



The Kenya Power & Lighting  
Co. Ltd.

**TITLE:**

**SPECIFICATION FOR SOFT  
DRAWN COPPER  
CONDUCTORS (Bare & PVC  
Covered) – for Earthing**

**Doc. No.**

**KPLC1/3CB/TSP/06/026**

**Issue No.**

**2**

**Revision  
No.**

**0**

**Date of  
Issue**

**2010-06-04**

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Authorized by: Head of Department, R&D

Signed: 

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### 0.1 Circulation List

COPY NO.	COPY HOLDER
1	Research & Development Manager
2	Procurement Manager
3	Stores & Stock Control Manager
4	Chief Manager, Distribution
5	Deputy Manager, Technical Audit

### 0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue 2 Rev 0	2010-06-03	Cancels & replaces KPLC1/3CB/TSP/05/030 Issue 1 Rev 1 of 2007-05-11	<i>S. Ngũgĩ</i> <i>Ngũgĩ</i>	<i>S. Kimani</i> <i>Kimani</i>

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## FOREWORD

This specification has been prepared by the Research & Development Department of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for soft drawn copper conductors for grounding electrical systems. It is intended for use by KPLC in purchasing the conductors.

The manufacturer shall submit information which confirms satisfactory service experience with products which fall within the scope of this specification.

### 1. SCOPE

This specification is for plain bare soft drawn copper conductors for grounding electrical systems. The specification covers bare and PVC covered conductors.

The specification also covers inspection and test of the conductors as well as schedule of Guaranteed Technical Particulars to be filled, signed by the manufacturer and submitted for tender evaluation.

The specification stipulates the minimum requirements for soft drawn copper conductors acceptable for use in the company and it shall be the responsibility of the Manufacturer to ensure adequacy of the design, good workmanship and good engineering practice in the manufacture of the conductors for KPLC.

The specification does not purport to include all the necessary provisions of a contract.

### 2. REFERENCES

The following standards contain provisions which, through reference in this text constitute provisions of this specification. Unless otherwise stated, the latest editions (including amendments) apply.

IEC 60228: Conductors of insulated cables

IEC 60502-1: Power Cables with extruded insulation and their accessories for rated voltages from 1kV (Um=1.2kV) up to 30kV (Um=36kV)- Part 1: Cables for rated voltages 1kV (Um=1.2kV) and 3kV (Um=3.6kV)

### 3. TERMS AND DEFINITIONS

For the purpose of this specification, definitions given in the reference standard shall apply.

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#### 4. REQUIREMENTS

##### 4.1 Service Conditions

The soft drawn copper conductors shall be suitable for continuous operation outdoors in tropical areas and average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C.

##### 4.2 Materials and Construction

- 4.2.1 The soft drawn copper conductors shall be suitable for grounding electrical systems where high conductivity and flexibility are required.
- 4.2.2 The conductors shall be as per IEC 60228. Sizes and electrical characteristics shall be in accordance with clause 4.3.
- 4.2.3 PVC covering shall be type PVC/A as per IEC 60502-1. The nominal thickness shall be in accordance with IEC 60502-1 (same values given in clause 4.3).

##### 4.3 Sizes

Nominal cross-sectional area mm <sup>2</sup>	Number & nominal diameter of wires No x Ø (mm)	Max. DC resistance at 20°C Ohm/km	Approx. overall diameter (uncovered conductor) mm	Nominal thickness of PVC covering mm
16	7x1.68	1.15	5.1	1.0
35	7x2.48	0.524	7.4	1.2
50	19x1.80	0.387	9.0	1.4
70	19x2.10	0.268	10.5	1.4
95	19x2.48	0.193	12.4	1.6
120	37 No. As per IEC 60228	0.153	14.5	1.6
150	37 No. As per IEC 60228	0.124	16.2	1.8

#### 5. TESTS AND INSPECTION

- 5.1 The soft drawn copper conductors shall be tested and inspected in accordance with the requirements of this specification, IEC 60502-1 and IEC 60228. It shall be the responsibility of the manufacturer to perform or to have performed the tests specified.
- 5.2 Copies of previous Test Reports (in English Language) from the relevant International or National Testing/Standards Authority of the country of manufacture (or ISO/IEC

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17025 accredited independent laboratory) shall be submitted with the tender for the purpose of technical evaluation. A copy of accreditation certificate for the laboratory shall also be submitted (all in English Language).

5.3 Routine and sample test reports for the cables to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods.

5.4 During delivery of the conductors, KPLC will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification (including verification of length on drum). The manufacturer shall replace/rectify without charge to KPLC, conductors which upon examination, test or use fail to meet any or all of the requirements in the specification.

**6. MARKING, LABELLING AND PACKING**

6.1 The finished conductor shall be wound on wooden drum such as to prevent damage during transportation and handling. The drums shall be made from treated timber resistant to termite attack.

6.2 The actual length of conductor shall not be less than the length indicated on the drum.

6.3 The following information shall be marked legibly and in a permanent manner on the flange of the drum.

- a) The manufacturer's name.
- b) The type of conductor.
- c) The conductor cross-sectional areas in mm<sup>2</sup>.
- d) The length of the conductor, in metres.
- e) The year of manufacture.
- f) The gross mass and net mass, in kilogram.
- g) The instructions for handling and use (in English Language).
- h) The words "**PROPERTY OF THE KENYA POWER & LIGHTING CO.**"

6.4 PVC covered conductors shall be marked with the manufacturer's name, type of conductor, cross-sectional area, year of manufacture and the words "**PROPERTY OF KENYA POWER & LIGHTING CO.**" An indelible marking shall also be given at every one meter interval to assist field personnel in cutting required length.

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**ANNEX A: Guaranteed Technical Particulars** (to be filled and signed by the Manufacturer for all clauses and submitted together with catalogues, brochures, drawings, technical data and test reports for tender evaluation)

**Tender No .....**

Clause Number	Bidder's offer	Reference documents to support the offer.
Manufacturer's Name & Address		
Clause 1		
Clause 2		
Clause 3		
Clause 4.1		
Clause 4.2.1		
Clause 4.2.2		
Clause 4.2.3		
Clause 4.3 (give details for sizes on tender & offered)		
Clause 5.1		
Clause 5.2 (list copies of test reports submitted with tender)		
Clause 5.3		
Clause 5.4		
Clause 6.1		
Clause 6.2		
Clause 6.3		
Clause 6.4		

**NB:** - This schedule does not in any way substitute for detailed information required elsewhere in the specification.

.....  
**Manufacturer's Name, Signature, Stamp and Date**

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