



The Kenya Power & Lighting
Co. Ltd.

TITLE:

SPECIFICATION FOR 66kV
WOODEN (PERMALI) STAY
INSULATORS

Doc. No.	KPLC1/3CB/TSP/04/025
Issue No.	1
Revision No.	1
Date of Issue	2008-04-10
Page 1 of 7	

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 AND INSTRUCTIONS

ANNEX A: Technical Particulars and Statement of Compliance

Issued by: Head of Section, Technical Stds & Specs

Authorized by: Research and Development Manager

Signed:

Signed:

Date:

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Date of
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Page 2 of 7

0.1 Circulation List

COPY NO.	COPY HOLDER
1	Research & Development Manager
2	Supplies Manager
3	Stores & Stock Control Manager
4	Transmission Manager
5	Distribution Manager
6	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)

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Page 3 of 7	

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 Wooden Stay Insulators (Permal Stay Insulators). It is intended for use by KPLC in purchasing the insulators.

It shall be the responsibility of the manufacturer to ensure adequacy of the design and good engineering practice in the manufacture of the insulators for KPLC. The manufacturer 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 Wooden Stay Insulators also referred to as Permal Stay Insulators for use on overhead power lines operating at voltages of up to 66kV, 50Hz.
- 1.2 The specification covers Double Beam Wooden Stay Insulators for use with 19/10 SWG stay wire on overhead power lines operating at voltages of up to 66kV, 50Hz.

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.

- ISO 1461: Metallic Coatings – Hot dip galvanized coatings on fabricated ferrous products – Requirements.
- IEC 383: Tests on insulators of ceramic material or glass for overhead lines with a nominal voltage greater than 1000V.
- BS4360: Specification for weldable structural steels.
- BS183: Specification for general purpose galvanized steel wire strand.

3. TERMS AND DEFINITIONS

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Date of
Issue 2008-04-10

Page 4 of 7

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

4. REQUIREMENTS

4.1 SERVICE CONDITIONS

The insulators 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 tropical sunshine conditions. The level of galvanizing for all ferrous parts and all materials used shall be suitable for these conditions.

4.2. MATERIALS AND CONSTRUCTION

4.2.1. The Wooden Stay Insulators shall be manufactured from impregnated laminated wood not subject to natural timber defects such as variability, splitting, weathering and moisture absorption.

4.2.2. The wood shall have high impulse flashover values and be free from defects that can lead to damage from lightning strikes and power arcs. Neither thorough wetting nor surface deposits shall affect the performance.

4.2.3. All the steelwork shall meet the requirements of BS 4360 and galvanized to ISO 1461. Nuts and bolts shall meet the requirements of relevant ISO Standards.

Note: The stay wire to be used is manufactured to BS 183.

4.2.4. The insulators shall offer good mechanical and electrical properties (as required in clause 4.2.6) and shall give satisfactory service for long periods under the specified conditions.

4.2.5. The stay wire insulators shall be supplied complete with hot – dip galvanized metal fittings and accessories including splice thimbles. Both ends shall be identical and the horn tangs and bolts shall be keyed into the end plates for positive positioning and single spanner assembly.

4.2.6. MECHANICAL AND ELECTRICAL PROPERTIES

4.2.6.1 The stay insulators shall be of the following minimum mechanical properties:

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Page 5 of 7	

Assembly	Wooden Section	Stay wire to BS 183	U.B.S. of stay wire	Required Breaking Strength of complete assembly
Double Beam	23mm x 44mm	19/10 SWG	110kN	122kN

4.2.6.2 The stay insulators shall withstand the following impulse flashover voltages (peak):

Assembly	Dimensions: Horn Gap (m)	Insulator condition	Impulse withstand, peak (kV)
Double Beam	1.04	New & Dry	645

5. TESTS AND INSPECTION

- 5.1 Tests shall be done in accordance with the requirement of this specification and relevant IEC standard. 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 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 accreditation certificate for the laboratory shall also be submitted.

Copies of test reports to be submitted shall include the following:

- 5.2.1 Impulse withstand test, peak (kV);
 5.2.2 Breaking Strength of complete assembly (kN);
 5.2.3 Verification of Dimensions;
- 5.3 Routine and sample test reports for the insulators to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods.

Acceptance tests shall include the following tests as per applicable latest IEC Standards:

- 5.3.1 Verification of dimensions;
 5.3.2 Verification of tightness of the interface between end fittings and insulator;
 5.3.3 Verification of the Breaking Strength of complete assembly;
 5.3.4 Galvanizing test (by Gravimetric method).

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2008-04-10

Page 6 of 7

6. MARKING AND LABELLING

6.1 The following information shall be marked indelibly and legibly on the insulator.

- a) Name or trade mark of the manufacturer
- b) Year of manufacture
- c) Ultimate Breaking Strength (U.B.S.) of complete assembly in kN
- d) Impulse withstand voltage (peak), kVp

The marking shall not impair the performance of the insulator.

6.2 A set of Three (3) installation and technical manuals for the insulators shall be submitted during delivery (all in English Language).

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Page 7 of 7	

ANNEX A: Technical Particulars (to be filled and signed by the Manufacturer for all clauses and submitted together with catalogues, brochures, drawings, technical data and test reports for tender evaluation)

Description	Bidder's offer
1. Service Conditions	
2. Applicable Standards	
3. Maximum System Voltage (kV)	
4. One-minute power frequency withstand voltage, 50Hz, wet. (kV)	
5. Lighting impulse withstand voltage, 1.2/50 pos. (kV)	
6. Minimum horn gap distance (mm)	
7. Ultimate Breaking Strength (kN)	
8. Length of insulator set with fittings (mm)	
9. Material of fittings and level of corrosion protection	
10. Material of insulating part	
11. List of copies of Test Reports submitted (indicate Test Report Numbers, Testing Authority & Contact Addresses)	
12. List Acceptance Tests to be witnessed by KPLC Engineers at the factory	
13. List of catalogues, brochures, technical data, drawings and customer sales records submitted to support the offer.	
14. Statement of Compliance to Specifications	

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Manufacturer's Name, Signature, Stamp and Date

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