

DOCUMENT NO: KP1/13D/4/1/TSP/13/006



Kenya Power

**12VDC SEALED RECHARGEABLE VALVE REGULATED LEAD ACID
BATTERIES - SPECIFICATION**

A Document of the Kenya Power & Lighting Co. Ltd

September 2024



TITLE:
**12VDC SEALED
RECHARGEABLE VALVE
REGULATED LEAD ACID
BATTERIES - SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/13/006
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0.1 Circulation List

COPY NO.	COPY HOLDER
	Manager, Standards
Electronic copy (pdf) on KPLC Server (currently: Network→stima-fprnt-001→techstd&specs)	

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.

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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)
Issue 1 Rev 0	2024-09-18	New issue	Eng. B Dianga Eng. J Ndirangu	Dr. Eng. Peter Kimemia

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FOREWORD

This Specification has been prepared by the Standards Department in collaboration with the System Protection all of Kenya Power & Lighting Co. Plc. (KPLC). The specification lays down the requirements for 12VDC Sealed Rechargeable Valve Regulated Lead Acid Batteries for use in pole-mounted switchgear applications (Auto reclosures, Load Break Switches, etc)

The Specification stipulates the minimum requirements for the 12VDC Sealed Rechargeable Valve Regulated Lead Acid Batteries acceptable for use in the company and it shall be the responsibility of the supplier and manufacturer to ensure the adequacy of the design, good engineering practice, adherence to the specification, applicable standards and regulations, as well as good workmanship in the manufacture of the units for KPLC.

Users of the specification shall be responsible for its correct interpretation and application.

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

Name	Department
Eng. Benson Dianga	Standards
Eng. Julius Ndirangu	Standards
Eng. Owen Munene	System Protection

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1. SCOPE

- 1.1. This specification covers the design, manufacture, testing at the Manufacturer's works, and delivery of 12VDC Sealed Rechargeable Valve Regulated Lead Acid Batteries intended for DC power supplies in pole-mounted switchgear. It specifies rate voltages, rated ampere-hour capacities, overall dimensions, and performance requirements for the 12VDC Sealed Rechargeable Valve Regulated Lead Acid Batteries.
- 1.2. The specification also covers test requirements for the 12VDC Sealed Rechargeable Valve Regulated Lead Acid Batteries as well as a schedule of Guaranteed Technical Particulars (GTP) to be fully filled with offered values, parameters and descriptions, signed by the manufacturer and submitted for tender evaluation.
- 1.3. The specification stipulates the minimum requirements for 12VDC Sealed Rechargeable Valve Regulated Lead Acid Batteries and it shall be the responsibility of the supplier to ensure the adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the batteries for The Kenya Power & Lighting Company.
- 1.4. The specification does not purport to include all the necessary provisions of a contract.

2. NORMATIVE REFERENCES

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

IEC 60896-22: Stationary lead-acid batteries - Part 22: Valve regulated types – Requirements


IEC 60896-21:2004: Stationary lead-acid batteries - Part 21: Valve regulated types - Methods of test

IS: 1652/ 1991 Stationary Cells and Batteries, Lead-Acid Type with Plante Positive Plates

IEEE 1187-2013: Recommended Practice for Installation Design and Installation of Valve-Regulated Lead-Acid Batteries for Stationary Applications


IEEE 1188-2005: Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications.

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IEEE 1189-2007: Guide for Selection of Valve-Regulated Lead-Acid (VRLA) Batteries for Stationary Applications

IEEE 1578 : Stationary Battery Electrolyte Spill Containment and Management

ISO/IEC 17025: General Requirements for the Competence of Calibration and Testing Laboratories

ISO 9001:2015: Quality Management Systems

3. TERMS AND DEFINITIONS

For the purpose of this specification, the definitions given in the reference standards shall apply in addition to the ones given below:

VRLA Valve-Regulated Lead-Acid

Ampere-hour (Ah): Quantity of electricity or a capacity of a battery obtained by integrating the discharge current in ampere with respect to time in hours.

Floating battery: secondary battery whose terminals are permanently connected to a source of constant voltage sufficient to maintain the battery approximately fully charged, intended to supply a circuit, if the normal supply is temporarily interrupted.

Lead – acid battery: Secondary battery in which the electrodes are made mainly from the lead and the electrolyte is a sulphuric acid solution.

Secondary battery: two or more secondary cells connected together and used as a source of electrical energy.

VRLA: Valve-Regulated Lead-Acid

4. REQUIREMENTS

4.1. Service Conditions

The batteries shall be suitable for use outdoors in tropical areas and harsh climatic conditions including areas exposed to:

- a) Altitudes of up to 2200m above sea level,
- b) Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C, in direct sunlight,

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- c) Humidity: up to 95%
- d) Pollution: Design pollution level to be taken as “Very Heavy” (Pollution level IV) in accordance with IEC 60815.
- e) Isokeraunic levels of up to 180 thunderstorm days per year.

4.2. Materials and Construction

- 4.2.1 The 12VDC Sealed Rechargeable Valve Regulated Lead Acid (VRLA) Batteries shall be manufactured to IEC 60896-21 & 22, other applicable standards and the requirements of this specification.
- 4.2.2 The batteries shall be sealed, rechargeable, valve regulated, maintenance free.
- 4.2.3 The construction shall be rugged, vibration and impact resistant.
- 4.2.4 The batteries shall have safety features in accordance with IEC 62485-1 and IEC 62485-2.
- 4.2.5 The battery performance shall meet the requirements of continuous float-charge operation until the end of its service life.
- 4.2.6 The batteries shall be sealed to prevent leakage, minimize maintenance and ensure safety.
- 4.2.7 The batteries shall have valves for pressure regulation and gas venting. The valves shall be self-reclosing.
- 4.2.8 The construction of the batteries shall comprise positive and negative plates, terminals, separators, valves, electrolyte, connectors, fasteners, container, cover and sealings and associated parts for proper and efficient operation.
- 4.2.9 Positive plates shall be made of flat-pasted type using lead-calcium-tin alloy. Negative plates shall be made of durable flat plates using a lead-calcium-tin alloy grid.
- 4.2.10 The separator shall be made of Absorbent Glass Mat (AGM) technology
- 4.2.11 Safety valves shall be provided in each cell. They shall be explosion resistant, self-resealing and pressure regulating type.
- 4.2.12 The electrolyte shall be battery-grade-immobilized diluted sulphuric acid H₂SO₄
- 4.2.13 Connectors and fasteners shall be made of high-conductivity corrosion-resistant materials.
- 4.2.14 Plate connections shall be made of robust construction and shall be made of lead-calcium or lead-tin alloy
- 4.2.15 The battery terminals shall be stainless steel studs with screw nut of designed for 8mm (5/16``) lug-terminated power cable connections.

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- 4.2.16 The terminals shall have a current carrying capacity to meet or exceed the current rating of the battery
- 4.2.17 Sealing shall be composed of acid-resistant materials, durable and flexible material and shall provide high quality bond between battery components to prevent leaks and contamination.
- 4.2.18 The terminals shall be made of corrosion-resistant, high conductivity materials and secure mounting. They shall have current carrying capacity to meet or exceed the Ah rating of the battery
- 4.2.19 The container shall be made of flame-retardant ABS plastic
- 4.2.20 The polarity marking of the terminals shall be marked for identification. The positive terminal shall be identified by (+) sign and the negative terminal shall be marked by (-) sign. The marking shall be permanent, embossed/stamped and non-effacing.
- 4.2.21 All materials used shall be of the best quality, free from flaws and defects and shall conform to the relevant standards applicable.
- 4.2.22 The workmanship shall conform to the highest standards accepted in practice.
- 4.2.23 There shall be no impurities, which may be harmful to the performance or battery cell.

4.3. CHARACTERISTICS

4.3.1 The design characteristics of the batteries shall be as per Table 1.

Table 1: Characteristics of Batteries

Parameter	Requirement
Nominal Voltage, V	12V
Nominal capacity, Ah	26Ah (20 hour rate, 25 ⁰ C)
Maximum Dimensions [L x W x H],mm	170 x 180 x 130mm
Internal resistance, mΩ	≤12mΩ
Charging voltage, V at 25 ⁰ C	Float 13.5 to 13.8V
Approximate Weight, kg	11kg
Cycles, min	200 at 100% depth of discharge
Shelf life, years	2 years at 25 ⁰ C
Service life, years	10years
Charge retention	At least 80% capacity retention after 90 days of storage at 20 ⁰ C
Min Short-Duration Discharge Current, A	260

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Parameter	Requirement
Safety Features	Manufacturer to state
Self-Discharge	The batteries can be stored for more than 6 months at 25°C. Self-discharge rate shall be less than 3% per month at 25°C.

4.3.2 The battery shall be supplied with the necessary tools and accessories for installation.

5. TESTS AND INSPECTION

- 5.1. The batteries shall be inspected and tested in accordance with the requirements of IEC 60896-21 and IEC 60896-22. It shall be the responsibility of the supplier to perform or to have performed the tests specified and whatever other tests he normally performs at work.
- 5.2. Copies of type test reports to be submitted with the tender (by bidder) for evaluation shall be submitted for the following routine tests:
- i) Verification of constructional requirements.
 - ii) Verification of marking.
 - iii) Verification of dimensions
 - iv) Gas emission test
 - v) High current tolerance test,
 - vi) Short circuit current and d.c internal resistance test
 - vii) Protection against internal ignition from external spark sources.
 - viii) Protection against ground short propensity
 - ix) Content and durability of required markings
 - x) Material identification
 - xi) Valve operation,
 - xii) Flammability rating of materials
 - xiii) Intercell connector performance
 - xiv) Discharge capacity
- 5.3. Routine and sample test reports for the battery unit to be supplied shall be submitted for approval before shipment/delivery. KPLC Engineers (2) will witness tests at the factory for assessment of compliance to requirements before shipment. All tests shall be carried out as per the relevant standards.
- 5.4. The test certificates shall be submitted for approval, before dispatch of the battery unit. Acceptance tests to be carried out at the Manufacturer's works, witnessed by KPLC engineers shall include:
- a) Verification of constructional requirements.
 - b) Verification of marking and packaging.
 - c) Verifications of dimensions.

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- d) Charge retention test
- e) Charge acceptance at the constant voltage and at high temperature test
- f) Test for voltage during discharge
- g) Battery impedance measurement test.

APPENDICES

A: Quality Management System

- A1. The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the design, material, workmanship, tests, service capability, maintenance and documentation of the battery units will fulfil the requirements stated in the contract documents, standards, specifications and regulations.
- A2. The QAP shall be based on and include relevant parts to fulfil the requirements of ISO 9001:2015.
- A3. The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including a copy of a valid and relevant ISO 9001: 2015 certificate shall be submitted with the tender for evaluation.
- A4. The bidder shall indicate the delivery time/schedule of the battery unit, manufacturer's monthly specifications and regulations. production capacity and experience in the production of the type and size of the batteries being offered
- A5. The Bidder shall clearly indicate what testing facilities are available in the works of the manufacturer and whether the facilities are adequate to carry out all Routine, and Acceptance Tests. These facilities should be available to KPLC Engineers to access and assess. Should any of the tests not be able to be carried out at the manufacturer's premises, the bidder shall have to arrange for such testing at any of the accredited laboratories at their own cost.

B: Test and Inspection

- B.1. Copies of previous Type test reports issued by a third-party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for 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 the English Language)
- B.2: The acceptance test certificates shall be submitted together with other technical documents during tender submission.
- B.3: Acceptance tests shall also be carried out at the Manufacturer's works in line with clause 5.5 of this specification:

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B.4: On receipt of the battery units, KPLC will inspect them for acceptance at stores and may perform or have tests performed on them to verify compliance with this specification. The supplier shall replace/rectify without charge to KPLC, any equipment which upon examination, test or use, fails to meet any or all of the requirements in this specification.

C: Warranty

C.1. The manufacturer shall guarantee through a warranty document that all goods supplied under this contract shall have no defect arising from design, materials or workmanship.

C.2. A warranty of 60 months from the date of delivery of the sealed rechargeable 12VCD Lead Acid batteries to Kenya Power store shall be offered by the manufacturer.

D: Markings and Packaging

D.1: Marking

The following information shall be legibly and indelibly marked on each cell by moulding screen printing process:

- a) Serial Number of battery
- b) Battery type;
- c) Month and year of manufacture.
- d) Manufacturer's name;
- e) Country of Manufacture;
- f) Rated Voltage & Rated Ampere Hour Capacity;
- g) Coloured safety symbols
- h) Polarity marking: (+) sign on positive terminal and (-) sign on negative terminal
- i) Words "**PROPERTY OF KPLC**".

D.2: Packing

D.2.1 : Packing shall be suitable for handling during transit by rail/road and secured to avoid any loss or damage during transit.

D.2.2 : The cases shall be furnished with an illustrated operating and maintenance instructions for the items.

D.2.3 : Instructions for safe handling of the batteries, chargers and accessories shall be provided together with necessary safety precautions to be taken in the management of the unit

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E. Documentation

- E.1 The bidder shall submit its tender complete with technical documents required by Appendices F (Guaranteed Technical Particulars) for tender evaluation. The technical documents to be submitted (all in the English language) for tender evaluation shall include the following:
- a) Guaranteed Technical Particulars signed by the manufacturer;
 - b) Copies of the Manufacturer's catalogues, brochures, and technical data sheets for the battery and layout drawings.
 - c) Product Data: Electrical characteristics of selected battery.
 - d) Sales records for the last five years and at least four customer reference letters;
 - e) Details of manufacturing capacity and the manufacturer's experience;
 - f) Copies of required type test reports by a third-party testing laboratory accredited to ISO/IEC 17025;
 - g) Copy of accreditation certificate to ISO/IEC 17025 for the third-party testing laboratory;
 - h) Manufacturer letter of authorization, ISO 9001:2015 certificate and other technical documents required in the tender.
- E.2 The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:
- a) Guaranteed Technical Particulars signed by the manufacturer;
 - b) Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfil the requirements stated in the contract documents, standards, specifications and regulations.
 - c) Detailed test program to be used during factory testing;
 - d) Packaging details (including packaging materials).
- E.3 The supplier shall submit together with the product during delivery of the batteries to KPLC stores, recommendations for use, care, safety precaution, storage and routine inspection/testing procedures, all in the English Language. The documents shall also state the safe environmentally accepted disposal mechanism recommended. An instruction label on the outer wrapping shall state the storage conditions and the date beyond which the battery cannot be stored without remedial actions.

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F. GUARANTEED TECHNICAL PARTICULARS

To be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, , all in English Language)

Tender No.

Clause number	KPLC requirements	Bidder's offer (indicate full details)
Manufacturer's Name and address	Specify	
Country of Manufacture	Specify	
Bidder's Name and address	Specify	
1. Scope		
1.1-1.4	Specify	
2. Normative References		
3. Terms & Definitions		
4. Requirements		
4.1 Service Conditions		
Altitudes of up to 2200m above sea level,	Maximum 2200m above the sea level	
Average ambient temperature	Average +30°C Minimum of -1°C and a Maximum of +40°C,	
Humidity	95% (Up to 100% during rainy season as per IEC 60721-3-5)	
Pollution Levels	"Very Heavy" (Pollution level IV) in accordance with IEC 60815.	
Isokeraunic Levels	180 thunderstorm days per year.	
4.2 Materials and Construction		
4.2.1	Manufacturing Standards	IEC 60896-21 & 22
4.2.2	Batteries sealed, rechargeable, valve regulated, maintenance free	State
4.2.3	Rugged, vibration and impact resistant construction	State
4.2.4	Safety features	As per IEC 62485-1 and IEC 62485-2
4.2.5	Battery Performance	Continuous float-charge operation until the end of its service life
4.2.6	Sealing to prevent	State

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		leakage, minimize maintenance and ensure safety		
4.2.7		Pressure regulation and gas venting	Batteries shall have self-reclosing valves for pressure regulation and gas venting	
4.2.8		Construction Details	Batteries shall comprise positive and negative plates, terminals, separators, valves, electrolyte, connectors, fasteners, container, cover and sealings and associated parts for proper and efficient operation	
4.2.9		Plates design & material	Positive plates - flat pasted type using Lead-calcium-tin alloy	
			Negative plates - durable flat plate using lead-calcium-tin alloy grid	
4.2.10		Separators	Made of Absorbent Glass Mat (AGM) technology	
4.2.11		Safety Valves	Provided in each cell Explosion resistant, self-resealing and pressure regulating type	
4.2.12		Electrolyte	Immobilized diluted sulphuric acid H ₂ SO ₄	
4.2.13		Material of Connectors & fasteners	High conductivity corrosion-resistant materials	
4.2.14		Plate Connections	Robust construction Made of lead-calcium or lead-tin alloy	
4.2.15		Terminal design, material, size	Stainless steel stud with screw nut for 8mm lug-terminated power cable connections.	
4.2.16		Terminals Current carrying capacity	Meets or exceeds battery current rating of the battery	
4.2.17		Sealing	Provides high quality bond between components to prevent leaks & contamination. Composed of acid-resistant materials, durable and flexible material	
4.2.18		Terminals material & current carrying capacity	Corrosion-resistant, high conductivity materials and secure mounting. Current carrying capacity meets or exceed the battery Ah rating	
4.2.19		Material of container	Flame retardant ABS plastic	
4.2.20		Terminals marking	Permanent, embossed/stamped and non-effacing polarity marking for identification. The positive terminal shall be identified by (+) sign and the negative terminal shall be marked by (-) sign.	

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4.2.21	Materials used are of the best quality, free from flaws and defects and conforms to the relevant standards applicable	State compliance	
4.2.22	Workmanship conforms to the highest standards accepted in practice	State compliance	
4.2.23	There shall be no impurities, which may be harmful to the performance or battery cell	State Compliance	

4.3 CHARACTERISTICS

Table 1: Characteristics of Batteries

Parameter	Requirement
Nominal Voltage, V	12V
Nominal capacity, Ah	26Ah (20 hour rate, 25°C)
Maximum Dimensions [L x W x H],mm	170 x 180 x 130mm
Internal resistance, mΩ	≤12mΩ
Charging voltage, V at 25°C	Float 13.5 to 13.8V
Approximate Weight, kg	11kg
Cycles, min	200 at 100% depth of discharge
Shelf life, years	2 years at 25°C
Service life, years	10years
Charge retention	At least 80% capacity retention after 90 days of storage at 20°C
Min Short-Duration Discharge Current, A	260
Safety Features	Manufacturer to state
Self-Discharge	The batteries can be stored for more than 6 months at 25°C. Self-discharge rate shall be less than 3% per month at 25°C.

4.3.1.2	Battery Accessories	The battery shall be supplied with the necessary tools and accessories for installation.	
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5 TESTS AND INSPECTION

5.1	Testing Standards & Responsibility to perform tests	IEC 60896-21 and IEC 60896-22 It shall be the responsibility of the supplier to perform or to have performed the tests specified and whatever other tests he normally performs at work	
5.2	Type test reports and routine tests submitted	i) Verification of constructional requirements.	

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		with tender for evaluation	<ul style="list-style-type: none"> ii) Verification of marking. iii) Verification of dimensions iv) Gas emission test v) High current tolerance test, vi) Short circuit current and d.c internal resistance test vii) Protection against internal ignition from external spark sources. viii) Protection against ground short propensity ix) Content and durability of required markings x) Material identification xi) Valve operation, xii) Flammability rating of materials xiii) Intercell connector performance xiv) Discharge capacity 	
	5.3	Routine & sample test reports	Submit for approval before shipment. KPLC Engineers (2) will witness tests at the factory for assessment of compliance to requirements (As per relevant Standards) before shipment	
	5.4	Acceptance tests witnessed by KPLC Engineers	Submit test Certificates for approval before dispatch <ul style="list-style-type: none"> a) Verification of constructional requirements. b) Verification of marking and packaging. c) Verifications of dimensions. d) Charge retention test e) Charge acceptance at the constant voltage and at high temperature test f) Test for voltage during discharge g) Battery impedance measurement test. 	

APPENDICES

A Quality Management System

	A1	QAP to ensure design, material, workmanship, tests, service capability, maintenance and documentation of the battery units will fulfil the requirements stated	Submit	
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TITLE:
**12VDC SEALED
RECHARGEABLE VALVE
REGULATED LEAD ACID
BATTERIES - SPECIFICATION**

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		in the contract documents, standards, specifications and regulations		
	A2	QAP is based on and include relevant parts to fulfil the requirements of ISO 9001:2015.	State Compliance	
	A3	Manufacturer's Declaration of Conformity & ISO 9001:2015 Certificate	Submit	
	A4	Delivery time/schedule of the battery unit, manufacturer's monthly specifications and regulations. production capacity and experience in the production of the type and size of the batteries on Offer	Indicate	
	A5	Availability of Testing facilities in the manufacturer's premises & adequacy to carryout Routine and Acceptance tests	Indicate Bidder shall have to arrange for such testing at any of the accredited laboratories at their own cost	
B	Tests and Inspection			
	B1	Copies of Previous Test Reports, accreditation certificate to ISO/IEC 17025 for Testing laboratory	Submit with tender for evaluation (All in English Language)	
	B2	Acceptance Test Certificates	Submit with other technical documents during tender submission	
	B3	Acceptance Tests	Carried out at the Manufacturer's works in line with clause 5.5	
	B4	Inspection of Goods	On receipt of the battery units, KPLC will inspect them for acceptance at stores and may perform or have tests performed on them to verify compliance with this specification. The supplier shall replace/rectify without charge to KPLC, any equipment which upon examination, test or use, fails to meet any or all of the	

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			requirements in this specification	
C	Warranty			
	C1	Warranty Document	Submit All goods supplied under this contract shall have no defect arising from design, materials or workmanship	
	C2	Warranty Period	60 months from the date of delivery to Kenya Power Store	
D	Marking and Packing			
	D1	Marking	The following information shall be legibly and indelibly marked on each cell by moulding screen printing process: a) Serial Number of battery b) Battery type; c) Month and year of manufacture. d) Manufacturer's name; e) Country of Manufacture; f) Rated Voltage & Rated Ampere Hour Capacity; g) Coloured safety symbols h) Polarity marking: (+) sign on positive terminal and (-) sign on negative terminal i) Words " PROPERTY OF KPLC "	
	D2	Packing	D.2.1: Packing suitable for handling during transit and secured to avoid loss or damage during transit. D.2.2: Cases furnished with an illustrated operating and maintenance instructions for the items D.2.2: Instructions for safe handling of the batteries, chargers and accessories provided together with necessary safety precautions to be taken in the management of the unit	
E	Documentation			
	E1	Documents submitted by bidder for tender evaluation (All in English language)	a) Guaranteed Technical Particulars signed by the manufacturer; b) Copies of the Manufacturer's catalogues, brochures, and technical data sheets for the battery and layout drawings. c) Product Data: Electrical characteristics of selected battery. d) Sales records for the last five years	

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			<p>and at least four customer reference letters;</p> <p>e) Details of manufacturing capacity and the manufacturer's experience;</p> <p>f) Copies of required type test reports by a third-party testing laboratory accredited to ISO/IEC 17025;</p> <p>g) Copy of accreditation certificate to ISO/IEC 17025 for the third-party testing laboratory;</p> <p>h) Manufacturer letter of authorization, ISO 9001:2015 certificate and other technical documents required in the tender</p>	
	E2	Documents submitted by supplier for approval before manufacture	<p>a) Guaranteed Technical Particulars signed by the manufacturer;</p> <p>b) Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfil the requirements stated in the contract documents, standards, specifications and regulations.</p> <p>c) Detailed test program to be used during factory testing;</p> <p>d) Packaging details (including packaging materials)</p>	
	E3	Recommendations for use, care, safety precaution, storage and routine inspection/testing procedures, all in the English Language	Submit during Delivery	

NOTE:

Bidders should note that the above Guaranteed Technical Particulars Schedules must be fully completed and submitted with the bid. Failure to complete the schedules shall lead to rejection of the bid. Guaranteed values shall be specified. Words like "noted and fulfilled", "Yes," "comply" etc. shall be treated as non-compliant and the bid shall be rejected.

.....
Manufacturer's Name, Signature, Stamp and Date

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