

STANDARD TECHNICAL SPECIFICATION COVER SHEET

Specification No. : ENG-EHV-1045

Specification Name : SPECIFICATION FOR LEAD ACID BATTERY 24/48V, 100/150AH(2V Cell Voltage)

Prepared by	Reviewed by	Reviewed by	Reviewed by	Approved by	Released by
Ranjan Kumar Sahoo	SATYA PRASAD NAYAK	K GOVINDARAJ	SURYAKANTA MOHANTY	Shailendra Kumar Jaiswal	SHIRISH SHARAD DIKAY
TPSODL	TPCODL	TPWODL	TPNODL	TPSODL	TPSODL
28-03-2023	28-03-2023	29-03-2023	29-03-2023	29-03-2023	29-03-2023

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1.0	SCOPE	This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading of lead acid 24/48V, 100/150 AH Battery at site/ stores complete with all accessories for efficient and trouble free-operation. It is not the intent to specify completely herein all the details of tech design and construction of material. However, the material shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in manner acceptable to TPCODL/TPNODL/TPSODL/TPWODL , who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered material shall be complete with all components necessary for their effective and trouble-free operation. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in this specification and/or the commercial order or not.		
2.0	APPLICABLE STANDARDS	The equipment covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian/International standards and shall conform to the regulations of the local statutory authorities.		
		IS 266-1993	Battery grade sulphuric acid	
		IS 1146-1981	Rubber and plastic container for lead acid storage batteries	
		IEE 485	Recommended Practice for Sizing Lead-Acid Batteries for Stationary Applications	
		IS 15549-2005	Stationary Value regulated lead acid batteries	
		IEC 60896-21&22:2004, PART-II.	Stationary lead acid batteries-Valve regulated types – Methods of test-Part 21 Stationary lead acid batteries-Valve regulated types – Requirements-Part 22	
		IEEE1188 & 1189	Recommended Practice for Maintenance, Testing, and Replacement of Valve-Regulated Lead- Acid (VRLA) Batteries for Stationary Applications	
3.0	CLIMATIC CONDITIONS OF THE INSTALLATION	1	Maximum ambient temperature	50 deg C
		2	Max. Daily average ambient temp	35 deg C
		3	Min Ambient Temperature	0 deg C
		4	Maximum Humidity	95%
		5	Average Annual Rainfall	150cm
		6	Average No. of rainy days per annum	120

		7	Altitude above MSL not exceeding	1000m	
		8	Wind Speed	300 Km/hr	
		9	Earthquakes of an intensity in horizontal direction	Equivalent to seismic acceleration of 0.3g	
		10	Earthquakes of an intensity in vertical direction	Equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity)	
		TPCODL/TPNODL/TPSODL/TPWODL service area has heavy saline conditions along the coast and High cyclonic Intensity winds with speed upto 300 Kmph. The atmosphere is generally laden with mild acid, dust in suspension during the dry months, and is subjected to fog in cold months.			
4.0	GENERAL TECHNICAL REQUIREMENTS	S. No.	Particular	Requirement	
			48V, 100/150AH Battery	24V, 100/150AH Battery	
1		Type of battery	Maintenance Free Valve Regulated Lead Acid (MF-VRLA).		
2		Container	Poly Propylene Co Polymer (PPCP)		
3		Nominal DC system voltage	48 V	24 V	
4		Number of batteries	One set	One set	
5		Number of cells	24	12	
6		Cell type	Flat Plated AGM Valve Regulated Lead Acid		
7		Cell voltage			
		a) Nominal	2 V	2 V	
		b) End cell voltage	1.85 V	1.85 V	
8		Capacity of battery	100/150 Ah	100/150 Ah	
		a) 10-hour rate of discharge			
9		Float charging voltage	2.23 to 2.25V	2.23 to 2.25V	
		Boost charging voltage	2.30 to 2.32V	2.30 to 2.32V	
		10	Mounting arrangement	Self-stackable MS HRCA racks coated with acid resistant powder coating	
5.0	GENERAL CONSTRUCTIONS: Each battery shall be of high rate performance, lead acid type with capacity as specified in data sheet to cater requirements of normal and emergency DC loads. The battery shall consist of series connected cells for a normal battery rating specified in data sheet.				
5.1	Cell elements	The cells shall be lead acid type flat pasted type positive plates. Both plates are constructed of heavy-duty lead alloy grids type. The plates shall be corrosion-resistant & shall have low self-discharge properties. maximum durability during all service, conditions including a high rate of discharge. Both plates shall be flat construction of good workmanship.			

5.2	Cell lids	The cell covers shall be made of suitable material compatible with the container material and permanently fixed with the container. It shall be capable to withstand internal pressure, Fixing of Pressure Regulation Valve & terminal posts in the cover shall be such that the seepage of electrolytes, gas escapes and entry of electro-static spark are prevented.
5.3	Electrolyte	The electrolyte shall be of battery-grade sulphuric acid and conforming to relevant standards. The battery shall be shipped completely charged, the sulphuric acid and water used for preparing electrolyte for the cells shall conform to latest edition of IS 266 and IS 1069.
5.4	Containers	The container material shall have chemical and electro-chemical compatibility and shall be acid resistant. The material shall meet all the requirements of VRLA batteries and be consistent with the life of battery. The porosity of the container shall be such as not to allow any gases to escape except from the regulation valve. The tensile strength of the material of the container shall be such as to handle the internal cell pressure of the cells in the worst working condition. The container shall be capable of withstanding the rigours of transport, storage and handling. The containers shall be enclosed in a steel tray.
5.5	Terminals posts and connectors	Both the +ve and –ve terminals of the cells shall be capable of proper termination and shall ensure its consistency with the life of the battery. The surface of the terminal post extending above the cell cover including bolt hole shall be coated with an acid-resistant and corrosion retarding material. Terminal posts or any other metal part which is in contact with the electrolyte shall be made of the same alloy as that of the plates or of a proven material that does not have any harmful effect on cell performance. Both +ve and –ve posts shall be clearly and unambiguously identifiable. Connectors, All inter-cell lead-coated copper connectors shall be protected with heat-shrinkable silicon sleeves for reducing the environmental impact including a corrosive environment.
5.6	Venting device	Each cell shall be provided with a pressure regulation valve. The valve shall be self-sealable. The valve unit shall be such that it cannot be opened without a proper tool. The valve shall be capable to withstand the internal cell pressure specified by the manufacturer, Each cell shall be equipped with a Flame Arrestor to defuse the Hydrogen gas escaped during charge and discharge. The material of the flame arrestor shall not affect the performance of the cell.
5.7	Fasteners	Nuts and bolts for connecting the cells shall be made of copper, brass, or stainless steel. Copper or brass nuts and bolts shall be effectively lead-coated to prevent corrosion. Stainless steel bolts and nuts can be used without lead coating.
5.8	Separators	The separators used in the manufacturing of battery cells shall be of glass mat or synthetic material having high acid absorption capability, resistant to sulphuric acid, and good insulating properties. The design of separators shall ensure that there is no misalignment during normal operation and handling
5.9	Stand and battery racks	All batteries shall be mounted in a suitable metallic stand/frame. The frame shall be properly painted with acid-resistant paint. Suitable insulation shall be provided between the stand/frame and floor to avoid the grounding of the frame/stand.

6.0	NAMEPLATE AND MARKINGS	The unit shall be provided with below information clearly visible, The label/detailing shall be indelibly and distinctly marked with all essential particulars as per relevant standards along with the following: i) Manufacturer's name ii) Month and Year of manufacture iii) Serial number and Type designation iv) Nominal voltage of each cell v) Ah capacity rate of the battery vi) Rated voltage vii) No. of cells in each module viii) No. of modules ix) charge voltage x) Charge current xi) Next due date for the freshening charge xii) Guarantee period. xiii) Reference standard. xiv) PROPERTY OF TPCODL/TPNODL/TPSODL/TPWODL
7.0	TESTS	All routine, acceptance & type tests shall be carried out in accordance with the relevant standards mentioned in clause 2.0. All routine & acceptance tests shall be witnessed by the TPCODL/TPNODL/TPSODL/TPWODL /his authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted on the metering cubical in addition to others specified in IS/IEC/IEEE/UL standards.
7.1	Type Test	All the type tests should be conducted as per the relevant standards: A.For battery: Type Test 1. Gas emission 2. High current tolerance 3. Short circuit current and d.c. internal resistance 4. Protection against internal ignition from external spark sources 5. Protection against the ground short propensity 6. Content & durability of required markings 7. Material identification 8. Valve operation 9. Flammability rating of materials 10. Intercell connector performance 11. Discharge Capacity 12. Charge retention during storage 13. Float service with daily discharges for reliable mains power 14. Recharge behavior 15. Service life at an operating temperature of 40° C for brief duration of exposure time. 16. Impact of a stress temperature of 60° C for brief duration exposure time with 3 h rate discharge test. 17. Abusive over-discharge 18. Thermal runaway sensitivity 19. Low-temperature sensitivity 20. Dimensional sensitivity at elevated internal pressure and temperature 21. Stability against mechanical abuse of units during installation

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		B. Acceptance test i) Visual Examination ii) Verification of dimensions iii) Test for capacity iv) Test for voltage during discharge v) Verification of marking
7.2	Routine tests	All the routine tests should be conducted as per the relevant standards.
7.3	Acceptance Tests	All the acceptance tests should be conducted as per the relevant standards mentioned in clause 2.0 and shall be witnessed by TPCODL/TPNODL/TPSODL/TPWODL officials.
8.0	TYPE TEST CERTIFICATES	The Bidder shall furnish the type test certificates of the for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ERDA/NABL accredited Labs by TPCODL/TPNODL/TPSODL/TPWODL as per the relevant IS/IEC. Type tests should have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable, same shall be carried out without any cost implication to TPCODL/TPNODL/TPSODL/TPWODL.

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9.0	PRE-DISPATCH INSPECTION	The successful bidder shall submit the compliance as per specifications and getting approval before mass manufacturing. Equipment shall be subject to inspection by a duly authorized representative of the TPCODL/TPNODL/TPSODL/TPWODL . Inspection may be made at any stage of manufacture at the option of the TPCODL/TPNODL/TPSODL/TPWODL and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection..Inspection by the TPCODL/TPNODL/TPSODL/TPWODL or its authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by the TPCODL/TPNODL/TPSODL/TPWODL . Following documents shall be sent along with material : - Test reports - MDCC issued by TPCODL/TPNODL/TPSODL/TPWODL - Invoice in duplicate - Packing list - Drawings & catalogue - Guarantee / Warrantee card - Delivery Challan - Other Documents (as applicable)

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10.0	INSPECTION AFTER RECEIPT AT STORE	The material received at TPCODL/TPNODL/TPSODL/TPWODL 's store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering department.
11.0	GUARANTEE	Bidder shall stand warrantee towards design, materials, workmanship & quality of process/manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the TPCODL/TPNODL/TPSODL/TPWODL up to a period of 60 months from the date of commissioning or 66 months from the date of last supplies made under the contract, whichever is earlier. Bidder shall be liable to undertake to replace/rectify such defects at his own costs, within mutually agreed timeframe, and to the entire satisfaction of the TPCODL/TPNODL/TPSODL/TPWODL , failing which the TPCODL/TPNODL/TPSODL/TPWODL will be at liberty to get it replaced/rectified at Bidder's risks and costs and recover all such expenses plus the TPCODL/TPNODL/TPSODL/TPWODL 's own charges (@ 20% of expenses incurred), from the Bidder or from the "Security cum performance Deposit" as the case may be. In case the battery bank, battery charger or/ and the BMS fails within the guarantee period, the TPCODL/TPNODL/TPSODL/TPWODL will immediately inform the bidder who shall take back the failed/ faulty part within 15 days from the date of intimation at his own cost and replace/repair it within forty-five days of the date of intimation with a roll over guarantee. Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the TPCODL/TPNODL/TPSODL/TPWODL.
12.0	PACKING	Rail/ Road transportation: The bidder shall ensure that the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit. Packaging shall be as per climate change perspective. TPCODL/TPNODL/TPSODL/TPWODL encourages to use environment friendly packaging. Note: Single use plastic not to be used for packing of the material.
13.0	TENDER SAMPLE	Not Applicable.
14.0	QUALITY CONTROL	The bidder shall submit with the offer Quality Assurance Plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The TPCODL/TPNODL/TPSODL/TPWODL 's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections. The bidder shall ensure that the material supplied is as per the Guaranteed Technical Particulars as specified in the specifications.
15.0	MINIMUM TESTING FACILITIES	Bidder shall have adequate in house testing facilities for carrying out all routine tests, acceptance tests as per Indian/International standards
16.0	MANUFACTURING ACTIVITIES	a) The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. b) CAT-B/CAT-A approval is mandatory to start manufacturing works.

17.0	SPARES, ACCESSORIES AND TOOLS	Recommended and mandatory spares to be supplied by the bidder, without any cost implication to TPCODL/TPNODL/TPSODL/TPWODL .						
18.0	DRAWING AND DOCUMENTS	A. Following documents shall be submitted along with the bid: 1. Completely filled-in clause wise compliance of the specification. 2. Type test Certificates for each specified test 3. Drawing of Battery B. Following documents shall be submitted after the placement of RC/PO: 1. Completely filled-in clause wise compliance of the specification. 2. Type test Certificates for each specified test if not submit during technical evaluation 3. Drawing of Battery 4. Compliances of undertaking submitted during Technical Evaluation 5. QAP 6. O&M/Instruction Manual All the Documents and Drawings shall be in English Language.						
19.0	GUARANTEED TECHNICAL PARTICULARS	Bidder to submit completely clause wise compliance of this specification.						
20.0	SCHEDULE OF DEVIATION	The bidders shall set out all deviations from this specification, Clause by Clause in this schedule. Unless specifically mentioned in this schedule, the tender shall be deemed to confirm the TPCODL/TPNODL/TPSODL/TPWODL 's specifications. <u>(TO BE ENCLOSED WITH THE BID)</u> All deviations from this specification shall be set out by the bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the TPCODL/TPNODL/TPSODL/TPWODL 's specifications: <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">S.No.</th><th style="width: 33%;">Clause No.</th><th style="width: 33%;">Details of deviation with justifications</th></tr> </thead> <tbody> <tr> <td style="height: 20px;"></td><td></td><td></td></tr> </tbody> </table> We confirm that there are no deviations apart from those detailed above. Seal of the Company Signature : Designation :	S.No.	Clause No.	Details of deviation with justifications			
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