required for performing electrical installation. Competencies required includes; applying EHS Standards, preparation of working drawings, preparation of list of tools equipments, perform marking, piping and fixing accessories, performing installation, terminating installation, testing installation.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements <i>(Bold and italicised terms are elaborated in the Range)</i>
1. Apply EHS standards	1.1 <i>Safety regulations</i> are applied as per the EHS 1.2 Occupational health and safety standards are applied 1.3 <i>Good housekeeping</i> practices are applied 1.4 Accident and incidents are recorded and reported as per the working organization structure. 1.5 First aid is applied as per the as per OSHA
2. Prepare working drawings	2.1 Installation design drawing is interpreted 2.2 Symbols and nomenclatures are applied in accordance with British Standards [BS 3939] 2.3 Drawing tools are applied as per the expected task 2.4 Components and their ratings are identified 2.5 Cable sizes and lengths are shown as per the design 2.6 Power supply and distribution circuits are drawn as per the design 2.7 Phase balancing of the loads is done as per the usage 2.8 Cable routes are clearly indicated in line with design 2.9 Working drawing is prepared per the design and any deviations shared with relevant parties
3. Prepare list of tools, equipment & materials.	3.1 Tools, equipment and materials needed for the work are determined and list prepared as per established procedure 3.2 Tools, equipment and materials are checked for <i>specifications</i> and functionality as per their the standard operating procedure

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	3.3 Tools, equipment and materials are assembled and stored as per the established procedure
4. Perform marking, piping and fixing of accessories	<p>4.1 Marking, piping and fixing tools are identified as per the nature of the job</p> <p>4.2 Marking is performed as per the working drawing</p> <p>4.3 Marking is performed in line with established procedures and standards</p> <p>4.4 Marking positions are performed as per the IEE regulations</p> <p>4.5 Conduits are laid in line with standard operating procedures</p> <p>4.6 Accessories are fixed as per the established procedure</p>
5. Perform installation	<p>5.1 Installation procedures and technical standards are applied</p> <p>5.2 Working drawing is implemented</p> <p>5.3 Safety procedures are adhered to for each activity</p> <p>5.4 Cables, conductors, conduits, enclosures and support systems are installed as per the working drawing</p> <p>5.5 Cables are drawn-in in line with standard operating procedures.</p> <p>5.6 Number and size of cables are laid in a conduit is performed as per the IEE regulations</p>
6. Terminate installation	<p>6.1 Cable lugging is performed as per the standards operating procedure.</p> <p>6.2 Cables are terminated as per the IEE regulations</p> <p>6.3 Labelling of the cables is performed as per the complexity of the job.</p>
7. Test installation	<p>7.1 Type of tests are identified</p> <p>7.2 Test is performed as per the IEE regulations</p> <p>7.3 Firmness of the installation is established</p> <p>7.4 Continuity test is performed</p> <p>7.5 Insulation resistance test is performed as per the IEE regulations</p> <p>7.6 Ring circuit test is performed as per the standard operating procedure</p>

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RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance

Variable	Range
1. Installation may include but is not limited to:	<ul style="list-style-type: none"> • Domestic installation • Commercial installation • Industrial Installation • Street lighting • Security • IBMS (integrated building Management system)
2. Established Procedures may include but is not limited to:	<ul style="list-style-type: none"> • Company rules • Procedures mentioned in contract
3. Design may include but is not limited to:	<ul style="list-style-type: none"> • Electrical design for lighting and power • Electrical design for switchgear • Electrical design for alarm systems
4. Standard may include but is not limited to:	<ul style="list-style-type: none"> • IEE standard • British Standard • KEBS standard
5. IEE regulations may include but is not limited to:	<ul style="list-style-type: none"> • 17th Edition
6. Logistics includes but not limited to	<ul style="list-style-type: none"> • Personnel, Finance and input materials • Transport and storage • Communications • Security
7. Specifications may include but is not limited to:	<ul style="list-style-type: none"> • Tolerance/ range • Make / model

Variable	Range
	<ul style="list-style-type: none"> • Size • Class
8. Regulations and legislative requirements may include but is not limited to:	<ul style="list-style-type: none"> • KPLC procedures • County bylaws • Energy Act, 2006 • National Construction Authority Act • OSHA
9. Work schedule may include but is not limited to:	<ul style="list-style-type: none"> • Gantt chart • Block
10. Permit to work may include but is not limited to:	<ul style="list-style-type: none"> • KPLC permit • Gate Pass • Daily work permit • Work Tag
11. Utilities may include but is not limited to:	<ul style="list-style-type: none"> • Water, electrical power, toilets and communication

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required skills

The individual needs to demonstrate the following skills:

- Communications (verbal and written);
- Proficient in ICT;
- Time management;
- Problem solving;
- Negotiation;
- Decision making;
- First aid;
- Report writing;
- Planning;

Required knowledge

- The individual needs to demonstrate the following knowledge:
- The manufacturer's warranty requirements relating to electrical installation systems and related components.
- The legal requirements relating to electrical installations

- Kenyan legislation and workplace procedures relevant to:
 - Health and safety;
 - Environment (including waste disposal);
 - Appropriate personal protective equipment (PPE).
- Workplace procedures for:
- Work place communication;
- Time management
- Materials management
- The importance of documentation and keeping records
- The relationship between time and costs
 - The importance of using the correct sources of technical information.
- Interpreting circuits, drawings, specifications and instructions
- Preparing work plans in accordance with legislative and regulatory requirements and standard operating procedures and health and safety requirements

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1. Critical Aspects of Competency	<p>Assessment requires evidence that the candidate:</p> <ul style="list-style-type: none"> 1.1 Applied work health and safety procedures 1.2 Interpreted the design and prepared a working drawing 1.3 Applied appropriate standard 1.4 Determined types and sizes of materials and equipment and protective devices 1.5 Measurement were we taken at the site 1.6 Load was calculated as per the scope of the installation 1.7 Phases were balanced as per the expected load 1.8 Cables and accessories were installed as per the IEE regulation 1.9 Cables were terminated as per the IEE regulation 1.10 Installation was tested and results documented
2. Resource Implications	<p>The following resources must be provided:</p> <p>Resources same as that of workplace are advised to be applied including Measuring tape, pegs, calculator, stationery, accessories and cables</p>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> 3.1 Observation 3.2 Oral questioning 3.3 Practical demonstration 3.4 Written tests

4. Context of Assessment	Competency may be assessed individually in the actual workplace and simulated setting of the actual work place or during industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.