Revised on 29.03.2014

TECHNICAL SPECIFICATION FOR 220V, 80 AH SEALED MAINTENANCE FREE VALVE REGULATED LEAD ACID BATTERIES

1. SCOPE :

This specification covers the design, manufacture, testing before dispatch, supply and delivery of 220V 80 AH Sealed maintenance free valve regulated lead acid battery with.

The Batteries with trickle charger units are intended to be used for operating 33 KV, 11 KV SF6/Vacuum Circuit Breakers with auto reclosing feature. The rating of closing and opening coils is 400 Watts (Operating time is 100ms.) and the rated operating sequence is 3 Min. Co-3 Min. – Co or 0-0.3 Sec. – Co-3. Min – Co.

The Batteries should have a capacity sufficient for operating 11KV Vacuum/SF6 Circuit Breakers simultaneously for about 25 closing operations on each when used without a charger.

2. STANDARDS.

i)	IS 1885(Part 15):2008/IEC 600504(482):2004	:	Electro technical vocabulary for primary and secondary cells and Batteries
ii)	IS 15549/2005	:	Stationery Cells & Batteries lead Acid Battery with flat pasted positive plates (or) latest version.
iii)	IS-1069/1964	:	Water for storage batteries.

Materials meeting any other equivalent International standards which ensures equal or better quality than the standards mentioned will be acceptable. In such cases the copy of the standards (English version) adopted should be enclosed to the tender.

3. CLIMATIC CONDITIONS :

The climate conditions under which the equipment shall operate satisfactorily are as indicated in Clause No. 22.1 of General terms and conditions for supply of materials.

4. RATINGS :

4.1	**BATTERY**	**:**	**220V**
4.1.1.	TYPE	:	Sealed and Maintenance Free valve regulated Lead Acid Battery
4.1.2.	Nominal Voltage of the Complete Bank Comprising Of 2V individual cells	:	220V
4.1.3.	Voltage/Cell	:	2 V (The Cell Voltage shall not exceed 2.25V with a continuous low rate floating charge and shall not be less than 1.75 V at the end of the emergency discharge)

4.1.4 Capacity of Batteries : 80AH
(in Amp. Hours at 10 Hour
rate to an end voltage of
1.75V per cell).)

4.1.5 Efficiency : Not less than 90% at full rated load

5. GENERAL REQUIREMENTS :

5.1 BATTERY :

The batteries required under this specification are for supplying aux. D.C. Supply to control Circuits of Circuit Breakers. The Battery shall be capable of withstanding large discharge currents for operating 33 KV & 11 KV SF6/Vac. Circuit Breakers. It shall be of rugged construction designed for long life and for working satisfactorily under the severest operating conditions and shall conform to the relevant Indian/International standards of latest issue. The Battery shall be supplied complete with all required accessories for their efficient operation and such parts/accessories shall be deemed to be within the scope of this specification, whether specifically mentioned or not.

The rating of the batteries is specified at 27 deg. C. However, the battery shall be capable of operating satisfactorily in outdoor applications when it is housed in a cubicle between 5 Deg. C and 50 Deg.C (At reduced capacities and in locations where relative humidity varies between12% and 100%.

All parts particularly removable ones shall be interchangeable with each other

The separators shall be micro porous absorbent glass material with high porosity. All connectors shall be of lead plated copper. All inter cell and nuts and bolts shall be of brass and lead plated. The lead plating shall be adequate and tenacious. The cells shall be suitably marked as per I.S.S.

The D.C. Battery shall be operated without an intentional ground. For indicating the incidence and degree of a ground fault on the D.C. control circuitry, the mid point of the battery shall be earthed through an ammeter (center Zero) of high resistance. The high resistance shall be so proportioned that the current flowing under the worst earth fault shall not exceed 250mA. The range of center zero ammeter in the existing battery charger is + 50ma – 0- (-) 50ma only [1). + or -5ma earth leakage is permissible 2.) above + or - 10ma is not tolerable.

6.0. TESTS:

6.1. ACCEPTANCE AND ROUTINE TESTS

All acceptance and routine tests as stipulated in the relevant standards shall be carried out by the bidder in presence of purchaser’s representatives.

6.2 Type Tests :-

The equipment offered shall be fully type tested in recognized laboratory (NABL) as per the relevant standards, The bidder shall furnish 2 sets of the type test reports along

with the bid. The bids received without type test reports shall be treated as non-responsive. The type tests as specified in the IS should be carried out not later than 5 years from the date of opening of bid.

6.3 Acceptance Tests :

Acceptance tests shall be done as per Sampling Scheme given in **IS-15549/2005 or latest version** of the offered quantity.
The following shall constitute the acceptance tests as per relevant standards.

6.3.1. Test for Battery Discharge capacity as per IS:15549/2005

6.4 Type Tests:

The following shall constitute the type tests in respect of batteries as per relevant standard IS:15549/2005 (latest version).

1. Checking of dimensions and markings
2. Test for capacities
3. Test for retention of charge

7.0 INSPECTION :

The inspection may be carried out by the purchaser at any stage of manufacture. The successful Bidder shall grant free access to the purchaser's representative at a Reasonable time when the work is in progress. Inspection and acceptance of any equipment under this specification by the purchaser shall not relieve the Bidder of his obligation of furnishing equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective. The Bidder shall keep the purchaser informed in advance, about the manufacturing program so that arrangement can be made for inspection. The purchaser reserves the right to insist for witnessing the acceptance/routine testing of the bought out items. The Bidder shall give 15 days advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests.

8.0 QUALITY ASSURANCE PLAN :

8.1. The Bidder shall invariably furnish following information along with his bid, failing which his bid shall be liable for rejection. Information shall be separately given for individual type of equipment offered.

i) Statement giving list of important raw material, names of sub- suppliers for the raw materials, list of standards according to which the raw materials are tested. List of test normally carried out on raw material in presence of the Bidder's representative, copies of test certificates.

ii) Information and copies of test certificates as in (i) above in respect of bought out accessories.

iii) List of manufacturing facilities available.

iv) Level of automation achieved and list of areas where manual processing exists.

v) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.

vi) List of testing equipment available with the Bidder for jesting of equipment specified and test plant limitation. If any, Vis-a- vis the type special acceptance and routine tests specified in the relevant standards. The limitations shall be very clearly brought out in schedule of deviations from specified test requirements.

8.2 The successful Bidder shall within 30 days of placement of order submit following information to the purchaser.

i) List of raw materials as well as bought out accessories and the names of sub suppliers selected from those furnished along with offer.
ii) Type test certificates of the raw materials and bought out accessories.
iii) Quality assurance plan (QAP) WITH HOLD POINTS FOR PURCHASER'S INSPECTION. The quality assurance plan and purchasers hold points shall be discussed between the purchaser and Bidder before the QAP is finalized.

8.3 The successful Bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material at the time of routine testing of the batteries,

9.0 DOCUMENTATION

9.1 All drawings shall conform to International standards organization (ISO) 'A' series of drawings, as per IS.656, All drawings shall be in ink and suitable for micro filming. All dimensions and data shall be in S.I Units.

9.2 LIST OF DRAWINGS AND DOCUMENTS :

The Bidder shall furnish one set of the following along with his Bid.

a. General out line and assembly drawings.
b. Graphs showing the performance of material.
c. General constructional features.
d. Type test reports in case the material has been type tested.
e. Test reports literature, pamphlets of the bought out items & raw materials.

9.3 The successful Bidder shall, within 2 weeks of placement of order, submit three sets of final versions of all the above said drawings for purchaser's approval. The purchaser shall communicate his comments/approval on the drawings to the Bidder within four weeks. The Bidder shall, if necessary, modify the drawings and resubmit three copies of the modified drawings for their approval. The Bidder shall within two weeks submit the prints and two good quality report copies of the approved drawings for purchaser's use.

9.4 Two sets of the type test reports duly approved by the purchaser, shall be submitted by the Bidder for distribution before commencement of supply. Adequate copies of acceptance and routine test certificates, duly approved by the purchase, shall accompany the dispatch consignment.

9.5 The manufacturing of the materials shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the Bidder's risk.

9.6 One set of nicely printed bond volumes of operation, maintenance and reaction manuals and approved drawings in English Language shall be supplied along with each unit supplied in addition to the two sets to be sent directly to the purchaser.

9.7 Approval of drawings/ work by purchase shall not relieve the Bidder of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirement of the latest revision of application standards, rules and codes of practices. The equipment shall conform in all respects to high standards of Engineering design, workmanship and Latest revision of relevant standards at the time of ordering and purchaser shall have the power to reject any work or materials which, in his judgment is not in full accordance therewith.

10. PACKING AND FORWARDING:

10.1 The packing shall be done as per the manufactures standard practice. However, he should ensure the packing such that, the materials should not get damaged during transit by Rail/Road.

11. Guaranteed Technical particulars: The guaranteed Technical particulars shall be furnished by bidder as per Section-V.

12. The Schedule of materials, Desired Delivery and prices.

12.1 The schedule of materials and desired deliveries are indicated in section IV.

12.2 The schedule of price shall be **On-line only.**

13. GUARANTEE

The batteries supplied shall be guaranteed for a period of 18 months from date of supply.

GUARANTEED TECHNICAL PARTICULARS

BATTERIES:

Sl. No.	Details		As per -PDCL Requirement	As per Bidder
1.	**Type of Designation as per I.S.S**	**:**	Sealed maintenance Free Valve Regulated Lead acid (MF-VRLA) Battery	
2.	Manufacturer's type Designation	:	_	
3.	Ampere hour capacity 10 Hrs. rate of discharge to 1.75V.	:	80AH	
4.	Total No. of Plates per cell	:	11	
5.	Nominal Cell Voltage (Volts)	:	2V	
6.	No. of Cells in each Bank	:	110	
7.	No. of Spare Cells if any in each Bank.		_	
8.	Internal resistance for each Cell	:	As per IS/IEC	
9.	Resistance of the Battery Including inter – connection Between the Cells (ohm)		As per IS/IEC	
10.	Cell discharge rate in Ampere (from rated Voltage to final discharge rate in Amp. 1) 5 Hrs. Discharge rate in Amp. 2) 2Hrs. Discharge rate in Amp. 3) 1 Hrs. Discharge rate in Amp. 4) 30 Min. Discharge rate in Amp. 5) 10 Min Discharge rate in Amp. 6) 1 Min Discharge rate in Amp. 7) 30 Min Discharge rate in Amp. 8) 1 Sec. Discharge rate in Amp. (Please furnish a graph showing Amps. Against time for the type of battery offered)	:	As per IS/IEC	
11.	Short circuit current (Amps)	:	1644.8Amp	
12.	i) Material of cell containers & ii) Material used for battery box (iii) Trays	: :	(i) &(ii) Poly propylene co-polymer(CRCA) (ii) Mild steel coated with acid resistance paint	
13.	Thickness, type and material of separators	:	Highly absorbent Micro porous spun glass matrix (AGM) 2.02mm at 20 Kpa	
14.	Constructional details and dimension: Surface area plates of i)Positive plate ii)Negative plate in Sq.mm	: :	_	
15.	i) Ampere hour efficiency % ii) Watt hour efficiency %	: :	Above 90% Above 80%	
16.	i) Recommended float charge current and voltage ii)Recommended boost charge current and voltage	:	(i)10A, 2.15V at 27 Deg. C (ii)16A, 2.5 V at 27 Deg.C	
17.	Time required for boost charging from discharged condition	:	_	
18.	i) Max. charging current/cell ii) Nominal charging rate	: :	_	

19.	i) Whether explosion proof or vent pugs provided ii) Whether vent is spill proof	: :	_	
20.	Type of inter cell connection and whether they are covered with plastic sleeves	:	_	
21.	i) Dimensions of each 2V Block/Cell Length mm Width mm Height mm Thickness of container mm ii) Net weight of the cell complete with acid 12V Block (kg).	 : : : :	As per approved drawings	
22.	Expected life span of battery	:	20 Years(Min)	
23.	Accessories provided	:	_	
24.	Special conditions if any	:	_	

ACRONYMS

Reference Abbreviation	Name and Address
I.E.C.	International Electro Technical Commission Bureau Central de la Commission Electro Technique International, Rue de Vermeer Geneva, Switzerland.
ISO	International Organization for Standardization, Danish Board of Standardization Aurchoegyej- 12 DK – 2900, Heel prop, DK – 2900. Heel prup. DENMARK
ISS	Indian Standard Bureau of Indian Standards Nanak Bhavan Bahadur Shah Zafar Marg, NEW DELHI – 110 002, INDIA
AC	Alternate Current
DC	Direct Current
V	Volt
VAC	AC Volts
A	Amps
HZ	Hertz
m V	milli Volts
M.Ohms	Mega Ohms