



TITLE:
**SPECIFICATION FOR TREATED
WOOD POLES. Part 1:
Eucalyptus Poles**

Doc. No.	KP1/3CB/TSP/03/001-1
Issue No.	6
Revision No.	1
Date of Issue	2014-03-30
Page 1 of 13	

TABLE OF CONTENTS

0.1 Circulation List

0.2 Amendment Record

FOREWORD

1. SCOPE
2. REFERENCES
3. TERMS AND DEFINITIONS
4. REQUIREMENTS
5. TESTS AND INSPECTION
6. MARKING
7. DOCUMENTATION

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 for past five years, customer reference letters, details of manufacturing capacity, the manufacturer's experience and copies of test certificates and test reports for tender evaluation, all in English Language*

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Issue No.	6
Revision No.	1
Date of Issue	2014-03-30
Page 2 of 13	

0.1 Circulation List

COPY NO.	COPY HOLDER
1	Research & Development Manager
2	Supply Chain Manager, Procurement
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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)
Issue 6	2014-03-30	Included pole top diameter of 140mm for 10m poles for low voltage lines	Head of Section	Head of
Rev 1			TS&S & Senior Wood Scientist	Department, R&D

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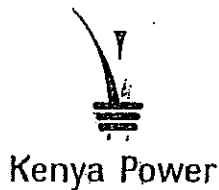
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Doc. No.	KP4/3GB/TSP/03/004-1
Issue No.	6
Revision No.	1
Date of Issue	2014-03-30
Page 3 of 13	

- FOREWORD

This specification has been prepared by the Research and Development Department in collaboration with the Supply Chain – Logistics Department and Distribution Division all of The Kenya Power and Lighting Company Limited (abbreviated as KPLC) and it lays down requirements for treated wooden poles (eucalyptus). It is intended for use by KPLC in purchasing treated wooden poles.

The bidder shall submit information which demonstrates satisfactory capacity and service experience of the manufacturer with products which fall within the scope of this specification.

1. SCOPE

This specification is for treated wooden poles of eucalyptus timber preserved with creosote or with a solution of copper, chromium and arsenic salts (or oxides); and intended to be used as upright supports for power transmission and distribution lines.

The specification also covers inspection and test of the poles 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 treated wooden poles of eucalyptus timber acceptable for use in the company (KPLC) and it shall be the responsibility of the supplier to ensure adequacy of the design, good workmanship, good engineering practice and adherence to applicable standards, regulations and specifications in the manufacture of the treated wooden poles for The Kenya Power and Lighting Company Limited.

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.

KS 02-93 Glossary of terms used in timber

KS 02-94 Kenya standard specification for Preservation of timber

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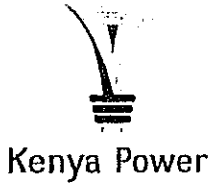
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Doc. No.	KP1/3CB/TSP/03/001-1
Issue No.	6
Revision No.	1
Date of Issue	2014-03-30
Page 4 of 13	

KS 516:2008 Kenya standard specification for Wood poles for power and telecommunications lines

3. TERMS AND DEFINITIONS

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

4. REQUIREMENTS

4.1. PREPARATION AND SEASONING

4.1.1. Species

Wood Poles shall be of any species of wood given in KS 516 as shown in Table 1.

Table 1: Species of Wood

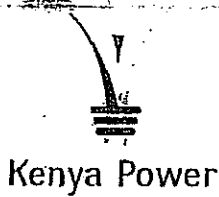
Standard or Trade Name	Scientific Name	Other Names
Iron Bark	<i>Eucalyptus paniculata</i>	Gum or Eucalyptus
Spotted Gum	<i>Eucalyptus citriodora</i> (<i>corymbia citriodora</i>) or <i>Eucalyptus maculata</i> (<i>corymbia maculate</i>)	Lemon Scented Gum or Eucalyptus
Tallow Wood	<i>Eucalyptus microcorys</i>	Spotted Gum or eucalyptus blue gum
Blue Gum	<i>Eucalyptus globulus</i>	
Regnans saligna gum	<i>Eucalyptus regnans</i> <i>Eucalyptus saligna</i> Or <i>Eucalyptus grandis</i>	Giant Gum (mountain ash) Blue gum (Saligna gum) Or River Red Gum

4.1.2. Felling

The trees shall be cut as close to the ground level as possible. The ends shall be sawn to give a flat section and branches shall be dressed down flush with the trunk. The poles shall then be stacked in open crib formation on flat clear ground.

4.1.3. Moisture content

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Issue No.	6
Revision No.	1
Date of Issue	2014-03-30
Page 5 of 13	

The average moisture content of individual poles at the time of treatment shall not exceed 25%.

4.1.4. Defects

The poles shall be of sound wood, free from decay, insect attack, rot pockets and any damages caused by handling and processing that would affect the strength of the poles.

Growth and seasoning defects (knots, spiral grain, end check, surface check and ring shakes) shall be limited to the requirements as set in KS 516:2008.

4.1.5. Straightness

A straight line from the centre of the butt to the centre of the tip shall lie entirely within the body of the pole.

Poles shall be free from crooks that deviate more than 75mm from straightness in any 2m length as shown in KS 516:2008.

4.1.6. Dimensions

4.1.6.1 The length of the pole shall conform to the values specified in the tables in clause 4.4, with a tolerance of ± 75 mm.

4.1.6.2 Holes shall be drilled in the pole to support fittings and shall have a diameter of 18mm for pole size 10.0m and diameter of 24mm for all other pole sizes, with a tolerance of ± 1 mm.

Holes shall be on a straight line parallel to the axis of the pole and 90° to the diameter.

The table below shows the required drilling positions, measured from the top of the pole for each pole category:

a) 10m Poles - four holes positioned as follows:

STANDARD POLE LENGTH	POSITION OF EACH HOLE FROM THE TOP OF THE POLE (mm)				
	Hole No. \Rightarrow	1	2	3	4
10m		150	455	760	1065

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Issue No.	6
Revision No.	1
Date of Issue	2014-03-30
Page 6 of 13	

b) Other pole sizes: one hole positioned at 150mm from the top

4.1.6.3 The butt end of the pole shall be cut square to within 5°. The top end shall be cut to a slant angle of 60° (- 0° + 5°) to the longitudinal axis (longer side).

4.1.6.4 Shaping and cutting of poles as well as drilling of holes shall be carried out before impregnation. Poles shall be shaved free of the bark, and branches shall be cut off neatly in the direction of growth and be dressed down flush with the trunk before impregnation.

4.2. IMPREGNATION

4.2.1. The poles shall have a minimum sap wood thickness of 15mm as observed at each end of pole.

4.2.2 The average moisture content of the pole at the time of impregnation shall be as indicated in clause 4.1.3, being expressed as a percentage on dry weight before treatment.

4.2.3. Impregnation shall be carried out using the full cell (vacuum-pressure) process according to Kenya standard specification KS:02-94.

4.2.4. The preservative used shall be specified in the Tender document but shall be either creosote in mineral oil base, or formulations of water soluble compounds of copper, chromium and arsenic (CCA), in accordance with Kenya standard specification KS 02-94; but as specifically required by KPLC in clause 4.2.5.

4.2.5. The penetration shall be complete in the sapwood and the retention shall be at levels not less than the following:

a) 100 kg/m³ for Creosote

b) 20 kg/m³ specific sapwood retention for CCA

Please note that these are weights of the Creosote and CCA retained per meter cubed of treated wood respectively. These preservatives are defined in KS 02-94.

4.2.6 Care shall be taken to ensure that the poles have undergone complete preservative fixation and are safe to handle before delivery. Fixation period shall not be less than 72 hours after preservative impregnation.

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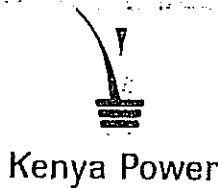
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Issue No.	6
Revision No.	1
Date of Issue	2014-03-30
Page 7 of 13	

4.3 BANDING AND COLOUR CODING

4.3.1 Banding

4.3.1.1. Each end of each pole shall be banded by one band of galvanized mild steel strapping of width not less than 19mm and thickness not less than 1.2mm. The strapping is to be firmly tensioned into position by the use of a suitable strapping machine capable of applying a tensile force of not less than one half of the ultimate tensile strength of the strapping being used. Each band is to be nailed to the pole at four different positions evenly located on the pole using galvanized clout nails of not less than 3mm diameter and length not less than 38mm.

4.3.1.2. The bands are to be applied at 100mm ± 10mm away from each end of the pole.

4.3.1.3. The banding shall be done after seasoning and dressing of the poles and prior to treatment.

4.3.2 Colour Coding

A coloured tag made of galvanized steel plate at least 50mm x 50mm x 1.2mm in dimensions shall be used at both ends of each pole to facilitate size identification in storage and handling. The paint used for colour coding shall be indelible and shall be in accordance with the table below:

STANDARD POLE LENGTH (M)		COLOUR OF PAINT
10.0	182.5 TGL (140mm top diameter)	BLACK
	202.5mm TGL (160mm top diameter)	PINK
	222.5mm TGL (180mm top diameter)	GREEN
	11.0	NAVY BLUE
	12.0	YELLOW
	14.0	RED
	15.0	SKY BLUE
	17.0	WHITE
	18.0	ORANGE

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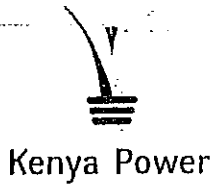
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Issue No.	6
Revision No.	1
Date of Issue	2014-03-30
Page 8 of 13	

The tag shall be secured onto the pole by use of four galvanized wire nails of a minimum length of 50mm.

4.4 DIMENSIONS AND STRENGTH VALUES FOR POLES (as per KS 516:2008)

LENGTH m	MINIMUM TOP DIAMETER mm	MINIMUM DIAMETER AT THEORETICAL GROUNDLINE mm	THEORETICAL GROUNDLINE (TGL) FROM BUTT m	FORCE REQUIRED TO CAUSE A FIBRE STRESS OF 55MPa (CANTILEVER LOADING) kN
10.0	140	182.5	1.8	4.15
10.0	160	202.5	1.8	5.67
10.0	180	222.5	1.8	7.52
11.0	180	227.5	1.8	7.13
12.0	180	232.5	1.8	6.85
14.0	200	262.5	2.0	8.20
15.0	220	287.5	2.0	9.93
16.0	220	292.5	2.0	9.71
18.0	200	282.5	2.0	7.65

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 treated wood poles material, manufacture, workmanship, tests, service capability, maintenance and documentation, will fulfil the requirements stated in the contract documents, standards, specifications and regulations.
- 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 (or for locally treated poles, the Diamond Mark of Quality from Kenya Bureau of Standards) shall be submitted with the tender for evaluation.

5. TESTS AND INSPECTION

- 5.1 The treated wooden poles shall be inspected and tested in accordance with the requirements of this specification, KS 02-94 and KS 516: 2008. It shall be the responsibility of the supplier to perform or to have performed the tests specified.

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