

**THE REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARDS**

**FOR**

**ELECTRICAL WIREMAN**

**KNQF LEVEL 3**

**OCCUPATIONAL STANDARD ISCED CODE: 0713 254A**

# ACRONYMS

EHS Environment, Health and Safety

IET Institute of Electrical and electronics Engineers

NCA National Construction Authority

OSHA Occupational Safety and Health Act

PPE Personal Protective Equipment

TVET Technical and Vocational Education and Training

IEC Institute Electrotechnical Commission

# KEY TO UNIT CODE



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# OVERVIEW

The Electrical Wireman Level 3 occupational standard describes competences required by a person to install electrical wiring systems. The competences include ability to install PVC sheathed cable systems, trunking system and conduit system.

An Electrical wireman at this level carries out electrical work using a given design and customer’s requirements. He or she applies electrical drawings prepared by an electrical technician. The size and quantity of materials and speciﬁcations necessary to install the electrical systems is determined by the electrical technician.

**SUMMARY OF UNITS OF COMPETENCY**

|  |  |
| --- | --- |
| **Unit Code** | **Unit Title** |
| **CORE UNITS OF COMPETENCY** | |
| 0713 251 23A | Install PVC Sheathed Cable System |
| 0713 251 24A | Install Trunking System |
| 0713 251 25A | Install Conduit System |

# CORE UNITS OF COMPETENCY

## INSTALL PVC SHEATHED CABLE SYSTEM

**UNIT CODE:** **0713 251 01A**

**UNIT DESCRIPTION**

This unit specifies competences required for installing PVC sheathed cable system. The competences include identifying cables and accessories, making cable joints, interpreting electrical symbols and fixing electrical accessories.

**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.  ***(Bold and italicised terms are elaborated in the Range)*** | |
| 1. Identify cables and accessories | * 1. Safety measures are applied as per OSHA and EHS standards.   2. Electrical cable colour code is identified as per IEC standards.   3. Electrical ***cable sizes*** are identified as per IEC standards   4. ***Electrical accessories* *and fittings*** are identified as per IEC standards. | |
| 1. Make cable joints | * 1. Safety measures are applied as per OSHA and EHS standards.   2. Electrical tools and equipment are selected as per work requirement.   3. ***Electrical cable joints*** are prepared as per IEC standards.   4. ***Housekeeping activities*** are performed as per the work requirement. | |
| 1. Interpret electrical symbols | * 1. Electrical symbols are sketched as per established standards.   2. Wiring diagrams are drawn as per the work requirement   3. Electrical components are identified as per the drawing | |
| 1. Fix electrical accessories | * 1. Safety measures are applied as per OSHA and EHS standards.   2. Electrical single-phase intake point is installed as per IET regulation.   3. ***Electrical final circuits*** are installed as per design requirement.   4. ***Housekeeping activities*** are performed as per the work requirement. | |
| 1. Perform Test and Inspection | * 1. Visual inspection is carried out to the installed design.   2. Perform testing methods to the installed designs. | |

**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. Electrical cable joints include but is not limited to: | * Britannia * Married * Tee * Straight twist * Scarf |
| 1. Electrical accessories and fittings include but is not limited to: | * Sockets * Switches * Lamp holders * Junction boxes * Pattress * Couplers * Circuit breakers * Plugs |
| 1. Cable sizes may include but not limited to: | * 1.0mm2 * 1.5 mm2 * 2.5 mm2 * 4.0 mm2 * 6.0 mm2 |
| 1. Electrical final circuits may include but is not limited to: | * Lighting * Power |
| 1. Housekeeping activities may include but not limited to: | * General cleanliness * Tools and equipment storage |

**REQUIRED KNOWLEDGE**

The individual needs to demonstrate knowledge of:

* Units of measurement and abbreviations
* Work sequence
* Electrical materials
* Tools and equipment

**REQUIRED SKILLS**

* Negotiation skills
* Waste disposal
* Occupational safety and health practices

**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 | Assessment requires evidence that the candidate:   1. Identified electrical cable colour code as per IEC standards. 2. Identified electrical cable sizes as per IEC standards 3. Identified electrical accessories as per IEC standards 4. Applied safety measures as per OSHA and EHS standards. 5. Selected electrical tools and equipment as per work requirement. 6. Drew Wiring diagrams as per the work requirement 7. Prepared electrical cable joints as per IEC standards. 8. Installed electrical single-phase intake point as per IET regulation. 9. Installed electrical final circuits as per design requirement. |
| 1. Resource Implications | The following resources should be provided:  2.1 Appropriately simulated environment where assessment can take place.  2.2 Access to relevant work environments.  2.3 Resources relevant to the proposed activities or task |
| 1. Methods of Assessment | Competency may be assessed through:  3.1 Practical  3.2 Projects  3.3 Written tests  3.4 Oral questions  3.5 Portfolio of evidence  3.6 Third party evidence |
| 1. Context of Assessment | * + 1. Competency may be assessed in a work place or a simulated work place. |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## **INSTALL TRUNKING SYSTEM**

**UNIT CODE:** **0713 251 02A**

**UNIT DESCRIPTION**

This unit covers competences required in installing trunking system. The competences include identifying trunking accessories, preparing trunking work pieces, mounting trunking work pieces, installing electrical cables and accessories and perform test and inspection.

**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.  ***(Bold and italicised terms are elaborated in the Range)*** |
| 1. Identify trunking accessories | * 1. ***Trunking types*** are identified as per IEC standards.   2. ***Trunking sizes*** are identified as per IEC standards.   3. Trunking accessories are identified as per IEC standards |
| 1. Prepare trunking work pieces | * 1. Safety measures are applied as per OSHA and EHS standards   2. ***Electrical tools*** ***and equipment*** are selected as per work requirement   3. Measurements are taken as per work requirement.   4. Trunking work pieces are cut as per the measurements.   5. ***Housekeeping activities*** are performed as per the work requirement. |
| 1. Mount trunking work pieces | * 1. Safety measures are applied as per OSHA and EHS standards.   2. Mounting points are marked out as per IEC standards   3. Trunking work pieces are mounted as per the IEC standards.   4. ***Housekeeping activities*** are performed as per the work requirement. |
| 1. Install electrical cables and accessories | * 1. Safety measures are applied as per OSHA and EHS standards.   2. Electrical cable colour code is identified as per IEC standards.   3. Electrical ***cable sizes*** are identified as per IEC standards.   4. Cables are laid as per the IEC standards.   5. Accessories are fixed as per IEC standards.   6. ***Housekeeping activities*** are performed as per the work requirement. |
| 1. Perform Tests and Inspection | * 1. Visual inspection is performed as per work requirements   2. Continuity test is performed as per IEC standards   3. polarity test is performed as per IEC standards |

**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. Trunking types may include but not limited to: | * PVC * Metallic * Galvanized iron |
| 1. Trunking sizes may include but not limited to: | * 16mm x 16mm * 25mm x 16mm * 25mm x 25mm * 40mm x 25mm |
| 1. Electrical tools and equipment may include but is not limited to: | * Cutting tools * Fastening tools * Measuring tools * Marking tools * Measuring instruments |
| 1. Cable sizes may include but not limited to: | * 1.0mm2 * 1.5 mm2 * 2.5 mm2 * 4.0 mm2 * 6.0 mm2 |
| 1. Housekeeping activities may include but not limited to: | * General cleanliness * Tools and equipment storage |

**REQUIRED KNOWLEDGE**

The individual needs to demonstrate knowledge of:

* Units of measurement and abbreviations
* Work sequence
* Electrical materials
* Tools and equipment

**REQUIRED SKILLS**

**•** Communication skills

• Negotiation skills

• Digital literacy

• Waste disposal

• Occupational safety and health practices

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Identified trunking types as per IEC standards. 2. Applied safety measures as per OSHA and EHS standards 3. Cut trunking work pieces as per the measurements. 4. Mounted trunking work pieces as per the IEC standards. 5. Laid cables as per the IEC standards. 6. Fixed accessories as per IEC standards. 7. Performed Continuity test as per IEC standards 8. Code of conduct is observed as per the workplace requirement. |
| 1. Resource Implications | The following resources should be provided:  2.1 Appropriately simulated environment where assessment can take place.   * 1. Access to relevant work environments.   2.3 Resources relevant to the proposed activities or task. |
| 1. Methods of Assessment | Competency may be assessed through:   1. Practical 2. Projects 3. Written tests 4. Oral questions 5. Portfolio of evidence 6. Third party evidence |
| 1. Context of Assessment | Competency may be assessed in a work place or a simulated work place. |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |

## INSTALL CONDUIT SYSTEM

**UNIT CODE:** **0713 251 03A**

**UNIT DESCRIPTION**

This unit covers competences required in installing conduit system. The competences include identifying conduit accessories, preparing conduit work pieces, mounting conduit work pieces, installing electrical cables and accessories and perform test and inspection.

**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.  ***(Bold and italicised terms are elaborated in the Range)*** | |
| 1. Identify conduit accessories | * 1. ***Conduit types*** are identified as per IEC standards.   2. ***Conduit sizes*** are identified as per IEC standards.   3. Conduit accessories are identified as per IEC standards |
| 1. Prepare conduit work pieces | * 1. Safety measures are applied as per OSHA and EHS standards   2. ***Electrical tools and equipment*** are selected as per work requirement   3. Measurements are taken as per work requirement.   4. Conduit work pieces are cut as per the measurements.   5. ***Housekeeping activities*** are performed as per the work requirement. |
| 1. Mount conduit work pieces | * 1. Safety measures are applied as per OSHA and EHS standards.   2. Mounting points are marked out as per IEC standards.   3. Conduit work pieces are mounted as per the IEC standards.   4. ***Housekeeping activities*** are performed as per the work requirement. |
| 1. Install electrical cables and accessories | * 1. Safety measures are applied as per OSHA and EHS standards.   2. Electrical cable colour code is identified as per IEC standards.   3. Electrical ***cable sizes*** are identified as per IEC standards.   4. Cables are drawn as per the IEC standards.   5. Accessories are fixed as per IEC standards.   6. ***Housekeeping activities*** are performed as per the work requirement. | |
| 1. Perform Tests and Inspection | * 1. Visual inspection is performed as per work requirements   2. Continuity test is performed as per IEC standards   3. Polarity test is performed as per IEC standards | |

**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. Conduit types may include but not limited to: | * Metallic * PVC |
| 1. Conduit sizes may include but not limited to: | * 20mm2 * 25mm2 * 32mm2 |
| 1. Electrical tools and equipment may include but is not limited to: | * Cutting tools * Fastening tools * Measuring tools * Marking tools * Measuring instruments |
| 1. Cable sizes may include but not limited to: | * 1.0mm2 * 1.5 mm2 * 2.5 mm2 * 4.0 mm2 * 6.0 mm2 |
| 1. Housekeeping activities may include but not limited to: | * General cleanliness * Tools and equipment storage |

**REQUIRED KNOWLEDGE**

* The individual needs to demonstrate knowledge of:
* Units of measurement and abbreviations
* Work sequence
* Electrical materials
* Tools and equipment

**REQUIRED SKILLS**

• Communication skills

• Negotiation skills

• Digital literacy

• Waste disposal

• Occupational safety and health practices

**EVIDENCE GUIDE**

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

|  |  |
| --- | --- |
| 1. Critical Aspects of Competency | Assessment requires evidence that the candidate:   1. Identified conduit types as per IEC standards. 2. Identified conduit accessories as per IEC standards. 3. Applied safety measures as per OSHA and EHS standards. 4. Cut conduit work pieces as per the measurement. 5. Mounted conduit work pieces as per the IEC standards. 6. Drawn cables as per the IEC standards. 7. Fixed accessories as per IEC standards 8. Performed Continuity test as per IEC standards 9. Identified Sources of personal and business funds as per financial procedures and standards |
| 1. Resource Implications | The following resources should be provided:   1. Appropriately simulated environment where assessment can take place. 2. Access to relevant work environments. 3. Resources relevant to the proposed activities or task |
| 1. Methods of Assessment | Competency may be assessed through:  3.1 Practical  3.2 Projects  3.3 Written tests  3.4 Oral questions  3.5 Portfolio of evidence  3.6 Third party evidence |
| 1. Context of Assessment | Competency may be assessed in a work place or a simulated work place. |
| 1. Guidance information for assessment | Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended. |