TABLE OF CONTENTS

0.1 Circulation List

COPY NO.	COPY HOLDER
1	Research & Development Manager
2	Procurement Manager
3	Stores & Stock Control Manager
4	Chief Manager, Distribution
5	Deputy Manager, Technical Audit

0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)

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 33kV Isolators also referred to as Disconnectors or Air Break Switches. It is intended for use by KPLC in purchasing the equipment.

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

1. SCOPE

This specification is for 33 kV Isolators (Disconnectors) for use on line disconnection, isolation of substation apparatus and sectionalizing purposes.

This specification is for the following manually operated Isolators:

a) Overhead Line Isolator (Disconnector)
b) Substation Apparatus Isolator (Disconnector)

Note: the type required will be stated for each tender.

The specification also covers inspection and test of the isolators 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 33kV Isolators (Disconnectors) acceptable for use in the company and it shall be the responsibility of the Manufacturer to ensure adequacy of the design, good workmanship and good engineering practice in the manufacture of the isolators for KPLC.

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.

IEC 62271-102: High-voltage switchgear and controlgear - Part 102: Alternating current disconnectors and earthing switches.

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

3. TERMS AND DEFINITIONS

For the purpose of this specification, definitions in the reference standards and the following shall apply.

Isolator (Disconnector) – a mechanical switching device which provides, in the open position, an isolating distance in accordance with electrical safety requirements.

4. REQUIREMENTS

4.1 SERVICE AND SYSTEM CONDITIONS

The isolator shall be suitable for continuous operation 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 and heavy saline conditions along the coast.

4.2. MATERIALS AND CONSTRUCTION

4.2.1 The isolator shall be designed and manufactured in accordance to IEC 62271-102, IEC 60694 and the requirements of this specification. The breaking medium shall be air.

4.2.2 The isolator shall be designed for three phase operation. Each switch pole shall incorporate three porcelain insulators mounted on hot dipped galvanized steel underbase. The centre insulator shall be moveable to effect contact operation.

4.2.3 The isolator shall be supplied complete with operating mechanism, all necessary components (coupling, drive rods etc) and all necessary steelwork for pole mounting including a pair of mounting stalks, a pair of cross member steel channels and assembly bolts & nuts. 33kV isolator shall be suitable for mounting on H-pole at phase centres of at least 900mm.

4.2.4 The isolator shall be of the vertical opening type, suitable for both vertical and horizontal mounting.

4.2.5 The isolator shall be suitable for manual operation by means of push – pull reciprocating mechanism. The mechanism shall be interlocked for safe operation. It shall be supplied complete with the operating mechanism.

4.2.6 All the three switch poles shall be arranged so that the phase units are mounted independently and then finally interconnected with coupling tubes so as to ensure simultaneous operation of all switches by drive rods and an operating handle.

4.2.7 The drive rod shall be fitted with an insulation insert to electrically isolate the top section from the lower section of the rod. The insulation insert shall be at least 0.4m in length and of adequate mechanical strength to withstand the switch operations.

4.2.8 All steel parts shall be hot dip galvanized to ISO 1461. The minimum coating of galvanizing required is 100microns.

4.2.9 The isolator shall be designed such that in fully open position, it shall provide adequate electrical isolation between the contacts on all the three phases. It shall conform to the requirement as single point isolation for safety.

4.2.10 The isolator shall be fitted with spring arc horns to enable the isolator interrupt loads of up to 10 Amps.

4.2.11 All current carrying parts of the isolator shall be made of electrolytic high conductivity copper with switch contacts hard drawn and silver plated.

4.2.12 The isolator shall be fitted with clamp connectors for Aluminium (ACSR) conductor of up to 18.2mm diameter. The clamp connectors shall be of ample cross-section and surface for carrying continuously the specified current.

4.2.13 Provision shall be made for padlocking in both CLOSED and OPEN positions.

4.2.14 The isolator shall have an earthing point for connection to the earth.

4.3. RATING

The rating of the complete isolator shall be as follows: -

	Overhead Line Isolator	Substation Isolator
Rated voltage & frequency	36 kV, 50Hz	36 kV, 50Hz
Rated lightning impulse withstand voltage 1.2/50μs, dry, +ve	200 kV	200 kV

Rated power frequency withstand voltage, wet, 50Hz, 60s	95 kV	95 kV
Rated normal current	400 Amps	800 Amps
Rated short time withstand current for 3s	16.0 kA	17.5 kA
Minimum creepage distance of insulators	900 mm	900 mm

4.4. QUALITY MANAGEMENT SYSTEM

4.4.1 The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the disconnector design, material, workmanship, tests, service capability, maintenance and documentation, will fulfil the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfil the requirements of ISO 9001:2008.

4.4.2 The Manufacturer's Declaration of Conformity to reference standards and copies of quality management certifications including copy of relevant and valid ISO 9001: 2008 certificate shall be submitted with the tender for evaluation.

5. TESTS AND INSPECTION

5.1 The isolator shall be inspected and tested in accordance with the requirements of this specification, IEC 62271-102 and ISO 1461. It shall be the responsibility of the manufacturer to perform or to have performed the tests specified.

5.2 Copies of previous type test certificates and type test reports by the relevant International or National Testing/Standards Authority of the country of manufacture (or ISO/IEC 17025 accredited independent laboratory) shall be submitted with the offer for evaluation. A copy of accreditation certificate for the testing authority/laboratory shall also be submitted (all in English Language).

Copies of type test certificates and type test reports to IEC 62271-102 for the disconnector offered to be submitted for tender evaluation shall include:

- Dielectric tests (Lightning Impulse and Power Frequency Withstand Tests),
- Short time withstand and peak withstand current tests,
- Temperature rise test,
- Measurement of the resistance of circuits,
- Tightness tests,
- Electromagnetic compatibility tests,
- Operation and mechanical endurance tests,
- Operation at the temperature limits.

5.3 The disconnector 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) and shall include the following Routine Tests to IEC 62271-102.

- Dielectric test on main circuit,
- Measurement of the resistance of the main circuit,
- Tightness test,
- Design and visual checks and
- Mechanical operating tests

5.4 Test reports for each disconnector (including its individual components) shall be submitted to The Kenya Power and Lighting Company for approval before shipment.

5.5 During delivery of the isolators, KPLC will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification. The supplier shall replace/rectify without charge to KPLC, isolators which upon examination, test or use fail to meet any or all of the requirements in the specification.

6. MARKING, LABELLING AND PACKING

6.1 The following information shall be marked indelibly and legibly and in a permanent manner on a name plate attached in a permanent manner to each isolator.

a) The manufacturer's name
b) The type reference number
c) The KPLC Purchase Order Number
d) The letters "KPLC"
e) The rated voltage, rated current, frequency and rated insulation levels

All markings shall be in the English language and figures representing ratings shall be followed by the symbol of the unit in which they are expressed.

6.2 The components of the isolator shall be packed in wooden crates so as to protect the porcelain insulators from damage. Each assembly and package of items associated with one complete disconnector shall be suitably marked for ease of identification and assembly.

6.3 Instructions for storage, handling, assembly and installation shall be included in each package, all in English Language.

ANNEX A: Guaranteed Technical Particulars *(to be filled and signed by the Manufacturer and submitted together with copies of manufacturer's catalogues, brochures, drawings, technical data, sales records and copies of complete type test certificates and complete type test reports for tender evaluation*

(pls indicate units of measure)

No.	REQUIREMENTS			GUARANTEED PARTICULARS	COMMENTS
1.	Name of the manufacturer and country of manufacture				
2.	Applicable standards				
3.	Service (indoor/outdoor), altitude, temperature range, humidity, environment (pollution severity level), wind speed etc				
4.	Type	Model/Type Reference Number			
		Breaking medium			
5.	Steelwork & components to be supplied (including components and mounting stalks for mounting on 12m wooden or concrete poles				
6.	Operating mechanism				
7.	Contacts	Materials			
		Thickness of silver coating			
		Contact resistance			
		Current Density	Moving blade		
			Terminal pad		
			Contacts		
			Terminal connector		
		Spare contacts (five male & five female)			
8.	Rating				
	Nominal System Voltage and frequency				
	Highest System Voltage of equipment				
	Rated continuous current				
	Rated short circuit withstand current & time				
	Rated short circuit making current				
	Breaking capacity of capacitive current				
	Rated inductive current switching capacity				
	Max temperature rise under rated voltage and current				
	Breaking capacity at rated voltage				

	Lightning impulse withstand voltage, 1.2/50µs, dry, +ve	With contacts closed		
		Across open contacts		
	One minute power frequency withstand voltage, 50Hz, 60s	With contacts closed		
		Across open contacts		
	Creepage distance of insulator			
	Minimum clearance between phases (phase centres)			
	Minimum clearance to earth			
	Mechanical endurance (number of close-open cycles without using spare parts)			
9.	Padlocking facility in both open and closed position			
10.	Degree of protection			
11.	Any special assembly tools			
12.	Corona prevention			
13.	Manufacturer's Guarantee and Warranty			
14.	List catalogues, brochures, technical data, drawings submitted to support the offer.			
15.	List customer sales records submitted to support the offer.			
16.	List Type Test Certificates and Type Test Reports submitted with tender (indicate test report numbers, date, Testing Institution and contact addresses) • Dielectric tests (Lightning Impulse and Power Frequency Withstand Tests), • Short time withstand and peak withstand current tests, • Temperature rise test, • Measurement of the resistance of circuits, • Tightness tests, • Electromagnetic compatibility tests, • Operation and mechanical endurance tests, • Operation at the temperature limits.			
17.	List Acceptance Tests to be witnessed by KPLC Engineers at the factory			
18.	List test reports (for disconnector and components) to be submitted to KPLC for approval before shipment			
19.	Copy of ISO 9001:2008 Certificate submitted (indicate relevance and validity)			
20.	Quality Assurance Plan			
21.	Manufacturer's Declaration of Conformity to Standards (including IEC 62271-102)			
22.	Statement of compliance to tender specifications			
23.	Guaranteed reliability and maintenance indicators:			

	a) reliability (MTBF) b) availability (A) c) maintainability (MTTR) d) service life e) warranty period of actuating under normal service conditions without maintenance		
24.	Deviations from tender specifications and supporting data, test reports, technical documents etc.		
25.	Inspection of the disconnector and components at KPLC stores/site.		
26.	List and details of auxiliaries, fittings, components and accessories included in scope of supply.		
27.	Details and supporting documents submitted on manufacturer's experience and manufacturing capacity		

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Manufacturer's Name, Signature, Stamp and Date