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Kenya Power

INSULATED LOW VOLTAGE TOOL KIT – SPECIFICATION

A Document of the Kenya Power & Lighting Co. Ltd

September 2016

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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0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2016-09-22	New Issue	Nancy Wairimu	Dr. Eng. Peter Kimemia

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FOREWORD

This specification has been prepared by the Standards Department in collaboration with Network Management division both of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for Insulated Low Voltage Kit. It is intended for use by KPLC in purchasing the Tool Kit.
The Insulated Low Voltage Kit is to be used for work on Live Low voltage equipment.

The specification stipulates the minimum requirements for digital light meter (insulated low voltage tool kit) acceptable for use in the company and it shall be the responsibility of the suppliers and manufacturer to ensure adequacy of the design, good workmanship and good engineering practice in the manufacture of the meter for KPLC.

The following are members of the team that developed this specification:

Name	Division
Stanley Ngetich	Network Management
Richard Kioko	Network Management
James Gitau	Network Management
Peter Waweru	Kenya Power International
Nancy Wairimu	Infrastructure Development

1. SCOPE

1.1 This specification is for Insulated Low Voltage Tool Kit for use in the KPLC Network.

1.2 This specification covers requirements, inspection and tests of the Insulated Low Voltage Tool Kit as well as schedule of Guaranteed Technical Particulars

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.

ISO 9001:2008 Quality Management System

ISO 6789: Assembly tools for screws and nuts -- Hand torque tools -- Requirements and test methods for design conformance testing, quality conformance testing and recalibration procedure

ISO 5743: 'Pliers and nippers - General technical requirements

ISO 5744: 'Pliers and nippers - Methods of tests

ISO 5746: Pliers and nippers -- Engineer's and "Lineman's" pliers -- Dimensions and test values

ISO 3318: Assembly tools for screws and nuts -- Double-headed open-ended wrenches, double-headed box wrenches and combination wrenches -- Maximum widths of heads.

ISO 10102: Assembly tools for screws and nuts -- Double-headed open-ended engineers' wrenches -- Length of wrenches and thickness of the heads

ISO 6787: Assembly tools for screws and nuts -- Adjustable wrenches

ISO 1711-1: Assembly tools for screws and nuts -- Technical specifications -- Part 1: Hand-operated wrenches and sockets

ISO 10103: Assembly tools for screws and nuts - Double headed, flat and offset, box wrenches.

ISO 15601: Hammers -- Technical specifications concerning steel hammer heads -- Test procedures

IEC 60900: Live working – Hand tools for use up to 1000 V a.c. and 1500 V d.c.

IEC 60903: Specification for gloves and mitts of insulating material for live working.

ANSI B 18.3.2M-1979: Metric Series Hexagonal Keys and Bits

KP1/6C/4/1/TSP/09-058: Specification for personal protective equipment.

KP1/3CB/TSP/01/003-7: Specification for personal protective equipment Eye protectors.

3. DEFINITIONS AND ABBREVIATIONS

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

3.1. ABBREVIATIONS

mm – Millimeter (metric)

" - Inch (Imperial)

lb. – Pound (Imperial)

kg – kilogram (metric)

ac – Alternating Current

DC – Direct Current

GTP – Guaranteed Technical Particulars

QAP – Quality assurance Plan

ANSI – American National Standards Institute

KPLC- Kenya Power and Lighting Company Limited

IEC – International Electrotechnical Commission

ISO – International Organization for Standardization

4. REQUIREMENTS

4.1 SERVICE CONDITIONS

4.1.1 The Insulated Low Voltage Tool Kit shall be designed and constructed for continuous outdoor use 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 and
d) Heavy saline conditions along the coast.

4.2 CARRIER CASE

4.2.1 The carrier case shall be made of high impact co-polymer polypropylene.

4.2.2 The carrier case dimensions shall be approximately 450mm X 250mmX 325mm and shall have compartments for related tools and delicate measuring equipment.

4.2.3 It shall have four sliding drawers enclosed with a side clasp front panel to prevent opening whilst in transit.

4.2.4 It shall have a top carry handle with soft touch grip zone and large locking clasp. The front cover panel and lid shall have aligning padlock hole for added security.

4.3 SPECIFIC REQUIREMENTS

The insulated low voltage tool kit shall contain insulated hand tool, measuring equipment and personal protective equipment. A tolerance of ±5% shall be allowed on all dimensions.

4.3.1 INSULATED HAND TOOLS

4.3.1.1 The tools shall be fully insulated to conform to IEC 60900 for safe electrical application up to nominal voltages of 1 000 V a.c. and 1 500 V d.c.

4.3.1.2 The insulated LV Tool kit shall include the following insulated hand tools:

a) **INSULATED WRENCHES AND SOCKETS**

They shall be manufactured to conform to ISO 1711-1, ISO 10103 and ISO 10102.

(i) **Reversible ratchet Podger wrenches**

It shall be made from chrome vanadium steel, suitable for heavy duty construction applications in confined spaces. Reversible head shall have the following two internal bi-hexagonal sizes: 10 & 13, 17 & 19, 19 & 24 and 24 & 30.

(ii) **Pipe wrench**

Insulated pipe wrench shall be made of cast iron frame with drop forged handles and jaws. All moving parts shall be heat treated to prolong tool life.
The jaws shall be serrated in opposite directions to ensure secure grip.
It shall measure 350mm in length with a capacity of upto 50mm.

(iii) **Torque wrench**

It shall be manufactured to conform to ISO 6789.It shall allow for preset torque to be set. It shall be ½" square drive.

(iv) **Insulated Hexagonal Socket Set**

They shall be manufactured from chrome vanadium steel and shall be fully insulated. They shall have an overall length of 37mm.
The hex socket sets shall be provided in following metric sizes: 10mm, 12mm, 13mm, 14mm, 15mm, 17mm and 19mm. Each set shall include sockets to fit any ½ " (12.7 mm) square-shank drive tool such as the All-Angle Cog Wrench and Flexible Insulated Wrench

b) **TAPE MEASURE**

The tape measure shall have non-slip and Impact resistance case, locking spring assisted blade return, riveted metal end hook, steel belt clip and wrist strap, action lock. It shall have an overall length of 5metres, with a blade width of 25mm and shall be graduated to 1mm.

c) **BALL PEIN HAMMER**

The ball pein hammer shall be manufactured to conform to ISO 15601. It shall be made of high grade drop forged steel head and a fibreglass shaft with texturized slip resistance rubber grip .It shall have a head size of 2lb, length of 400mm and an approximate weight of 7.20kg.

d) **INSULATED CABLE CUTTER**

It shall be manufactured from drop forged high carbon steel with induction hardened blades. It shall have a capacity of 60mm^2 with an overall length of 255mm..

e) **CLUB HAMMER**

The club hammer shall be manufactured to conform to ISO 15601. It shall be made of fine grain, forged steel head and a fibreglass shaft with texturized slip resistance rubber grip .It shall have a head size of 4lb, length of 270mm and an approximate weight of 4.00kg.

f) INSULATED COMBINATION SPANNER SET

They shall made of chrome vanadium steel and shall conform to ISO 3318.The set shall comprise of the following sizes: 10mm, 13mm, 14mm, 17mm, 19mm, 24mm and 30 mm.

g) HAND STAMPS SET(LETTER AND NUMBER PUNCHES)

The hand stamps shall be made from drawn carbon steel nickel –plated with chamfered edges. The hand stamp set shall be as shown in table 1 below.

Table 1: Hand stamps set

Set Description	Number of pieces	Font Size	Overall length
Letter A- Z plus &	27	10	92
Numbers 0-9	9	10	90

h) INSULATED PLIERS

They shall be manufactured to conform to ISO 5743, ISO 5744 and ISO 5746.

(i) Crimping tool

It shall be made from heavy gauge carbon steel. It shall be used on both insulated and non-insulated terminals with crimp capacity of 1.5-16mm.

(ii) Diagonal cutter

It shall be made from chrome vanadium steel. It shall have an overall length of 200mm.

(iii) Electrical pliers

It shall be made from chrome vanadium steel, with serrated jaws for gripping nuts, bolts and studs. It shall have an overall length of 200mm

(iv) Long nose pliers

It shall be made from chrome vanadium steel. It shall have an overall length of 205mm.

(v) Vice grip

It shall be made from chrome vanadium steel. It shall have an overall length of 205mm.

(vi) Water pump

It shall be made from chrome vanadium steel, with a sliding pivot. It shall have an overall length of 300mm.

i) INSULATED SHIFTING/ADJUSTABLE SPANNERS

They shall be manufactured from chrome vanadium steel with hardened parallel jaws that are ground and polished, laser etched with metric graduations .They shall have wide grooved profile of the opening mechanism and coarsely knurled adjusting screw to ensure smooth adjustment. It shall be fully insulated. It shall comprise of the sizes shown in table 2 below.

Table 2: Adjustable spanner sizes

Overall Length	Capacity
100mm	13mm
150mm	18mm
200mm	24mm
250mm	27mm
300mm	34mm

j) INSULATED SCREW DRIVER SET

Shall be made of insulated handle and chrome vanadium blades .The blade shall be provided with an insulated sleeve tested dielectrically to 20 kV in one (1) minute and their use shall be limited to 1 kV in accordance with IEC 60900.The set shall be as shown in table 3 below.

Table 3: Screw driver Set

Type	Tip size	Blade length
Star	No. 1	75mm
	No. 2	100mm
	No. 3	150mm
Flat	3.5mm	150mm
	4.8mm	150mm
	6mm	150mm
	8mm	200mm
	9.5mm	250mm

k) INSULATED ALLEN KEYS

They shall be made from hardened Chrome vanadium steel, long arm shall be suitable for working in confined spaces, tempered and chemically blacked, display pack in plastic case. It shall be supplied as a complete set of at least 7 keys of sizes 1.5 to 12 as per ANSI B 18.3.2M-1979.

l) INSULATED TRIMMING KNIFE

It shall have a retractable contour grip complete with 5 blades. Slim line die cast body with contoured grips to provide greater degree of control and comfort. It shall have an overall length of 155mm.

m) CORDLESS IMPACT DRIVER

It shall be compact ½ " square drive, lightweight and with a soft grip. It shall have forward and reverse capabilities with integral battery level indicator. It shall have heavy duty motor and gearbox and variable speed trigger. It shall be powered by high capacity lithium-ion batteries. It shall be provided with a spare battery and 230V charger.

4.3.2 **MEASURING EQUIPMENT**

The tool kit shall also contain the following measuring equipment:

a) 3 PHASE ROTATION INDICATOR TESTER

The 3 phase rotation indicator tester shall comply with all the requirements of KPLC specification no. KP1/6C/4/1/TSP/09-58.

b) DIGITAL CLAMP METER

The digital clamp meter shall comply with all the requirements of KPLC specification no. KP1/6C/4/1/TSP/09-58 .

c) VOLTAGE TESTER

The voltage tester shall comply with all the requirements of KPLC specification no. KP1/6C/4/1/TSP/09-58.

d) EARTH RESISTANCE TESTER

The earth resistance tester shall comply with all the requirements of KPLC specification no. KP1/6C/4/1/TSP/09-58.

e) INSULATION RESISTANCE METER (1000V)

The insulation resistance tester shall comply with all the requirements of KPLC specification no. KP1/6C/4/1/TSP/09-58.

f) MULTIMETER

The multimeter shall comply with all the requirements of KPLC specification no. KP1/6C/4/1/TSP/09-58.

g) POLARITY TESTER/ EARTH LEAKAGE TESTER

The polarity tester/ earth leakage tester shall comply with all the requirements of KPLC specification no. KP1/6C/4/1/TSP/09-58.

h) CABLE HEIGHT METER

The cable height meter shall comply with all the requirements of KPLC specification no. KP1/6C/4/1/TSP/09-58.

4.3.3 **PERSONAL PROTECTIVE EQUIPMENT (PPE)**

The tool kit shall also contain the following PPE:

a) FACE SHIELD

The face shield shall comply with all the requirements of KPLC specification no. KP1/3CB/TSP/01/003-7.

b) EYE PROTECTORS

The eye protectors shall comply with all the requirements of KPLC specification no. KP1/3CB/TSP/01/003-7.

c) CLASS 1 GLOVES

Shall be manufactured to conform to IEC 60903.It shall be made of elastomer. It shall the electrical characteristics shown in table 4 below.

Table 4: Electrical characteristics of insulating glove

Class	Proof test Voltage		Highest operational voltage	
	ac	DC	ac	DC
1	10 kV rms	20kV	7.5 kV rms	11.5kV

5. TESTS REQUIREMENTS

5.1. The insulated low voltage tool kits shall be tested in accordance with the requirements of relevant ISO, IEC and Kenyan standards and provisions of this specification.

6. MARKING

The following information shall be marked indelibly and legibly on the Tools & carrier case

i) Manufacturer's Name or Trademark;
ii) Serial number;
iii) Standard of manufacture.
iv) Letters "**PROPERTY OF KPLC**".

APPENDICIES

A: TESTS AND INSPECTION (NORMATIVE)

A.1 It shall be the responsibility of the supplier to perform or to have performed the tests specified.

A.2 Copies of previous Type Tests 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. The accreditation certificate to ISO/IEC 17025 for the same third party testing laboratory used shall also be submitted with the tender document (all in English Language).

A.3 Routine and sample test reports for the insulated low voltage tool kit to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods. KPLC Engineers will witness tests at the factory before shipment.

A.4 On receipt of the goods KPLC will perform any of the tests specified in order to verify compliance with this specification.

A.5 The supplier shall replace without charge to KPLC the insulated low voltage tool kit, which upon examination, test or use; fail to meet any 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 insulated low voltage tool kit design, 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: 2008 or 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: 2008 or ISO 9001: 2015 certificate shall be submitted with the tender for evaluation.

B.3 The bidder shall indicate the delivery time of the insulated low voltage tool kit, manufacturer's monthly & annual production capacity and experience in the production of the type and size of item being offered. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the cables sold in the last five years as well as reference letters from customers shall be submitted with the tender for evaluation.

C: DOCUMENTATION (NORMATIVE)

C.1 The bidder shall submit its tender complete with technical documents required by Annex A (Guaranteed Technical Particulars) for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:

a) Fully filled guaranteed technical particulars (GTP) signed and stamped by the manufacturer;
b) Copies of the Manufacturer's catalogues, brochures, drawings 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;
f) Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;
g) Manufacturers letter of authorization, ISO 9001:2008 certificate and other technical documents required in the tender.
h) Operating instructions of measuring instruments shall comprise the following details:
   (i) Instructions for measurements.
   (ii) Brief description of the principle of measurement.
   (iii) Diagrams or tables showing the maximum permissible indicated values taking into consideration the tolerances stated by the manufacturer (if necessary).
   (iv) Type of battery/rechargeable cells.
   (v) Information on the charging current, charging voltage and duration of charging for rechargeable cells.
   (vi) Operational lifetime/runtime of the battery/rechargeable cells or the possible number of measurements.
   (vii) Type of IP protection (IEC 60529).
   (viii) Any necessary special guidance notes.

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) signed by the manufacturer;
b) Design Drawings with details of low voltage measurement instruments 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 9001:2008

d) Detailed test program to be used during factory testing;
e) All documentation necessary for safety of the equipment as specified in IEC 61010-1 clause 5.4 shall be provided with the instrument.

C.3 The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the Insulated low voltage tool kits to KPLC stores.

D: GUARANTEED TECHNICAL PARTICULARS (GTP) (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 manufacturing capacity, the manufacturer's experience and copies of complete type test certificates and type test reports for tender evaluation, all in English Language)

Tender No. .....

Clause Number	Requirements			Bidder's offer
Manufacturer's Name and Address				**Specify**
Brand name and designation				**Specify**
Country of Manufacture				**Specify**
Bidders Name and address				**Specify**
1.	Scope			**Specify**
2.	Normative References			**Specify**
3.	Definitions and Abbreviations			**Specify**
4.	Requirements			**Specify**
4.1	Service Conditions	Altitude		**State**
		Humidity		
		Temperature		
4.2	Carrier case	Material		**State**
		Dimensions		
		Number of compartments		
		Handle		
		Locking facility		
4.3.1	Insulated hand tools			
4.3.1.1	Insulation			**State**
4.3.1.2 a)	Insulated wrenches and sockets		Standard of manufacture	**State**
	(i) Reversible ratchet Podger wrenches		Material	**State**
			sizes	
	(ii) Pipe wrench		Material	**State**
			Length	
			capacity	
	(iii) Torque wrench		Standard	**State**
			Material	
			Size	
	(iv) Insulated hexagonal socket set		Material	**State**
			Overall length	

		Sizes		
b)	Tape measure	Overall length		State
		Blade width		
c)	Ball pein hammer	Standard		State
		Material		
		Head size		
		Length		
		Approximate weight		
d)	Insulated cable cutter	Material		State
		length		
		Capacity		
e)	Club hammer	Standard		state
		Material		
		Head size		
		Length		
		Approximate weight		
f)	Insulated combination spanner set	Standard		State
		Material		
		Sizes		
g)	Hand stamp set	Material		State
			Letters	Numbers
		Set Description	State	State
		Number of pieces	State	State
		Font size	State	State
		Overall length	State	State
h)	Insulated pliers	Standard		State
	(i) Crimping tool	Material		State
		Crimp capacity		
	(ii) Diagonal cutter	Material		State
		Overall length		
	(iii) Electrical pliers	Material		State
		Overall length		
	(iv) Long nose	Material		State
		Overall length		
	(v)Vice grip	Material		State
		Overall length		
	(vi) Water pump	Material		State
		Overall length		
i)	Insulated adjustable spanners			
j)	Insulated screw driver set	Material		State
		Type	Tip size	Overall length

		Star	No. 1	**State**
			No.2	
			No.3	
		Flat	3.5mm	**State**
			4.8mm	
			6mm	
			8mm	
			9.5mm	
k)	Insulated Allen keys	Material		**State**
		Sizes		
l)	Insulated trimming knife	Material		**State**
		Number of blades		
		Overall length		
m)	Cordless impact driver	Size		**State**
		Battery type		
		Accessories		
4.3.2	Measuring Equipment			
4.3.2.1	a) 3 Phase rotation indicator tester			Provide as per KPLC specification no. KP1/6c/4/1/TSP/09/004-2
	b) Digital clamp meter			
	c) Voltage tester			
	d) Earth Resistance Tester			
	e) Insulation Resistance Tester			
	f) Multimeter			
	g) Polarity Tester/ Earth Leakage Tester			
	h) Cable Height meter			
4.3.3	Personal Protective Equipment			
4.3.3.1	a) Face Shield			Provide as per KPLC specification no. KP1/3CB//TSP/01/009-4
	b) Eye protectors			
	c) Class 1 Gloves	Standard		**State**
		Proof test voltage (ac and DC)		**State**
		Highest operational voltage(ac and DC)		**State**
5.	Tests and Inspection			
5.1	Test standards and responsibility of carrying out tests			**State**
5.2	Copies of Type Test Reports submitted with tender			Provide
5.3	Acceptance tests to be witnessed by KPLC at factory before shipment			Provide
5.4	Test reports to be submitted by supplier to KPLC for approval before shipment			Provide
5.5	Replacement of rejected tool kit			State compliance
6.	Marking and Packing			

6.1	Marking	Specify
6.2	Packing	Specify
A	Quality Management System	
A.1	Quality Assurance Plan	Provide
A.2	Copy of ISO 9001:2008 Certificate	Provide
A.3	Manufacturer's experience	Provide
	Manufacturing Capacity (units per month)	Provide
	List of previous customers	Provide
	Customer reference letters	Provide
B	Documentation	
B.1	Documents submitted with tender	Provide
B.2	Documents to be submitted by supplier to KPLC for approval before manufacture	Provide
B.3	Statement of compliance to specification	Provide

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Manufacturer's Name, Signature, Stamp and Date