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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)

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 Alloy Conductors (AAAC). It is intended for use by KPLC in procurement of 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

This specification is for all aluminium alloy stranded conductors (AAAC) for overhead power transmission. It covers 300mm² AAAC.

2. REFERENCES

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

IEC 61089: Round wire concentric lay overhead electrical stranded conductors.

BS 3242: Specification for Aluminium Alloy Stranded Conductors for Overhead Power Transmission.

3. TERMS AND DEFINITIONS

For the purpose of this specification the definitions given in IEC 61089 shall apply.

4. REQUIREMENTS

4.1 SERVICE CONDITIONS

The conductors shall be suitable for continuous use outdoors 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, heavy saline conditions along the coast and isokeraunic levels of up to 180 thunderstorm days per year.

4.2. MATERIALS AND CONSTRUCTION

4.2.1. The conductor shall be designed and manufactured in accordance with IEC 61089 and the requirements of this specification.

4.2.2. The conductor shall be made of aluminium-magnesium-silicon alloy wires designated A2 as per IEC 61089.

4.2.3. The resistivity of the wires shall be 32.530nΩm (corresponding to 53% IACS) as per IEC 61089.

4.2.4. 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). The wires in each layer shall be evenly and closely stranded around the underlying wire or wires.

4.2.5. The conductor shall have grease applied to the centre and outer wires as protection against corrosion.

4.3. STANDARD SIZES AND CHARACTERISTICS

The standard sizes and characteristics for the conductor shall be as follows:

Nominal aluminium area (mm^2)	300
Stranding and wire diameter (No/mm)	37/3.53
Sectional Area (mm^2)	362.1
Approximate overall diameter (mm)	24.71
Approximate mass per km (kg)	997
Calculated d.c. resistance at 20°C per km (Ω)	0.091 55
Calculated breaking load (kN)	101.5

Note: (1) ***The Current Carrying Capacity of the conductor (and applicable conditions) shall be stated by the manufacturer in the technical particulars as per Annex A.***

(2) ***The above table is for conductors for existing/established designs of overhead lines as allowed by clause 5.2 of IEC 61089.***

5. TESTS AND INSPECTION

5.1 The conductor shall be inspected and tested in accordance with the requirements of this specification and IEC 61089. It shall be the responsibility of the manufacturer to

perform or to have performed the tests specified and whatever other tests he normally performs at works.

5.2 Copies of previous Type Test and Sample Test Reports issued by the relevant International or 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 IEC 61089 and this specification.

a) joints in aluminium wires;
b) stress-strain curves;
c) breaking strength of conductor;
d) tests on wire before stranding;
e) cross-sectional area, overall diameter, linear density, surface condition, lay ratio and direction of lay, (on the conductor).

5.4 **Construction/Workmanship:** The Manufacturer shall demonstrate during factory inspection/tests that the complete conductor is of good workmanship and that caging problems shall not arise during stringing.

5.5 Test reports shall be completed for the above tests and submitted to KPLC for approval before shipment/delivery of the conductor.

5.6 On receipt of the conductors KPLC may perform any of the tests specified in order to verify compliance with the 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, 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 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 legibly and in a permanent manner on the flange of the drum:

(a) Direction of rotation of the reel
(b) Type of conductor and size (cross-sectional areas in mm^2)
(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."

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

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ANNEX A: <u>**Statement of Compliance and Technical Particulars**</u> *(to be filled and signed by the Manufacturer <u>for all clauses</u> and submitted together with Manufacturer's catalogues, brochures, drawings, technical data, customer sales records and test reports for tender evaluation)*

TENDER NO................................

	Description		Guaranteed Technical Particulars for Conductor offered
1	Type and Size		
2	Service Conditions		
3	Materials	Composition	
		Grade designation as per IEC 61089	
		Resistivity of wires and % IACS	
		Grease	
4	Construction & Standard		
5	Nominal area of aluminium, mm²		
6	Overall diameter of bare conductor, mm		
7	Stranding	No./mm	
		Tolerance on diameter	
8	Maximum d.c. resistance at 20°C, ohm/km		
9	Minimum breaking load, kN		
10	Approximate mass of conductor, kg/km		
11	Current carrying capacity, A (state applicable conditions)		
12	Packing, Marking & Length on drum		
13	List test reports submitted (indicate test report numbers, date, Testing Institution and contact addresses)		
14	Manufacturer's Guarantee and Warranty		
15	List catalogues, brochures, technical data, drawings and customer sales records submitted to support the offer		
16	List Acceptance Tests to be witnessed by KPLC Engineers at the factory		
17	Statement of compliance to specification		

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Manufacturer's Name, Signature, Stamp and Date

Issued by: Head of Section, Tech Stds & Specs	Authorized by: Research & Development Manager
Signed:	Signed:
Date: 2008-04-07	Date: 2008-04-07