

GUJARAT ENERGY TRANSMISSION CORPORATION LTD.
SARADAR PATEL VIDYUT BHAVAN,
RACE COURSE, BARODA – 390 007.

TECHNICAL SPECIFICATIONS

FOR

50V, 250Ah/ 350Ah/ 600Ah TUBULAR LEAD
ACID BATTERY SETS

GETCO/E/TS-BATT 031/R1 Jan 2020

SPECIAL INSTRUCTIONS TO BIDDER

Please read following instructions carefully before submitting your bid.

1. All the drawings, i.e. elevation, side view, plan, cross sectional view etc., in AutoCAD format and manuals in PDF format, for offered item shall be submitted. Also the hard copies as per specification shall be submitted.
2. The bidder shall submit Quality Assurance Plan for manufacturing process and Field Quality Plan with the technical bid.
3. The bidder shall have to submit all the required type test reports for the offered item.
4. The bidder must fill up all the point of GTP for offered item/s. Instead of indicating “refer drawing, or as per IS/IEC”, the exact value/s must be filled in.
5. All the points other than GTP, which are asked to confirm in technical specifications must be submitted separately with the bid.
6. The bidder is required to impart training in view of manufacture, assembly, erection, operation and maintenance for offered item, at his works, to the person/s identified by GETCO, in the event of an order, free of cost. The cost of logistics will be bear by GETCO.
7. Please note that the evaluation will be carried out on the strength of content of bid only. No further correspondence will be made.
8. The bidder shall bring out all the technical deviation/s only at the specified annexure.
9. The bidder should indicate manufacturing capacity by submitting latest updated certificate of a Chartered Engineer (CE).

Sign and Seal of Bidder

QUALIFYING REQUIREMENT DATA

(For Supply)

Bidder to satisfy all the following requirements.

- 1) The bidder shall be Original Equipment Manufacturer (OEM). The offered equipment has to be designed, manufactured and tested as per relevant IS/IEC with latest amendments.
- 2) The minimum requirement of manufacturing capacity of offered type, size and rating of equipment shall be **7 times tender/bid quantity**. The bidder should indicate manufacturing capacity by submitting latest updated certificate of Chartered Engineer (CE).
- 3) Equipment proposed shall be of similar or higher rating and in service for a minimum period of THREE (3) years and satisfactory performance certificate in respect of this is to be available and submitted.
- 4) The bidder should clearly indicate the quantity and Single Value Contract executed during last FIVE (5) years, for the offered equipment. Bidder should have executed one single contract during last five years for the quantity equivalent to tender/bid.
- 5) The details are to be submitted in following format,

Sr. No	ITEMS SUPPLIED TO	ORDER REFERENCE No. & DATE	ITEMS	QUANTITY	ORDER FULLY EXECUTED YES/NO	STATUS, IF ORDER UNDER EXECUTION	REMARK

- 6) Equipment offered shall have Type Test Certificates from accredited laboratory (accredited based on ISO/IEC Guide 25 / 17025 or EN 45001 by the National accreditation body of the country where laboratory is located), as per IEC / IS / technical specifications not older than SEVEN (7) years and valid till validity of offer.

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Technical Specification of 50V,250Ah/350Ah/600Ah Lead Acid Battery

1.0 SCOPE:

1.1 This specification covers the design, manufacture, Supply & testing of 50V, 250 Ah/350 Ah/ 600Ah, HDP/ Hard Rubber Container lead acid tubular battery set (with tubular positive plates) at the manufacturer's works and supply at site including FRP stand and all accessories mentioned in this specification.

2.0 APPLICABLE STANDARDS:

2.1 Unless otherwise specified in this specification, the lead acid batteries shall comply with the following standards and latest amendments thereof.

- a) IEC 60896- 11: General requirements & methods of tests for stationary lead acid batteries.
- b) IS: 1885: Electrical vocabulary – Stationary cells and batteries.
- c) IS: 1651: Specification for stationery cells and batteries lead acid type (with tubular + ve plates)
- d) IS: 1146: Specification for hard rubber and plastic containers for lead acid storage batteries.
- e) IS: 6071: Specification for synthetic separators for lead acid batteries
- f) IS: 652: Specification for wooden separators for lead acid batteries.
- g) IS: 266: Specification for sulphuric acid
- h) IS: 1069: Specification for water for storage batteries
- i) IS: 3116: Specification for sealing compound for lead acid batteries.

3.0 General Requirements:

The batteries shall be suitable for a long life under continuous float operations at maximum 2.70 volts per cell and occasional discharges and shall be stationary lead acid type with **high discharge performance (HDP)** confirming to IS:1651 (latest edition) suitable for Indoor operation.

- 3.1 The batteries shall be of the capacity 50 Volts,250 Ah/ 350 Ah/ 600Ah as per requirement of tender.
- 3.2 Battery of 50V, 250Ah rating shall consist of double tire, double row of 25 nos. of series connected HDP lead acid cells of 1.85 V/Cell at 27 Deg. C, having 250 ampere Hour Capacity at 10 hours Discharge Rate.
- 3.3 Battery of 50V, 350Ah rating shall consist of double tire, double row of 25 nos. of series connected HDP lead acid cells of 1.85 V/Cell at 27 Deg. C, having 350 ampere Hour Capacity at 10 hours Discharge Rate.
- 3.4 Battery of 50V, 600Ah rating shall consist of double tire, double row of 25 nos. of series connected HDP lead acid cells of 1.85 V/Cell at 27 Deg. C, having 600 ampere Hour Capacity at 10 hours Discharge Rate.
- 3.5 Fully discharged batteries shall get recharged at 25/35/60 Amps rate within 10 hours at room temperature. The trickle charge rate shall be 50-100mA.
- 3.6 The cell container shall be closed type made **from non-porous Hard Rubber**. The material shall have chemical & electrochemical compatibility and shall be acid & heat resistant. The container and cover shall be capable of withstanding the rigorous of transport, storage and handling and shall be free from flaws. Sufficient space for sediments shall be provided.
- 3.7 The battery cell shall have tubular positive plate having high mechanical strength & porosity. The construction of plate shall confirm to latest revision of IS:1651. The active material of positive plate shall be encapsulated in a one piece, multitude woven gauntlet of acid resistant Terylene. The construction of positive plate shall be such that active material is not displaced and allows free access of electrolyte for

instant and unimpeded chemical reaction. It will withstand high stress of contraction and expansion of the active material during charge and discharge.

- 3.8 The Positive and Negative terminal plate shall be of lead alloy or lead alloy reinforced with copper inserts. It shall be clearly marked and these shall be easily identifiable.
- 3.9 The antimony lead selenium alloy content shall be restricted to minimum value of less than 2% in + ve plate. There shall be minimum voltage drop across the battery terminals as per IS:1651.
- 3.10 The negative plates shall be pasted type matching with positive plates. The design of the plates shall be such that it is firmly placed in the cell.
- 3.11 The plates shall be separated by a low resistance absorbent micro porous glass fiber /Polyethylene (PE) mat. The separators shall be compressed sufficiently to maintain 'separator to plate contact' throughout the life of the cell. The separators shall maintain the electrical insulation between the plates and shall allow the electrolyte to flow freely.

3.12 Accessories:

The bidder shall supply the battery with accessories and devices as stated here under:

- I. One battery stand constructed out of FRP as per detailed specifications mentioned at cl.no. 3.10.
- II. One set of inter-cell, inter raw, inter-tier, inter rack, end take off connectors and lugs for termination of cables as required for the complete installation.
- III. One set of stand insulators and cell insulators of hard rubber material size.
- IV. Hydrometer syringe capable of indicating specific gravity reading in steps of 0.005. The hydrometer shall be complete with wall mounting teak wood holder.

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- V. One DC voltmeter having range $-3V - 0 - +3V$, confirming to IS: 1248 (latest edition) with suitable leads for measuring cell voltage.
- VI. One filler hole thermometer and Gravity correcting scale.
- VII. Electrolyte shall be prepared from battery grade Sulphuric acid confirming to IS:226 and distilled water confirming to IS:1069 Electrolyte for first filling with 10% extra shall be supplied in non-returnable containers. (Type of electrolyte, Qty per cell, total first filling Qty and total Qty, no. of containers (carboys of 35-liter capacity) may please be specified in GTP).
- VIII. 25 Nos. of cell number plates (1 to 25 No) and fixing pins / screws
- IX. Two Nos of rubber syringe.
- X. Two nos of acid resisting plastic jug each of 2-litre capacity.
- XI. Two nos of acid resisting plastic funnels.
- XII. Lead plated MS or acid proof stainless steel Bolt & nuts. (Size and quantity may please be mentioned in GTP).
- XIII. Each cell shall be provided with ceramic type vent plug. It shall be anti-splash type, having more than one exit hole and shall allow the gases to escape freely but shall prevent acid from coming out.
- XIV. Each cell shall be provided with acid and oxidation proof float type level indicators with marking for the electrolyte level for upper-lower-normal limits.
- XV. Rubber Apron
- XVI. Rubber Boot and Gloves
- XVII. Petroleum jelly 250 gms.in packed Tin

XVIII. Insulated Spanner set (Indicate size and Nos.in GTP)

XIX. Log book for maintenance.

XX. Any item not specified above but which is needed for maintenance & efficient working of batteries may be indicated separately without extra cost.

3.13 The construction of the stand shall be suitable for mounting on a flat concrete floor. The stand shall be rigid, free standing type and free from warp and twist. The stand should be made up of MS channels/angles with FRP coating of min.5.0 mm or of pure FRP material. The FRP STAND shall also be non-reactant to acid. The stand should be designed considering all aspect of loading and safety, so as to withstand the loading of battery set throughout its life, which shall be supported by load bearing calculation. The lower tier of the stand will be at the height of 300 mm from the ground level. Support angle should be provided for each rack so as to safeguard each battery cell from falling or declining. There shall be sufficient space, at least 400 mm, between two tiers of stand so that maint. of battery cells of lower tier can be done easily. Necessary supports for power cable connected to end takeoff terminals shall be mounted on the stand.

3.11 **QAP:**

Bidder shall submit the Manufacturing Quality Plan showing all the details in the bid.

4.0 DRAWINGS AND DATA:

4.1. The bidder shall submit along with their offer the following drawings in Hard and soft copy.

- i) Set of GA Drawing for complete battery sets, battery stand and individual battery cell drawing with sectional view.
- ii) Technical literature/Manuals
- iii) Performance curves/write-up on working of battery. The Data submitted shall be adequate to evaluate the performance/quality of item offered

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iv) The detailed drawing showing the size & quantity of steel sections for FRP stands.

4.2. The successful bidder shall submit three sets of following drawings for approval in hard and soft copy.

i) Set of GA Drawing for complete battery sets, battery stand and individual battery cell.

ii) Complete bill of material accessories indicating make, material, quantity, size & type wherever applicable.

iii) Sectional view showing interior construction of the battery cell. It shall also include the information of C/S area of positive and negative plates, container dimensions, type/grade and quantity of electrolyte.

iv) The detailed drawing showing the size & quantity of steel sections for FRP stand.

v) Technical literature/Manuals covering manufacturer's instructions for filling and initial charging of the battery together with starting and finishing charging rate, maintenance instructions and storage conditions of electrolyte and battery cells.

4.3. The successful bidder shall have to supply the 3 sets of the approved drawings/literature and manuals along with each battery set to be supplied.

5.0 PACKING:

5.1 Battery shall be supplied in dry and uncharged condition suitably packed securely in wooden crates. Packing shall be suitable for handling during transit by Rail / Road and secured to avoid any loss or damage during transit.

6.0 TESTS:

The bidder shall submit the following type test reports as stated hereunder for the offered item along with the offer.

These tests must have been conducted in the **NABL** approved laboratory as per IS 1651 & IEC 60896 – 11 within last 7 years prior to date of validation of the offer.

6.1 TYPE TESTS:

6.1.1 Type Test for Battery cell:

- a. Verification of constructional requirements (As per IS 1651).
- b. Verification of marking and packing (As per IS 1651).
- c. Verifications of dimensions (As per IS 1651).
- d. Capacity test (As per IEC 60896 – 11)
- e. Charge Retention Test (As per IEC 60896 – 11)
- f. Endurance in discharge – charge cycles (As per IEC 60896 – 11)
- g. Endurance in overcharge (As per IEC 60896 – 11)
- h. Test of suitability for floating battery operation (As per IEC 60896 – 11)
- i. Short circuit current and internal resistance Test (As per IEC 60896 –11)
- j. Ampere- hour and watt-hour efficiency tests (As per IS 1651).
- k. Test for voltages during discharge (As per IS 1651).

6.1.2 Type test for Battery cell Containers: (As per IS 1146):

1. High voltage test.
2. Izod impact test.
3. Drop ball test.
4. Plastic yield test.
5. Test for resistance to acid.
6. Hydraulic thrust endurance test.

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6.2 Acceptance Tests for Battery Cells:

Tests shall be carried out as under at Manufacturer's works:

- a) Visual inspection including marking and packing.
- b) Dimensional check.
- c) Capacity test.
- d) Test for voltage during discharge.
- e) Battery Impedance Measurement Test.

6.3 Routine Tests for Battery Cells:

Tests shall be carried out as under at Manufacturer's works:

- a) Visual inspection including marking and packing.
- b) Dimensional check.
- c) Capacity test.
- d) Test for voltage during discharge.
- e) Battery Impedance Measurement Test.

Note: - Signature Value (Battery Impedance) of all the cells shall invariably be submitted **after commissioning the battery set at the site.**

The acceptance test certificates shall be submitted for approval, before dispatch of the battery sets in bound volume. Also one set shall be submitted and sent with battery set.

7.0 COMMISSIONING:

The first charging & commissioning of each battery set at site shall be in the scope of the Bid. The successful Bidder/s shall have to carry out first charging & commissioning of each battery set at site. The successful bidder shall arrange for all the necessary equipment, including the variable resistor, tools, tackles, and instruments.

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**SCHEDULE OF GURANTEED TECHNICAL PARTICULAR FOR
48V,250Ah/ 350Ah/ 600Ah TUBULAR LEAD ACID BATTERY**

(To be filled up along with offer of Battery Set)

Sr.No	Particulars	250Ah Capacity	350Ah Capacity	600Ah Capacity
1	Name of Manufacturer			
2	Confirming to Standards			
3	Type and Model			
4	Cell Container a. Dimension (Width x Depth x Height) b. Thickness c. Material of Container			
5	Capacity of battery at 10Hr. rate			
6	Minimum weight of each cell With / Without electrolyte a. Material and cross sectional area in sq.mm of i) Positive plate ii) Negative plate b. Type and Material of Separator			
7	Details of electrolyte: (i) Type/Grade: (ii) Qty per cell: (iii) 10% extra qty.: (iv) Grand total qty in Ltr.:			
8	Recommended Sp. Gravity of electrolyte at the end of a full charge			
9	Expected Sp. gravity of electrolyte at the end of discharge at 10 Hr rate			
10	Distance between centers of the cells when erected			

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Sr.No	Particulars	250Ah Capacity	350Ah Capacity	600Ah Capacity
11	Recommended max. period of Storage before first charge			
12	Internal resistance of the cell			
13	Max. Nos. of charge/ discharge Cycles required to reach rated capacity:			
14	Method of connection between cells i.e. bolted or burnet			
15	Voltage Rating of each cell when battery is: a) Floating: b) Nominal: c) Fully charged:			
16	Ampere-hour capacity			
17	a) Normal charging rate: b) Starting charging rate: c) Finishing charging rate: d) Trickle charging rate: e) Discharge rate on 3 Minutes basis in Amp. at end voltage 1.85 V/Cell for lead acid Battery cell.			
18	Average life of battery offered			
19	FRP Stand: (i) Size of MS channel/angle: (ii) Size of support angle: (iii) Thickness of FRP (mm): (iv) Nos. of rack per battery set: (v) Dimension (HxWxL): (vi) Min. weight (Kg.):			

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Sr.No	Particulars	250Ah Capacity	350Ah Capacity	600Ah Capacity
Indicate quantity for all the following accessories per set.				
20	Performance curve state design values (i) % Ah after 5 yr. and 10yr.: (ii) Discharge rate (end voltage) at 5 hr & 10 Hr: (iii) Charging curve cell voltage At 60 hrs and 100 hrs.: (iv) Discharge Amp v/s time curve Amp for 1 Hr. and 10 Hr.			
21	Lead plated cu connector (Size and Quantity) A) Inter cell: B) Inter row: C) Inter tier: D) Inter rack:			
22	Details of Stand and cell insulators A) Material: B) Size: C) Quantity:			
23	Hydrometer with stand:			
24	Cell tester			
25	Thermometer with stand			

Sr.No	Particulars	250Ah Capacity	350Ah Capacity	600Ah Capacity
Indicate quantity for all the following accessories per set.				
26	Details of Electrolyte: A) Type B) Liters per cell C) first filling + 10% extra in Ltr D) No of carboys (35 ltr)			
27	Acid filler (Rubber Syringe)			
28	Acid Resistance plastic jug			
29	Acid Resistance Funnels			
30	Cell Number plate Lead plated MS / SS Nut-Bolts, washers A) Size: B) Qty (Nos+ extra= Total):			
31	Ceramic Vent plug			
32	Insulated Spanner set (Size and Nos)			
33	Level Indicator			
34	Petroleum Jelly 250 gms. in packed Tin			
35	Rubber boot & Gloves			
36	Rubber apron			
37	Log book			

Note:- Over and above the GTP, The Bidder shall also fill up & submit the checklist for each of the offered battery set , given separately ,with this specifications.

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**Amendment - I to the Technical Specifications
(GETCO/E/TS-BATT 031/R1 Jan 2020)
for 50V, 250Ah/ 350Ah/ 600Ah TUBULAR LEAD ACID BATTERY SETS**

Date: 26.05.2022

S/N	Clause No.	Item	Existing Specification	Amended Specification
1	1	SCOPE	This specification covers the design, manufacture, Supply & testing of 50V, 250 Ah /350 Ah/ 600Ah , HDP/ Hard Rubber Container lead acid tubular battery set (with tubular positive p lates) at the manufacturer's works and supply at site including FRP stand and all accessories mentioned in this specification.	This specification covers the design, manufacture, Supply & testing of 50V, 250 Ah /350 Ah/ 600Ah , non Porous Hard Rubber/ Styrene Acrylonitrile (SAN) Container lead acid tubular battery set (with tubular positive p lates) at the manufacturer's works and supply at site including FRP stand and all accessories mentioned in this specification
2	3.6	General Requirements	The cell container shall be closed type made from non porous Hard Rubber. The material shall have chemical & electrochemical compatibility and shall be acid & heat resistant. The container and cover shall be capable of withstanding the rigorous of transport, storage and handling and shall be free from flaws. Sufficient space for sediments shall be provided	The cell container shall be closed type made from non porous Hard Rubber / Styrene Acrylonitrile (SAN).The material shall have chemical & electrochemical compatibility and shall be acid & heat resistant. The container and cover shall be capable of withstanding the rigorous of transport, storage and handling and shall be free from flaws. Sufficient space for sediments shall be provided

CHECK LIST FOR High Discharge Performance Tubular LEAD ACID BATTERY SET

Supplier :-
Manufacturer :-
Project :-
Tender No./ Order No. :-
Battery Set Rating :- 50V, 250/350/600Ah Battery set
Drawing /Document No.: - Drg. No. _____, BOM Doc. No. _____ & MQP Doc. No. _____
Quantity :- _____ Sets

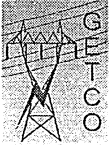
Date:

Sr. No.	Data / Item of Verification	Design data		Remarks
A	Drawings			
	Battery Cell			
1	Rating	2V, 25/350/600 AH		
2	Type	High Discharge Performance Tubular Lead Acid Battery Set		
3	Designation			
4	No. of Cells	25		
5	Sectional View	As per Drawing		
6	Dimensions			
	- Height (mm)	_____ mm		
	- width (mm)	_____ mm		
	- Depth (mm)	_____ mm		
7	Container			
	- Material			
	- Thickness (mm)	_____ mm		
8	Positive plates			
	- Type	Tubular		
	- Material	Lead /Lead Oxide		
	- Size			
	-- Height (mm)	_____ mm		
	-- Thickness (mm)	_____ mm		
	-- Area (sq.mtr) (H x W)	_____ Sq.mtr		
	- Nos. of Plates	_____ Nos.		

Supplier :-				
Manufacturer :-				
Project :-				
Tender No./ Order No. :-				
Battery Set Rating :- 50V, 250/350/600Ah Battery set				
Drawing /Document No.:- Drg. No. _____, BOM Doc. No. _____ & MQP Doc. No. _____				
Quantity :- _____ Sets				
Date:				
Sr. No.	Data / Item of Verification	Design data		Remarks
	- Total area (sq.m)			
9	Negative plates			
	- Type	Flat pasted		
	- Material	Lead /Lead Oxide		
	- Size			
	-- Height (mm)	_____ mm		
	-- Thickness (mm)	_____ mm		
	-- Area (sq.mtr) (H x W)	_____ Sq.mtr		
	- Nos. of Plates	_____ Nos.		
	- Total area (sq.m)			
10	Separator			
	- Material	Low resistance absorbent microporous glass fiber material		
	Size of separator (L x W x TH)	____ X ____ X ____ mm		
	Nos. of separator	_____ Nos.		
11	Vent plug			
	- Type	Anti-splash type ceramic		
	- Material	Ceramic		
12	Electrolyte			
	- Type/Grade	Battery grade Sulphuric Acid		
	- Quantity per cell (Ltr)	_____ Ltr.		
	- 10% extra Quantity (Ltr)	_____ Ltr		
	- Total Quantity per cell (Ltr)	_____ Ltr.		
13	Weight of Cell (Kg.)			
	- Without electrolyte	_____ kg		
	- With electrolyte	_____ Kg		
14	Connectors			
	- Material	Lead plated copper		
	- Lead coating (Min.)	50 microns		
	- Dimensions	Min. 4 mm thick		
	-- Inter-cell connectors (L x W x TH)	____ x ____ x ____ mm		
	-- Inter-row connectors	____ x ____ x ____ mm		
	-- Inter-tier connectors			
	-- Lugs for cable	50 Sq. mm 3 Nos.		

Supplier :-			
Manufacturer :-			
Project :-			
Tender No./ Order No. :-			
Battery Set Rating :- 50V, 250/350/600Ah Battery set			
Drawing /Document No. :- Drg. No. _____, BOM Doc. No. _____ & MQP Doc. No. _____			
Quantity :- _____ Sets			
			Date:
Sr. No.	Data / Item of Verification	Design data	Remarks
16	Nut-Bolts, washers		
	- Material	Lead plated M.S/S.S	
	- Size	5/16 x 1 & 1/2 x Full Thread	
17	Total weight of Battery set (Kg.)	_____ Kg (+/- 5 %)	
Battery Stand			
18	Material		
19	Thickness of FRP coating (mm, Min.)	_____ mm	
20	Size of Channels / Angles	_____ X _____ X _____ mm	
21	Size of Supports	_____ X _____ X _____ mm	
22	Stand insulators		
	- Material	Hard rubber	
	- Size	100 x 100 mm	
	- Nos.	_____ Nos.	
23	Height of lower tier from the ground (mm, Min.)	_____ mm	
24	Space between lower tier cell & bottom of the upper tier (mm, Min.)	_____ mm	
25	Height of Upper tier from the ground (Total height of the stand), (mm, Max.) (mm, Max.)	_____ mm	
26	Total height (mm, Max.)	_____ mm	
27	Length of the stand (mm, Max.)	_____ stands of _____ mm	
28	Width of the stand (mm, Max.)	_____ mm of each stand	
29	Weight of the stand (Kg.)	_____ Kg /Stand	
B Bill of Quantity			
1	Battery cells	25 Nos.	
2	Battery Stands	_____ No.	
3	Stand insulators	_____ Nos.	
4	Cell insulator	_____	
5	Inter-cell connectors - long	_____ Nos. (___ x ___ x ___ mm)	
6	Inter-cell connectors - short	If any	
6	Inter-row connectors	_____ Nos. (___ x ___ x ___ mm)	
7	Inter-tier connectors	If any	

Supplier :-				
Manufacturer :-				
Project :-				
Tender No./ Order No. :-				
Battery Set Rating :- 50V, 250/350/600Ah Battery set				
Drawing /Document No. :- Drg. No. _____, BOM Doc. No. _____ & MQP Doc. No. _____				
Quantity :- _____ Sets				
				Date:
Sr. No.	Data / Item of Verification	Design data		Remarks
9	Lugs for cable (50 sq. mm)	_____ Nos.		
10	Lead plated MS Nut-Bolts, washers	_____ Sets. + 5 Sets Extra		
11	Ceramic Vent plug	_____ Nos. (___ per cell)		
12	Syringe type Hydrometer with stand	1 No.		
13	Digital Cell tester (Multimeter)	1 No.		
14	Thermometer with stand	1 No.		
15	Gravity correcting scale	1 No.		
16	Electrolyte Qty. (first filling + 10% extra) in Ltr	_____ Ltr.		
17	No of carboys (35 ltr)	_____ Nos.		
18	Acid filler (Rubber Syringe)	1 No.		
19	Acid Resistance plastic jug (2 Ltr capacity)	1 No.		
20	Acid Resistance Funnels	1 No.		
21	Cell Number plates with fixing pins / screws	25 Nos.		
22	Spanners	2 Nos.		
23	Petroleum Jelly .	250 gms		
24	Rubber boot & Gloves	1 pair each		
25	Rubber apron	1 No.		
26	Battery Log book	1 No.		
27	Installation, commissioning and O & M manual with drawing for battery set	1 set		
28	FQP	1 copy		



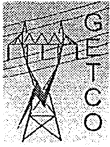
Dated: 08.09.2020

TTR validity amendment-1

(Addendum to Technical Specification for validity of type test reports
for major electrical equipments)

Sr. No.	Name of test/ Equipment	Type test reports validity (In Years)
i.	On Line Tap Changer (OLTC)	10
ii.	Power Transf. Bushing/ Reactor Bushing	7
iii.	Transformer/reactor fittings and accessories.	10
iv.	Circuit Breaker	10
v.	Isolators	10
vi.	Lightning Arrestors	10
vii.	Wave Trap	10
viii.	Instrument Transformer	7
ix.	Low Voltage (LV) & Medium Voltage (MV) Switchgear	10
x.	Cable & associated joints	10
xi.	Capacitors	10
xii.	Energy Meters [including smart meters & Availability Based Tariff (ABT) meters]	5
xiii.	Conductors & earth wire	10
xiv.	Insulators(Porcelain/ Glass)	10
xv.	Composite Insulators	5
xvi.	Power Line Carrier Communication (PLCC)/Fibre Optic (FO) cable/Optical Ground Wire (OPGW)	5
xvii.	Terminal connectors of all major equipments including transformers	10

Note: Type test reports shall be valid as on the last date of submission of bid.



Dated: 08.09.2020

TTR validity amendment-2

(Addendum to Technical Specification for validity of type test reports of *all the equipments*)

The validity of type test reports to be submitted with technical bid shall be considered as per following:

“Type test reports shall be valid as on the last date of submission of bid”