



The Kenya Power & Lighting
Co. Ltd.

TITLE:

**SPECIFICATION FOR
ALL ALUMINIUM
CONDUCTORS
(Soft Drawn)**

Doc. No. KPLC1/3CB/TSP/06/021

Issue No. 1

Revision
No. 0

Date of
Issue 2008-04-01

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Issued by: Head of Section, Tech Stds & Specs

Signed: 

Date: 2008-04-07

Authorized by: Research & Development Manager

Signed: 

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0.1 Circulation List

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

0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)

Issued by: Head of Section, Tech Stds & Specs

Authorized by: Research & Development Manager

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[Signature]

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[Signature]

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FOREWORD

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

It shall be the responsibility of the manufacturer to ensure adequacy of the design and good engineering practice in the manufacture of the conductors for KPLC. The manufacturer shall submit information which confirms satisfactory service experience with products which fall within the scope of this specification.

1. SCOPE

- 1.1. This specification is for All Aluminium conductors (soft drawn) intended for use on low voltage overhead power distribution lines.
- 1.2. The specification covers the following conductor sizes:
 - 50 sq. mm All Aluminium Conductor (soft drawn), Polyvinyl Chloride (PVC) covered.
 - 100 sq. mm All Aluminium Conductor (soft drawn), Polyvinyl Chloride (PVC) covered.

2. REFERENCES

The following documents were referred to during the preparation of this specification, in case of conflict; the provision of this specification shall take precedence.

- BS 215: Specification for Aluminium Conductors and Aluminium Conductors Steel - Reinforced for Overhead Power Transmission. Part 1: Aluminium Stranded Conductors.
- BS 6485: PVC Covered Conductors for Overhead Power Lines.
- BS 6746: Specification for PVC insulation and sheath of electric cables.
- BS 2627: Specification for Wrought Aluminium for Electrical Purposes. Wire.

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3. TERMS AND DEFINITIONS

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

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

The conductors shall be suitable for continuous outdoor operation in tropical areas at altitudes of up to 2200m above sea level, humidity of up to 90%, average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C and heavy saline conditions along the coast.

4.2. MATERIALS

Aluminium wires used in the construction of the conductor shall be soft drawn as per BS 2627.

4.3 CONSTRUCTION

4.3.1 The conductor shall be manufactured as per BS 215 part 1.

4.3.2 The conductor shall be concentrically stranded, with successive layers in opposite lay, but such that the outer layer shall be in the right hand spiral (Z). Variation in diameter shall not exceed $\pm 1\%$ of aluminium wires.

The wires in each layer shall be evenly and closely stranded.

4.3.3 The conductor shall have an inner insulation of red PVC Type TI2 to BS 6746 and over sheath of black PVC compound Type TM2 to BS 6746 and shall be applied by extrusion.

The insulation shall have a thickness of not less than 0.5mm with over sheath of not less than 0.8mm.

4.4. STANDARD SIZES

The Standard Sizes for the aluminium wires used in the construction of the conductors and the conductors sizes shall be as follows:-

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CONDUCTOR	units	50 sq. mm	100 sq. mm
Nominal Area of Aluminium	mm ²	50	100
Approximate overall diameter	mm	9.30	13.17
Overall diameter of covered conductors.	mm	11.7	16.00
Stranding	No/mm	7/3.10	7/4.39
Maximum d.c. resistance at 20°C	Ω/km	0.5419	0.2702

5. TESTS AND INSPECTION

- 5.1. The conductors shall be inspected, sampled and tested in accordance with the requirement of BS 215-1 (Bare Conductors), BS 6485 (PVC Covered Conductors) and this specification. It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified.
- 5.2. Copies of previous Type Test and Routine Test Reports issued by the National Testing/ Standards Authority of the country of manufacture (or ISO/IEC 17025 accredited laboratory) shall be submitted with the offer for evaluation (all in English Language). A copy of the accreditation certificate for the laboratory shall also be submitted. Any translations of certificates and test reports into English shall be certified by the Testing Authority.
- 5.3. The following tests shall be done at the manufacturer's works in the presence of KPLC Engineers (2) and in accordance with BS 215-1, BS 6485 and this specification:
- a) The aluminium wires shall be tested in accordance with BS 215-1 and the following.

ALUMINIUM WIRES	COMPLETE CONDUCTOR
1. Tensile test	1. Lay ratio of each layer
2. Wrapping test	2. Tensile strength
3. Resistivity test	3. Measurement of weight
	4. Resistance test

- b) The following tests shall be carried out on the PVC covered conductor in accordance with BS 6485:
1. Spark Test
 2. Conductor Resistance

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3. Thickness of PVC Covering
4. Conductor Examination and Test
5. PVC material

c) Construction/workmanship: The Manufacturer shall demonstrate during factory inspection/tests that the complete conductor is of good workmanship.

- 5.4. Test reports shall be completed for the above tests and submitted to KPLC for approval before shipment/delivery of the conductor.
- 5.5. On receipt of the conductors the purchaser (KPLC) may perform or have performed any of the tests specified in order to verify compliance with specification.

The manufacturer shall replace without charge to KPLC conductors, which upon examination, test or use, fail to meet any of the requirements in the specification.

6. MARKING AND LABELLING

- 6.1 The complete conductor shall be packed on wooden drums such as to prevent damage during transportation. The wooden drums shall be made from treated timber resistant to termite attack.
- 6.2 The actual length of conductor on a drum shall not be less than the length indicated on the drum.
- 6.3 Both ends of every drum length of conductor shall have been sealed to prevent the ingress of water during transportation, storage, handling and installation. Both ends shall be secured to the drum to prevent mechanical damage.
- 6.4 The following information shall be marked (in a permanent manner) on one flange of the reel:
 - (a) Direction of rotation of the reel
 - (b) Type of conductor and size (cross-sectional areas in mm²)
 - (c) The length of the conductor, in metres
 - (d) Gross weight and net weight (kg)
 - (e) Manufacturer's name
 - (f) Year of manufacture
 - (g) KPLC Order Number
 - (h) The instructions for handling and use (in English Language)
 - (i) The words "PROPERTY OF KENYA POWER & LIGHTING CO."

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

TENDER NO.

	Description	Guaranteed Technical Particulars for Conductor offered
1	Type and Size	
2	Service Conditions	
3	Materials	
	Aluminium (condition/grade)	
	PVC Insulation (type and thickness)	
	PVC Sheath (type and thickness)	
4	Construction & Standard	
5	Nominal area of aluminium, mm ²	
6	Overall diameter of bare conductor, mm	
7	Overall diameter of covered conductor, mm	
8	Stranding, No./mm	
	Aluminium	
	Tolerance on diameter	
9	Maximum d.c. resistance at 20°C, ohm/km	
10	Minimum breaking load, kN	
11	Approximate mass of conductor, kg/km	
12	Current carrying capacity, A (state applicable conditions)	
13	Packing, Marking & Length on drum	
14	List test reports submitted (indicate test report numbers, date, Testing Institution and their contact addresses)	
15	Manufacturer's Guarantee and Warranty	
16	List catalogues, brochures, technical data, drawings and customer sales records submitted to support the offer	
17	List Acceptance Tests to be witnessed by KPLC Engineers at the factory	
18	Statement of compliance to specification	

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

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

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