



Kenya Power

TITLE:

**SPECIFICATION FOR STAY
WIRES & GUY GRIPS**

Doc. No.

KP1/6C.1/13/12/TSP/03/021

Issue No.

2

Revision No.

0

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2016-06-03

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0.1 Circulation List

COPY NO.	COPY HOLDER
1	Manager ,Standards
Electronic copy (pdf) on Kenya Power server (currently: Network→stima-fprnt-001→techstd&specs)	

0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue 2 Rev 1	2015-06-03	1. Include the ISO/IEC 17025 in reference 2. Change Manufacturer to Supply in forward 3. Change Clause 6.3 sentence starting "Each drum length---" to read 'Each drum length shall have only one continuous length of approximately 1000m for 19/3.55/700 stay wire size and approximately 2000m for all other sizes of stay wire.'	S. Nguli	P. Kimemia

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FOREWORD

This specification has been prepared by the Standards Department of The Kenya Power and Lighting Company Limited (abbreviated as KPLC) and it lays down requirements for stay wires and preformed guy grips. It is intended for use by KPLC in purchasing the items.

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

1. SCOPE

This specification covers steel wires for use as stays and for similar purposes on overhead power distribution lines and preformed guy grips to be used with size 19/3.55/700 galvanized stay wire.

The specification covers the following sizes:-

- a) Stay Wire sizes: 7/2.00/700, 4/4.00/700, 7/4.00/700 and 19/3.55/700 all to BS 183.
- b) Pre-formed guy grip, dead-end, for 19/3.55/700 stay strand.

The specification also covers inspection and test of the stay wires and preformed guy grips as well as schedule of Guaranteed Technical Particulars to be filled, signed by the supplier and submitted together with other required technical details for tender evaluation.

The specification stipulates the minimum requirements for stay wires and preformed guy grips acceptable for use in the company and it shall be the responsibility of the supplier to ensure adequacy of the design, adherence to the specification and applicable standards, good workmanship and good engineering practice in the manufacture of the stay wires and preformed guy grips for KPLC.

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

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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.

BS 183: British standard specification for general purpose galvanized steel wire strand.

BS 443: British standard specification for testing zinc coatings on steel wire and for quality requirements.

ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories

3. TERMS AND DEFINITIONS

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

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

The conductor shall be suitable for continuous outdoor operation in tropical areas with the following conditions.

- a) Altitude: up to 2,200m above sea level;
- b) Temperature: average of +30°C with a minimum of -1°C and max +40 °C;
- c) Humidity: up to 95%;
- d) Pollution: Design pollution level to be taken as "Heavy" (Pollution level III) for inland and "Very Heavy" (Pollution level IV) for coastal applications in accordance with IEC 60815
- e) Isokeraunic level: 180 thunderstorm days per year

4.2. STAY WIRES

4.2.1 Material

- 4.2.1.1 The base metal shall be of such quality and purity that, when drawn to the size of wire specified and coated with zinc, the finished strand and the individual wires shall be of uniform quality and have the properties and characteristics as specified in this specification.

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4.2.1.2 The galvanized steel wires used in the construction of the stay wire shall comply with the requirement of BS 443.

4.2.2 Construction

4.2.2.1 The stay wire shall be manufactured to BS 183 and to this specification.

4.2.2.2 The outer wires of all strands shall have a right-hand lay (Z).

4.2.2.3 All wires shall be stranded with uniform tension. Stranding shall be sufficiently close to ensure no appreciable reduction in diameter when stressed to 10% of the specified wire strength.

4.2.2.4 The wires shall be concentrically twisted with a uniform pitch of not less than 10 and not more than 18 times the specified nominal diameter of the strand.

4.2.2.5 There shall be no joints in the completed strand as per BS 183.

4.2.3 Standard Sizes of Stay Wires

The stay wires shall have the following mechanical properties:

Table 1: mechanical properties

size (to bs 183)	grade (to bs 183)	minimum elongation 600mm (as per bs 183)	in	minimum breaking load	existing reference (imperial)	size
7/2.00	700	10%		15.4kN	7/14 SWG	
4/4.00	700	10%		35.2kN	4/8 SWG	
7/4.00	700	10%		61.6kN	7/8 SWG	
19/3.55	700	10%		131.6kN	19/10 SWG	

4.3. Guy Grips

4.3.1 The guy grips shall be suitable for use with Stay Strand (Stay Wire) to BS183 and of the following characteristics.

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Size of Stay Wire: 19/10 SWG (19/3.55/700 mm), right hand lay.
Minimum failing load of stay wire: 131.6 kN)

- 4.3.2 The guy grips shall be manufactured from galvanized steel wire of such quality that when applied to the specified stay strand, they hold full rated breaking strength of the stay strand.
- 4.3.3 The galvanized steel wires used in the construction of the guy grip shall comply with the requirement of BS 443.
- 4.3.4 The guy grips shall be heli-formed to be quickly made and present a neat finished appearance. They shall have a long-term performance commensurate with other fittings used in guying applications.
- 4.3.5 The guy grips shall be capable of being removed and re-applied to their original position on the stay strand up to three times for the purpose of stay adjustment during line construction procedures.

4.4 QUALITY MANAGEMENT SYSTEM

- 4.4.1 The bidder shall submit a 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.
- 4.4.2 The Manufacturer's Declaration of Conformity to reference standards and copy of quality management certification to ISO 9001: 2008 shall be submitted with the tender for evaluation.
- 4.4.3 The bidder shall indicate the delivery time of the stay wires and preformed guy grips, manufacturer's monthly & annual production capacity and experience in the production of the type and size of items being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar size of stay wires and preformed guy grips sold in the last five years as well as reference letters from at least four of the customers shall be submitted with the tender for evaluation.

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5. TESTS AND INSPECTION

5.1 The stay wires and preformed guy grips shall be inspected and tested in accordance with the requirements of this specification, BS 183 and BS 443. It shall be the responsibility of the supplier to perform or to have performed all the required tests.

5.2 Copies of previous Test Reports issued by a third party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for the purpose of technical evaluation. The accreditation certificate for the testing laboratory shall also be submitted with the tender (all in English Language).

The copies of previous test reports to be submitted with the tender for evaluation shall include the following tests to BS 183:

- a) Dimensions (diameter)
- b) Tensile & Elongation test
- c) Wrapping test

5.3 Test reports to BS 183 for the stay wires and guy grips to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods. KPLC Engineers (2) will witness these tests at the factory before shipment. The tests to be carried out at the factory shall include, but are not limited to:

- a) Dimensions (diameter)
- b) Tensile & Elongation test
- c) Wrapping test
- d) Verification of the length on a randomly selected drum
- e) Verification of marking

5.4 During delivery of the stay wires and guy grips, 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/rectify without charge to KPLC, stay wires and guy grips which upon examination, test or use fail to meet any or all of the requirements in the specification.

5.5 Should a test piece fail to meet any of the test requirements, two additional tests in respect of the same requirements shall be made on material taken from the same drum. If the results of both additional tests fulfill the requirements, the drum shall be deemed to comply. If either of

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the additional tests do not meet the requirements, the drum shall be deemed not to comply with this specification.

6. MARKING, LABELLING AND PACKING

- 6.1 The words "Property of Kenya Power & Lighting Co Ltd." shall be marked at intervals of 500mm on the centre strand by laser cutting. The laser cutting shall not change the required mechanical properties of the stay wire.
- 6.2 The completed stay wire shall be wound in one continuous length on wooden drum such as to prevent damage during transportation. The wooden drums shall be made from treated timber resistant to termite attack. The drums shall be firm, with wooden lagging all round and any collapsed drums shall be rejected during delivery.
- 6.3 The actual length of stay wire shall not be less than the length indicated on the drum. Each drum shall have only one continuous length of approximately 1000m for stay wire size 19/3.55/700 and 2000m for all other sizes of stay wires.
- 6.4 Both ends of every drum length of stay wire shall be sealed with PVC plugs to prevent the ingress of water during transportation, storage, handling and installation. Both ends shall be secured to the drum to prevent mechanical damage.
- 6.5 The following information shall be marked legibly and in a permanent manner on the flange of the drum of stay wire and on metallic label attached to guy grips package:
- a) The manufacturer's name;
 - b) The designation of the stay wire/guy grip;
 - c) The length of the stay wire, in meters;
 - d) The gross mass and net mass, in kilogram;
 - e) Standard of manufacture
 - f) The instructions for handling and use (in English Language);
 - g) The words "Property of The Kenya Power & Lighting Co. Ltd."

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7. DOCUMENTATION

7.1 The bidder shall submit its tender complete with technical documents required by Annex A (Guaranteed Technical Particulars) for tender evaluation. The documents to be submitted (all in English language) for tender evaluation shall include the following:

- a) Guaranteed Technical Particulars;
- b) Copies of the Manufacturer's catalogues, brochures, drawings and technical data;
- c) Sales records and at least four customer reference letters;
- d) Details of manufacturing capacity and the manufacturer's experience;
- e) Copies of test reports by a third party testing laboratory accredited to ISO/IEC 17025;
- f) Copy of accreditation certificate for the testing laboratory.

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

- a) Guaranteed Technical Particulars,
- b) Design Drawings construction details of the stay wires and preformed guy grips,
- c) 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
- d) Test Program to be used after manufacture,
- e) Marking details and method to be used in marking the stay wires and guy grips,
- f) Manufacturer's undertaking to ensure adequacy of the design,
- g) Packaging details (including packaging materials and length on drum).

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ANNEX A: Guaranteed Technical Particulars (to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, customer reference letters (4), details of manufacturing capacity, the manufacturer's experience and copies of test reports for tender evaluation, all in English Language)

Bidder's Name & Address **Tender No.....**

clause	REQUIREMENT	BIDDER'S OFFER (indicate full details of offered item)
1	Name & address of manufacturer	state
	Country of manufacture	state
	Manufacturer's letter of authorization (for each item)	
2.0	reference standards	state
3.0	terms & definitions	state
4.1	Service Conditions	state
4.2	Stay Wires	
4.2.1	Materials and standard of manufacture	specify
4.2.1.1	Base metal and level of galvanization	specify
4.2.1.2	Galvanized wire and standard of complied to	specify
4.2.2	Construction	
4.2.2.1	Standard of manufacture of wires	state
4.2.2.2	Direction of lay and lay ration	state
4.2.2.3	Diameter tolerance of single wires	State value
4.2.2.4	Pitch for concentrically twisted wires	State value
4.2.2.5	Provision for joints	specify
4.2.3	Standard sizes of stay wires	
	Standard Size (to BS 183)	State value
	Grade (to BS 183)	State grade
	Minimum elongation in 600mm, %	State value
	Minimum breaking load, kN	State value
4.3	Guy Grips	
4.3.1	Size of stay wire and failing load	specify
4.3.2	Standard of manufacture	state
4.3.3	Standard of manufacture of steel wires	state
4.3.4	Formation of guy grips and performance	specify

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clause	REQUIREMENT	BIDDER'S OFFER <i>(indicate full details of offered item)</i>
4.3.5	Re-usability of guy grips	specify
4.4	QUALITY MANAGEMENT SYSTEM	
4.4.1	Quality Assurance Program	submit
4.4.2	Declaration of conformity to standard	state
4.4.3	Production capacity	state
5.1	Test standard(s) for stay wires and guy grips	state
5.2	List test reports submitted (indicate test report numbers, date, Testing Institution and their contact addresses)	List
5.4	Test reports to be submitted to KPLC before delivery	List
5.5	Replacement of non-compliant stay wires and guy grips r	State compliance
6.1	Mode of Packing, & Length on drum	specify
6.3	Mode of Sealing of both end of stay wires and guy grips	specify
6.4	Permanent Marking on the drum	state
7.1	Documents submitted with tender	List
7.2	Documents to be submitted to KPLC for approval before manufacture	List
Other details required with the tender	Manufacturer's Guarantee and Warranty	Attach
	List catalogues, brochures, technical data, drawings and customer sales records submitted to support the offer	Attach
	List Acceptance Tests to be witnessed by KPLC Engineers at the factory	List
	Statement of compliance to specification	state

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Manufacturer's Name, Signature, Stamp and Date

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