

## PERFORM ELECTRICAL INSTALLATION

**UNIT CODE:** ENG/OS/PO/CR/01/5/A

### 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

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

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|  | <p><i>specifications</i> and functionality as per their the standard operating procedure</p> <p>3.3 Tools, equipment and materials are assembled and stored as per the established procedure</p>  |
| <p>4. Perform marking, piping and fixing of accessories</p>                                    | <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 establishes 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>                          |
| <p>5. Perform installation</p>   | <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> |
| <p>6. Terminate installation</p>   | <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>   |
| <p>7. Test installation</p>  | <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>  |

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|   | 7.6 Ring circuit test is performed as per the standard operating procedure<br>7.7 Earth continuity test is performed as per the IEE regulations<br>7.8 Short circuit test is performed as per the IEE regulation |

### 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

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

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

## 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.

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

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| assessment |  |
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