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Kenya Power

12kV AND 36KV SURGE ARRESTERS - SPECIFICATION

A Document of the Kenya Power & Lighting Co. Plc.

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TABLE OF CONTENTS

0.1 CIRCULATION LIST 3
0.2 AMENDMENT RECORD 4
FOREWORD 5
1. SCOPE 6
2. NORMATIVE REFERENCES 6
3. DEFINITIONS AND ABBREVIATIONS 7
3.1. ABBREVIATIONS 7
4. REQUIREMENTS 7
4.1. SERVICE CONDITIONS 7
4.2. DESIGN AND CONSTRUCTION 8
4.2.1. GENERAL 8
4.2.2. HOUSING 10
5. TESTS REQUIREMENTS 11
6. MARKING AND PACKING 11
6.1. MARKING 11
6.2. PACKING 11
6.3. MANUFACTURER'S EXPERIENCE AND CAPACITY 12
APPENDICIES 13
A. TESTS AND INSPECTION (Normative) 13
B. QUALITY MANAGEMENT SYSTEM (Normative) 14
C. DOCUMENTATION (Normative) 14
D. GUARANTEED TECHNICAL PARTICULARS (Normative) 16

0.1 CIRCULATION LIST

COPY NO.	COPY HOLDER
1	Manager, Standards
2	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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Users are reminded that by virtue of section 25 of the Copyright Act, 2001 (Revised 2009) Cap 130 of the Laws of Kenya copyright subsists in all KPLC Standards and except as provided under Section 26 of this Act, no KPLC standard produced by KPLC may be reproduced, stored in retrieval system by any means without prior permission from the Managing Director & CEO, KPLC.

0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2012-03-22	Cancels and replaces all previous issues	S. Kimitei	G. K. Gathige
0	2018-05-21	Updated table 1 and 2 Added clause 4.2.2 on surge arrester housing.	Nancy Wairimu	Dr. Eng. Peter Kimemia
0	2021-03-23	Updated table 1, 2 and 3. Added clause 6.3 manufacturer's capacity and experience requirements	Eng. Julius Ndirangu	Dr. Eng. Peter Kimemia

FOREWORD

This Specification has been prepared by the Standards Department and Technical Services Department both of The Kenya Power and Lighting Company Plc and it lays down requirements for 12kV and 36kV surge arresters.

The surge arresters are intended for use in the KPLC power system to protect electrical equipment from over voltage transients caused externally by lightning and internally by switching.

Specifications in this series are:
(i) TSP/11/034 -145kV Surge Arresters - Specification
(ii) TSP/11/035- 245kV Surge Arresters - Specification
(iii) TSP/11/033- 72.5kV Surge Arresters - Specification
(iv) TSP/11/037- Integrated Drop-out surge arrestors and Fuse (11kV and 33kV) Unit Specification

This specification stipulates the minimum requirements for surge arresters acceptable for use in the company and it shall be the responsibility of the suppliers and manufacturer to ensure that the offered design is of the highest quality and guarantees excellent service to KPLC, good workmanship and good engineering practice in the manufacture of the surge arresters for KPLC.

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

Technical Team

Name	Department
Eng. Paul Mwangi	Technical Services
Eng. Kahoro Wachira	Technical Services
Eng. Julius Ndirangu	Standards

1. SCOPE

1.1. This Specification covers the requirements, design, test methods, marking and packing of non-linear metal-oxide resistor type surge arresters without spark gaps designed to limit voltage surges on a.c. power circuits operated at 11kV and 33kV nominal voltages at 50Hz.

1.2. The Specification covers requirements, design, inspection and tests and schedule of Guaranteed Technical Particulars (GTPs) of surge arresters.

2. NORMATIVE REFERENCES

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

IEC 60099:	Surge arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems - Part 5: Selection and application recommendations.
IEC 60270:	High-voltage test techniques — partial discharge measurements.
IEC 60071-2:	Insulation co-ordination - Part 2: Application Guide.
IEC 60507:	Artificial pollution tests on high voltage insulators to be used on ac systems.
IEC 60587	Electrical insulating materials used under severe ambient conditions - Test methods for evaluating resistance to tracking and erosion.
ISO 1461	Metallic Coatings – Hot dip galvanized coatings on fabricated ferrous products – Requirements.
ISO 48:	Rubber, vulcanized or thermoplastic -- Determination of hardness (hardness between 10 IRHD and 100 IRHD),
IEC/TS 60815:	Selection and dimensioning of high voltage insulators intended for use in polluted conditions.
ISO 9001:2015	Quality management systems — Requirements

3. DEFINITIONS AND ABBREVIATIONS

For the purpose of this specification the definitions and abbreviations given in the reference standards shall apply together with the following:

3.1. ABBREVIATIONS

KPLC- Kenya Power and Lighting Company Plc

IEC – International Electrotechnical Commission

ISO – International Organization for Standardization.

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

4.1.1 The surge arresters shall be suitable for continuous use outdoors in tropical areas and harsh climatic conditions including areas exposed to:

a) Altitudes of up to 2200m above sea level;

b) Humidity of up to 90%;

c) Average ambient temperature of +30˚C with a minimum of -1˚C and a maximum of +40˚C

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

4.1.2 The surge arrestors shall be connected between phase and earth to a system that is generally solidly earthed and with the following system characteristics shown in Table 1.

Table 1: System requirements

Particulars	Requirements	
System highest voltage and frequency	12 kV, 50Hz	36 kV, 50Hz,
Maximum duration of earth fault	≤ 3 seconds	
Earth fault factor as per IEC 60099-4	1.4	
Maximum short circuit current, kA	20	
Discharge class as per IEC 60099-4	Class 2	
Power frequency withstand voltage, wet, kVrms	38	95

Particulars	Requirements	
Lightning impulse withstand voltage, kVpk	95	200
Specific creepage distance as per IEC/TS 60815:2008	31mm/kV	

4.2. DESIGN AND CONSTRUCTION

4.1.3 GENERAL

4.2.1.1. The surge arrester shall be designed and constructed in accordance with IEC 60099-4 and the requirements of this specification.

4.2.1.2. The surge arrester shall be suitable for atmospheric and switching overvoltage protection of switchgear, power and distribution transformers and other medium voltage equipment.

4.2.1.3. The surge arrester shall have non-linear metal-oxide resistors with highly non-linear voltage-current characteristics, connected in series, but having no integrated series or parallel spark gaps

4.2.1.4. The metal-oxide used shall be of quality to ensure thermal stability under service duty of the surge arrester.

4.2.1.5. The surge arrester shall be self-supported and installed between phase and earth. The maximum number of units in one arrester shall be 1.

4.2.1.6. Surge arrester shall be provided with a pressure relief device, a means for relieving internal pressure in an arrester and preventing explosive shattering of the housing following prolonged passage of flow current or internal flashover of the arrester.

4.2.1.7. Each surge arrester shall be supplied complete with a disconnector. The disconnector shall be an integral part of the arrester to give a visual indication of a failed arrester by disconnecting it from the system while the line remains in operation after disconnection of the arrester. This shall be an explosive device triggered by the fault current; but shall extinguish the fault current. Details of the disconnector shall be included in the submitted surge arrester drawing.

4.2.1.8. The surge arrester shall be hermetically sealed to ensure no moisture absorption or deterioration of the metal-oxide element of the surge arrester.

4.2.1.9. Each surge arrester shall be supplied complete with fixing accessories, line terminal and earth terminal. It shall be fitted with conductor connector (suitable for conductor sizes of up to 150mm², either copper or aluminium).

4.2.1.10. The steel plates or straps and all ferrous parts shall be hot dip galvanized in accordance with ISO 1461. Average minimum coating thickness shall be 85µm

4.2.1.11. Each surge arrester shall be complete with an insulating mounting bracket. The mounting bracket shall be made of a base polymer or cast resin. It shall be subjected to environmental tests and bending tests as per IEC 60099-4.

4.2.1.12. The mounting brackets shall be NEMA type mounting brackets to facilitate mounting of arresters on angle or channel iron type cross arms suitable for both horizontal and vertical mounting on a steel cross-arm (U-channel).

4.2.1.13. The guaranteed protection characteristics of the surge arrester based on IEC 60099-4 selection formulas shall be required to comply during tests, with all the withstand capabilities stated in Table 2.

Table 2: Technical protective data for Arrester

Guaranteed protective data for Arrester			
Description		**Requirement**	
Maximum system voltage, Um, kV		12	36
Rated voltage, Ur, kV		11	33
Continuous operating voltage, kVrms	As per IEC 60099-4, Uc	9.6	28.8
Temporary overvoltage capability (TOV), kVrms	1 s	13.8	41.4
	10 s	13.1	39.2
Maximum residual voltage at steep, lightning and switching impulse current with current wave, kV	10kA (1/2 µs)	35.1	105.4
	5 kA (8/20 µs)	30.0	90.1
	10 kA (8/20 µs)	31.9	95.8
	20 kA(8/20 µs)	35.1	105.4
	40 kA (8/20 µs)	40.2	120.7
	250A (30/70 µs)	24.9	74.8
	500 A (30/70 µs)	25.8	77.4
	1 kA (30/70 µs)	26.9	80.7
	2 kA (30/70 µs)	28.1	84.5
Lightning impulse protective level, max, kV as per IEC 60099-5		28	83
Steep current impulse protective level, max, kV as per IEC 60099-5		30	88
Energy discharge capability , kJ/kV at Ur		≥ 4.5	
Long duration discharge class (current compliance)	Current, A	500	
	Duration , µs	2000	
	Discharge tolerance, %	5	
Accelerated ageing performance	Temperature , ^{0}C	115	
	Time, hrs	100	
	Watt loss	Continuous decreasing	
Operating duty characteristics (Discharge current withstand)	Two 4/10µs current wave (Ur) , kA	100	
	Low current at 2000µs, kApk	500	
	Discharge tolerance, %	5	
Partial discharge performance, pC as per IEC 60270.		< 10	
Pressure relief withstand capability (Short circuit)	High symmetrical RMS (A)/ duration (s)	20000/0.2	
	Low symmetrical RMS (A)/ duration (s)	600/1	
	Asymmetrical peak (A)	50 kA at 0.2s	

4.2.2. HOUSING

4.2.2.1. The housing of the surge arrester shall be made of high quality reinforced high temperature vulcanized (HTV) silicone rubber based on dimethyl siloxane, which exhibit hydrophobicity with the capability to transfer hydrophobicity to the layer of pollution.

4.2.2.2. The polymer shall be high quality reinforced high temperature vulcanized (HTV) silicone rubber based on dimethyl siloxane, which exhibit hydrophobicity with the capability to transfer hydrophobicity to the layer of pollution.

4.2.2.3. The reinforced HTV silicone rubber shall have a Shore 'A" hardness of not less than 60 as per ISO 48 and the track resistance of the sheath and shed materials shall meet the requirements of IEC 60587 Method 1 Class 1A4.5 or 1B4.5 or Method 2 Class 2A4.5.

4.2.2.4. The housings shall meet the requirements of IEEE Std. 592 by demonstrating shield resistance of less than 5000Ω and capability of initiating two consecutive fault-current arcs to ground.

4.2.2.5. The complete surge arrester shall be housed in a silicon rubber housing, which shall be dimensioned to provide a leak free interface with the end caps.

4.2.2.6. Insulator sheds shall be open type, designed to minimize trapping of contamination. It shall be made of polymer having glazed brown or gray color.

4.2.2.7. The silicon rubber housing shall be made by direct molding method.

4.2.2.8. The entire insulator housing shall have the rated withstand voltage given in Table 3 based on IEC 60099-4 clause 6.1.

Table 3: Withstand capabilities of surge arrestor housing as per IEC 60099-4

Description	Units	Requirement	
Maximum system voltage, Um,	kVrms	12	36
Lightning impulse withstand voltage,	kVpk	95	200
Power frequency withstand voltage for 1 min, wet	kVrms	46	116
Creepage distance, 31mm/kV,	mm	372	1116
Permissible head load static (SLL),	N	175	
Permissible head load dynamic (SLL),	N	250	

Short circuit withstand capability (rated short circuit (withstand) current Is)	kA	31.5	
Minimum permissible length of the active part	mm	135	330
Housing shield resistance	Ω	>5,000	
Number of units		1	

5. TESTS REQUIREMENTS

The Surge arresters shall be inspected and tested in accordance with the requirements of IEC 60099-4, IEC 60099-5, IEC 60507, IEC 60071-2, IEC 60587, ISO 48, ISO 1461 and provision of this specification.

6. MARKING AND PACKING

6.1. MARKING

The following information shall be marked indelibly and legibly on a nameplate permanently attached to each surge arrester in English language:

a) Continuous operating voltage;
b) Rated voltage;
c) Rated frequency;
d) Nominal discharge current;
e) Rated short-circuit withstand current in kilo amperes (kA).
f) The manufacturer's name or trade mark;
g) type and identification of the complete arrester;
h) The year of manufacture;
i) Line discharge class
j) The letters, "**Property of the Kenya Power & Lighting Company Plc**".

6.2. PACKING

6.2.1. The surge arresters shall be supplied packed in wooden crates which are reinforced and held closed by external steel wire bindings. Each crate shall be internally braced to permit stacking and the steel wire bindings shall be designed to keep the crate firmly closed and permit easy and rapid opening at time of installation.

6.2.2. The crates shall then be stacked on sturdy wood pallet. The assembly shall be held tightly in place with steel bands and protected against moisture by a complete covering of heat-shrinkable polyethylene film.

6.2.3. A set of three (3) original installation and technical manuals for the surge arresters shall be supplied with the equipment. Details on the surge counter and fault indicator device shall also be submitted during deliver (as well as for tender evaluation).

6.3. MANUFACTURER'S EXPERIENCE AND CAPACITY

6.3.1. The surge arrester manufacturer shall have a minimum of 25 years' experience in the manufacture of 12kV and 36kV surge arresters.

6.3.2. The surge arrester on offer shall have been in service and given reliable service for a minimum period of 8 years in at least two (2) power utilities in at least three (3) of the following continents/regions:

i) Europe
ii) North America
iii) Africa
iv) Asia or South America

Note: The manufacturer shall provide references to support requirements of this including export records with copy of contractual letters, circuit breaker details and date of sale/export, letter of satisfaction from power utilities.

6.3.3. Surge arresters brands that have failed in service or mal-operated while in service on the Kenyan power system shall not be accepted.

6.3.4. The warranty for the offered surge arrester shall be 5 years from the date of circuit breaker delivery to KPLC store

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APPENDICIES

A. TESTS AND INSPECTION (Normative)

A.1 It shall be the responsibility of the supplier to test or to have all the relevant tests performed.

A.2 Copies of Type Test Certificates and Type 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. A copy of the accreditation certificate for the testing laboratory shall also be submitted with the tender (all in English Language).

Copies of type test reports to be submitted with the tender for evaluation shall be as stated below:

a) Insulation withstand test on arrester housing;
b) Residual voltage tests;
c) Long duration current impulse withstand test;
d) Short circuit
e) Operating duty tests;
f) Test of disconnector/ fault indicator (when fitted);
g) Internal Partial discharge test;
h) Bending moment test;
i) Weather ageing tests;
j) Seal leak rate test
k) Radio interference voltage

In addition, the following test report shall be availed for the silicone insulating material used.

a) UV test
b) Thermal endurance test
c) Flammability test
d) Long term water immersion test
e) Dielectric Testing
f) Tracking and Erosion test

NOTE: Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Authority.

A.3 Routine and sample test reports for the surge arresters to be supplied shall be submitted to KPLC Engineers during Factory acceptance Testing. KPLC Engineers will witness tests at the factory before shipment. Tests to be witnessed by KPLC Engineers at the factory before shipment/delivery shall be in accordance with IEC 60099-4, IEC 60270, IEC 60507, ISO 1461 and this specification and shall include the following:

a) Measurement of reference voltage;

b) Residual voltage test;
c) Measurement of power frequency voltage on the complete arrester;
d) Lightning impulse residual voltage on the complete arrester;
e) Internal Partial discharge test;
f) Galvanization test

A.4 On receipt of the surge arresters, KPLC will inspect them and may perform any of the relevant tests in order to verify compliance with the specification. The supplier shall replace without charge to KPLC, any surge arresters which upon examination, test or use fail to meet any or all of the requirements in the specification.

B. QUALITY MANAGEMENT SYSTEM (Normative)

B.1 The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the surge arresters physical properties, tests 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 9001:2015.

B.2 The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001:2015 certificate shall be submitted with the tender for evaluation.

C. 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 (GTP) signed and stamped by the manufacturer;

b) Copies of the Manufacturer's catalogues, brochures, drawings giving all relevant dimensions and technical data;

c) Sales records for the last five years and at least four customer reference letters;

d) Details of manufacturing capacity and the manufacturer's experience;

e) Copies of required type test reports by a third party testing laboratory accredited to ISO/IEC 17025. The test reports shall not be more than five years old;

f) Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;

g) Contacts and address of third party testing laboratory;

h) Manufacturers letter of authorization, ISO 9001:2015 certificate and other technical documents required in the tender.

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

a) Fully filled clause by clause guaranteed technical particulars (GTP) stamped and signed by the manufacturer (these are not the ones submitted with the tender).
b) Detailed Design Drawings with details of the surge arrester to be manufactured for KPLC.
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 9001:2015.
d) Marking details and method to be used in marking the surge arresters.
e) Packaging details (including packaging materials).

C.3 Statement of compliance to specification (indicate deviations if any provide supporting documents)

NOTE: *The drawings to be submitted by the supplier to KPLC for approval before manufacture shall be in standard format clearly indicating the drawing number, 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).*

D. GUARANTEED TECHNICAL PARTICULARS (Normative)

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 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 number	KPLC Requirements		Bidder's offer
Manufacturer's Name and address			Specify
Country of Manufacture			Specify
Name and model Number			Specify
1.	Scope		State
2.	Normative References		State
3.	Definitions and Abbreviations		
3.1.	Abbreviations		State
4.	Requirements		
4.1.1	Service conditions		State
4.1.2	System Requirements	System highest voltage, kV	State
		Frequency, Hz	State
		Maximum duration of earth fault, Seconds	State
		Earth fault factor as per IEC 60099-4	State
		Maximum short circuit current, kA	State
		Earth fault factor as per IEC 60099-4	State
		Maximum short circuit current, kA	State
		Discharge class as per IEC 60099-4	State
		Power frequency withstand voltage, wet, kVrms	State
		Lightning impulse withstand voltage, kV peak	State
		Minimum specific creepage distance as per IEC TS 60815	State
4.2	Design and construction		
4.2.1	General		
4.2.1.1	Standard of manufacture		State
4.2.1.2	surge arrester shall be suitable for atmospheric and switching overvoltage protection of switchgear, power and distribution transformers and other medium voltage equipment		State

Clause number	KPLC Requirements		Bidder's offer
4.2.1.3	surge arrester shall have non-linear metal-oxide resistors with highly non-linear voltage-current characteristics, connected in series, but having no integrated series or parallel spark gaps		State
4.2.1.4	metal-oxide used shall be of quality to ensure thermal stability under service duty of the surge arrester		State
4.2.1.5	Shall be self-supported and shall be installed between phase and earth.		State
	maximum number of units in one arrester		State
4.2.1.6	Surge arrester shall be provided with a pressure relief device		State
4.2.1.7	Each surge arrester shall be supplied complete with a disconnector		State
	Details of the disconnector shall be included in the submitted surge arrester drawing.		State
4.2.1.8	Surge arrester shall be hermetically sealed		State
4.2.1.9	Surge arrester shall be supplied complete with fixing accessories, line terminal and earth terminal. It shall be fitted with conductor connector (suitable for conductor sizes of up to 150mm², either copper or aluminium).		List
4.2.1.10	Steel plates or straps and all ferrous parts shall be hot dip galvanized in accordance with ISO 1461.		State
	Average minimum coating thickness shall be 85µm		State
4.2.1.11	Each surge arrester shall be complete with an insulating mounting bracket		State
	The mounting bracket shall be made of a base polymer or cast resin		State
	Mounting brackets shall be subjected to environmental tests and bending tests as per IEC 60099-4		State
4.2.1.12	The mounting brackets shall be NEMA type mounting brackets to facilitate mounting of arresters on angle or channel iron type cross arms suitable for both horizontal and vertical mounting on a steel cross-arm (U-channel).		
4.2.1.13	Technical protective data for arrester		
	Maximum System voltage, Um		State
	Rated Voltage, Ur		State
	Continuous operating voltage, KVrms		State
	Temporary overvoltage capability (TOV), KVrms	1 s	State
		10 s	State
	Maximum residual voltage with current wave	5 kA 8/20 µs	State
		10 kA 8/20 µs	State

Clause number	KPLC Requirements		Bidder's offer
		20 kA 8/20 µs	State
		40 kA 8/20 µs	State
		500 A 30/60 µs	State
		1 kA 30/60 µs	State
		2 kA 30/60 µs	State
	Lightning impulse protective level, max, kV as per IEC 60099-5		State
	Steep current impulse protective level, max, kV as per IEC 60099-5		State
	Energy discharge capability , kJ/kVrms at Ur		State
	Metal oxide (MO) diameter , mm		State
	Height of the MO resistor column, mm		State
	Long duration discharge class (current compliance)	Current, A	State
		Duration , µs	State
	Accelerated ageing performance	Temperature , ^{0}C	State
		Time, hrs	State
	Operating duty characteristics (Discharge current withstand)	Two 4/10µs current wave (Ur) , kA	State
		Low current at 2000µs, kApk	State
	Partial discharge performance, pC as per IEC 60270.		State
	Pressure relief withstand capability (Short circuit)	High symmetrical RMS (A), duration (s)	State
		Low symmetrical RMS (A), duration (s)	State
4.2.2	Housing		
4.2.2.1	Material of housing of the surge arresters		State
4.2.2.2	Polymer shall be high quality reinforced high temperature vulcanized (HTV) silicone rubber based on dimethyl siloxane		State
4.2.2.3	Reinforced HTV silicone rubber hardness		State
	Track resistance		State
4.2.2.4	Shield resistance		State
	Capability of initiating two consecutive fault-current arcs to ground.		State
4.2.2.5	Dimensioned to provide a leak free interface with the end caps		State
4.2.2.6	Insulator sheds shall be open type, designed to minimize trapping of contamination		State
	Colour		State
4.2.2.7	Method of molding		State
4.2.2.8	Withstand capabilities of surge arrester housing		
	Lightning impulse withstand voltage,		State
	Power frequency withstand voltage for 1 min, wet		State
	Creepage distance		State
	Permissible head load static (SLL),		State
	Permissible head load dynamic (SLL),		State

Clause number	KPLC Requirements	Bidder's offer
	Short circuit withstand capability current (Is)	State
	Permissible length of the active part	State
	Housing shield resistance	State
	Number of units	State
5	Test standards	State
6	Marking and Packing	
6.1	Marking details indelibly and legibly marked on a nameplate	List
6.2	Packing	State
6.2.1	The surge arresters shall be supplied packed in wooden crates which are reinforced and held closed by external steel wire bindings.	State
	Each crate shall be internally braced to permit stacking and the steel wire bindings shall be designed to keep the crate firmly closed and permit easy and rapid opening at time of installation	State
6.2.2	The crates shall then be stacked on sturdy wood pallet. The assembly shall be held tightly in place with steel bands and protected against moisture by a complete covering of heat-shrinkable polyethylene film.	State
6.2.3	Set of three (3) original installation and technical manuals for the surge arresters shall be supplied with the equipment.	State
	Details on the surge counter and fault indicator device shall also be submitted during deliver (as well as for tender evaluation).	State
6.3	MANUFACTURER'S EXPERIENCE AND CAPACITY	
6.3.1	Surge arrester manufacturer shall have a minimum of 25 years' experience in the manufacture of 12kV and 36kV surge arresters	State
6.3.2	Surge arrester on offer shall have been in service and given reliable service for a minimum period of 8 years in at least two (2) power utilities in at least three (3) of the following continents/regions: i) Europe ii) North America iii) Africa iv) Asia or South America	Attach references
6.3.3	Surge arresters brand offered have failed in service or mal-operated while in service on the Kenyan power system	State
6.3.4	The warranty for the offered surge arrester shall be 5 years from the date of circuit breaker delivery to KPLC store	State
A	Test and inspection	
A.1	Responsibility of carrying out tests	State
A.2	Copies of Type Test Reports submitted with tender	List
A3	Test certificates to be submitted by supplier to KPLC for approval before supply/delivery	Provide

Clause number	KPLC Requirements	Bidder's offer
	Tests to be witnessed by KPLC Engineers at the factory	List
A.4	Inspection at the stores and replacement of rejected items	State compliance
B	Quality Management System	
B.1	Quality Assurance Plan based on ISO 9001:2015.	Provide
B.2	Copy of ISO 9001:2015 Certificate	Provide
C	Documentation	
C.1	Documents submitted with tender for evaluation	List
C.2	Documents to be submitted by supplier to KPLC for approval before manufacture	List
C.3	Statement of compliance to specification (indicate deviations if any & supporting documents)	State compliance

NOTE:

1) Bidders shall give full details of the item(s) on offer as per the specification and applicable standards. The details provided shall conform to the test reports and their certificates, as well as labeled drawings complete with dimensions, catalogues and/or brochures for the purpose of tender evaluation.

2) Bidders 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.

3) Guaranteed values shall be specified.

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

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Manufacturer's Name, Signature, Stamp and Date