



**KENYA ELECTRICITY GENERATING COMPANY PLC**

**TENDER FOR SUPPLY OF BATTERIES FOR OLKARIA I AU POWER  
PLANT**

**TENDER No. KGN-GDD-213-2021**

**Date: 21<sup>st</sup> January 2022**

**ADDENDUM NO.1**

In accordance with the Tender for Supply of Batteries for Olkaria I AU Power Plant, KenGen hereby issues addendum No.1 as follows;

**I. TECHNICAL SPECIFICATIONS**

The technical specifications for ITEMS A & ITEM B on pages 64 to 68 changes from 2V, VLRA maintenance free batteries to 2V, 1500AH, Flooded Lead Acid maintenance type (OPzS) batteries whose specifications and Technical evaluation schedule changes as detailed below

**NOTES:**

- i. Previous addendum issued is still valid for quantities for each item.
- ii. The Ampere-hour rating changes to 1500Ahr for both items A and Item B

**TECHNICAL SPECIFICATIONS FOR ITEMS A & B**

The specifications for both items shall be the same, but categorized separately in the price schedule

**General Specifications**

- I. KenGen intends to replace three battery banks at Olkaria IAU. This shall involve supply, installation, testing and commissioning of maintenance type flooded lead acid as follows:
  - a) Two Mains battery banks for supplying 110V DC for control, plant protection and Emergency oil pump. Each bank shall consist of a total of 54 cells each rated

at 2Volts, 1500Ah connected in series. An additional twelve (12) batteries shall be delivered as spares making a total of 120 pieces.

- b) One UPS system battery bank consisting of 118 cells each rated at 2V, 1500Ahr for 240VAC system for an existing UPS. An additional 6 batteries shall be delivered as spares making a total of 124 pieces.
2. Due to the limited room space available the tenderer shall supply the tall tower battery design type whose dimensions will be in the limits of (mm) 275(L) X 210 (W) X 851 (H)
  3. The bidder shall prepare metallic racks made from heavy duty painted mild steel and thick wooden blocks to KenGen's approval. Bidder shall submit the rack arrangement alongside the bid for evaluation.
  4. The vented lead acid (OPzS) tubular plate flooded battery shall offers 20+ years design life according to the standard IEC60896-11 and DIN standard 40736-1.
  5. The batteries shall be the flooded Lead Acid type of batteries (OPzS).
  6. Cells to be supplied shall be vented lead acid, (OPzS) tubular plate, deep cycle batteries with all the necessary clamps, tinned connecting links/flexible jumper cables, terminal shrouds, terminals/connecting links insulating covers, bolts, nuts and washers in adequate quantities to interconnect all the cells into sets of appropriate voltage banks. All connection bolts, nuts, washers & lock washers shall be of stainless steel or high-grade plated brass so as to last the lifetime of the batteries.
  7. Flexible jumper wires for implementing parallel/series connections must also be supplied.
  8. Appropriate labels for numbering the cells must also be supplied. These should be waterproof and should be yellow on a black background. They should be of stick-on type. Handwritten labels will not be accepted.
  9. These cells will be used in conjunction with a constant voltage battery charger. They will therefore be subjected to a constant trickle or float charge while on standby.
  10. The nominal voltage will be 2 Volts per cell, @1500Ah. The final voltage after a 10-hour discharge rate shall be in accordance with IEC- 60896 or more superior standards.
  11. Bidder must have capacity to install, test and commission the batteries. The batteries shall be subjected to site commissioning tests (including temperature rise, individual cell voltage, charging and discharge among others).
  12. The electrolyte supplied shall sufficient for all the batteries supplied and shall also be of high purity diluted Sulphuric acid with a specific gravity of  $1.240 \pm 0.010$  at 20°C.
  13. The supplier to submit the constant current battery discharge table together with the bid submission the Discharge characteristic curve, Charge voltage Vs ambient temperature curve, Discharge capacity vs ambient temperature curve, Self-discharge characteristic curve. Life characteristics of cyclic use.

## **Specific Technical Specifications**

- 1) The batteries shall be 2V, 1500Ah flooded lead acid (Opzs) Deep Cycle batteries
- 2) Vented lead acid batteries consist of positive tubular plates and negative grid plates that shall offer extreme long cycle life.
- 3) Positive electrodes: Die cast tubular plates with low antimony lead alloy for longer life.
- 4) Negative electrodes: Pasted flat plates provide perfect balance with the positive plates to give maximum performance.
- 5) Terminals: Lead alloy leak proof pole with brass insert designed to give minimum resistance and maximum current flow.
- 6) Container: Moulded from durable, transparent styrene acrylonitrile (SAN) to allow electrolyte level and cell condition to be monitored. It comes in transparent SAN container. To make it user friendly and easy to monitor. All the cell information shall be printed on the container, and this information shall include model, ampere hour, voltage, IEC standard, month/date of manufacture, country of manufacture. Any form of stickers to the cell container for this information shall not be accepted
- 7) Electrolyte- Diluted Sulphuric acid with a specific gravity of  $1.240 \pm 0.010$  (maximum level) at 20 °C for a fully charged cell.
- 8) Tall tower type design to lower the foot print due to the limited space available in the battery room.
- 9) Plastic encapsulated bolt-on terminals. The corrosion resistant bolt on terminals with brass inserts provide better electrical performance and resistance to wear and tear of the terminals.
- 10) Reliable: Shall be extremely reliable for stand by float operation.
- 11) Vent plugs: Are specially designed with ceramic dome, which filters the sprayed acid and is fire retardant.
- 12) Insulated inter-cell connectors: TO offer better conductivity. The insulation protects the connectors from acid attack and electric shock.
- 13) AH efficiency: >92%, WH efficiency: >80%
- 14) Performance conforms to IEC 60896-11
- 15) Quality System: Batteries manufactured system that meets or exceeds the requirements of ISO 9001:2008 and ISO 14001:2004

## **Battery Construction Specifications**

	Item	Description
1.	Nominal Voltage	2V
2.	Nominal Capacity (10HR)	1500AH @ 10hr-rate to 1.85V per Cell, 25 °C
3.	Positive electrodes	Die cast tubular plates with low antimony lead alloy for longer life
4.	Negative electrodes	Pasted flat plates provide perfect balance with the positive plates to give maximum performance.
5.	Cells needed	120 cells
6.	Dimensions (mm)	275(L) X 210 (W) X 851 (H)
7.	Container material	SAN transparent container
8.	Rated Capacity	1500 AH/ 150A (10hr, 1.85V/Cell, 25 °C
9.	Maximum discharge current	5000A
10.	Internal resistance	Approximate 0.21 mΩ
11.	Operating temperature range	Discharge: -15-50°C Charge: 0-40 °C Storage: -15-40 °C
12.	Float charging Voltage	2.23 to 2.25 Vdc per cell at 25 °C
13.	Maximum Charging current	150A
14.	Capacity affected by temperature	
15.	Self-discharge	Self-discharge rate less than 3.5% per month at 25 °C
16.	Terminal	Thread insert and bolt

## **Delivery, Installation & Commissioning.**

### **Delivery**

The supplier shall deliver the batteries to the Olkaria IV Power Station store, packed in a manner that shall be suitable for handling using either forklift or overhead crane facility.

### **Installation**

During installation the batteries shall be divided into 2 banks comprising of 54 pieces per bank and connected in series to give a total of 110V, 1500AH system.

The supplier shall provide adequate flexible copper cable/ appropriate connectors for paralleling. The installation, testing and commissioning shall be quoted as a separate item

- a) The batteries will replace existing ones where each battery bank carries 54 cells connected in series which shall be housed in a new rack. The final rack design shall be reviewed by KenGen after signing of contract.
- b) 12 cells will be supplied as spares.

**Notes:**

- a) Cells to be supplied **dry** with the appropriate quantities of electrolyte supplied separately.
- b) All the necessary clamps, connecting links, terminal shrouds, terminals/connecting links insulating covers, bolts, nuts and washers in adequate quantities to interconnect the cells into sets of appropriate voltage banks must be supplied. Jumpers for parallel/series connections must also be supplied
- c) Appropriate **labels** for numbering the cells must also be supplied. These should be waterproof and should be black on a white background. They should be stick on type. Handwritten labels will not be accepted

**Technical Evaluation Schedule**

ITEM	DESCRIPTION	REQUIREMENT	BIDDERS OFFER/COMMENT
1	2V, 1500AH, Flooded Lead Acid maintenance type (OPzS)	2V, 1500AH	
2	Battery Manufacturer	Indicate manufacturer	
3	Cell Dimensions (mm)	L x W x H	
4	Clamps and inter cell connectors complete with adequately rated copper cable connectors for parallel and series connections	Tin plated Copper and covered with heat shrink	
5	Flexible insulated jumper Wires/Conductors	To be provided	
6	Manufacturer Constant Current Charging/Discharge curves and data sheets	To be submitted with offer	
7	Final Voltage after 10-hour discharge (should not be below 80% of individual cell final float voltage)	To be submitted with offer	
8	Appropriate Labelling	Yellow on a black background	

9	Warranty	Minimum 1 year from date of Commissioning	
10	Documentation/Brochures to demonstrate industrial application and high performance	To be submitted with offer	
11	Delivery period	To be provided	
12.	High purity dilute Sulphuric acid	1.240 ± 0.010 at 20°C.	
13.	Manufacturers Authorization	To be submitted with offer	

## 2. PRICE SCHEDULE

The price schedule changes as detailed below

### **PRICE SCHEDULE FOR SUPPLY OF BATTERIES FOR OLKARIA I AU POWER PLANT**

<b>Ite m</b>	<b>DESCRIPTION</b>	<b>TYPE / MODEL</b>	<b>QUANTI TY</b>	<b>UNIT PRICE</b>	<b>TOTAL PRICE</b>
1	2V, 1500AH, Flooded Lead Acid maintenance type (OPzS) batteries (110VDC)		120 pc		
2	2V, 1500AH, Flooded Lead Acid maintenance type (OPzS) Batteries (110VDC) Clamps, Inter-cell connectors, paralleling cable connectors complete for all the cells		LOT		
3	2V, 1500AH, Flooded Lead Acid maintenance type (OPzS) Batteries (110VDC) Installation, testing and Commissioning.		LOT		
4	2V, 1500AH, Flooded Lead Acid maintenance type (OPzS) batteries (UPS)		124 pc		
5	2V, 1500AH, Flooded Lead Acid maintenance type (OPzS) Batteries (UPS) Clamps, Inter-cell connectors, paralleling cable connectors complete for all the cells		LOT		
6	2V, 1500AH, Flooded Lead Acid maintenance type (OPzS) Batteries (UPS) Installation, testing and Commissioning.		LOT		
7	Acid electrolyte (sufficient for all the cells in this schedule)		LOT		
8	Clamp-on Ammeter		5 Pc		
9	Digital Multi-meter		5 Pc		
Total					
Discount (%) if any					
<b>Total Cost DDP to Olkaria IAU Power Station</b>					
Country of Origin					

Make & Model for 2V, 1500AH, Flooded Lead Acid maintenance type (OPzS)	
Currency of Tender	
Delivery Period	

Tenderer's name (Company) \_\_\_\_\_

Signature & Rubber-stamp \_\_\_\_\_ Date \_\_\_\_\_

**3. Extension of tender closing date:**

<b>INITIAL TENDER CLOSING DATE</b>	<b>REVISED TENDER CLOSING DATE</b>
Tender closing date 24 <sup>th</sup> January, 2022 at 2.00 p.m.	Tender closing date <b>3<sup>rd</sup> February 2022 at 2.00 p.m.</b>
Tender opening date 24 <sup>th</sup> January, 2022 at 2.30 p.m.	Tender opening date <b>3<sup>rd</sup> February 2022 at 2.30 p.m.</b>

**ACKNOWLEDGEMENT OF ADDENDUM No.**

We, the undersigned hereby certify that the addendum is an integral part of the document and the alterations set out in the clarification have been incorporated in the tender proposal.

Signed.....

Tenderer.....