



TITLE:  
**SPECIFICATION FOR STAY  
RODS AND TURNBUCKLES**

Doc. No.	KP1/6C.1/13/TSP/03/022
Issue No.	1
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Authorized by: Manager, Standards

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### 0.1 Circulation List

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

### 0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
1	2015-06-03	1. Forward: To amend "manufacturer" to "supplier"	S. Nguli	Dr. Eng P. Kimemia
		2. Scope: Metric equivalents indicated		
		3. Tests and Inspection Clause 5.3: Tests to be witnessed by KPLC engineers indicated		

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## FOREWORD

This specification has been prepared by the Standards Department of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for Stay Rods and Turnbuckles. It is intended for use by KPLC in purchasing the items.

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

### 1. SCOPE

1.1 This specification covers Stay Rods and Turnbuckles for use on stays and for similar purposes on overhead power lines.

1.2 This specification covers the following sizes:

#### 1.2.1 Stay Rods:

- a) 6ft x  $\frac{5}{8}$ " (1.83M x 15.88mm)
- b) 8ft x  $\frac{3}{4}$ " (2.44M x 19.05mm)
- c) 9ft x 1" (2.74M x 25.4mm)

#### 1.2.2 Turnbuckle Double Eye Bolt:

- a) 10" x  $\frac{5}{8}$ " (254mm x 15.88mm)
- b) 12" x  $\frac{3}{4}$ " (304.8mm x 19.05mm)

The specification also covers inspection and test of the Stay rods and Turnbuckles 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 Stay rods and Turnbuckles acceptable for use in the company (KPLC) and it shall be the responsibility of the supplier to ensure adequacy of the design, good workmanship and good engineering practice in the manufacture of the Stay rods and Turnbuckles for KPLC.

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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.

ISO 1461: Metallic Coatings – Hot dip galvanized coatings on fabricated ferrous products – Requirements.

ISO 1460: Metallic Coatings – Hot dip galvanized coatings on fabricated ferrous metals – Determination of mass per unit area – Gravimetric method.

BS 464: Specification for thimble for wire ropes.

BS 1387: Specification for screwed and socketed steel tubes and tubulars and for plain and steel tubes suitable for welding or screwing to BS 21 pipe threads.

BS 3643: ISO metric screw threads.

BS 4360: Specification for weldable structural steels.

**3. TERMS AND DEFINITIONS**

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

**4. REQUIREMENTS**

**4.1 SERVICE CONDITIONS**

The stay rods and turnbuckles 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%;

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- 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. MATERIALS**

**4.2.1. Stay rods**

- 4.2.1.1 The threads shall be to BS 3643, coarse pitch, tolerance class 7H/8g (free fit).
- 4.2.1.2 The screw-in stay anchor and the adjustable head shall be manufactured from Grade 43A steel as specified in BS 4360.

**4.3. CONSTRUCTION**

**4.3.1 Stay Rods**

- 4.3.1.1 The stay anchor and the adjustable head shall have hexagon lock nuts of the same size as the hexagon head of the tubular turnbuckle.
- 4.3.1.2 The lower end of the stay anchor shall be forged square to fit square plate.  
  
The stay rod shall be complete with a square plate for securing the rod to a concrete stay block. The dimensions of the square plate shall be 100x100x6mm and 100x100x12mm as indicated on the drawings for each size of stay rod.
- 4.3.1.3 The stay adjustable head shall have a forged eye with a thimble suitable for the specified stay wire sizes.
- 4.3.1.4 The stay rod assembly shall be galvanized to ISO 1461.
- 4.3.1.5 The complete stay rod assembly shall have the minimum failing load as stated in clause 4.4 and shall be in accordance with Drawings No. TSP/03/022/01

**4.3.2 Turnbuckles, Double Eyebolt**

- 4.3.2.1 The turnbuckle shall be manufactured from Grade 43A steel as specified in BS 4360.  
The Threads shall be to BS 3643, course pitch tolerance class 7H/8g (free fit).

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4.3.2.2 The tubular turnbuckle shall have hexagon head (consisting of a forged hex ended plug welded in the tube and tapped right hand). It shall have provision for greasing.

4.3.2.3 The tubular turnbuckle (the tube portion of the adjustable rod) shall be manufactured from heavy gauge steel tube as specified in BS 1387.

4.3.2.4 The turnbuckle shall have a forged eye bolt at each end and shall be supplied complete with hexagon lock nuts and thimble on each side suitable for the specified stay wire size.

4.3.2.5 The turnbuckle shall be double screw threaded in opposite directions to achieve simultaneous adjustment/tightening.

4.3.2.6 The complete turnbuckle assembly shall be galvanized to ISO 1461 and have the minimum failing load as stated in clause 4.4.

**4.4. STANDARD SIZES**

4.4.1 The standard sizes for the Stay rods shall be as follows:

Table 1: Stay rods standard sizes

SIZE	MINIMUM FAILING LOAD	SIZE OF STAY WIRE (Stay wire to BS183)
6ft x 5/8" (1.83Mx 15.88mm)	52 kN	4/8 stay wire
8ft. x 3/4" (2.44Mx 19.05mm)	71.3 kN	7/8 stay wire
9ft. x 1" (2.74M x 25.4mm)	145 kN	19/10 stay wire

4.4.2 The standard sizes for the Turnbuckles (double eye bolt) shall be as follows:

Table 2: Turnbuckles (double eye bolt) standard sizes

SIZE	MINIMUM FAILING LOAD	SIZE OF STAY WIRE (Stay wire to BS183)
10" x 5/8" (254x 15.88mm)	52 kN	4/8 stay wire
12" x 3/4" (304.8x 19.05 mm)	71.3 kN	7/8 stay wire
10" x 7/8" (254 x22.23mm)	145 kN	19/10 stay wire

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#### 4.5. QUALITY MANAGEMENT SYSTEM

- 4.5.1. The supplier 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.
- 4.5.2. The Manufacturer's Declaration of Conformity to reference standards and copies of quality management certifications including copy of valid and relevant ISO 9001: 2008 certificate shall be submitted with the tender for evaluation.
- 4.5.3. The bidder shall indicate the delivery time of the stay rods and turnbuckles, manufacturer's monthly and annual production capacity and experience in the production of the type and size of stay rods and turnbuckles being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for the stay rods and turnbuckles sold in the last five years together with reference letters from four of the customers shall be submitted with the tender for evaluation.

#### 5. TESTS AND INSPECTION

- 5.1 Tests shall be done in accordance with the requirements of BS 4360, BS 464, BS 1387, BS 3643, ISO 1461, ISO 1460 and the requirements of this specification. It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified.
- 5.2 Certified true copies of previous test reports by the relevant 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 Accreditation Certificate for the laboratory shall be submitted to support the test reports.
- 5.3 The stay rods and turnbuckles shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by The Kenya Power and Lighting Company Limited (KPLC).  
The tests reports to be shall include, but not limited to:-  
(i) Tensile strength  
(ii) Galvanization  
(iii) Dimensional verification of all parts

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5.4 Test reports for the stay rods and turnbuckles to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods.

**6. MARKING AND LABELLING**

6.1 The following information shall be marked legibly and indelibly on the stay rod/turnbuckle:

- i) Manufacturer's Name or Trademark;
- ii) Manufacturer's Type Designation;
- iii) Minimum Failing Load and Dimensions.
- iv) Property of **K P L C**

**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 cable,
- 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 rods and turnbuckles
- 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 and Statement of Compliance** (to be filled and signed by the Manufacturer and submitted together with copies of Manufacturer's catalogues, brochures, drawings, technical data, sales records, copy of accreditation certificate for test laboratory and certified true copies of test reports for tender evaluation)

Clause	Guaranteed Technical Particulars	Bidder's Offer
1	Manufacturer's name & country of manufacture of item offered	state
	Manufacturer's type reference number for the item	state
	Manufacturer's drawing number	state
	Type & size	state
4.1	Service conditions	specify
4.2.1.1- 4.2.1.2	Standard and grade of manufacture	state
	<b>Materials:</b> a) Tubular part	specify
	b) Stay anchor & adjustable head	specify
	c) Thimble	Specify design
4.3.1.1- 4.3.1.5	d) Forged base and eye	specify
	Standard and grade of steel for manufacture of turnbuckle	state
	<b>Construction:</b> a) Tubular turnbuckle	Specify
	b) Lower end forged	specify
	c). Adjustable head with lock nuts	specify
	e) Threading in opposite direction	specify
f) Level of Galvanizing	State values	
	g) Minimum failing load for complete assembly	Specify for each size
5.1	Test standards	state
5.2	List of copies of Design and Type Test Reports submitted (indicate Test Report Numbers, Testing Authority and contact addresses)	List
5.3	Copies of previous Test Reports from an ISO/IEC 17025	Specify
5.4	List Acceptance Tests to be witnessed by KPLC Engineers at the factory	List

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Clause	Guaranteed Technical Particulars	Bidder's Offer
5.5.	Inspection and Acceptance at KPLC stores	State compliance
	Replacement of rejected poles at no extra cost to KPLC	State compliance
6.1	Marking (indicate parameters and method of marking to be used during manufacture)	Specify
6.2	Packaging (indicate parameters and method of packaging to be used during and after manufacture)	Specify
6.3	Handling and storage instruction to be provided during delivery	Specify
7.1	Documents submitted with tender	list
7.2	Documents to be submitted to KPLC for approval before manufacture	specify
Other details required with the tender	List of catalogues, brochures, technical data, drawings and customer sales records submitted to support the offer.	specify
	Deviations from tender specifications and supporting data, test reports, technical documents etc.	specify

**NB:** - *This schedule shall be used during tender evaluation and must be supported by Manufacturer's catalogues, brochures, drawings, technical data, sales records, copy of accreditation certificate for test laboratory and certified true copies of test reports.*

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

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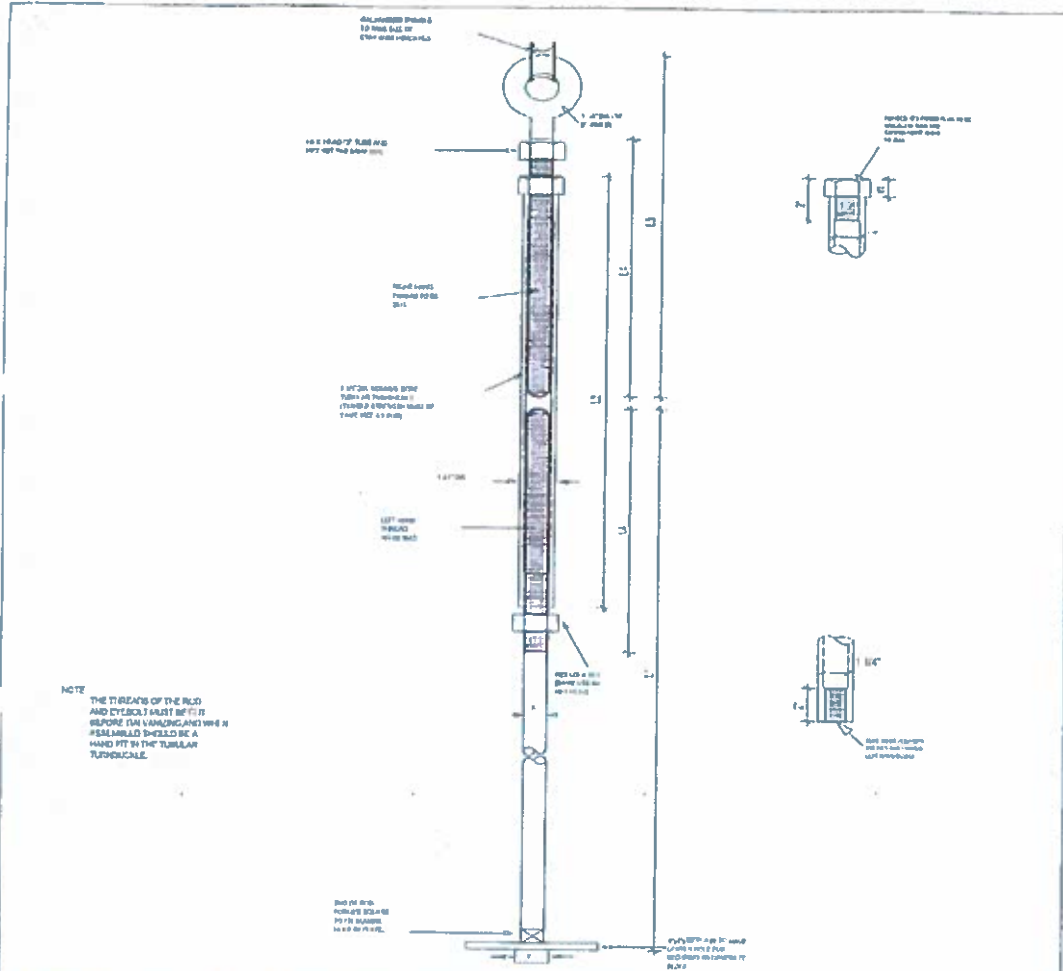
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NOTE  
THE THREADS OF THE ROD  
AND EYEBOLT MUST BE FIT  
BEFORE THE VANDERING AND  
ASSEMBLED SHOULD BE A  
HAND FIT IN THE TUBULAR  
TURNBUCKLE.

ITEM	QTY	UNIT	DESCRIPTION	REMARKS
1	1	EA	STAY ROD 1"x9FT AND 3/4"x8FT	
2	1	EA	TURNBUCKLE 1/2"x10"	

Dimensions in inches or its nearest metric equivalent

MATERIAL: HDG STEEL  
GALVANIZING ISO 1461

DATE	2016-06-03
BY	[Signature]
CHECKED	[Signature]
APPROVED	[Signature]

STAY ROD 1"x9FT AND 3/4"x8FT

K.P. 61.03.1.1  
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