Kenya Power

The Kenya Power & Lighting Co. Ltd
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STIMA PLAZA, KOLOBOT ROAD, PARKLANDS, NAIROBI.
Telephone – 24-20-3201000 – Fax No. 254 – 20 – 3514485

Our Ref: KP1/9A.3/OT/12/20-21/JM/aoo Date: 6th October 2020

Your Ref:

TO: ALL PROSPECTIVE BIDDERS

Dear Sir/ Madam

RE: ADDENDUM NO. 5 TO THE TENDER NO. KP1/9A.3/OT/12/20-21 FOR SUPPLY OF 66KV SURGE DIVERTERS

The following amendments are made to the specified provisions of the Tender document for the Supply of 66KV Surge Diverters.

1. **RELATIONSHIP WITH THE PRINCIPAL TENDER DOCUMENT.**

   Save where expressly amended by the terms of this Addendum, the Principal Tender Document shall continue to be in full force and effect.

   The provisions of this Addendum shall be deemed to have been incorporated in and shall be read as part of the Principal Tender Document.

2. **CLARIFICATIONS ON ISSUES RAISED BY PROSPECTIVE BIDDERS**

Item No.	Item/Clause Description	Prospective Bidders' Queries	KPLC Response
1		Reference is made to the Addendum No. 3 from KPLC. The clarifications mentions of new specification. Can you please provide the new specification?	The revised Specification is attached
		According to the specification, the 66kV arresters are to protect switchgear and transformers; making the arresters clearly intended for a station application. Using a disconnect-device in a station application is thus not needed and certainly not recommended. The insulation being	Surge arrestor to be supplied complete with fault indication device and

2	4.2.1.9	protected in normally non self-restoring (eg paper & oil). If the disconnect-device operates, this insulation will be unprotected and at very high risk of failure while the arrester is out of service. Furthermore, it is possible that the disconnect device could operate without causing a breaker operation (depends on the relay co-ordination) which means that the user would not even know that the equipment is unprotected; leading to that it could be so for a very long period of time (increasing the probability that a significant surge could impinge on the station unhindered). At high voltage and in a station, the risk is deemed too great. An overloaded arrester inside a substation is usually easy to identify by CB operation and, possibly, SCADA indication. At worst, a specific line bay could be quickly identified and then a visual check could pinpoint the exact phase. Disconnect devices may be used on arresters for distribution class applications, as these are remote and hard to locate and are anyway protecting relatively low value items, eg distribution transformer. An LSA by definition is a Line Surge Arrester, intended to be used out on the transmission line (not to be confused with an arrester which is simply suspended mounted from the line conductor). LSA are able to be fitted with a disconnect device since they are protecting self-restoring line insulation. This means that the risk of permanent damage to the line insulators is low in the case of a subsequent lightning strike after the LSA has been disconnected and it is hence permissible to disconnect an overloaded arrester. The disconnector is thus a means to quickly autoreclose after an arrester overload (if the fault is detected by the relays at all) and also identify the arrester during subsequent line patrol. If there are many LSA positioned along the line and, without some kind of physical indication of which arrester has overloaded, it would be all but impossible to locate the failed arrester. So, the use of a disconnector/fault indicator depends very much on the application. Based on the specification, we reasonably conclude that the arresters are to be station class and used inside a station, and hence a	interpretation of the condition indication

		disconnector is not appropriate for use on such 66kV arresters. If the specification is otherwise meant to cover for an LSA application, then we see discrepancies and non-applicability of values to the extent that we doubt the relevance as it is written - but we can offer for a completely different style as an LSA; upon request. Please if possible send us a sketch of where the customer is planning to use these Arresters. In addition please also explain what the arresters are protecting and form what.	
3	4.2.1.9	The requirement for a disconnecting device is only applicable for Line Surge Arresters for installation for overhead lines. These disconnecting devices are not applicable for Station Arresters. According to the specification, the 66kv Arresters are to protect switchgear and transformers; making the arresters intended for a station application. Please clarify the application of the Arresters and if disconnecting devices are required.	Surge arrestor to be supplied complete with fault indication device and interpretation of the condition indication

2. <u>TENDER CLOSING</u>

Tender closing date remains the **13th of October 2020 at 10.00am.**

All other terms and conditions remain as per the Principal Tender Document (PTD).

Yours faithfully
FOR: THE KENYA POWER & LIGHTING COMPANY LIMITED

DR. JOHN NGENO
<u>GENERAL MANGER, SUPPLY CHAIN.</u>

DOCUMENT NO.: KP1/6C/4/1/TSP/11/034

Kenya Power

66KV SURGE ARRESTERS - SPECIFICATION

A Document of the Kenya Power & Lighting Co. Ltd

September 2020

TABLE OF CONTENTS

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

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.

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
Rev 1.0	2020-09-17	Revision of Table 2: MCOV, Energy discharge capability, Operating duty characteristics, Pressure relief withstand capability	Eng. S. Nguli	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 Limited (KPLC) and it lays down requirements for 66kV surge arresters

The surge arresters are intended for use in the 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- Specification for 132kV Surge Arresters
(ii) TSP/11/035- 220kV Surge Arresters - Specification
(iii) TSP/11/036- Specification for 11kv and 33kv surge arrestors for distribution systems
(iv) TSP/11/037- Integrated Drop-out surge arrestors & 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, and exhibits good workmanship and good engineering practice in the manufacture.

Users of Kenya Power specifications are responsible for their correct interpretation and application.

Technical Team

Name	Designation	Department
Stephen Nguli	Senior Engineer	Standards

1. SCOPE

1.1. This specification covers non-linear metal-oxide resistor type surge arresters without spark gaps designed to limit voltage surges on a.c. power circuits operated at 66kV nominal voltage at 50Hz.

1.2. The specification covers requirements, design, inspection and tests and schedule of Guaranteed Technical Particulars of 66 kV 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 60099-4:2014	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 1461:2009	Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods.
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 System.

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 95%;

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, kV	72.5
Frequency, Hz	50
Maximum duration of earth fault, Seconds	3
Earth fault factor as per IEC 60099-4	1.4

Particulars		Requirements
Maximum short circuit current, kA		10
Discharge class as per IEC 60099-4		2
Power frequency withstand voltage, wet, kVrms		140
Lightning impulse withstand voltage, kV peak		325
Pollution level as per IEC TS 60815	Inland	III (Heavy)
	Coastal	(IV) Very Heavy
Minimum specific creepage distance as per IEC TS 60815	Inland	25mm/kV
	Coastal	31mm/kV

4.2. DESIGN AND CONSTRUCTION

4.2.1. 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, transformers and other high voltage equipment.

4.2.1.3. The surge arrester shall have one 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 single column with no stack, self-supported and shall be installed between phase and earth.

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 surge counter and a leakage current indicator. The interpretation of condition indication shall be given on the unit.

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 complete with a disconnector/fault indicator device for disconnecting the arrester from the system in the event of arrester failure, to prevent a persistent fault on the system and to give visible indication of the failed arrester. Technical details (including interpretation of the condition indication) of the device shall be submitted with the bid.

4.2.1.10. 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 400mm^2, either copper or aluminium).

4.2.1.11. The steel plates or straps and all ferrous parts shall be hot dip galvanized in accordance with ISO 1461.

4.2.1.12. Each surge arrester shall be complete with an insulating base. The mounting shall be on a pitch circle diameter (p.c.d.) of 127mm.

4.2.1.13. The guaranteed protection characteristics of the surge arrester based on IEC 60099-4 & 5 selection formulas shall be required to comply during tests, with all the withstand capabilities stated in Table 2 below.

Table 2: Technical protective data for Arrester

Guaranteed protective data for Arrester calculated as per IEC 60099-4 & 5		
Description		**Requirement**
Rated Voltage, Ur, kV		66kV
Maximum system voltage, Um, kV		72.5
Maximum continuous operating voltage, kVrms	As per IEC 60099-4, Uc	≥59
Temporary overvoltage capability (TOV), kVrms	1 s	≥ 150kV
	10 s	≥ 143kV
Maximum residual voltage with current wave	5 kA 8/20 µs	≤ 157 kV
	10 kA 8/20 µs	≤ 168 kV
	20 kA 8/20 µs	≤ 188kV
	40 kA 8/20 µs	≤ 215 kV
	500 A 30/60 µs	≤ 130 kV
	1 kA 30/60 µs	≤ 135 kV
	2 kA 30/60 µs	≤ 141 kV
Lightning impulse protective level, max, kV as per IEC 60099-5		325
Steep current impulse protective level, max, kV as per IEC 60099-5		333

Description		Requirement
Energy discharge capability , kJ/kVrms at Ur		≥5.1
Long duration discharge class (current compliance)	Current, A	750
	Duration , µs	2000
Accelerated ageing performance	Temperature , ^{0}C	20
	Time, hrs	1000
Operating duty characteristics (Discharge current withstand)	Two 4/10µs current wave (Ur) , kA	100
	Low current at 2000µs, A	125-500
Partial discharge performance, pC as per IEC 60270.		≥ 10pC
Pressure relief withstand capability (Short circuit)	High symmetrical RMS (A), duration (s)	63000 / 0.2
	Low symmetrical RMS (A), duration (s)	600±200 / 1

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 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.

4.2.2.3. The housings shall meet the requirements of IEEE Std. 592 by demonstrating shield resistance of not less than 5000Ω and capability of initiating two consecutive fault-current arcs to ground.

4.2.2.4. 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.

4.2.2.5. Insulator sheds shall be open type, designed to minimize trapping of contamination. It shall be made of polymer having glazed grey color.

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

4.2.2.7. 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 based on IEC 60099-4

Description		Units	Requirement
Rated Voltage, Ur,		kV	66kV
Maximum system voltage, Um,		kV	72.5
Lightning impulse withstand voltage,		kV pk	325
Power frequency withstand voltage for 1 min, wet		kVrms	140
Creepage distance	25mm/kV	mm	1820
	31mm/kV	mm	2250
Permissible head load static (SLL),		N	2000 SLL
Permissible head load dynamic (SLL),		N	2500 SSL
Short circuit withstand capability current (Is)		kA	31.5
Permissible length of the active part		mm	>1450mm
Housing shield resistance		Ω	>5000
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 PACKAGING

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. PACKAGING

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 of the surge counter and disconnector/fault indicator devices shall also be submitted during delivery (as well as for tender evaluation).

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.

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 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 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) 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;

d) Marking details and method to be used in marking the surge arresters;

e) Packaging details (including packaging materials).

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).

Note: The original clauses in the specification take precedence over the GUARANTEED TECHNICAL PARTICULARS.

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
	Item on offer			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
		Pollution level as per IEC TS 60815	Inland	State
			Coastal	State
		Minimum specific creepage distance as per IEC TS 60815	Inland	State
			Coastal	State
4.2	Design and construction			

Clause number	KPLC Requirements		Bidder's offer
4.2.1	General		
4.2.1.1	Standard of manufacture		State
4.2.1.2	Application		State
4.2.1.3	Type of surge arrester		State
4.2.1.4	Metal oxide quality		State
4.2.1.5	Shall be single column with no stack, self-supported and shall be installed between phase and earth.		State
4.2.1.6	Pressure relief		State
4.2.1.7	Surge counter		State
	Leakage current indicator		state
	Interpretation of condition indication		State
4.2.1.8	Surge arrester shall be hermetically sealed		State
4.2.1.9	Disconnector/ fault indicator		State
	Interpretation of the condition indication		State
4.2.1.10	Accessories and ratings		List
4.2.1.11	Galvanization of ferrous parts		State
4.2.1.12	Mounting pitch circle diameter		State
4.2.1.13	Technical protective data for arrester		
	Rated Voltage, Ur		State
	Maximum System voltage, Um		State
	Maximum 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
		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

Clause number	KPLC Requirements		Bidder's offer
		Discharge tolerance, %	State
	Accelerated ageing performance	Temperature , ^{0}C	State
		Time, hrs	State
		Watt loss	State
	Operating duty characteristics (Discharge current withstand)	Two 4/10µs current wave (Ur) , kA	State
		Low current at 2000µs, kApk	State
		Discharge tolerance, %	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
		Asymmetrical peak (A)	State
4.2.2	Housing		
4.2.2.1	Material of housing of the surge arresters		State
4.2.2.2	Reinforced HTV silicone rubber hardness		State
	Track resistance		State
4.2.2.3	Shield resistance		State
	Capability of initiating two consecutive fault-current arcs to ground.		State
4.2.2.4	Housing dimensioned to provide a leak free interface with the end caps		State
4.2.2.5	Type of shed		State
	Colour		State
4.2.2.6	Method of molding		State
4.2.2.7	Withstand capabilities of surge arrester housing		
	Lightning impulse withstand voltage,		State
	Power frequency withstand voltage for 1 min, wet		State
	Creepage distance	25mm/kV	State
		31mm/kV	State
	Permissible head load static (SLL),		State
	Permissible head load dynamic (SLL),		State
	Short circuit withstand capability current (Is)		State
	Permissible length of the active part		State
	Housing shield resistance		State
	Number of units		State
5	Test requirements		State
6	Marking and Packing		

Clause number	KPLC Requirements	Bidder's offer
6.1	Marking	State
6.2	Packaging	State
6.2.1	Packaging	State
6.2.2	Stacking	State
6.2.3	Original installation and technical manuals	State
	Details of the surge counter and disconnector/fault indicator devices	State
A	Test and inspection	
A.1	Responsibility of carrying out tests	State
A.2	Copies of Type Test Certificates and Type Test Reports, test reports submitted with tender	Provide
A3	Routine test certificates to be submitted by supplier to KPLC for approval before supply/delivery	Provide
	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	Provide
B.2	Manufacturer's Declaration of Conformity to applicable standards	State
	Copy of ISO 9001:2015 Certificate	Provide
C	Documentation	
C.1	Documents submitted with tender	Provide
C.2	Documents to be submitted by supplier to KPLC for approval before manufacture	Provide
Statement of compliance to specification (indicate deviations if any & supporting documents)		State compliance

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Manufacturer's Name, Signature, Stamp and Date