

TECHNICAL SPECIFICATION FOR 30 V, 75 Ah, Ni-Cd STATIONARY BATTERIES

1 . SCOPE :

The specification covers the design, manufacture, testing at the Manufacturer's works, delivery by road transport to different sites of West Bengal State Electricity Distribution Company Limited of Ni-Cd Battery set suitable for Auto and Manual Float cum Boost Battery Charger with 30 V DC Output. Supervision and erection/commissioning of devices shall have to be undertaken by mutual acceptance of terms and conditions for the same, if required.

APPLICATION:

The system requires a reliable and uninterrupted D.C. supply for supplying D.C. Power to emergency lights, closing and tripping coils of circuit breakers, relays, semaphores etc.

2.SERVICE CONDITIONS:

Equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions.

Maximum ambient temperature (Degree C)	50
Maximum temperature in shade (Degree C)	45
Minimum Temperature (Degree C)	3
Relative Humidity (percent)	95
Maximum Annual rain fall (mm)	1450
Maximum wind pressure (kg/sq. m)	150
Maximum altitude above mean sea level (Meter)	1500
Isoceraunic level (days per year)	50
Seismic Level	The sites fall within seismic zone-III and IV as classified in the IS:1983
Moderately hot and humid tropical climate conducive to rust and fungus growth	

3. APPLICABLE STANDARDS

Unless otherwise specified, the equipment shall conform to latest applicable Indian standard of equivalent IEC, British or USA standard and in particular to the following standard (or equivalent IEC British, USA standard):

The tenderer shall clearly state the standard to which the equipment offered by him conforms.

Sl.No.	International Standards	Indian Standards	Description
1	IEC: 60623	IS: 10918	Secondary cells and batteries containing alkaline or other non-acid electrolytes-vented Nickel-Cadmium prismatic rechargeable single cells
2	IEEE: 1106		Recommended practice for maintenance, testing & replacement of Ni-Cd storage batteries for generating stations & substations

3	IEEE: 1115		Recommended practice for sizing of Ni-Cd batteries for stationary applications
4		IS 13410	Glass reinforced Polystar sheet moulding compounds.
5		IS: 1248	Voltmeter

4. STANDARD RATING

The standard voltage ratings of batteries for use at 33/11 KV sub- stations shall be 30 volts. The batteries for the above application shall have a rating of 75 Ah in case of 30 V battery system or as per the load requirement of the substation.

5. CELL VOLTAGE

The nominal voltage of a single cell shall be 1.2 V

Nominal Voltage Rating of battery	Nominal single cell voltage	Float cell voltage	Boost Cell Voltage	Number of cells	End of discharge cell voltage (Min.)
(V)	(V)	(V)	(V)	(Nos.)	(V)
30	1.2	1.42	1.47	25	1.1

6. BATTERY SIZING

The Capacity of the Battery should be of 75 Ah (KPL Type).

7. CONSTRUCTION

The cells shall be flooded type containing sufficient reserve electrolyte. Battery shall be equipped with nickel- plated inter-cell connectors and terminals. The cells shall be housed in high-strength impact resistant & alkali-resistant containers and should be transparent / translucent to facilitate checking of electrolyte level. Container and Lid should be welded and should not cause leakage of electrolyte/gases during operation even in case of normal mechanical/electrical abuses. O-rings of nitrile rubber with EPOXY sealing shall be used to ensure proper sealing of bushings etc. Flip-top vent plugs/ valves with flame arrester feature shall be provided. Construction of cells shall be to ensure proper air circulation between the cells for heat dissipation/ ventilation (by providing either insulated button separators integral with the outer surface of the cell container or by suitably designing the inter cell connectors). The containers shall be strong enough, so that excessive bulging of container does not occur during service. Cells shall be supplied in filled & charged state or otherwise electrolyte dry form & battery water separately or in liquid form shall be shipped as desired by the owner.

Battery shall have provision for water top up to ensure electrolyte level does not fall below recommended level.

8. ELECTRODES

+ ve and –ve electrodes shall be made by encapsulating/impregnating active material in order to ensure that the battery is able to perform reliably over its life. +ve and –ve electrodes shall be separated by flat grid type separators made by polypropylene materials. The structure of electrodes shall be elastic enough to absorb mechanical stresses & volume changes during charge/discharge cycles.

9. ELECTROLYTE

The electrolyte shall be prepared from battery grade potassium hydroxide (KOH) confirming to IEC 60993. The cells shall contain sufficient reserve electrolyte for efficient heat dissipation & to reduce water topping up interval. Reserve electrolyte shall not be less than 3.5 ml/Ah.

10. CONNECTORS

Nickel plated copper inter-cell connectors shall be used for connecting up adjacent cells. Inter-row connectors shall be of flexible PVC insulated copper cable. Bolts, nuts and washers shall be nickel-plated steel/stainless steel. All terminals and cell inter-connectors shall be fully insulated or have insulation shrouds.

11. TERMINALS

Separate terminals shall be provided on the end cell for connecting load through DCDB and for connecting charger leads. All terminals shall be of suitably sized nickel-plated steel. All connectors and leads shall be suitable for carrying 30-minute discharge current continuously and rated for short circuit duty of 4kA for 01 second.

12. MANUAL OF INSTRUCTIONS

The manufacturer shall supply a copy of the instruction manual for commissioning & initial treatment of the battery and maintenance during service with every battery bank ordered.

13. BATTERY RACKS

Suitable corrosion resistant steel battery racks and cable supports shall be provided. Metallic racks shall be properly earthed. The bottom tier of stand shall have a ground clearance of 150mm minimum above the floor. Racks shall be made of alkali resistant powder coated mild steel to ensure corrosion resistance.

14. ACCESSORIES

The following accessories (BIS certified) shall be supplied with each set of battery:-

- i) Clamp-on type multi-meter of AC/DC current range having ISI mark.
- ii) Pair of gloves
- iii) 10" Slide insulated wrench for opening terminal nuts
- iv) Plastic/glass syringe
- v) Alcohol thermometer
- vi) Hydrometer for use while filling electrolyte.

16. CHARGE RATE

Fully discharged batteries should be able to get recharged in 7 hours maximum to 90% of capacity with charging current in the range of 0.1 to 0.4C5 rate at 20°C. At higher temperatures, the charging time may be more. The trickle charge rate shall be 1-2 mA/Ah.

17. CELL DESIGNATION

The practice as per IS: 10918 (latest version) shall be followed.

18. POLARITY MARKING

The polarity of the terminals shall be marked for identification. Positive terminal may be identified by 'P' or a (+) sign or red colour mark and negative terminal may be identified by 'N' or (-) sign or blue colour mark. Marking shall be permanent and non-deteriorating.

19. WARNING MARKING

The battery shall be furnished with a warning plate located at conspicuous place specifying the use of 'ALKALINE ELECTROLYTE ONLY' (in block letters) and specifying proper filling level of the electrolyte. Marking shall be permanent and non-deteriorating.

20. PACKING

The batteries shall be securely packed in wooden crates suitable for handling during transit by rail/road and secured to avoid any loss or damage during transit. Carton boxes duly palletized shall also be acceptable.

21. TESTING FACILITIES

The Bidder must clearly indicate what testing facilities are available in the works of manufacturer and whether the facilities are adequate to carry out all Routine, Acceptance Tests. These facilities should be available to WBSEDCL's Engineers, if deputed to carry out or witness the tests in the manufacturer's works. If any of the tests can not be carried out in the manufacturer's works, Bidder shall have to arrange for such testing at any NABL Accredited/Govt. Test house or Laboratory at his own cost.

22. INSPECTION :

All tests and inspection shall be made at the place of manufacturer unless otherwise specially agreed upon by the manufacturer and the WBSEDCL. The manufacturer shall provide the WBSEDCL all reasonable facilities, without charge to satisfy him that the material is being supplied in accordance with this specification.

Tests:-

General: The equipment including all components and accessories shall be subjected to all type of tests including Routine and acceptance tests in accordance with provision contained in relevant standard.

Type Test:-

The Bidder shall have to submit along with their Tender documents , as pre-requisites, the complete type Test Reports as stipulated in the relevant IS/IEC, carried out within 5 years from

the due date of Tender, from CPRI/NABL accredited/Govt. recognized Test House or Laboratory on the offered Item having identical design and same/higher AH rating, failing which their offer may not be technically acceptable.

Routine and acceptance Tests:-

Routine & acceptance tests shall have to be carried out in compliance with provision contained in the relevant standard and / or to ascertain satisfactory performance of the offered device at the works of the Manufacturer.

The acceptance tests shall have to be conducted in the presence of authorized representative of the purchaser before effecting delivery.

23. DRAWINGS :

The successful bidder shall have to submit the 6(six) copies of final drawings, manuals, literatures for approval to the office of the Chief Engineer (P & E) for approval before starting manufacture of the equipment. Before despatch of the equipment, 6(six) copies of drawings, manuals and literature shall be submitted to purchaser for distribution to different offices of the Company.

In addition to above, every crate of complete set of equipment shall also contain in waterproof folder, 2(two) sets of drawing, manuals and literature for commissioning, operation and maintenance at site.

24. PERFORMANCE GUARANTEE

Battery shall be delivered to the various consignees of WBSEDCL and shall be suitably packed to avoid damages during transit. The Battery with all its integral part will be guaranteed for the period of 5 years from the date of last dispatch.

In the event of any defect in any of its integral part of the equipment arising out of faulty design, materials, workmanship within the above period, the supplier shall guarantee to replace or repair the same to the satisfaction of the purchaser. However, any engineering error, omission, wrong provision, etc. which do not have any effect on the time period, shall be attended to as and when observed/pointed out without any price implication.

25. GUARANTEED TECHNICAL PARTICULARS

The bidder should fill up the details in schedule A –“Guaranteed Technical Particulars” and the statement such as “as per drawing enclosed”, “as per WBSEDCL requirement”, “as per IS”, “as per specification” etc. shall be considered as details not furnished and such offers may be rejected.

26. SCHEDULES:

The Bidder shall fill in the following schedules, which is part and parcel of the tender specification and offer. If the schedules are not submitted duly filled in with the offer, the offer shall be liable for rejection.

Schedule A: Guaranteed Technical Particular

Schedule-A

GUARRANTEED TECHNICAL PARTICULARS

Name of manufacturer :

Address :

Sl.No.	Description	Units	Details
1	Rated DC system voltage	Volts	30
2	Rated cell voltage	Volts	1.2
3	Number of cells	Nos.	25
4	Cell designation		KPL
5	Type of electrode		
6	Specific gravity of electrolyte		
7	Cell float charge voltage	Volts	1.42
8	Cell boost charge voltage	Volts	1.47
9	End Cell voltage	Volts	1.10
10	Nominal cell capacity at 5 Hrs rate	Ah	75
11	Material of container		
12	Size of terminals		
13	S/C rating of terminals/ connectors/ leads	kA	
14	Current for charge to 90% capacity in 7 Hrs from fully discharged state	Amps	
15	Recombination efficiency	%	
16	Release pressure for valve regulated type	Kg/m2	
17	Volume of electrolyte per cell	ml	
18	Volume of reserve electrolyte per cell	ml	
19	No of electrode plates per cell	Nos.	
20	Type of racks		

21	Cell dimension: (a) Height (b) Width (c) Depth	Mm Mm Mm	
22	Rack Dimensions (a)Height (b)Width (c)Depth	Mm Mm Mm	

Place:
Name of the Company:

Signature with Date:
Name & Designation:
Seal of the company

