



ALUMINIUM CONDUCTORS STEEL REINFORCED (ACSR)
Part 4: 300 mm² (BARE)—
SPECIFICATION

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Doc. No.	KP1/13D/4/1/TSP/06/022-4
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0.1 Circulation List

COPY NO.	COPY HOLDER
1	Manager, Standards
Electronic copy (pdf) on Kenya Power server (http://172.16.1.40/dms/browse.php?fFolderId=23)	

REVISION OF KPLC STANDARDS

In order to keep abreast of progress in the industry, KPLC standards shall be regularly reviewed. Suggestions for improvements to approved standards, addressed to the Manager, Standards department, are welcome.

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0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2025-06-30	New Issue	Rotich Benard Eng. Julius Ndirangu	Dr. Eng. Peter Kimemia

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FOREWORD

This specification has been prepared by the Standards Department in collaboration with the Transmission Network Maintenance Department, both of the Kenya Power and Lighting Company Plc (KPLC). The specification lays down requirements for Aluminium Conductor Steel Reinforced (ACSR) 300 mm² (Bare) codenamed “Goat” as per BS EN 50182:2001, and herein called ‘conductor’.

This specification stipulates the minimum requirements for the conductor acceptable for use in the company and it shall be the responsibility of the supplier and manufacturer to ensure that the offered design is of the highest quality, good workmanship and good engineering practice in the manufacture of the conductors for KPLC.

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

Other Kenya Power Standards dealing with Aluminium Conductor Steel Reinforced (ACSR) for overhead lines and falling under the Kenya Power specification code *TSP/06/022*, and under the general title *Aluminium Conductor Steel Reinforced*, are listed below:

TSP/06/022-1: Aluminium Conductors Steel Reinforced - Part 1: Single Wire Earth Return System — Specification

TSP/06/022-2: Aluminium Conductors Steel Reinforced - Part 2: 75 mm² & 150 mm² (Bare and PVC Covered) — Specification

TSP/06/022-3: Aluminium Conductor Steel Reinforced (ACSR) Part 3: 175 mm² (Bare) — Specification

Users of this KPLC specification are responsible for its correct interpretation and application.

The following are members of the team that developed this specification:

Name	Department
Sande O. Semo	Transmission Network Maintenance
Rotich Benard	Standards
Eng. Julius Ndirangu	Standards

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1. SCOPE

- 1.1. This specification is for Aluminium Conductors Steel Reinforced, 300mm² (bare) for high voltage overhead power lines, and provides for the manufacture, testing, supply and delivery of Aluminium Conductors Steel Reinforced (ACSR).
- 1.2. The specification also covers inspection and test of the Aluminium Conductors Steel Reinforced, 300mm² (bare) as well as a schedule of Guaranteed Technical Particulars to be filled and signed by the manufacturer and submitted for tender evaluation.
- 1.3. The specification stipulates the minimum requirements for ACSR, 300mm² (bare) conductors acceptable for use in the company and it shall be the responsibility of the supplier to ensure adequacy of the design, good engineering practice, adherence to the specification, applicable standards and applicable regulations as well as ensuring good workmanship in the manufacture of the ACSR, 300mm² (bare) conductors for the Kenya Power & Lighting Company Plc. This specification does not purport to include all the necessary provisions of a contract.

2. REFERENCES (NORMATIVE)

The following standards contain provisions which through reference in this text constitute provisions of this specification. For dated editions the cited edition shall apply; for undated editions the latest edition of the referenced document shall apply.

- IEC 62641: Conductors for overhead lines – Aluminium and aluminium alloy wires for concentric lay stranded conductors
- IEC 61089: Round wire concentric lay overhead electrical stranded conductors.
- IEC 61394: Overhead lines - Requirements for greases for aluminium, aluminium alloy and steel bare conductors
- BS 2627: Specification for wrought aluminium for electrical purposes. Wire
- IEC 63248: Conductors for overhead lines – Coated or clad metallic wire for concentric lay stranded conductors
- BS EN 50182:2001: Conductors for Overhead lines – Round wire concentric lay stranded conductors

3. DEFINITIONS AND ABBREVIATIONS

3.1. Definitions

For the purpose of this specification the definitions and abbreviations given in the reference standards shall apply.

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4. REQUIREMENTS

4.1. Service Conditions

- 4.1.1. The ACSR, 300mm² (bare) conductors shall be suitable for use outdoors in tropical areas and harsh climatic conditions including areas exposed to:
- Altitudes of up to 2200m above sea level
 - Humidity of up to 95%,
 - Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C, in direct sunlight,
 - Heavy saline conditions along the coast and
 - Isokeraunic levels of up to 180 thunderstorm days per year.

4.2. Materials

4.2.1. Aluminium

- 4.2.1.1. The aluminium shall be of the highest purity commercially obtainable and shall not be less than 99.5% as per IEC 62641. Certificates of analysis, giving the percentage and nature of impurities in the metal from which the wires were made from, shall be submitted.
- 4.2.1.2. The aluminium wire used in the manufacture of ACSR conductors shall conform to BS 2627. Aluminium wires shall be material in the H9 condition as specified in BS 2627 Clause 2.3 and characteristics as per Clause 2.4 of the standard.
- 4.2.1.3. Joints in the wire before final drawing shall be permitted in accordance with clause 5.5.4 of IEC 61089. Joints in the aluminium wire shall not be permitted in the final drawing.
- 4.2.1.4. Aluminium wires shall be uniform in quality, circular in cross section, clean, smooth and free from harmful defects, splinter irregularities and brittle places.
- 4.2.1.5. The characteristics of the Aluminium used for the construction of ACSR conductor shall be as per Table 1.

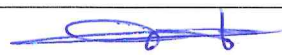
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Table 1: Characteristics of aluminium wires used for construction of standard Aluminium Conductors Steel Reinforced as per BS 2627, IEC 63248 & IEC 61089, BS EN 50182:2001

Particulars	300mm ² (Goat)	
	Units	Value
Standard diameter	mm	3.71
Tolerance of diameter	%	+ 1.0
Resistivity at 20 ⁰ C, max	μΩcm	2.8264
Density at 20 ⁰ C	g/cm ³	2.703
Coefficient of linear expansion	/ ⁰ C	23 x 10 ⁻⁶

4.2.2. Reinforcement Steel wire

- 4.2.2.1. The steel wire used for the reinforcement of the ACSR conductor shall conform to IEC 63248 and the tensile strength grade of the steel wire shall conform to mechanical properties of ST1A wires as per IEC 63248.
- 4.2.2.2. Joints in the base steel rod or wire before final drawing shall be permitted in accordance with the clause 5.5.1 of IEC 61089. Joints in the steel wire shall not be permitted in the final drawing.
- 4.2.2.3. All steel core wires shall be hot-dipped galvanized to comply with the requirements of IEC 63248. The purity of zinc shall be 99.98%, and the minimum zinc mass per unit area shall be 245g/m².
- 4.2.2.4. The weight and uniformity of coating and zinc adhesion shall be in accordance with IEC 63248.
- 4.2.2.5. Galvanized Steel wires shall be uniform in quality, circular in cross section, clean, smooth and free from harmful defects, splinter irregularities and brittle places.
- 4.2.2.6. The tensile strength and stress at 1% elongation values, calculated on the nominal dimensions of the finished wire, shall conform to IEC 63248.
- 4.2.2.7. The elongation at break shall conform to IEC 63248, measured after fracture on an original gauge length of 250mm and the coefficient of linear expansion is 11.5 x 10⁻⁶/°C.

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- 4.2.2.8. The ratio of mandrel diameter to wire diameter for ductility wrapping test shall be 1 and the minimum number of torsions shall be 16 as per IEC 63248.
- 4.2.2.9. The ratio of mandrel diameter to wire diameter for coating adherence test shall be 4 as per IEC 63248.
- 4.2.2.10. The tolerance on nominal diameter of the galvanized steel wire shall conform to IEC 63248. The zinc-coated steel wires shall not depart from the nominal diameter, when measured over the coating by more than ± 0.05 mm.
- 4.2.2.11. The characteristics of the Galvanized steel wire used for the construction of ACSR conductor shall be as per Table 2.

Table 2: Characteristics of galvanized steel wires used for construction of standard Aluminium Conductors Steel Reinforced as per IEC 63248 & IEC 61089, BS EN 50182:2001

Particulars	300mm ² (Goat)	
	Units	Value
Standard diameter	mm	3.71
Tolerance of diameter	mm	± 0.05
Minimum coating weight of zinc	g/m ²	245
Resistivity at 20°C, max	$\mu\Omega\text{cm}$	19.157
Density at 20°C	g/cm ³	7.78
Coefficient of linear expansion	/°C	11.5×10^{-6}
Modulus of Elasticity (<i>E</i>)	N/mm ²	195,000

4.2.3. Grease

- 4.2.3.1. Neutral grease shall be applied between and over the layers of steel wires only. This shall be as shown in Figure C.2 of IEC 61089 and Fig. 1 below. Wax thickened greases shall be applied at a temperature above the dropping point.
- 4.2.3.2. The grease used to protect the conductor from corrosion in service shall have the following requirements satisfying IEC 61394:
- Shall not flow, deteriorate nor exude from the conductor during storage, transport, erection or service at temperatures of up to 100°C (degrees Celsius).
 - Shall have adequate resistance to oxidation

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- c) Shall not be inimical to aluminium or galvanized steel and it shall also have good adhesive and cohesive properties
- d) Shall retain these qualities after weathering.
- e) Shall be compatible with any wire drawing lubricant that might be applied on the conductor
- f) Shall not extrude a surplus to the outside of the conductor after erection.
- g) shall be substantially free from contaminants.
- h) Shall not present any risks to health and shall comply with all the relevant current health and safety standards and requirements.

4.2.3.3. The minimum fill factor of grease shall not be less than 70 percent. Each layer of wire except the outer layer shall have, both lengthwise and peripherally, an even and continuous coating of grease.

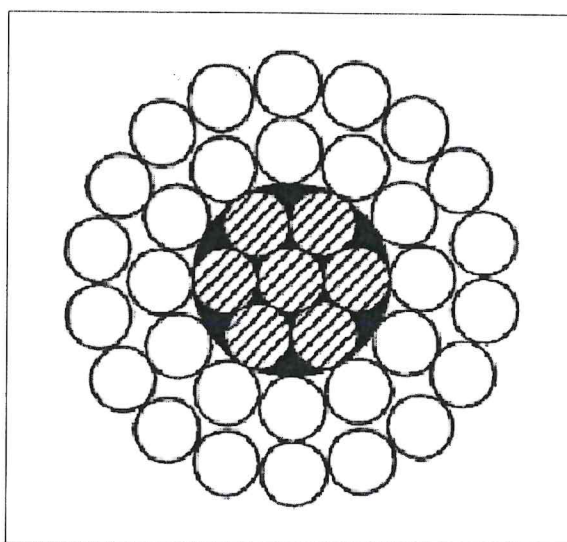


Figure 1: Application of grease as per Fig C.2 of IEC 61089

4.3. Construction of Conductor

4.3.1. The conductor shall be manufactured as per BS EN 50182: 2001 with stranding conforming to IEC 61089.

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- 4.3.2. The conductor shall be concentrically stranded, with successive layers in opposite lay, but such that the outermost layer shall be in the right hand spiral (Z) as per BS EN 50182: 2001.
- 4.3.3. The wires in each layer shall be evenly and closely stranded. The complete conductor and its layers shall be firm and solid.
- 4.3.4. The lay ratios for the zinc coated steel wire layers shall be 16 to 26. as per BS EN 50182: 2001 and IEC 61089. The lay ratios for the aluminium wires shall be 10-16 for all inner layers and 10-14 for the outer layer as per as per BS EN 50182: 2001 and IEC 61089. The lay ratio of any layer shall be equal to or less than the lay ratio of the layer immediately beneath it.
- 4.3.5. Steel wires shall be formed during stranding so that they remain inert when the conductor is cut.
- 4.3.6. All steel wires shall lie naturally in their position in the stranded core, and where the core is cut, the wire ends shall remain in position or be readily replaced by hand and then remain approximately in position. This requirement also applies to aluminium wires of the conductor.
- 4.3.7. Before stranding, aluminium and steel wires shall have approximately uniform temperatures.
- 4.3.8. There shall be no joints of any kind made in the steel core wire during stranding. Joints in individual aluminium wires are permitted, in addition to those made in the wire before final drawing, but no two such joints shall be less than 15 m apart in the complete stranded conductor. Such joints shall be made by resistance or cold-pressure butt-welding or other approved methods.
- 4.3.9. It shall be demonstrated during factory inspection/tests that good workmanship has been exercised in the manufacture of the complete conductor and that caging problems shall not arise during stringing.
- 4.3.10. The completed conductor shall be free from dirt, grit, excessive amounts of drawing oil and other foreign deposits. No grease shall be accepted on the outer layer.

4.4. Workmanship

- 4.4.1. The conductors shall be cleaned and free of imperfections, such as pipes, laps, cracks, kinks, bends, twists, seems excessive grease and other injurious defects.
- 4.4.2. Higher quality of work shall be maintained in drawing the wire and fabrication of the conductors.

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- 4.4.3. Due precaution shall be taken to prevent the aluminium wires making contact with copper conductors, copper parts or copper residues during the process of redrawing, stranding as well as storage.
- 4.4.4. All machines and equipment used for this purpose of redrawing shall be properly cleaned, free from any copper residues.

4.5. Complete Conductor Characteristics

The complete stranded conductor shall have the following properties as shown in Table 3 as per BS EN 50182: 2001 & IEC 61089

Table 3: Characteristics for the Complete Conductor

Stranded Conductor characteristics		Units	300mm ²
Nominal Area of Aluminium		mm ²	300
Stranding No/ Diameter	Aluminium	No/mm	30/3.71
	Steel	No/mm	7/3.71
Nominal overall diameter of conductors		mm	26.0
Calculated sections of conductors	Aluminium	mm ²	324.3
	Steel	mm ²	75.7
	Total	mm ²	400.0
Maximum DC resistance at 20°C		Ω/km	0.0891
Rated Strength		kN	135.13
Mass of conductor per kilometre—excluding mass of grease		Kg/km	1488.2
Minimum Ampacity		A	Manufacturer to state

5. TEST AND ACCEPTANCE REQUIREMENTS

The conductor shall be tested and inspected in accordance with IEC 63248, BS EN 50182: 2001, BS 2627, IEC 62641, IEC 61089, IEC 61394 and the requirements of this specification. It shall be the responsibility of the supplier to test or to have all the relevant tests performed.

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6. MARKING AND PACKING

6.1. PACKING

- 6.1.1. The conductor shall be supplied on impregnated drums of approved materials constructed so as to enable the conductor to run smoothly. The drums shall be firm and any collapsed drums shall be rejected during delivery.
- 6.1.2. Length of conductors on any drum shall not be less than 2,000m.
- 6.1.3. The conductor shall be wound on non-returnable drum, strong enough and with lagging of adequate strength, constructed to protect the conductor against all displacement during transit, storage and subsequent handling and stringing operation in the field.
- 6.1.4. The drum shall be suitable for wheel mounting.
- 6.1.5. The drum shall be suitable for letting off the conductor under controlled tension of the order of 5kN minimum.
- 6.1.6. Outside the protective lagging, there shall be minimum two binders consisting of hoop iron or galvanized steel wire. Each protective lagging shall have recesses to accommodate hoop binders.
- 6.1.7. The conductor ends shall be properly sealed and secured with the hoop of “B” nails or bolts on the side of one of the flanges to avoid loosening of the conductor layers during transit and handling.
- 6.1.8. Both ends of the drum length of the conductor shall have been sealed to prevent ingress of water during transportation, storage, handling and installation.

6.2. CONSTRUCTION OF DRUMS

6.2.1. Wooden Components

All wooden components shall be manufactured out of seasoned soft wood free from defects that may materially be weak on the component parts of the drums. Preservative treatment shall be applied to the entire drum with preservative of such a quality which is not inimical to the conductor.

6.2.2. Flanges

- 6.2.2.1. The flanges shall be of two ply construction with such ply at right angle of the other and nailed together. The nails shall be driven from the inside face of flanges, punched and then

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cleaned on the outer face. There shall be at least 3 nail per plank of ply with maximum nail spacing 70- 75 mm.

6.2.2.2. There will be a slot in the flange to receive the inner end of the conductor; the entrance shall be in line with the periphery of the barrel.

6.2.2.3. Spindle hole shall be provided at the center of the middle planks of the plies and spindle planets with 100 mm diameter holes shall be fitted on either side of both the flanges.

6.2.3. Drum and Supports

The end supports shall be securely fixed by nailing and may be disc or segmental type. The middle barrel support of the two ply construction of disc type with a 100 mm diameter concentric with the holes in flanges shall be provided at the centres of the barrel supports.

6.2.4. Drum

6.2.4.1. The wooden batons used for making the barrel of the conductor shall be segmental type. These shall be nailed to the barrel supports with at least two nails.

6.2.4.2. The batons shall be closely butted and shall provide a round barrel with smooth surface. The edges of the batons shall be rounded or compared to avoid damage to the conductor.

6.2.5. Drum Studs

Barrel studs shall be used for the construction of drum. The flanges shall be holed and the barrel supports slotted to receive them. The barrel studs shall be threaded over a length on either end sufficient to accommodate washers, spindle plates and nuts for fixing at the required spacing.

6.2.6. Iron Components

The nuts on the studs shall stand pound of the flange. All the nails used on the inner surface of the flanges and the drum barrel shall be counter sunk at least 5 mm deep. The ends of barrel shall generally be flushed with the top of the nuts.

6.2.7. Protective Arrangement

6.2.7.1. The inner side of the flanges and drum barrel surfaces shall be painted with bitumen based paint.

6.2.7.2. Before reeling, cardboard of double corrugated or thick bituminised water proof bamboo paper shall be secured to the drum barrel and inside the flanges of drum by means of suitable adhesive materials. These protective wrappings and the adhesive material used shall be of a quality which is not inimical to the conductor.

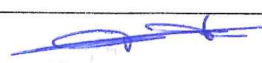
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6.2.7.3. After reeling the conductor, the exposed surface of the outer layer of the conductor shall be wrapped with water proof, thick, bituminised bamboo paper and also with thick plastic sheet to prevent the conductor from dirt, grit and damage during transport and handling.

6.3. MARKING:

6.3.1. Each drum shall have the following information stencilled on it in indelible ink along with other essential details:

- KPLC Order Number/ specification number.
- Manufacturer's name or trade mark.
- Type, Code name and size of the conductor (cross-sectional areas in mm²).
- Length of the conductor in metres.
- Gross weight (of drum and conductor) and net weight (of the conductor) in kg
- Month and year of manufacture
- Direction of rotation of the reel (Arrow marking for unwinding)
- Position of the conductor end.
- Instructions for handling
- The words "**PROPERTY OF KENYA POWER & LIGHTING COMPANY Plc.**"

6.3.2. The actual length of conductor on a drum shall NOT be less than the length indicated on the drum.

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APPENDICES

APPENDIX A: TESTS AND INSPECTION (NORMATIVE)

- A.1. Copies of test certificates by a third party testing laboratory accredited to ISO/IEC 17025 shall be submitted with the offer for evaluation. A copy of the accreditation certificate for the testing laboratory shall also be submitted with the tender (all in English Language). Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Authority. A copy of the accreditation certificate to ISO/IEC 17025 for the testing laboratory shall also be submitted (all in English language).
- A.2. Copies of type test reports to be submitted with the tender (by bidder) for evaluation shall be as stated:

Table 4: Type Tests

Aluminium Wires	Steel Wires	Grease	Complete Conductor
1. Tensile test	1. Stress at 1% elongation	1. Adherence test	1. Lay ratio of each layer
2. Wrapping test	2. Tensile test	2. Stability and Aging test	2. Tensile strength
3. Resistivity test	3. Wrapping test	3. Corrosion test	3. Measurement of weight
4. Chemical composition	4. Galvanizing test	4. Oil Separation test	4. Resistance test
			5. Stress Strain Curves

- A.3. The conductors shall be subject to acceptance tests at the manufactures' works before dispatch. Acceptance tests (routine & sample tests) will be witnessed by two Engineers appointed by The Kenya Power and Lighting Company Limited (KPLC). Routine and sample test reports for the conductors to be supplied shall be submitted to KPLC for approval before shipment of the goods.
- A.4. Tests to be witnessed by KPLC Engineers at the factory before shipment shall be the same as those in clause A.2, in accordance with this specification, BS EN 50182, BS 2627, IEC 63248, IEC 61089 and IEC 61394

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A.5. On receipt 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. The supplier shall replace without charge to KPLC, conductors which upon examination, test or use fail to meet any of the requirements in the specification

APPENDIX B: QUALITY MANAGEMENT SYSTEM (NORMATIVE)

- B.1. The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the conductor design, material, workmanship, tests, service capability, maintenance and documentation, will fulfil the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfil the requirements of ISO 9001:2008/2015
- B.2. The Manufacturer's Declaration of Conformity to reference standards and copies of quality management certifications including copy of valid and relevant ISO 9001: 2008 or 2015 certificate shall be submitted with the tender for evaluation.
- B.3. The bidder shall indicate the delivery time of the conductors, manufacturer's monthly and annual production capacity and experience in the production of the type and size of conductor being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for the conductors sold in the last five years together with reference letters from four of the customers shall be submitted with the tender for evaluation.

APPENDIX C: TECHNICAL DOCUMENTATION (NORMATIVE)

- C.1. The bidder shall submit its tender complete with technical documents for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:
- a) Fully-filled clause by clause Guaranteed Technical Particulars (GTPs)- Appendix D - stamped and signed by the manufacturer.
 - b) Copies of the Manufacturer's catalogues, brochures, drawings and technical data;
 - c) Sales records for previous five years and reference letters from at least four of the customers;
 - d) Details of manufacturing capacity and the manufacturer's experience;
 - e) Copies of required type test certificates and type test reports by a third party testing laboratory accredited to ISO/IEC 17025;

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- f) Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;
- g) Manufacturer's letter of authorization, copy of the manufacturer's ISO 9001:2015 certificate and other technical documents required in the tender.
- h) Test report of grease used in the manufacture of ACSR conductor and its technical specifications including its expected life before expiry.
- i) Certificates of analysis, giving the percentage and nature of impurities in the metal from which the aluminium wires were made from.

C.2. The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:

- a) Fully filled clause by clause Guaranteed Technical Particulars (GTPs) stamped and signed by the manufacturer **(these are not the ones submitted with the tender)**;
- b) Authentic manufacturing drawings & construction details of the conductors including 3-D views; stamped and signed by the manufacturer.
- c) Test Program to be used after manufacture;
- d) Marking details and method to be used in marking each conductor;
- e) Manufacturer's undertaking to ensure adequacy of the design, adherence to applicable regulations, standards and specification, ensure good workmanship and good engineering practice in the manufacture of the conductors for The Kenya Power and Lighting Company Limited;
- f) Packaging details (including packaging materials and marking and identification of component packages).
- g) Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001:2008 or 2015.

C.3. The drawings to be submitted by the supplier to KPLC for approval before manufacture shall be in standard format clearly indicating the drawing number, dimensions, parts list with material details and quantities, standard of manufacture, ratings, approval details and identity of the manufacturer (as per manufacturer's authorization submitted during tendering).

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**APPENDIX D: GUARANTEED TECHNICAL PARTICULARS (GTPS) —
NORMATIVE**

(to be filled and signed by the Supplier and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records for previous five years, four customer reference letters, details of suppliers' capacity and experience; and copies of complete type test certificates and test reports for tender evaluation, all in English Language)

Tender No.

Bidder's name and Address.....

Clause	Description		Bidder's offer
	Manufacturer's Name & Country of manufacture		State
	Type Reference/Model Number of item		State
	Supplier's name		Specify
1.1 – 1.3	Scope		State
2	Applicable Standards		List
3	Definitions and Abbreviations		State
4	REQUIREMENTS		
4.1	Service conditions		
4.1.1	Service conditions Conductors will be exposed to		Specify
4.2	Materials		
4.2.1	Aluminium		
4.2.1.1	Purity of pre-draw aluminium		State
4.2.1.2	Condition of aluminium wires as per BS 2627		State
4.2.1.3	Final aluminium wire has no joints		State
4.2.1.4	Quality of aluminium wires		State
4.2.1.5 Table 1	Characteristics of aluminium	Standard diameter, mm	State values
		Tolerances on diameter	State values
		Resistivity at 20 ⁰ C, max, μΩcm	State values
		Standard Density, at 20 ⁰ C, g/cm ³	State values
		Coefficient of linear expansion, / ⁰ C	State values
4.2.2	Reinforcement Steel wire		
4.2.2.1	Material of the reinforcement steel wire and tensile strength grade		State
4.2.2.2	No joints in the final drawn steel wire as per IEC 61089		Specify
4.2.2.3	Galvanization standard and minimum hot-dip zinc coating of steel wires		Specify
4.2.2.4	Weight and uniformity of coating standard		Specify
4.2.2.5	Quality of Galvanized steel wire		State

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4.2.2.6	Tensile strength and stress at 1% elongation values	Specify
4.2.2.7	Elongation at break	State
4.2.2.8	Ratio of mandrel diameter to wire diameter for ductility wrapping test	State
4.2.2.9	Ratio of mandrel diameter to wire diameter for coating adherence test	State
4.2.2.10	Tolerance on the nominal diameter of galvanized steel	State
4.2.2.11 Table 2	Characteristics galvanized steel wires	Standard diameter, mm
		Tolerances on diameter
		Minimum coating weight of zinc
		Resistivity at 20 ⁰ C, max, μΩcm
		Standard Density, at 20 ⁰ C, g/cm ³
		Coefficient of linear expansion, / ⁰ C
		Modulus of Elasticity (E), N/mm ²
4.2.3	Grease	
4.2.3.1	Application shall be as per Fig. C.2 of IEC 61089 and Fig. 1 of specification	State
4.2.3.2	Grease conforms to IEC 61394	State
	Shall not flow or deteriorate at temperatures up to 100 ⁰ C	Specify
	Have adequate resistance to oxidation	Specify
	Shall not be inimical to aluminium or galvanized steel	Specify
	Shall retain its qualities after weathering	Specify
	Compatible with any wire drawing lubricant	Specify
	Shall not extrude a surplus to the outside conductor	Specify
	Free from contaminants	Specify
4.2.3.3	Shall not present any health risk to users	Specify
	Minimum fill factor of grease	State
4.3	Construction of Conductor	
4.3.1	Standards of manufacture of the conductor	State
4.3.2	The stranding of successive layers	State
4.3.3	Wires are evenly and closely stranded; layers firm and solid	State
4.3.4	Lay ratio of zinc coated steel wires	State
	Lay ratio of Aluminium wires	State
	Lay ratio of any layer compared to layer beneath	State
4.3.5	Steel wires remain inert when the conductor is cut.	State
4.3.6	Behaviour of steel wires & outer layer of Aluminium wires when conductor is cut	State

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4.3.7	Stranding done with aluminium and steel having uniform temperatures	Specify
4.3.8	No joints during stranding	State
4.3.9	Good workmanship demonstrated during factory inspection	State
4.3.10	Completed conductor free from dirt or contaminants	Specify
4.4	Workmanship	Specify
4.4.1	Conductors are clean, free of imperfections	State
4.4.2	Drawing of wire and fabrication of conductors	State
4.4.3	No contact between Aluminium with copper	State
4.4.4	Machines properly cleaned, free from copper residues	State
4.5	Complete Stranded Conductor characteristics	
	Nominal Area of Aluminium, mm ²	State values
	Stranding No/Diameter	Aluminium, No/mm.
		Steel, No/mm
	Nominal overall diameter of conductors, mm	State values
	Calculated Cross sectional area of conductors, mm ²	Aluminium
		Steel
		Total
	Rated Strength, kN	State values
	Maximum DC resistance at 20°C, Ω/km	State values
	Mass of conductor per kilometre—excluding mass of grease, Kg/km	State values
	Minimum Ampacity, A	State values
5	Tests and Acceptance Requirements	State
5.1	Test standards	State
	Responsibility of carrying out tests	State
6	Marking and Packing	
6.1	Packing	
6.1.1	Shall be supplied on impregnated drums	State
6.1.2	Minimum length of conductor per drum	State
6.1.3	Adequate strength of lagging	State
6.1.4	Drum suitable for wheel mounting	State
6.1.5	Minimum tension to withstand when for letting the conductor	State
6.1.6	Material and number of binders	State
6.1.7	Method and means of sealing and securing the conductor ends	State
6.1.8	Both ends of conductor sealed for ingress protection	State
6.2	Construction of drums	
6.2.1	Type of treatment for wooden components material	State
6.2.2	Flanges	

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Kenya Power

TITLE:
ALUMINIUM CONDUCTOR
STEEL REINFORCED (ACSR)
Part 4: 300 mm² (BARE) —
SPECIFICATION

Doc. No.	KP1/13D/4/1/TSP/06/022-4
Issue No.	1
Revision No.	0
Date of Issue	2025-06-30
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6.2.2.1	Number and angle of fixing the ply on the flanges, nails per plank and spacing	State
6.2.2.2	Slot in flange to receive the inner end of the conductor	State
6.2.2.3	Spindle hole	State
6.2.3	Barrel support centres shall have a 100mm diameter concentric disc with holes	State
6.2.4	Drum	
6.2.4.1	Wooden batons of segmental type, nailed with at least 2 nails	State
6.2.4.2	Batons closely butted to avoid conductor damage	State
6.2.5	Barrel studs threaded on either ends to accommodate washers, spindle plates etc.	Specify
6.2.6	Nuts stand pound of flange, nails on inner surface counter sunk, ends of the flanges flushed with top of the nuts	Specify
6.2.7	Protective Arrangement	
6.2.7.1	Inner side of the flanges painted with bitumen-based paint	Specify
6.2.7.2	Cardboard of double corrugated or thick bituminised water proof bamboo paper, fitted before reeling	State
6.2.7.3	Exposed surface of the outer layer of the conductor wrapped with water proof, thick, bituminised bamboo paper and also with thick plastic sheet after reeling	State
6.3	Marking	
6.3.1	Markings on the drums	State
6.3.2	Actual length of the conductor NOT less than the indicated.	State
	APPENDICES	
A	TESTS AND INSPECTION (NORMATIVE)	
A1	Copies of test certificates and routine test reports TO BE submitted with offer	Submit
A2	Copies of type test reports to be submitted with the tender (by bidder) for evaluation, Accreditation Certificate	List/Submit
A3	Conductors shall be subjected to Factory Acceptance Tests witnessed by Kenya Power engineers	State Compliance
A4	The FATs shall be same as in Clause A2	State
A5	Supplier shall replace without charge to KPLC items that don't meet specification	State
B	QUALITY MANAGEMENT SYSTEM (NORMATIVE)	
B1	QAP and ISO 9001:2015	Submit
B2	Copies of quality management certifications attached, Declaration of Conformity	Submit
B3	Delivery time, Production capacity & experience of the manufacturer	Submit
C1	Technical documents to be submitted with tender documents	
	a. Fully-filled clause by clause Guaranteed Technical Particulars (GTPs)- Appendix D - stamped and signed by the manufacturer.	State
	b. Manufacturer's catalogues, brochures, drawings and technical data;	state

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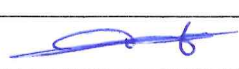
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	c. Sales records for previous five years and reference letters from at least four of the customers;	Specify
	d. Details of manufacturing capacity	State
	e. Copies of required type test certificates and type test reports by a third party testing laboratory accredited to ISO/IEC 17025;	State
	f. Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;	State
	g. Manufacturer's letter of authorization, copy of the manufacturer's ISO 9001:2008 certificate	State
	h. Test report of grease used in the manufacture of ACSR conductor and its technical specifications including its expected life before expiry	State
	i. Certificate of Analysis	State
C2	Documents to be submitted for approval before manufacture	
	a. Fully filled clause by clause Guaranteed Technical Particulars (GTPs	State
	b. Authentic manufacturing drawings; stamped and signed by the manufacturer.	State
	c. Test Program to be used after manufacture;	State
	d. Marking details and method to be used in marking each conductor;	State
	e. Manufacturer's undertaking	State
	f. Packaging details (including packaging materials and marking and identification of component packages).	State
	g. Quality assurance plan (QAP)	State
C.3	Drawings to be submitted to KPLC for Approval before manufacture	State

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

NOTE:

- Bidders/Manufacturers shall give full details of the items on offer as per the specification and applicable standards. The details provided shall conform to the test reports and their certificates, as well as labelled drawings complete with dimensions, catalogues and/or brochures for the purpose of tender evaluation.*
- Bidders/Manufacturers should note that the above Guaranteed Technical Particulars Schedules must be fully completed and submitted with the bid. Wherever there is conflict between the GTPs and the clauses in the specification, the clauses in the specification take precedence. Failure to complete the schedules shall lead to rejection of the bid.*

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Kenya Power

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STEEL REINFORCED (ACSR)
Part 4: 300 mm² (BARE) —
SPECIFICATION

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3. *Guaranteed values shall be specified. Words like 'agreed', 'confirmed', 'As per KPLC specifications', etc. shall not be accepted and shall be considered non-responsive.*

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