shamikgupta@bhel.in

From: shamikgupta@bhel.in
Sent: 11 July 2024 16:01
To: 'Rahul Sharma'
Cc: 'Shri Praksah Yadav/ श्री प्रकाश यादव'; 'Sanjay Kumar Dubey'
Subject: Reg, Tender enquiry No.77/23/6071/SHA dated 11.07.24 for 220 V DC Lead Acid/ni-Cd Batteries for 1x 660 MW Panki TPS
Attachments: NIT.pdf; SCC REV-01 PANKI.pdf; COW.pdf

Sir,

Refer,

PROJECT	**:- 1x 660 MW Panki TPS**
PACKAGE	**:- 220 V DC Lead Acid/ni-Cd Batteries**
ENQUIRY No. & Date	**:- 77/23/6071/SHA dated 11.07.24**
Bid Submission Date & Time	**:-16.07.24, 02.00 P.M**
NIC Tender ID	**:- 2024_BHEL_37950_1**

Dear Sir/Madam,

Please note that in recent, BHEL-PEM has issued a tender enquiry for **220 V** DC Lead Acid/ni-Cd Batteries for **1x 660 MW Panki TPS**. You are invited to upload the tender against this enquiry on e-procurement portal i.e**.** ***https://eprocurebhel.co.in*** **(NIC portal).**

The due date for offer uploading is on or before **16.07.24 (02:00 PM)**.Please ensure uploading/submission of offer by due date & time. Kindly Note the Tender ID in NIC portal for downloading & uploading the tender **is 2024_BHEL_37940_1**
For Complete tender Details, please visit the **E-procurement portal *https://eprocurebhel.co.in***. **(NIC portal)**

All corrigenda, addenda, amendments, time extensions, clarifications etc. to the tender will be hosted on BHEL websites only (https://pem.bhel.com, www.bhel.com (NIT_82216) & https://eprocurebhel.co.in) under subject tender reference. Bidders are requested to visit our websites from time to time to keep themselves updated. **Bidders may go through the Sellers' manual & Help documents provided on NIC Portal website & obtain required Digital Signature Certificate for participating in the subject Tender.**
Note: - Offer (If any) received in hard Bid in BHEL-PEM tender-room shall not be considered as the enquiry has been issued through **NIC** portal. As such, please upload the offer through NIC procure e-procurement portal i.e**.** ***https://eprocurebhel.co.in*** only**.**

Thanks and Regards
Shamik Gupta/PG II/9716336332
Follow us on:

Ref. Enquiry No.: 77/23/6071/SHA dated 11.07.24

DUE DATE
16.07.2024
BY 02:00 PM

Dear Sir/ Ma'am

Subject: Single tender Enquiry for "220 V DC Lead Acid/Ni-CD Battery for 1x660 MW Panki TPS

-BHEL invites your offers for **220 V DC Lead Acid/Ni-CD Battery** for scope as described in the various sections of the technical specification for **x660 MW Panki TPS**

Your offer shall be submitted in two parts strictly as per Clause-2.0 of the "**Instructions to Bidders**" of GCC Rev. 07, in sealed cover for the below mentioned equipment/system.

Item Description – Lighting Fixtures, Lamps and Misc. Items			
Sl. No.	**Project**	**TECHNICAL SPECIFICATION**	**Delivery completion schedule**
1	**1x660 MW Panki TPS**	**PE-TS-426-508-E001**	**60 days from PO DATE**

Your best quotation/offer for the above requirement, in line with tender terms and conditions, should be submitted **online via e-procurement system (NIC portal)**. It shall be the responsibility of the bidder to ensure that the tender is submitted **on or before the due date** by **02:00 PM.** Part-I (techno-commercial) bids shall be opened **at 03:00 PM on due date**.

Bidders to note that detailed tender documents have been uploaded on following website: -
https://eprocurebhel.co.in

Bidders are requested to upload their best offer on https://eprocurebhel.co.in only. In case bidders are not interested to quote, please send us the regret by e-mail or letter.

ENQUIRY TERMS AND CONDITIONS:

1. Bidders who are participating in this tender please note that GeM seller ID is mandatory before placement of order.

2. Offers should be submitted/uploaded separately in two parts **online through e-procurement system** as follows:

   Part-I: TECHNO-COMMERCIAL BID **Part-II: PRICE BID**
   For detailed instructions, please refer GCC Rev 07- Instructions to Bidders & Corrigenda to GCC Rev. 07.

3. Bidders shall submit their offers meeting the requirements of the following tender documents indicated in BHEL PEM GCC Rev- 07, Corrigenda to GCC Rev. 07 and other Terms and Conditions included in this Enquiry Letter. Web link of GCC Rev 07 shall be as below, **bidders may download the GCC Rev 07 from the given web link and go through the same before quoting: -**
   https://pem.bhel.com/Documents/GCC/GCCRev07.pdf
   https://pem.bhel.com/gcc.aspx

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Regd. Office
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New Delhi-110049

Ref. Enquiry No.: 77/23/6071/SHA dated 11.07.24

4. Bidders to note that following form the part of tender documents:
   a. Enquiry terms & conditions (NIT)
   b. Technical PQR
   c. Special Conditions of Contract (SCC Rev. 01) of Project.
   d. General Conditions of Contract (GCC) Rev 07 & corrigenda to GCC Rev. 07 comprising of: **Instructions to Bidders (ITB)** and **General Commercial Terms & Conditions (GCTC)**
   e. Technical Specifications & BoQ

5. Any hidden conditions/deviations mentioned elsewhere in offer and standard pre-printed terms & conditions of the tenderers shall not be considered valid.

6. Tenders shall be submitted strictly in accordance with the requirements of the above-mentioned tender documents. Deviations (Technical as well as Commercial), if any, shall be listed out separately in Annexure-II of GCC Rev-07 along with reasons for taking such deviations in the bidding format in E-Procurement portal (NIC portal). Any deviations (Technical as well as Commercial) not mentioned in the Annexure-II shall not be considered. Bidders to note all the points mentioned in "Notes" of Annexure-II of GCC Rev.07.

7. Bidder has to submit "NO DEVIATION CERTIFICATE FOR COMMERCIAL TERMS AND CONDITIONS as per General Conditions of Contracts (GCC, Rev.07), Special Conditions of Contract and Notice Inviting Tender (NIT)" **in case of no deviations.**

8. Unsolicited fresh/revised bids shall not be entertained.

9. If any bidder has mentioned the term "Not Applicable" / "not required" / "not quoted" in BHEL price format, the same to be substantiated by the bidder. If such item is required to be supplied for system completion in future, same will be supplied free of cost by the successful bidder.

10. Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any/all tender(s) in part or full without assigning any reason whatsoever.

11. Tenderers must enclose the Quality Plan in the prescribed format, for approval. Equipment will be dispatched only after Purchaser's/Owner's inspection of the hold points specified in the approved Quality Plan and issue of Material Dispatch Clearance Certificate (MDCC).

12. Offers should be submitted separately in two parts online through e-procurement system only (NIC portal), however, all correspondence thereof, shall be addressed to the following persons and sent at the following address:

Mr. Shamik Gupta **Engr., PG-II-2** **E-mail: shamikgupta@bhel.in** **Mob: 9716336332**	**Ms. S K Dubey** **S.DGM, PG-II-2** **E-Mail: skdubey@bhel.in** **Mob: 8800377855**
M/s. Bharat Heavy Electricals Ltd., Project Engineering Management, 3rd Floor, New Building, BHEL, Plot No 25, Sector-16A, Noida-201301, U.P., INDIA	

13. Evaluation shall be done on Total Cost to BHEL basis excluding GST charges and supervision of E&C charges. Incomplete offer or part offer of NIT BOM/BOQ shall be summarily rejected

14. **Govt. of India's Public Procurement Policy – Preference to Make in India Clause:** -
Procurement under this bid is reserved for purchase from Class 1 local suppliers as defined in public procurement (Preference to Make in India), Order 2017 issued by DPIIT as amended from time to time and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products. The minimum local content to qualify as a class 1 local supplier is denoted in the bid document as 60%. All bidders must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is made along with their bid, failing which the bid is liable to be rejected.
Regarding verification of local content, the local supplier at the time of tender, bidding or solicitation shall be required to provide certification (as per enclosed **Annexure**) as per para 9 of PP-MII order revision dated 16.09.2020.

The package is non-divisible in nature.

15. CIF is not available for this package.

16. Bidder to note that this is a conditional Open tender enquiry subject to following conditions: -
a. Techno-commercial qualification/recommendation of bidder by the BHEL-PEM.
b. Offered item should mandatorily conform to PP-MII order provisions.

17. Compliance of model clauses as provided in Annexure-III of Ministry of Finance Order (Public Procurement No. 4 issued on 23.02.23 (Restrictions under Rule 144 (xi) of the GFR,2017) shall be applicable for subject tender. Model Certificates provided in same Annexure-III shall also be complied as per enclosed annexure.

18. For bidders (who are not registered with BHEL-PEM) -Online Registration Portal is operational in BHEL. Registration in BHEL-PEM is not mandatory for this tender. However, Non-registered Vendors, who wish to apply for registration with BHEL-PEM, can apply through Online Registration Portal available at www.bhelpem.com →vendor section → Online Supplier Registration. All credentials and/or documents duly signed and stamped related to registration may be uploaded on the website and submit the application for registration.

19. All corrigenda, addenda, amendments, time extensions, clarifications etc. to the tender will be hosted on BHEL website only (https:// https://eprocurebhel.co.in) under subject tender reference. Bidders are requested to visit our website from time to time to keep themselves updated. Bidders may go through the Sellers' manual & Help documents provided on E-Procurement Portal website & obtain required Digital Signature Certificate for participating in the subject Tender. For Bidders' convenience, the Helpdesk Nos. of E-Procurement (NIC) Portal is available at website i.e. https://eprocurebhel.co.in.

20. If any bidder uploads price bid in the unpriced section (techno-commercial attachment page) of the tender in e- Procurement (NIC portal), in that case bidder(s) shall only be responsible for such mistake and any consequences thereof. Hence all bidders are requested to be more careful at the time of uploading the Unpriced and Price Bid for Part-I and Part-II respectively to avoid mismatch.

21. Bidders to note that "This item /package/system falls under the list of items defined in para 3 of ministry of finance guideline dated 20.09.16 (procurement of items related to public safety, health, critical security operations and Equipment etc.) & hence criteria of prior experience /turnover shall be same for all bidders including start-up /MSME".

22. PVC is not applicable for this enquiry.

23. Overall (%) variation in contract values (due to changes in the scope) shall be Nil.

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24. **Payment terms:** As per Clause 9.1.1 of GCTC of GCC Rev. 07 for Main Supply and 9.5 for Supervision of E &C, however final drg. /doc. Is not required for last 10% payment processing of Main Supply.

25. **Delivery Terms:** - **For Main Supply: - 60 days from the date of PO.**

For Supervision of E &C- Supplier to depute its service engineer for respective site activity within 15 days from BHEL's intimation.

Delivery Notes:

i. The end period specified is for completion of the deliveries. Deliveries to start progressively so as to meet the completion schedule.
ii. The delivery conditions specified are for contractual LD purposes, however BHEL may ask for early deliveries without any compensation thereof.

26. **Guarantee Period**: Guarantee Period shall be as per clause no. 12 of General Commercial Terms & Conditions (GCTC) of GCC Rev. 07.

27. **Performance Bank Guarantee:**

A) Supplier may opt any of the following for submission of Performance Security: -

Initially 10% of the contract value (Total Order value excluding PVC). 5% of the contract value (excluding PVC) will be released after completion of Main Supply based on certification by PG. However, balance 5% of the contract value (excluding PVC) will be released on completion of all contractual obligations, including guarantee/warranty obligations based on certification by PG.

Or

5% of the contract value (total Order value excluding PVC). Additional 5% of the contract value (excluding PVC) will be deducted & retained from first bill & subsequent bill(s) of the same contract (in case the value of first bill is less than 5% of the contract value). The retention amount will be released after completion of Main Supply based on certification by PG. However, balance 5% of the contract value (excluding PVC) will be released on completion of all contractual obligations, including guarantee/warranty obligations based on certification by PG.

B) Initial validity of performance security shall be 22 months from PO date (Considering delivery period of 2 months + 18 months guarantee period + 2 months claim period. Further, extension shall be in order to cover the entire guarantee period.

Modes of deposit:

Performance security may be furnished in the following forms:

a) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
b) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.
c) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).
d) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).
e) Insurance Surety Bond. (Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

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Performance Security is to be furnished within **14** days from the date of PO/LOA and it should remain valid for a period of 60 (sixty) days beyond the date of completion of all contractual obligations of the supplier, including warranty obligations.

Forfeiture of Performance Security:

a) The performance security will be forfeited and credited to BHEL's account in the event of a breach of contract by the supplier.
b) PS should be refunded to the contractor without interest, after he duly performs and completes the contract in all respects but not later than 60(sixty) days of completion of all such obligations including the warranty under the contract.
c) The Performance Security shall not carry any interest.

Note - In case of BG from private banks, a clause shall be incorporated in the text of bank guarantee that it can be enforced by being presented at any branch of the bank located in the Delhi-NCR.

This clause shall prevail over clause no. 11.0 of GCTC of GCC rev 07.

28. **Earnest Money Deposit**: EMD amount shall be Nil.

29. **Validity of contract (PO rates, terms and conditions):** Vendor has to make supply of goods/services
1. Supplier has to make supply of goods/services as per the delivery schedule. However, due to unavoidable circumstances where there is delay in providing inputs/ clearances from the Buyer (inputs, engineering approvals, deputing inspector for inspection, issuance of MDCC and/or any hold put by the Buyer for whatever reasons during execution of contract etc. as applicable) delivery time extension is admissible. In such situation it shall be obligatory on part of the Supplier to execute the contract at PO rates, terms and conditions provided inputs/ clearances have been accorded within validity of contract. Validity period for various activities shall be as defined below:-

1.1 Validity of the contract for main supply:
Contract shall be valid for 365 days from the PO date. However, delay at Supplier's end (if any) shall be added to the validity period and contract validity shall get extended by the delay period at Supplier's end.

1.2 Validity of the contract for Services (other than PG test) applicable in the contract:
Validity of contract for supply of Electrolyte/mandatory spares/ services applicable in the contract shall be one year over and above contractual validity period for main supply including quantity variation as specified at point no. 1.1 above.

2. Main supply applicable in the contract released/ cleared for manufacturing within contractual validity period, to be supplied by Supplier at PO rates, terms and conditions.
3. Execution of the contract quantities released beyond contract validity period shall be decided on mutual consent basis at PO rates, terms and conditions.

30. **Evaluation Conditions: Price Bid Shall be opened.**

31. **Breach of Contract, Remedies and Termination**:
In case of Breach of Contract, BHEL shall recover 10% of the contract value from the Supplier using following instruments:

(i) encashment of security instruments like EMD, Performance Security with PEM against the said contract.
(ii) balance amount (if value of security instruments is less than 10% of the contract value) from other financial remedies i.e. available bills of the Supplier, retention amount etc. with PEM.

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(iii) balance amount from security instruments like EMD, Performance Security and other financial remedies i.e. available bills of the Supplier, retention amount etc. with other units of BHEL.
(iv) Any other mode as deemed fit by the Buyer at its sole discretion.
(v) if recovery is not possible then legal remedies shall be pursued.

However, Supplier shall continue performance of the Order/ Contract, under all circumstances, to the extent not cancelled.
Above mentioned clause shall be considered in place of Risk & Cost clause of GCC Rev 07.

32. The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process. In case, the bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies/guideline.

33. A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. The bidder found to have a conflict of interest shall be disqualified. A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:

a) they have controlling partner (s) in common;' or
b) they receive or have received any direct or indirect subsidy/ financial stake from any of them; or
c) they have the same legal representative/agent for purposes of this bid; or
d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; or
e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid, or
f) In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorise only one agent/dealer. There can be only one bid from the following:
1. The principal manufacturer directly or through one Indian agent on his behalf; and
2. Indian/foreign agent on behalf of only one principal,'
or
g) A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid, or
h) In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business.

34. Detailed offers are to be uploaded including the following along with the Price schedule as per BHEL format enclosed with NIT:

- Acceptance of BHEL-PEM GCC (Rev.-07) & Corrigenda to GCC Rev. 07
- Acceptance of Special Conditions of Contract (SCC Rev. 01) for the project.
- Technical & Commercial Deviations, if any along with Cost of withdrawal in Annexure-II of GCC Rev 07.

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Ref. Enquiry No.: 77/23/6071/SHA dated 11.07.24

- Along with your offer, please submit a copy of this letter duly signed & stamped on each page as token of acceptance of terms & instructions conveyed.
- Un-Priced price format duly filled in 'Quoted" or 'Q' in each column/row.
- Filled Format of Certification reg. Local content
- Land Border

All the above Tender Documents shall automatically become a part of the Order/Contract after its finalisation.

Please note all correspondence from BHEL-PEM before part – I opening, shall also be part of NIT.

Thanking You

Yours faithfully,
For and on behalf of BHEL-PEM

Digitally signed by Shamik Gupta
DN: cn=Shamik Gupta, o=BHEL,
ou=PS-PEM,
email=shamikgupta@bhel.in, c=IN

SHAMIK GUPTA
(ENGR./PG-II-2/BHEL-PEM)

Enclosures:

1. Technical Specification No. **PE-TS-426-508-E001**
2. Unpriced format (Annexure-I)
3. Unpriced Deviation schedule (Annexure-II)
4. Format of Certification reg. Local Content
5. Format of Certification reg. Land Border
6. SCC Rev. 01

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(Letter head of Company)

Ref……. Date…….

To,
Bharat Heavy Electricals Limited
PEM, PPEI Building, Plot No 25,
Sector -16A, Noida (U.P)-201301

Subject: - Certification regarding local content

Reference: Bid No. **Tender Ref. No. 77/23/6071/SHA dated 11.07.24**
Name of Package: **220 V DC Lead Acid/Ni-CD Battery**

Dear Sir,

We hereby certify that items offered by us **220 V DC Lead Acid/Ni-CD Battery for 1x 660 MW Panki TPS** meets the requirement of minimum local content of NIT and Public Procurement (Preference to Make in India), Order 2017 dated-15.06.2017, 28.05.2018 & 29.05.2019, 04.06.20, 16.09.20 and 16.11.21.

Local content of the items being offered by us is …….. %age.

We further confirm that details of location at which the local value addition is made will be our registered works at
……..
…… (complete address of the works)

Yours truly
……
…… (firm name)

(Letter head of Company)

Ref……. Date…….

To,
Bharat Heavy Electricals Limited
PEM, PPEI Building, Plot No 25,
Sector -16A, Noida (U.P)-201301

Subject: - DECLARATION REGARDING LAND BORDER

Reference: Bid No. **Tender Ref. No. 77/23/6071/SHA dated 11.07.24**
Name of Package**: 220 V DC Lead Acid/Ni-CD Battery**
Dear Sir,

This has reference to:-

1. Our Offer for Supply of **220 V DC Lead Acid/Ni-CD Battery for 1x 660 MW Panki TPS** against Tender No. **……**

2. Order dated 23.02.2023 reg. restriction under rule 144 (xi)of GFR issued by Ministry of Finance, Department of Expenditure Public Procurement Division.

I have read the clause regarding restriction on procurement from a bidder of a country which shares a land border with India. I hereby certify that **M/s ……**, is not from such a country and is eligible to be considered.

Thanking you,

Yours truly

……. ((highest competent authority at your end (i.e. Owner, partner, CMD, Director etc.))

…… (firm name)

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1 X 660 MW PANKI TPS

Annexure I to BOQ-CUM-PRICE SCHEDULE FOR DC Ni-Cd BATTERIES

S NO.	ITEM CODE	ITEM DESCRIPTION	UNIT	QTY.	HSN Codes	Unit Ex-works (Rs.)	Total Ex-works (Rs.)	FREIGHT % IN W.R.T TOTAL EX-WORKS (IN %)	FREIGHT AMOUNT (Rs.)	TOTAL PRICE (EXWORKS + FREIGHT) (Rs.)	GST@18% ON EX-WORKS + FREIGHT (Rs.)	TOTAL FOR SITE PRICE (Rs.)
(A)	**MAIN ITEMS**											
1.0	**508-14001-A**	**220V BATTERY (MAIN PLANT)**	Sets	1								
A.1		**Break up detail for 220V Battery Main Plant**										
A.1.1		220V, Ni-Cd battery suitable For MAIN PLANT as per Annexure-II (Load duty cycle) (1 set comprises 169 Nos. cell)	Sets	1	8507							
A.1.2		Battery insulators (Insulation sheet)	lot	1	3923							
A.1.3		Cell interconnectors (Inter cell, Inter row & Inter bank connectors) with 5% extra and end take-off with one no. extra	lot	1	8507							
A.1.4		Nickel coated connection hardware plus 5% extra	lot	1	8507							
A.1.5		Cell numbering tags with fixing arrangement (1 Set)	Sets	1	3919							
A.1.6		Cable clamps with hardware	Lot	1	8507							
B		**SUPERVISION OF E&C**										
B.1		Visits	Nos.	2		10,000.00						
B.2		Mandays	Nos.	15		10,000.00						
NOTES:												

1 Technical specification no. PE-TS-426-508-E001 of DC Ni-Cd Batteries package (REF. PO No. -P-170/20 dtd. 04.12.2020), approved documents and already supplied items for DC Ni-Cd Batteries (Sl. No. A) of 1X660MW Panki TPS are to be referred for the supply of above mentioned items listed.

2 Compatibility of above items with already supplied DC Ni-Cd Batteries (Sl. No. A) is to be ensured by M/s HBL. In case supplied items found incompatible with supplied DC Ni-Cd Batteries, items shall be replaced by M/s HBL without any cost implication to BHEL.

ANNEXURE-II: DEVIATION SHEET (COST OF WITHDRAWAL)

PROJECT:-

PACKAGE:-

TENDER ENQUIRY REFERENCE:-

NAME OF VENDOR:-

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWL OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
TECHNICAL DEVIATIONS									
COMMERCIAL DEVIATIONS									
PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE									
NAME				**DESIGNATIONS**		**SIGN & DATE**			

NOTES:

1. Cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
3. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
4. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable. In the absence of same, such deviation(s) shall not be considered and offer shall be considered in total compliance to NIT.
5. Bidder shall furnish price copy of above format along with price bid.
6. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
7. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
8. For deviations w.r.t. Credit Period, Liquidated damages, Firm prices if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VII, will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
9. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be considered.
10. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
11. Cost of withdrawal is to be given separately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
12. In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
13. In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.

1 X 660 MW PANKI THERMAL POWER EXTENSION PROJECT

VOLUME – II

TECHNICAL SPECIFICATION FOR

220V DC Lead Acid / Ni-Cd BATTERY

SPECIFICATION NO: ***PE-TS-426-508-E001***

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, UTTAR PRADESH, INDIA – 201301

	TECHNICAL SPECIFICATION FOR 220V DC BATTERY	SPECIFICATION NO. PE-TS-426-508-E001
		VOLUME II
		REVISION 0 | DATE :05.11.19
		SHEET 1 OF 1

CONTENTS

TOTAL NO. OF SHEETS =44 (INCLUDING COVER/ SEPARATOR SHEETS)

COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same.

2. There are no deviation with respect to specification other than those furnished in the 'schedule of deviations'.

3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.

4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.

5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in Annexure-A [BOQ-Cum-Price schedule] enclosed with NIT shall not be considered (i.e., technical description & quantities as per specification shall prevail).

BIDDER'S STAMP & SIGNATURE

SECTION –I

SPECIFIC TECHNICAL REQUIREMENTS

1.0 SCOPE OF ENQUIRY

1.1 This specification covers the design, manufacture, inspection and testing at manufacturer's works, proper packing and delivery to site, & supervision of E&C of **220V DC BATTERY**.

1.2 Standard technical requirements of the **220V DC BATTERY** are indicated in Section-II. Project specific technical/ quality requirements / changes are listed in Section-I & Data Sheet-A.

1.3 The stipulations of Section-I, followed by those of Data Sheet-A, followed by Section-II shall prevail in case of any conflict between the stipulations of Section-I, Section-II & Datasheet-A.

2.0 BILL OF QUANTITIES:

2.1 Quantity requirements shall be as per **BOQ cum Unpriced Price Schedule** enclosed with NIT.

3.0 SPECIFIC TECHNICAL REQUIREMENTS:

3.1 Technical /Quality/ Inspection:

S. No.	*Reference clause No. of Section II (if any)*	*Specific Requirement/ Change*
	Section-II part-I (Ni CD Battery)	
1	Clause no 5.2: CONTAINER :Containers shall be made of transparent glass/hard rubber, robust, heat resistant, leak proof, non-absorbent, alkali resistant, non-bulging type and free from flaws such as wrinkles, cracks, blisters, pinholes etc.	Containers shall be made of polypropylene plastic material. Containers shall be robust, heat resistance, leak proof, non absorbent, alkali resistant, non-bulging type and free from flaws, such as wrinkles, cracks, blisters, pin holes etc.
2	Clause no 5.5 : CONNECTIONS :Inter-cell, inter-tier, inter-rack connectors, terminals, bolts and nuts shall **be lead - coated copper** connector/Rubber Moulded Copper connector. The cross section of the connectors shall be designed to withstand the **one minute** discharge rating and also short circuit rating of the battery.	**Nickel coated copper** connectors shall be used for connecting up adjacent cells and rows. Bolts, nuts and washers shall be effectively Nickel coated to prevent corrosion. The thickness of Nickel coating of connectors should be not less than 0.02 mm. All the terminals and cells inter-connectors shall be fully insulated or have insulation shrouds. End take off connections from positive and negative poles of batteries shall be made by single core cables having stranded AL conductors and XLPE insulation. Necessary supports and lugs for termination of these cables on batteries shall also be supplied by the contractor. All connectors and lugs shall be capable of continuously carrying the **30 minutes** discharge current of the respective batteries and through fault short circuit current which the battery can produce and withstand for the period declared. Contractor shall furnish necessary sizing calculations to prove compliance to the same. Suitable number of Inter-rack connectors shall be supplied by the contractor to suit the battery room layout during detailed engineering.

3	Clause no 5.6 Vent plugs :	**Add**: Vent plugs shall be provided in each cells. In addition the ventilator shall be easily removed for topping up the cells and of such dimensions that the syringe type hydrometer can be inserted into the vent to take electrolyte samples.
4	Clause no 5.9 : Electrolyte	**Add**: The electrolyte shall be prepared from battery grade potassium hydroxide conforming to BS:1069. The cells can be shipped either in charged condition or in dry condition
5	Clause no 5.11 : Battery racks : **Wooden/FRP/Steel battery** racks to be supplied as specified in datasheet-A. Wooden rack shall be made of best quality seasoned teak wood b. Two (2) coats of wood primer shall be applied on wodded battery racks prior to application of **two (2) coats of anti-acid paint.** c. The battery racks shall be free standing type mounted on porcelain/hard rubber insulators. d. Numbering tags for each cell shall be attached on to the battery racks. e. Battery racks and other supporting/interconnecting accessories shall be as per layout arrangement to be approved by purchaser during contract engineering stage.	**Mild steel** racks for all the batteries shall be provided. They shall be free standing type mounted on porcelain/hard rubber/PVC pads insulators/High impact plastic insulators. Batteries shall preferably be located in the single tier arrangement. However, batteries having a complete cell weight of lower than 50 Kg could be located in the double tier arrangement. The batteries racks and supports for cable termination shall be coated with three **(3) coats of anti-alkali paint of approved shade**. Name plates, resistant to alkali, for each cell shall be attached on to the necessary racks. The bottom tier of the stand shall not be less than 150 mm above the floor. Wherever racks are transported in dismantled conditions, match markings shall be provided to facilitate easy assembly.
6	Clause no 5.8 :	The information indicated in clause no 5.8 shall be indelibly marked on outside of each cell. Add following point also in marking a) Manufacturer type designation.
7		THE FOLLOWING INFORMATION SHALL BE GIVEN ON THE INSTRUCTION CARDS SUPPLIED WITH THE BATTERY: (a.) Manufacturer's instructions for filling and initial charging of the battery together with starting and finishing charging rate. (b.) Maintenance instructions. (c.) Designation of cell in accordance with IS:10918. (d.) Storing conditions of electrolyte.
8		The Contractor shall submit for Owner's approval the reports of all the type tests carried out as per latest IS-1146(for all applicable tests for containers) / IS-10918 (for NI-CD batteries). The complete type test reports shall be for any rating of battery in a particular group, based on plate dimensions being manufactured by supplier.
9		Commissioning Checks: All tests as listed below shall be carried out on sample cell selected at random by the owner at site after completion of installation. (a.) Physical Examination. (b.) Dimensions, Mass & layout. (c.) MARKING. (d.) Polarity and absence of short circuit. (e) Air pressure test. (f.) Ampere -

		hour capacity. (g.) Retention of charge. (h.) Insulation resistance. The Contractor shall arrange for all necessary equipment, including the variable resistor, tools, tackles and instruments.
	Section-II part-II (Lead acid battery)	
1	Clause no 5.2 Container : Containers shall be made of transparent polymeric material, robust, heat resistant, leak proof, non-absorbent, acid/alkali resistant, non-bulging type and free from flaws such as wrinkles, cracks, blisters, pinholes etc.	Containers shall be made of transparent glass, hard rubber, suitable robust, heat resistance, leak proof, non-absorbent, acid resistant, non-bulging type and free from flaws, such as wrinkles, cracks, blisters, pin holes etc
2	Clause no 5.2 : Container	**Add**: The material of level indicator shall be acid proof and oxidation proof. **All type tests shall be carried out for sealing compound as per IS:3116. The pole sealing arrangement should be such that no acid particle gets entrapped due to acid creep as a result of capillary action and it should be possible to remove and refix the sealing to carry out the maintenance.**
3	Clause no 5.7 :	The information indicated in clause no 5.7 shall be indelibly marked on outside of each cell. Add following point also in marking Manufacturer type designation.
4	Clause no 5.4 : Connections	**Add**: The thickness of lead-coating of connectors should not be less than 0.025 mm. The lead coating thickness shall be measured in accordance with APPENDIX F of IS:6848 (latest edition).
5	Clause no 5.4: Connections: All connectors and lugs shall be capable of continuously carrying the discharge current of the respective Batteries and through fault short circuit current which the battery can produce and withstand for the period declared. Successful bidder shall furnish necessary sizing calculations to prove compliance to the same.	All connectors and lugs shall be capable of continuously carrying the 30 minutes discharge current of the respective Batteries and through fault short circuit current which the battery can produce and withstand for the period declared. Contractor shall furnish necessary sizing calculations to prove compliance to the same.
6	Clause no 5.9: battery racks: a) **Wooden/FRP/Steel battery** racks to be supplied as specified in datasheet-A. Wooden rack shall be made of best quality treated wood b) Racks shall be painted with at least **two (2) coats of acid resistant/ anti corrosive paint**. c) Racks shall be free standing type mounted on porcelain/hard rubber/ PVC Pad insulators as applicable. d) Numbering tags for each	**Wooden racks** for all the batteries shall be provided. These racks shall be made of good quality first class seasoned teak wood in line with CPWD specification. They shall be free standing type mounted on porcelain/hard rubber/PVC pads insulators/High impact plastic insulators. Batteries shall preferably be located in the single tier arrangement. However, batteries having a complete cell weight of lower than 50 Kg could be located in the double tier arrangement. The batteries rack and wooden support for cable termination shall be coated with **three (3) coats of anti-acid paint of approved shade**.

	cell shall be attached on to the battery racks. e) Battery racks and other supporting/interconnecting accessories shall be as per layout arrangement to be approved by purchaser during contract engineering stage. f) The bottom tier of the stand shall not be less than 150 mm above the floor. g) Wherever racks are transported in dismantled conditions, match markings shall be provided to facilitate easy assembly.	Numbering tags, resistant to acid, for each cell shall be attached on to the necessary racks. The bottom tier of the stand shall not be less than 150 mm above the floor. Wherever racks are transported in dismantled condition, suitable match markings shall be provided to facilitate easy assembly.
7		Cell insulator : Each cell shall be separately supported on PVC/porcelain/hard rubber insulators fixed on the racks with adequate clearance between adjacent cells. Minimum distance between adjacent cells shall be more than the bulge allowed for two cells in accordance with IS:1146.
8		The Contractor shall submit for Owner's approval the reports of all the type tests carried out as per latest IS-1146 (for rubber & plastic containers for lead-acid storage batteries)/IS 1652 (for lead-acid plante batteries). The complete type test reports shall be for any rating of battery in a particular group, based on plate dimensions being manufactured by supplier.
9		Commissioning Checks: All tests as listed below shall be carried out on sample cell selected at random by the owner at site after completion of installation. 1) Verification of markings. 2) Verification of dimensions. 3) Test for capacities for 10 hrs discharge rate alongwith the test for voltage during discharge. The Contractor shall arrange for all necessary equipment, including the variable resistor, tools, tackles and instruments. BHEL shall provide battery charger and discharge resistor at site.
	GENERAL	
1		DC health monitoring system shall be provided as per details given below: **DC Health Monitoring System**: DC Health Monitoring System shall include microprocessor based hardware and software to monitor the condition of each battery cell of 220V DC systems battery banks on-line on 24x7 basis. With DC Health Monitoring System it shall be possible to measure & analyse the individual cell and battery parameters so that any damage to battery shall be prevented by pro-active maintenance. A typical Architecture is shown in Drg. No. 0000-000-POE- A-002. Each Battery set shall have its own independent DC Health Monitoring System. DC Health Monitoring System shall measure and store the following parameters at pre- determined time interval as

		decided by the owner during detail engineering: a) Each Cell Voltage. b) Battery DC Current. c) Ambient and Cell temperature. Further, DC Health Monitoring System module shall have additional provision of accepting at least 6 Nos. of Digital inputs and 2 Nos. of Analog inputs(4-20mA). DC Health Monitoring System shall also be able to store these inputs status for future reference.
2		**Communication**: DC Health Monitoring System shall communicate with the DDCMIS System and provide alarms for abnormal condition of Cell/Battery as finalized by owner during detailed engineering. DC Health Monitoring System modules shall have one port suitable for connecting laptop locally and one port suitable for TCP/IP protocol for communication to DDCMIS system. DC FAIL alarm shall be generated and given in Central Control Room buzzer (Audio Visual Fascia).
3		**Software**: Necessary software for communication between DC Health Monitoring System and DDCMIS System as well as for analysis of stored data shall be provided by the contractor. The software for analysis shall be capable of showing graphical representation of various stored parameters and shall give some corrective suggestion based on the abnormal parameters. The software shall calculate and show battery Ah during charge/discharge cycles. Logging of cell/battery parameters (voltage, current and temperature) and alarm conditions as well as event log of all activities affecting the battery bank shall be possible with date/time stamp. Logged data can be exported in MS Excel format.
4	Part-I Clause 8.3: Type, Routine and Acceptance Tests Part-II Clause 9.2 : Type, Routine and Acceptance Tests	All equipment to be supplied shall be of type tested design. During detail engineering, the contractor shall submit for Owner's approval the reports of all the type tests as listed in Annexure-B & C and carried out within last five years from the date of bid opening (02.11.15) . These reports should be for the test conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. However if the contractor is not able to submit report of the type test(s) conducted within last five years from the date of bid opening (02.11.15) , or in the case of type test report(s) are not found to be meeting the specification requirements, the contractor shall conduct all such tests under this contract at no

		additional cost to BHEL either at third party lab or in presence of client/owners representative and submit the reports for approval. All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price. The type test reports once approved for any projects shall be treated as reference. For subsequent projects of UPRVUNL, an endorsement sheet will be furnished by the manufacturer confirming similarity and "No design change". Minor changes if any shall be highlighted on the endorsement sheet.

3.2 <u>220V DC SYSTEM</u>

Battery and charger will be connected to DCDB. Under normal conditions, each charger will cater continuous loads and trickle charging current of batteries. If load is high and exceeds the charger capacity then excess load will be supplied by the battery. All the terminals and inter-cell connectors will be fully insulated. In case of failure of AC, battery will meet the DC load requirement. After restoration of power, the float charger will continue to supply the loads as well as trickle charge the battery.

4.0 SINGE LINE DIAGRAM FOR 220V DC SYSTEM (Refer Annexure-I enclosed with Section-I)

5.0 LOAD DUTY CYCLE (Refer Annexure-II enclosed with Section-I)

6.0 DOCUMENTS REQUIRED ALONG WITH TECHNICAL OFFER (Refer Annexure-III enclosed with Section-I)

7.0 DOCUMENTS REQUIRED AFTER AWARD OF LOI (Refer Annexure-IV enclosed with Section-I)

8.0 The Quality Plan no. PE-QP-999-508-E002 for Lead Acid Battery and Ni-Cd Battery should be read in conjunction with Annexure-A and Annexure-B.

9.0 **PROVENNESS CRITERIA** (Project specific prequalification criteria):

The Bidder / Sub Vendor should have manufactured and supplied at least two (2) numbers of highest offered rating or above of High Discharge type Plante Positive Plate type battery (in case bidder offers Lead Acid Plante type battery) or High Discharge type Nickel Cadmium battery (in case bidder offers Nickel Cadmium battery), at least one (1) each at two (2) different industrial installations, which should have been in successful operation for at least two (2) years prior to the date of Techno-Commercial bid opening (02.11.15).

NOTE: Two different installations mean two different project sites or two different contracts

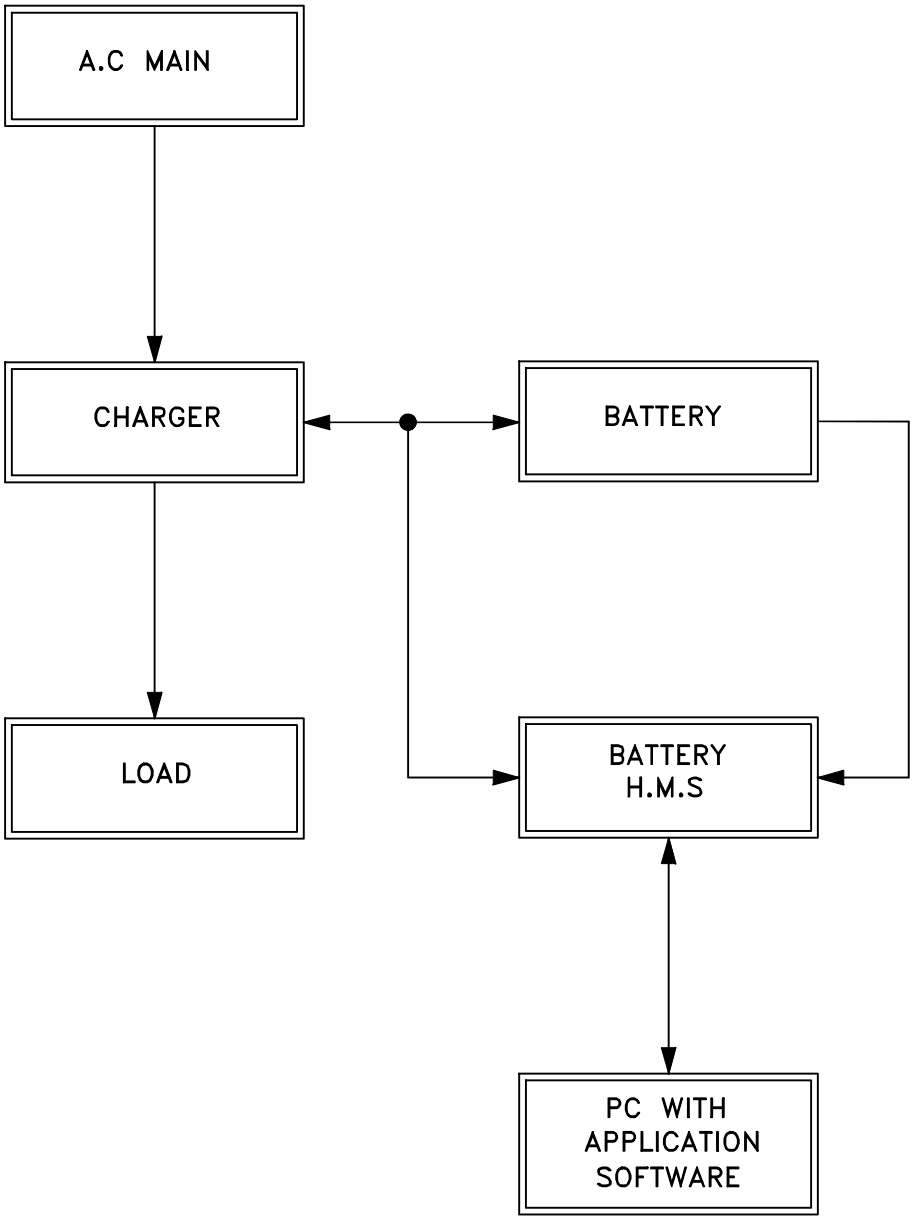


FIG : SYSTEM ARCHITECTURE OF BATTERY HEALTH MONITORING SYSTEM

NOTES :

1. THIS DRAWING SHOWS TYPICAL SYSTEM ARCHITECTURE FOR BATTERY HEALTH MONITORING SYSTEM ONLY. ACTUAL MAY VARY AS PER OEM STANDARD PRACTICE.
2. APPLICATION SOFTWARE SHALL BE BASED ON LATEST OPERATING SYSTEM OF WINDOWS.

FOR TENDER PURPOSE ONLY

					TYPICAL ARCHITECTURE FOR DC HEALTH MONITORING SYSTEM	DEVELOPMENT CONSULTANTS PVT. LTD. CONSULTING ENGINEERS
					UTTAR PRADESH RAJYA VIDYUT UTPADAN NIGAM LIMITED	JOB NO. 14A14 / SCALE : NTS
DS	RD	AK	NIL	20.11.19	1X660MW PANKI THERMAL POWER PROJECT	DWG. NO. 14A14-DWG-POE-A-002 SHT. 01 / REV. NIL
APPVD.	REVWD.	CHKD.	REV.	DATE		

	TECHNICAL SPECIFICATION FOR 220V DC BATTERY	SPECIFICATION NO. PE-TS-426-508-E001	
		VOLUME II	
		SECTION I	
	DATA SHEET–A	REVISION 0	DATE : 05.11.19
		SHEET 1 OF 1	

1.	Rated voltage (V)	:	220V DC
2.	Type of Battery	:	Lead-Acid Plante OR Ni-Cd high discharge Pocket Plate type
3.	Conforming to	:	IEEE/ IEC/ IS standards
4.	DC system Fault level & duration	:	*25KA for 1 Sec*
5.	Material of Battery Rack	:	*Seasoned Teak Wooden for Lead Acid Battery/ Mild Steel Racks for Ni-CD battery*
6.	Design Ambient Temperature	:	50 Deg. C
7.	Minimum Electrolyte Temperature to be considered for Battery Sizing	:	*5* Deg. C
8.	No. of cells	:	*107 for Lead Acid Battery/ 169 for Ni-Cd Battery*
9.	End cell voltage		*1.85V/cell (Lead Acid) / 1.14V/ cell (Ni- Cd)*
10.	Nominal Float voltage (V)	:	2.25 V/cell (Lead-Acid)/1.42V/cell (Ni-Cd)
11.	Boost voltage (Maximum) (V)	:	Bidder to furnish the detail along with offer
12.	AH Capacity of Battery	:	Bidder to furnish quoted AH capacity and battery sizing as per LOAD DUTY CYCLE (Annexure-II)
13.	Minimum AH rating of Battery	:	Refer attached Annexure-II for battery sizing.
14.	Arrangement of batteries on racks	:	Single tier for batteries having cell weight 50kg or more.
15.	Cable size to be terminated at Battery end	:	*2 Run-1Cx630 sq.mm*
16.	Tapping to be provided in battery	:	*Yes*
17.	Tapping to be provided at which cell (if Tapping is applicable)	:	Bidder to furnish the detail along with offer
18.	Recommended boost charging rate	:	Bidder to furnish the detail along with offer
19.	Recommended trickle charging rate	:	Bidder to furnish the detail along with offer

`

Notes :

1.Suitable number of copper lugs for cable termination at battery terminals shall be provided by bidder as per cable size to be informed by BHEL during detailed engineering. Tentative size of cable is mentioned above at sl. no. 15.

2. Bidders stand guarantee that the rating offered at S. No. 12 shall meet 'Load Duty Cycle' as per Annexure-II of specification.

3. Refer Annexure-I (Single Line Diagram of 220V DC system) for connection arrangement of Battery, charger and DCDB.

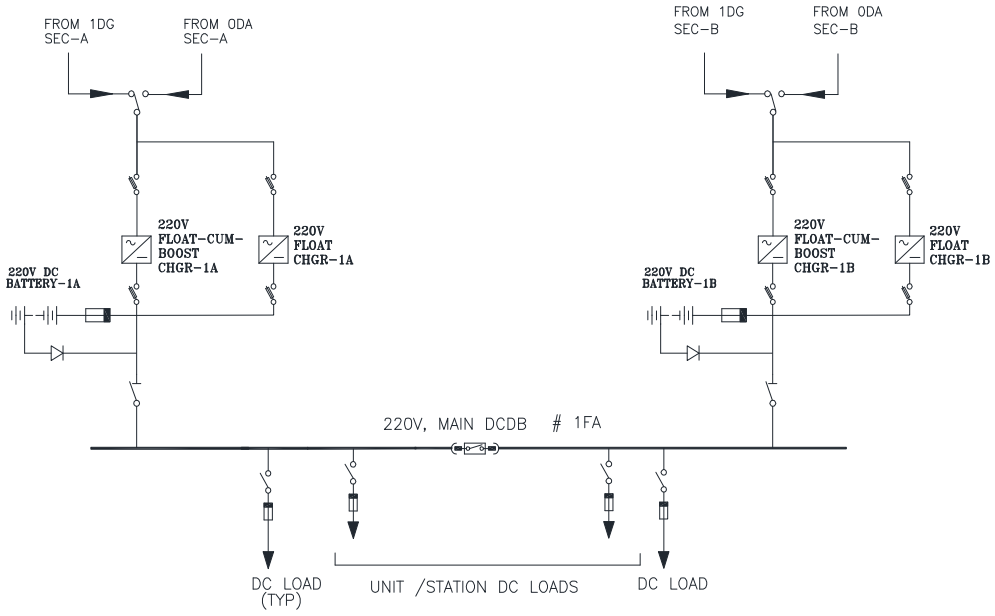
	TECHNICAL SPECIFICATION FOR 220V DC BATTERY DATA SHEET–C	SPECIFICATION NO. PE-TS-426-508-E001
		VOLUME II B
		SECTION C
		REVISION 0 | DATE : 05.11.19
		SHEET 1 OF 2

Sr. No.	PARAMETER	UNIT	VALUE
1.0	Make and Type		
2.0	AH capacity at 27° C and end voltage		
2.1	At 10 Hr discharge rate	AH	
2.2	At 1 Hr discharge rate	AH	
3.0	Battery Discharge current		
3.1	At one minute rate	Amp	
3.2	At 30 minutes rate	Amp	
3.3	At 30 minutes rate at end voltage	Amp	
3.4	At 60 minutes rate	Amp	
3.5	At 60 minutes rate at end voltage	Amp	
4.0	Types of plates		
4.1	Negative plates		
4.2	Positive plates		
5.0	Method of connection between cells		
6.0	Voltage per cell at the end of charge at the finishing rate	V	
7.0	Recommended Trickle charge current	Amp	
8.0	Type and material of separators		
9.0	Material of container		
10.0	Type of container		
11.0	Internal resistance of cells	Ohms	
12.0	Total resistance of connectors	Ohms	
13.0	Insulator Material for		
13.1	Cells		
13.2	Racks		
14.0	Average life	Years	
15.0	Recommended boost charger rating for		
15.1	Charging in 8 hours	Amp	

15.2	Charging in 10 hours	Amp	
16.0	Allowable ripple content acceptable to battery (r.m.s)	%	
17.0	Hydrogen evaluation		
18.0	Cell designation in accordance with IS: 1651/1652 or equivalent IEC		
19.0	Applicable standard		
20.0	Whether battery performance curve and calculation for capacities enclosed		
21.0	Recommended Maximum period of storage of Electrolyte before first charge		
22.0	Amount and specific gravity of electrolyte per cell required for first filling at 27° C		
23.0	Recommended specific gravity of electrolyte at 27° C		
23.1	When fully charged		
23.2	When fully discharged		
24.0	Container dimensions	(L X B X H)mm	
25.0	Distance between centres of cells when erected	Mm	
26.0	Terminal connectors		
26.1	Type		
26.2	Material		
27.0	Battery Racks		
27.1	Type & Material		
27.2	Outline dimensions	(L X B X H) mm	
27.3	Net weight	Kg	
28.0	Weight per cell	Kg	
28.1	Net dry weight	Kg	
28.2	Net weight with electrolyte	Kg	
29.0	Total shipping weight of one battery unit (without electrolyte)	Kg	
30.0	Taps provided at cell no.		
31.0	Connection from battery to charger (busbar/ cable)		
32.0	Recommended size of (busbar/ cable)		
33.0	Whether backup calculation furnished		
34.0	Cable Lugs at Battery terminals of suitable size		

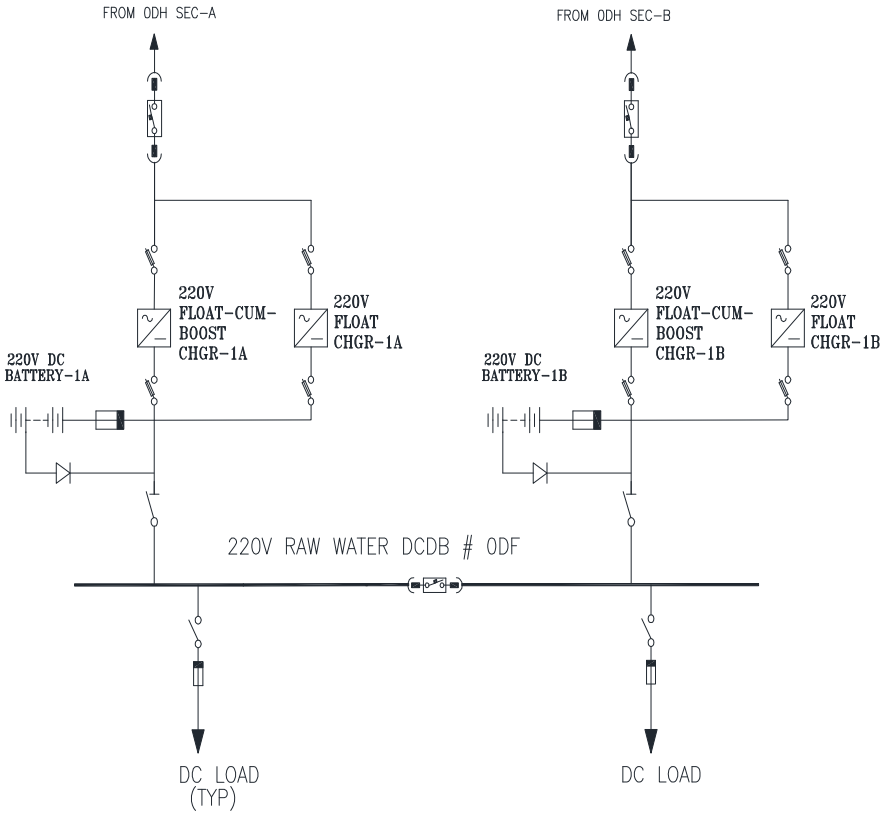
ANNEXURE-I

SINGE LINE DIAGRAM FOR MAIN PLANT 220V DC SYSTEM

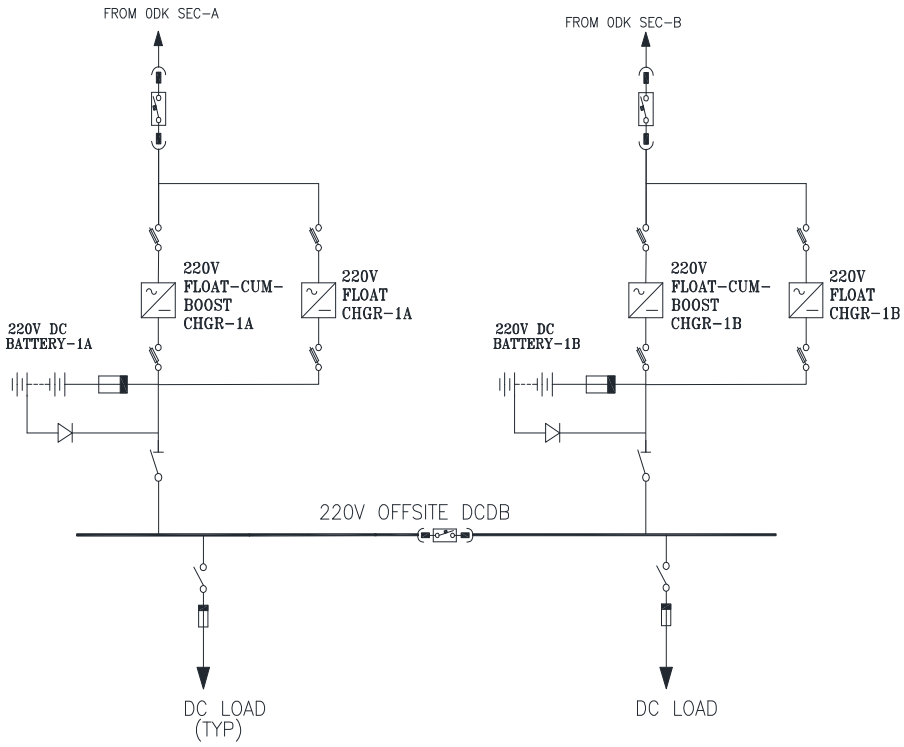


	TECHNICAL SPECIFICATION FOR 220V DC BATTERY	SPECIFICATION NO. PE-TS- 426-508-E001
		VOLUME II
		SECTION I
		REVISION 0 / DATE: 05.11.19
		SHEET 2 OF 1

SINGE LINE DIAGRAM FOR RWPH 220V DC SYSTEM



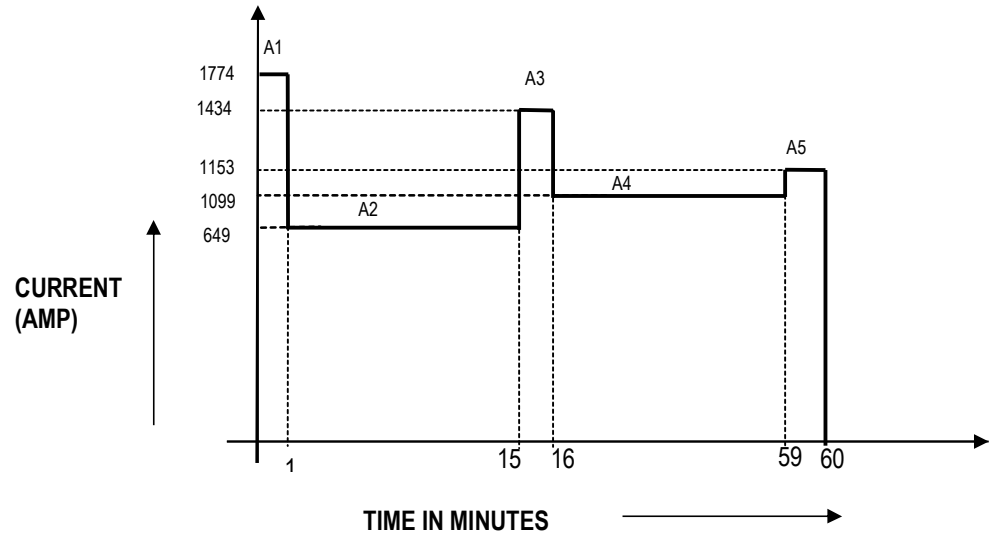
SINGE LINE DIAGRAM FOR RW INTAKE PH & FOPH 220V DC SYSTEM



ANNEXURE-II

LOAD DUTY CYCLE

LOAD DUTY CYCLE OF MAIN PLANT



FACTORS TO BE CON[1]SIDERED FOR BATTERY SIZING:

1. AGEING FACTOR	: 1.25 (Not applicable for lead acid battery).
2. MIN.ELECTROLYTIC TEMP.	: 5 ˚C
3. END CELL VOLTAGE	: 1.85V (for Lead-Acid Plante) & 1.14V (for Ni-Cd) PER CELL
4. TEMPERATURE CORRECTION FACTOR	: As per IEEE 485 (Refer note-2)
5. CONTINGENCY MARGIN	: 10%.
6. DESIGN MARGIN	: 20%.

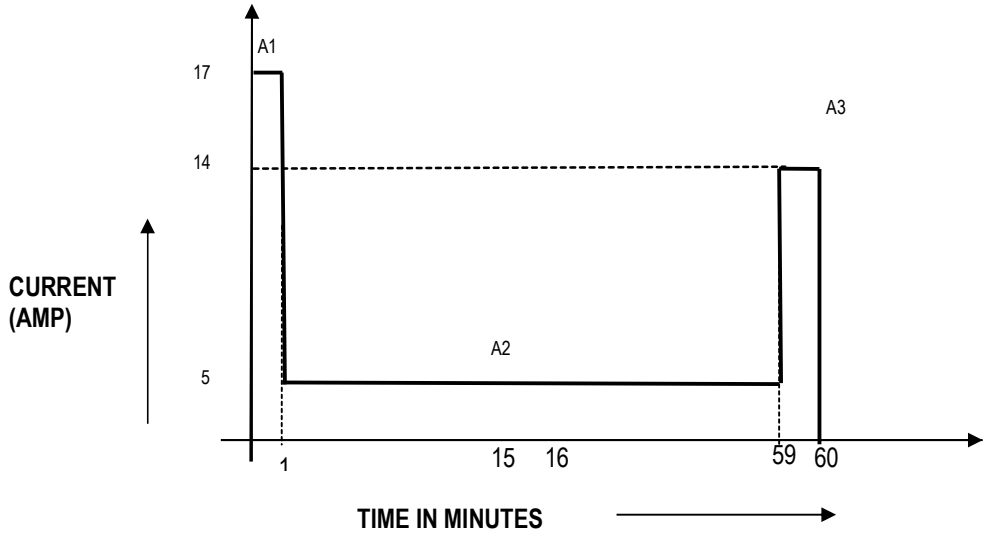
Note :

i) Bidder has to take ageing factor (margin) in their battery sizing calculation for Ni-CD battery. No deviation is acceptable on ageing factor.

ii) Supporting calculation for temp correction factor as per IEEE 485 shall be furnished for batteries which are not designed at 25˚ C.

LOAD DUTY CYCLE

LOAD DUTY CYCLE OF RWPH



FACTORS TO BE CON²SIDERED FOR BATTERY SIZING:

1. AGEING FACTOR	: 1.25 (Not applicable for lead acid battery).
2. MIN.ELECTROLYTIC TEMP.	: 5 ˚C
3. END CELL VOLTAGE	: 1.85V (for Lead-Acid Plante) & 1.14V (for Ni-Cd) PER CELL
4. TEMPERATURE CORRECTION FACTOR	: As per IEEE 485 (Refer note-2)
5. CONTINGENCY MARGIN	: 10%.
6. DESIGN MARGIN	: 20%.

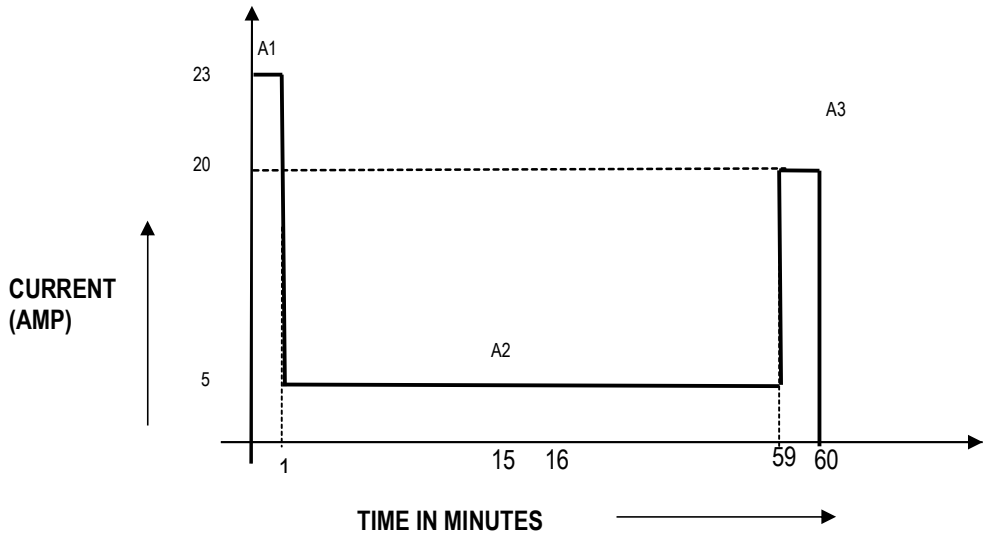
Note :

i) Bidder has to take ageing factor (margin) in their battery sizing calculation for Ni-CD battery. No deviation is acceptable on ageing factor.

ii) Supporting calculation for temp correction factor as per IEEE 485 shall be furnished for batteries which are not designed at 25˚ C.

LOAD DUTY CYCLE

LOAD DUTY CYCLE OF RW INTAKE PH & FOPH



FACTORS TO BE CON³SIDERED FOR BATTERY SIZING:

1. AGEING FACTOR	: 1.25 (Not applicable for lead acid battery).
2. MIN.ELECTROLYTIC TEMP.	: 5 ˚C
3. END CELL VOLTAGE	: 1.85V (for Lead-Acid Plante) & 1.14V (for Ni-Cd) PER CELL
4. TEMPERATURE CORRECTION FACTOR	: As per IEEE 485 (Refer note-2)
5. CONTINGENCY MARGIN	: 10%.
6. DESIGN MARGIN	: 20%.

Note :

i) Bidder has to take ageing factor (margin) in their battery sizing calculation for Ni-CD battery. No deviation is acceptable on ageing factor.

ii) Supporting calculation for temp correction factor as per IEEE 485 shall be furnished for batteries which are not designed at 25˚ C.

ANNEXURE-III

DOCUMENTS REQUIRED ALONG WITH THE TECHNICAL OFFER

i. Capability / discharge curve, temperature correction factor, float charging factor & published technical catalogue for considered factors.
ii. Unpriced Price Schedule (Annexure-A) as enclosed with NIT with "Quoted" word against items with bidder's signature and company stamp.
iii. A copy of the sheet "Compliance certificate" with bidder's signature and company stamp.
iv. A copy of sheet "Data Sheet-A" with required information and bidder's signature and company stamp.

ANNEXURE-IV

DOCUMENTS REQUIRED AFTER AWARD OF LOI

S.NO	DOCUMENT TITLE	DWG. / DOCUMENT No.
1.	220V Battery Datasheets	PE-V0-426-508-101
2.	Battery- GA drawing and Bill of material	PE-V0-426-508-102
3.	Battery sizing calculation for 220V DC battery bank (including battery catalogue & curves)	PE-V0-426-508-103
4.	220V Battery Type test reports	PE-V0-426-508-105
5.	220V battery O & M manual	PE-V0-426-508-106
6.	220V battery bank FQP	PE-V0-426-508-901
7.	220V Battery bank MQP	PE-V0-426-508-902
8.	**List of mandatory spares for battery**	**PE-V0-426-508-903**
9.	**Fault calculation & Connector sizing calculation**	**PE-V0-426-508-E104**
10.	**Cable Termination arrangement for battery terminal**	**PE-V0-426-508-E904**
11.	**Battery room layout**	**PE-V0-426-508-E905**
12.	**List of E&C spares for battery**	**PE-V0-426-508-E906**
13	**GA schematic, circuit diagram and BOM for BHMS**	**PE-V0-426-508-113**
14	**Quality plan for BHMS**	**PE-V0-426-508-114**

NOTE:

Drawing/Documents indicated above shall be submitted through document management system (DMS).

SECTION –II

STANDARD TECHNICAL REQUIREMENTS

DC NI-CD BATTERY

1.0 SCOPE OF ENQUIERY

1.1 This specification covers the design, materials, constructional features, manufacture assembly, testing, packing and dispatch of 220V DC Ni-CD Battery complete with all accessories. *In this specification, as erection and commissioning is not included in vendor's scope, Vendor shall still not be absolved of his responsibility of establishing the correctness of equipment at site.*

2.0 CODES AND STANDARDS

2.1 Unless otherwise specified, the latest revisions of codes/standards as specified under Table-1 enclosed are applicable and shall referred to.

3.0 EQUIPMENT AND SERVICES TO BE PROVIDED BY THE BIDDER

The bidder shall supply the equipment and provide the services in accordance with the various sections of this specification and as per Unpriced Price Schedule enclosed as Annexure-A.

4.0 SERVICES AND EQUIPMENT TO BE EXCLUDED

a. *Civil works like foundation and cable cellar, flooring of the battery room etc.*
b. *Ventilation of battery and charger room.*
c. *220V DCDB*
d. *Power and control cables*
e. *Erection of the equipment*
f. *Battery charger, battery fuse box and discharge resistor*

5.0 DESCRIPTION OF EQUIPMENT

5.1 BATTERY

Batteries shall be stationary staorage Nickel-Cadmium *high discharge* type suitable for float charged opeartion conforming to IS-10918/IEC60623. The batteries shall meet the duty cycle requirements under all site and operating conditions as specified in data sheet 'A'. *IEEE 1115 shall be the principle for sizing the battery.*

5.2 CONTAINER

Containers shall be made of transparent glass/hard rubber, robust, heat resistant, leak proof, non-absorbent, alkali resistant, non-bulging type and free from flaws such as wrinkles, cracks, blisters, pinholes etc. Electrolyte level lines shall be marked on containers in case of translucent containers. The marking for the electrolyte level shall be for upper & lower limits on the translucent container. Container shall be closed/sealed lid type. Open type cells are not acceptable. Lid and sealing compound shall be non-cracking type. sealing arrangement shall be such that no alkali particle gets entrapped due to alkali

creep as a result of capillary action and it shall be possible to remove and refix the sealing to carry out maintenance.

5.3 PLATES

The plates shall have Pocketed Plates designed for maximum durability during all service conditions including high rate of discharge and rapid fluctuation of load. Separator between plates shall permit free flow of electrolyte. Springs to keep end plates in position shall be provided.

5.4 TERMINAL POST

Positive and negative terminal posts provided of cells shall be clearly and unmistakably indentifiable. The positive terminal shall be marked with red colour in addition to '+' marking.

5.5 CONNECTIONS

Inter-cell, inter-tier, inter-rack connectors, terminals, bolts and nuts shall be lead - coated copper connector/*Rubber Moulded Copper connector*. The cross section of the connectors shall be designed to withstand the one minute discharge rating and also short circuit rating of the battery.

5.6 VENT PLUG

Vent plug and filler cap shall be anti-splash type and having more than one exit hole to allow the gases to escape freely but prevent the acid spray from the battery.
Provision shall be made for drawing electrolyte samples checking and topping up of the electrolyte. The design shall be such that the water loss due to evaporation is kept to minimum.

5.7 SEDIMENT SPACE

Sufficient sediment space shall be provided beneath the plates to accommodate any plate deposit, which accumulates at the bottom of the cell over a reasonable life of battery without short-circuiting the plates.

5.8 The following information shall be marked on out side of each cell.

- Name, type and trade mark of manufacturer
- Country and year of manufacture
- Capacity at 5 hr discharge rate.
- Upper and lower electrolyte level in case of transparent containers.
- ***Serial No. of each Cell as per Layout***

5.9 ELECTROLYTE

The electrolyte used shall be a solution of potassium hydroxide in distilled water made up to the specific gravity at 27 Deg. C. The cells shall be shipped dry, uncharged with electrolyte supplied in non-returnable good quality polyethylene or other suitable containers *which do not get punctured/damaged during transportation/handling at site.*
Ten percent extra electrolyte shall be supplied to account for any spillage during transit.

5.10 SEPARATORS

Separator between plates shall permit free flow of electrolyte. Separator between plates of the cells shall be porous alkali resistant and have insulating capacity to avoid shorting or leakage of current between the plates of opposite polarity. The separator shall also be dimensionally stable without deformation or determination at the temperatures of use.

5.11 BATTERY RACKS

a. *Wooden/FRP/Steel battery racks to be supplied as specified in datasheet-A. Wooden rack shall be made of best quality seasoned teak wood*
b. Two (2) coats of wood primer shall be applied on wodded battery racks prior to application of two (2) coats of anti-acid paint.
c. The battery racks shall be free standing type mounted on ***porcelain/hard rubber insulators.***
d. Numbering tags for each cell shall be attached on to the battery racks.
e. Battery racks and other supporting/interconnecting accessories shall be as per layout arrangement to be approved by purchaser during contract engineering stage.

6.0 LIFE

The guaranteed life of battery when operating under the specified conditions shall be furnished.

7.0 ACCESSORIES

Battery accessories shall be provided as specified in BOQ-Cum-Price Schedule.

8.0 INSPECTION AND TESTING

8.1 *Offered equipment shall be of type tested design. The bidder shall confirm compliance to quality plan enclosed with the specification, which is subject to customer/ BHEL approval and the inspection shall be carried out based on this approved Quality Plan (QP no. PE-QP-999-508-E003).*

8.2 **Quality Assurance**

All materials components and equipment's covered under this specification shall be procured, manufactured, inspected and tested as per the BHEL standards, quality, plan number PE-QP-999-S08-E003 enclosed with this specification and which shall be complied with.

All acceptance and routine tests as per IS-10918 shall be carried out by the manufacturer. Charges for all these routine and acceptance tests for all the materials shall be deemed to be included in the bid price.

8.3 Type, Routine and Acceptance Tests

Type, Routine and Acceptance tests to be performed as per Quality Plan(QP no. PE-QP-999-508-E003) enclosed with this specification.

9.0 PERFORMANCE GUARANTEE

Bidders shall guarantee that battery offered shall meet the duty cycle requirements as stipulated in this specification and as confirmed by them in technical data sheets. In case, the performance of battery at site is not as per the performance guarantee, the bidder will have to replace the battery at site free of cost.

10.0 By all Bidders as technical offer:

i. Battery sizing calculation with respect to load duty cycle enclosed with Section-C to be provided along with supporting documents (capability / discharge curve, temperature correction factor, float charging factor & published technical catalogue) for considered factors.
ii. Unpriced Price Schedule (Annexure-A as enclosed with the specification) with "Quoted "word against items with bidder's signature and company stamp.
iii. A copy of the sheet "Instructions to Bidders for Preparing Technical Offer" with bidder's signature and company stamp.
iv. A copy of sheet "List Of Contents" with bidder's signature and company stamp.
v. A copy of sheet "Deviation schedule" with NO DEVIATION and bidder's signature and company stamp.
vi. A copy of sheet "Data Sheet-A" with required information and bidder's signature and company stamp.

11.0 Final documents to be submitted after award of contract shall be as given in Annexure- C enclosed with section-C.

12.0 No. of prints to be submitted by vendor after award of contract shall be as specified under Annexure-B enclosed with section-C.

13.0 INSTRUCTION MANUALS

13.1 Instruction manuals for the installation, operation and maintenance of battery to be supplied shall be furnished at least two months before the date of despatch of equipment.

13.2 The installation and maintenance manual of battery shall contain the following.

(a) General description giving type and rating of various batteries.

(b) Technical data

(c) Salient constructional details.

(d) Instruction to be followed on receipt at site.

(e) Instructions for foundations, if any

(f) Erection procedures and checks.

(g) Procedure for filling of electrolyte.

(h) Commissioning procedures and site tests.

(i) Routine, periodic and preventive inspection and maintenance procedures.

(j) Safety rules.

(k) Possible faults, their causes and remedies.

(l) Type and routine test certificates.

(m) Catalogues, literatures and drawings.

13.3 Bidder shall furnish field quality plan detailing out the specific quality control procedure covering receipt of material/equipment and handling at site, storage, erection, commissioning, post commissioning etc.

TABLE-1

LIST OF CODES AND STANDARDS FOR NI-CD BATTERY

1.	VENTED TYPE NI-CD BATTERY	IS 10918
2.	RECOMMENDED PRACTICE FOR SIZINGOF NI-CD BATTERIES	IEEE 1115
3.	SPECIFICATION FOR WATER FOR STORAGE BATTERIES	IS 1069
4.	SPECIFICATION FOR POTASSIUM HYDROXIDE FOR NI-CD BATTERIES	IS 6831
5.	RUBBER & PLASTIC CONTAINERS FOR NI-CD BATTERIES	IS 1146
6.	SYNTHETIC SEPARATORS FOR NI-CD BATTERIES	IS 6071
7.	SEALING COMPOUND FOR NI-CD BATTERIES	IS 3116
8.	METHODS OF TESTS FOR NI-CD BATTERIES	IS 8320
9.	ELECTRICAL VOCABULAR, PRIMARY CELLS AND BATTERIES.	IS: 1885
10.	VENTED NICKEL-CADMINUM PRISMATIC RECHARGEABLE SINGLE CELLS	IEC60623
11.	INDIAN ELECTRICITY RULES & INDIAN ELECTRICITY ACTS	

Note:

Vendor to note that wherever IS is mentioned equivalent IEC is also acceptable. In case of any technical requirement not covered by IEC, technical requirement as per IS shall prevail.

DC LEAD ACID BATTERY

1. TECHNICAL REQUIREMENTS

This specification covers the design, materials, constructional features, manufacture assembly, testing, packing and dispatch of 220V DC Lead-Acid Battery complete with all accessories.

In this specification, as erection and commissioning is not included in vendor's scope, Vendor shall still not be absolved of his responsibility of establishing the correctness of equipment at site.

It is not the intent to specify herein all the details of design & manufacture. However, the equipment shall conform in all respects to high standards of design engineering and workmanship and shall be capable of performing in continuous commercial operation up to bidder's guarantee. This enquiry covers the supply of 220V DC LEAD ACID BATTERY conforming to this specification.

2. CODES AND STANDARDS

Unless otherwise specified, the latest revisions of codes/standards as specified under Table-1 enclosed are applicable and shall referred to.

3 EQUIPMENT AND SERVICES TO BE PROVIDED BY THE BIDDER

The bidder shall supply the equipment and provide the services in accordance with the various sections of this specification and as per BOQ cum unpriced Price Schedule (Annexure-A) enclosed with NIT.

4 SERVICES AND EQUIPMENT TO BE EXCLUDED

b. Civil works like foundation and cable cellar, flooring of the battery room etc.
c. Ventilation of battery and charger room.
d. 220V DCDB
e. Power and control cables
f. Erection of the equipment
g. Battery charger, battery fuse box and discharge resistor

5 DESCRIPTION OF EQUIPMENT

5.1 BATTERY

All batteries shall be stationary storage Lead-Acid *high discharge* type conforming to IS-1652/IEC60896-11. The batteries shall meet the duty cycle requirements under all site and operating conditions as specified in data sheet 'A'. IEEE 485 shall be the principle for sizing the battery including temperature correction factor.

5.2 CONTAINER

Containers shall be made of transparent polymeric material, robust, heat resistant, leak proof, non-absorbent, acid/alkali resistant, non-bulging type and free from flaws such as wrinkles, cracks, blisters, pinholes etc. The marking for the electrolyte level shall be for upper & lower limits. Container shall be closed/sealed lid type. Open type cells are not acceptable. Lid and sealing compound shall be non-cracking type.

5.3 PLATES

The plates shall be designed for maximum durability during all service conditions including high rate of discharge and rapid fluctuation of load.

The separators shall maintain the electrical insulation between the plates and shall permit free flow of electrolyte. Proper arrangement to keep end plates in position shall be provided. Separators shall be suitable for continuous immersion in the electrolyte without distortion.
The positive and negative terminal posts shall be clearly marked

5.4 CONNECTIONS

Lead coated copper connectors (or a better product) shall be used for connecting up adjacent cells and rows. Bolts, nuts, clamps, washers etc as applicable in shall be provided. All the terminals and inter-cell connectors shall be fully insulated or shrouded. End take of connections from positive and negative poles of batteries shall be done through single core cables. Necessary support equipments and copper lugs for termination of these cables on batteries shall also be supplied by the contractor. Suitable numbers of inter rack connectors shall be supplied by the bidder to suit the battery room layout during detailed engineering.

All connectors and lugs shall be capable of continuously carrying the discharge current of the respective Batteries and through fault short circuit current which the battery can produce and withstand for the period declared. Successful bidder shall furnish necessary sizing calculations to prove compliance to the same.

5.5 VENT PLUG

Vent plug shall be provided in each cell. It shall be anti-splash type and having more than one exit hole to allow the gases to escape freely but prevent the acid spray from the battery. The design shall be such that the water loss due to evaporation is kept to minimum. In addition the ventilator shall be easily removed from topping up the cells and of such dimensions that the syringe type hydrometer can be inserted into the vent to take electrolyte sample.

5.6 SEDIMENT SPACE

Sufficient sediment space shall be provided beneath the plates to accommodate any plate

deposit, which accumulates at the bottom of the cell over a reasonable life of battery without short-circuiting the plates.

5.7 The following information shall be marked on outside of each cell.

- Name, type and trade mark of manufacturer
- Country and year of manufacture
- Capacity at 10 hr discharge rate .
- Upper and lower electrolyte level
- Serial Number

5.8 ELECTROLYTE

The electrolyte comprise of battery grade sulphuric acid conforming to IS: 266 and water conforming to IS: 1069. The cells shall be shipped dry, uncharged with electrolyte supplied in non-returnable good quality polyethylene or other suitable containers.
Ten percent extra electrolyte shall be supplied to account for any spillage during transit.

5.9 BATTERY RACKS

a) Wooden/FRP/Steel battery racks to be supplied as specified in datasheet-A. Wooden rack shall be made of best quality treated wood
b) Racks shall be painted with at least two (2)coats of acid resistant/ anti corrosive paint.
c) Racks shall be free standing type mounted on porcelain/hard rubber/ PVC Pad insulators as applicable.
d) Numbering tags for each cell shall be attached on to the battery racks.
e) Battery racks and other supporting/interconnecting accessories shall be as per layout arrangement to be approved by purchaser during contract engineering stage.
f) The bottom tier of the stand shall not be less than 150 mm above the floor.
g) Wherever racks are transported in dismantled conditions, match markings shall be provided to facilitate easy assembly.

6 Following minimum information shall be given on the instruction cards:

h. Manufacturer's instructions for filling and initial charging of the battery together with starting and finishing charging rate
i. Maintenance instructions
j. Designation of cell in accordance with relevant standard.
k. Storing conditions of electrolyte

7 LIFE

The guaranteed life of battery when operating under the specified conditions shall be furnished.

8 ACCESSORIES

Battery accessories shall be provided as specified in BOQ cum unpriced Price Schedule (Annexure-A) enclosed with NIT.

9 INSPECTION AND TESTING

Offered equipment shall be of type tested design. The bidder shall confirm compliance to quality plan enclosed with the specification, which is subject to customer/ BHEL approval and the inspection shall be carried out based on this approved Quality Plan (QP no. PE-QP-999-508-E002).

9.1 Quality Assurance

All materials components and equipment's covered under this specification shall be procured, manufactured, inspected and tested as per the BHEL standards, quality plan number PE-QP-999-S08-E002 enclosed with this specification and which shall be complied with.

All acceptance and routine tests as per IS-1652 shall be carried out by the manufacturer. Charges for all routine and acceptance tests for all the materials shall be deemed to be included in the bid price.

9.2 Type, Routine and Acceptance Tests

Type, Routine and Acceptance tests to be performed as per Quality Plan(QP no. PE-QP-999-508-E002) enclosed with this specification.

10. PERFORMANCE GUARANTEE

Bidders shall guarantee that battery offered shall meet the duty cycle requirements as stipulated in this specification and as confirmed by them in technical data sheets. In case, the performance of battery at site is not as per the performance guarantee, the bidder will have to replace the battery at site free of cost.

11.0 INSTRUCTION MANUALS

11.1 Instruction manuals for the installation, operation and maintenance of battery to be supplied shall be furnished. The installation and maintenance manual shall contain the following.

a) General description giving type and rating of various batteries.
b) Technical data

c) Salient constructional details.

d) Instruction to be followed on receipt at site.

e) Instructions for foundations, if any

f) Erection procedures and checks.

g) Procedure for filling of electrolyte.

h) Commissioning procedures and site tests.

i) Routine, periodic and preventive inspection and maintenance procedures.

j) Safety rules.

k) Possible faults, their causes and remedies.

l) Type and routine test certificates.

m) Catalogues, literatures and drawings.

11. Bidder shall furnish field quality plan detailing out the specific quality control procedure covering receipt of material/equipment and handling at site, storage, erection, commissioning, post commissioning etc.

12. By all Bidders as technical offer:

i. Battery sizing calculation with respect to load duty cycle enclosed with Section-I to be provided along with supporting documents (capability / discharge curve, temperature correction factor, float charging factor & published technical catalogue) for considered factors.
ii. Unpriced Price Schedule (Annexure-A) as enclosed with NIT with “Quoted” word against items with bidder’s signature and company stamp.
iii. A copy of the sheet “Compliance certificate” with bidder’s signature and company stamp.
iv. A copy of sheet “Data Sheet-A” with required information and bidder’s signature and company stamp.

Table-1

LIST OF CODES AND STANDARDS FOR LEAD ACID BATTERY

1.	STATIONERY LEAD ACID PLANTE BATTERY	IS 1652
2.	RECOMMENDED PRACTICE FOR SIZING LEAD ACID BATTERIES	IEEE 485
3.	SPECIFICATION FOR WATER FOR STORAGE BATTERIES	IS 1069
4.	SPECIFICATION FOR SULPHURIC ACID FOR LEAD ACID BATTERIES	IS 266
5.	RUBBER & PLASTIC CONTAINERS FOR LEAD ACID BATTERIES	IS 1146
6.	SYNTHETIC SEPARATORS FOR LEAD ACID BATTERIES	IS 6071
7.	SEALING COMPOUND FOR LEAD ACID BATTERIES	IS 3116
8.	METHODS OF TESTS FOR LEAD ACID BATTERIES	IS 8320
9.	SPECIFICATION FOR HIGH PERFORMANCE PLANTE'S CELLS	BS-6290
10.	ELECTRICAL VOCABULAR, PRIMARY CELLS AND BATTERIES.	IS: 1885
11.	STATIONARY LEAD-ACID BATTERIES – VENTED TYPES – GENERAL REQUIREMENTS & METHODS OF TESTS	IEC60896-11
12.	INDIAN ELECTRICITY RULES & INDIAN ELECTRICITY ACTS	

Note:

Vendor to note that wherever IS is mentioned equivalent IEC is also acceptable. In case of any technical requirement not covered by IEC, technical requirement as per IS shall prevail.

	QUALITY PLAN		CUSTOMER : NTPC			PROJECT: 1 X 660 MW PANKI TPEP TITLE			SPECIFICATION NO. PE-TS-426-508-E001			
			BIDDER/ VENDOR :			STANDARD QUALITY PLAN NO.- PE-QP-999-508-E002, REV.0			SPECIFICATION : TITLE			220 V DC Battery
	SHEET 1 OF 3		SYSTEM			ITEM : LEAD ACID BATTERY			DOC. NO.			
SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
1	2	3	4	5	6	7	8	9	10			11
1.0	**RAW MATERIALS & BOUGHT OUT ITEMS**											
1.1	(Pure Lead for Pos. plate, Lead Alloy for Neg. plate & Sulphuric acid)	Chemical	MA	Chemical Analysis	Random Sample	IS:1652, IS:266, IS:1069 & MFR's Std.	IS:1652, IS:266, IS:1069 & MFR's Std.	Test Cert.	3/2	-	1	
1.2	**SEPARATOR**											
a)	Visual	Visual	MA	Visual	Random Sample	IS:1652 & MFR's Std.	IS:1652 & MFR's Std.	Test Cert.	3/2	-	1	
b)	Physical	Physical		Physical	-do-	-do-	-do-	-do-	3/2	-	1	
c)	Chemical	Chemical		Chemical	-do-	(For Synthetic IS : 6071)	(For Synthetic IS : 6071)	-do-	3/2	-	1	
d)	Electrical Resistance Test	Electrical		Electrical	-do-	-do-	-do-	-do-	3/2	-	1	
e)	Acceptance test Dimension, Volume Porosity, Wettability of separator	Test		As per Standard	-do-	-do-	-do-	-do-	3/2	-	1	
1.3	**TERMINAL POST**											
a)	Dimensional Conformance	Visual	MA	Visual	Random Sample	IS:1652, IS:8320 & MFR's Std.	IS:1652, IS:8320 & MFR's Std.	Test Cert.	3/2	-	1	
b)	Material Conformance	Chemical	CR	Chemical	-do-	-do-	-do-	-do-	3/2	-	1	
c)	Thread size depth & chamfer	Physical	MA	Measurement	-do-	-do-	-do-	-do-	3/2	-	1	
d)	Surface finish & defects	Visual	MA	-do-	100%	-do-	-do-	-do-	3/2	-	1	
e)	Plating Quality	Thickness	CR	-do-	Random Sample	-do-	-do-	-do-	3/2	-	1	

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S/ VENDORS COMPANY SEAL

LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION

	QUALITY PLAN		CUSTOMER : NTPC			PROJECT: 1 X 660 MW PANKI TPEP TITLE			SPECIFICATION NO. PE-TS-426-508-E001				
			BIDDER/ VENDOR :			STANDARD QUALITY PLAN NO.- PE-QP-999-508-E002, REV.0			SPECIFICATION : TITLE	220 V DC Battery			
	SHEET 2 OF 3		SYSTEM			ITEM : LEAD ACID BATTERY			DOC. NO.				
SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS	
1	2	3	4	5	6	7	8	9	10			11	
1.4	**CONNECTOR**												
a)	Dimension	Dimension	MA	Measurement	Random Sample	IS:1652, IS:6848 & Appd. Drg./Doc.	IS:1652, IS:6848 & Appd. Drg./Doc.	Test Cert.	3/2	-	1		
b)	Thickness of lead coating	Visual		Visual	-do-	-do-	-do-	-do-	3/2	-	1		
1.5	**VENT CAP**												
a)	Dimensional Conformance	Dimension	MA	Measurement	-do-	Refer Remarks#	Refer Remarks#	-do-	3/2	-	1	*# Vent cap shall be easily removed from topping up the cells and of such dimensions that the syringe type hydrometer can be inserted into vent to take electrolyte sample.*	
1.6	**CONTAINER**												
a)	Verification Constructional requirement	Visual	MA	Visual	Sample Plan as per IS:1146	IS:1652, IS:1146, IS:8320	IS:1652, IS:1146, IS:8320	Test Cert.	3/2	-	1		
b)	Verification of Markings	Visual	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
c)	High Voltage Test	Electrical	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
d)	Drops Ball Test	Mechanical	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
e)	Plastic Yield Test	-do-	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
f)	Acid Resistance Test	Chemical	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
g)	Hydraulic thrust enduarnce test	Physical	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
2.0	**FINISHED BATTERY**	Routine Test	CR	Elec. & Meas.	100%	IS:1652 & IS:8320	IS:1652 & IS:8320	Test Cert.	3/2	-	1		
3.0	**FINAL INSPECTION**												
3.1	**Type Test #**												
a)	Verification Constructional requirement	Visual	MA	Visual	Sample Plan as per IS: 8320	IS:1652	IS:1652	Inspection Report	3/2	1	-	*# Conduction of Type Tests from S.No. (d) to (g) shall be as per Annexure-B enclosed.*	
b)	Verification of Markings	Dimension	MA	Measurement	-do-	-do-	-do-	-do-	3/2	1	-		
c)	Verification of Dimensions	-do-	MA	-do-	-do-	-do-	-do-	-do-	3/2	1	-		
d)	Test for Capacity & Voltage during discharge	Test	CR	As per IS: 1652	-do-	-do-	-do-	-do-	3/2	1	-		

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S/ VENDORS COMPANY SEAL

LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION

	QUALITY PLAN		CUSTOMER : NTPC			PROJECT: 1 X 660 MW PANKI TPEP TITLE			SPECIFICATION NO. PE-TS-426-508-E001			
			BIDDER/ VENDOR :			STANDARD QUALITY PLAN NO.- PE-QP-999-508-E002, REV.0			SPECIFICATION TITLE : 220 V DC Battery			
	SHEET 3 OF 3		SYSTEM			ITEM : LEAD ACID BATTERY			DOC. NO.			
SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
1	2	3	4	5	6	7	8	9	10			11
e)	AH & WH efficiency Test	-do-	CR	As per IS:1652	Sample Plan as per IS:8320	IS:1652	IS:1652	Inspection Report	3/2	1	-	
f)	Retension of Charge	-do-	CR	-do-	-do-	-do-	-do-	-do-	3/2	1	-	
g)	Endurance Test	-do-	CR	-do-	-do-	-do-	-do-	-do-	3/2	1	-	
3.2	**Acceptance Test**											
a)	Verification of Markings	Visual	MA	Visual	Sample Plan as per IS: 8320	IS:1652	IS:1652	Inspection Report	3/2	1	-	
b)	Verification of Dimensions	Dimension	MA	Measurement	-do-	-do-	-do-	-do-	3/2	1	-	
c)	Test for Capacity	Capacity	CR	As per IS: 1652	-do-	-do-	-do-	-do-	3/2	1	-	
d)	Test for Voltage during discharge	Voltage during discharge	CR	-do-	-do-	-do-	-do-	-do-	3/2	1	-	
4.0	**ACCESSORIES**	Visual & Dimension	MA	Visual	100%	Appd. Drg./Doc.	Appd. Drg./Doc.	-do-	2	1	-	
5.0	**CABLE LUGS**	Visual	MA	Visual	100%	Appd. DataSheet	Appd. DataSheet	-do-	2	1	-	

NOTE:- Wherever IS is mentioned equivalent IEC is also acceptable. In case of any technical requirement not covered by IEC, technical requirement as per IS shall prevail.

BHEL	**PARTICULARS**	**BIDDER/ VENDOR**
	NAME	
	SIGNATURE	
	DATE	

BIDDER'S/ VENDORS COMPANY SEAL

LEGEND : 1 - BHEL/ CUSTOMER 2 - VENDOR 3 - SUB- VENDOR P - PERFORM W - WITNESS V - VERIFICATION

ANNEXURE-B

QUALITY PLAN
STANDARD QP NO. : PE-QP-999-508-E002, REV. 0

LIST OF TYPE TEST FOR LEAD ACID BATTERY

S No	Test	Type test description	Referred standard	Test to be specifically conducted (Yes/No)	BHEL/Customer's approval Req. on test certificate (Yes/No)
1	Type Test	• Test for Capacity & Voltage during discharge	IS:1652	NO	* YES
		• AH & WH efficiency Test	IS:1652	NO	* YES
		• Retension of Charge	IS:1652	NO	* YES
		• Endurance Test	IS:1652	NO	* YES

	STANDARD QUALITY PLAN		CUSTOMER : NTPC			PROJECT: 1 X 660 MW PANKI TPEP TITLE			SPECIFICATION NO. PE-TS-426-508-E001				
			BIDDER/ VENDOR :			QUALITY PLAN NUMBER: PE-QP-999-508-E002 REV.01			SPECIFICATION TITLE			TECHNICAL SPECIFICATION FOR 220V DC BATTERY	
	SHEET 1 OF 4		SYSTEM			ITEM : NI CD BATTERY			SECTION			VOLUME III	
SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	W	V	REMARKS	
1	2	3	4	5	6	7	8	9	10			11	
1.0	**RAW MATERIALS & BOUGHT OUT ITEMS**												
1.1	**CELL CONTAINER**												
a)	Dimensional & constructional conformance	Visual	MA	IS:10918	Random Sample	IS:10918	IS:10918	Test Cert.	3/2	-	1		
b)	Ball drop test	Mechanical	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
c)	Hydraulic thrust enduarnce test	Physical	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
d)	Resistance to alkali	Chemical	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
e)	HV test	Electrical	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
f)	Shade difference, straightness of side walls, free from burrs, flash lines etc.	Visual	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
1.2	**TERMINAL POST**												
a)	Dimensional Conformance	Visual	MA	IS:10918	Random Sample	IS:10918	IS:10918	Test Cert.	3/2	-	1		
b)	Material Conformance	Chemical	CR	As per IS-2062	-do-	As per IS-2062	As per IS-2062	-do-	3/2	-	1		
c)	Thread size depth & chamfer	Physical	MA	Measurement	-do-	-do-	-do-	-do-	3/2	-	1		
d)	Surface finish & defects	Visual	MA	-do-	100%	MFR's Std.	MFR's Std.	Test Cert.	3/2	-	1		
e)	Plating Quality	Thickness	CR	-do-	Random Sample	-do-	-do-	-do-	3/2	-	1		

BHEL	**PARTICULARS**	**BIDDER/ VENDOR**	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S/ VENDORS COMPANY SEAL

BHEL	**STANDARD QUALITY PLAN**		CUSTOMER : NTPC			PROJECT: 1 X 660 MW PANKI TPEP TITLE			SPECIFICATION NO. PE-TS-426-508-E001				
			BIDDER/ VENDOR :			QUALITY PLAN NUMBER: PE-QP-999-508-E002 REV.01			SPECIFICATION TITLE			TECHNICAL SPECIFICATION FOR 220V DC BATTERY	
	SHEET 2 OF 4		SYSTEM			ITEM : NI CD BATTERY			SECTION			VOLUME III	
SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	W	V	REMARKS	
1	2	3	4	5	6	7	8	9	10			11	
1.3	**CONNECTOR**												
a)	Material Conformance	Chemical	CR	As per IS-1897	Random Sample	As per IS-1897	As per IS-1897	-do-	3/2	-	1		
b)	Dimensional Conformance	Visual	MA	Measurement	-do-	Approved drg/ doc & MFR's Std.	Approved drg/ doc & MFR's Std.	-do-	3/2	-	1		
c)	Visual defects	Visual	MA	-do-	100%	-do-	-do-	-do-	3/2	-	1		
d)	Plating Quality (Duplex)	Thickness	CR	-do-	Random Sample	-do-	-do-	-do-	3/2	-	1		
1.4	**SEPARATOR**												
a)	Dimensional Conformance	Visual	MA	Measurement	-do-	As per BHEL Spec. / IS:10918	As per BHEL Spec. / IS:10918	-do-	3/2	-	1		
b)	Colour shade difference, burrs, flash at the edge	Visual	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1		
1.5	**Vent Cap**												
a)	Dimensional Conformance	Dimension	MA	Measurement	-do-	Refer Remarks#	Refer Remarks#	-do-	3/2	-	1	# Vent cap shall be easily removed from topping up the cells and of such dimensions that the syringe type hydrometer can be inserted into vent to take electrolyte sample.	

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S/ VENDORS COMPANY SEAL

	STANDARD QUALITY PLAN		CUSTOMER : NTPC			PROJECT: 1 X 660 MW PANKI TPEP TITLE			SPECIFICATION NO. PE-TS-426-508-E001			
			BIDDER/ VENDOR :			QUALITY PLAN NUMBER: PE-QP-999-508-E002 REV.01			SPECIFICATION TITLE			TECHNICAL SPECIFICATION FOR 220V DC BATTERY
	SHEET 3 OF 4		SYSTEM			ITEM : NI CD BATTERY			SECTION			VOLUME III

SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
1	2	3	4	5	6	7	8	9	10			11
1.6	**Rubber Components (Gaskets & Sealing ring etc)**											
a)	Material quality	Shore hardness	CR	-do-	-do-	-do-	-do-	-do-	3/2	-	1	
b)	Resistance to alkali & oil	Chemical	MA	-do-	-do-	-do-	-do-	-do-	3/2	-	1	
c)	Dimensional Conformance	Dimension	MA	Measurement	-do-	-do-	-do-	-do-	3/2	-	1	
d)	Flash or burrs	Visual	MA	Visual	-do-	-do-	-do-	-do-	3/2	-	1	
1.7	**Strip**											
a)	Plating Quality including thickness	Dimension	CR	Measurement	1 sample/ coil	MFR's Std.	MFR's Std.	Test Cert.	3/2	-	1	Nickel plating thickness of steel strip shall be minimum 3 microns.
2.0	**FINISHED BATTERY**	Routine Test	CR	Elec. & Meas.	100%	IS:10918 & IS:8320	IS:10918 & IS:8320	Test Cert.	3/2	-	1	
3.0	**FINAL INSPECTION**											
3.1	**Type Test #**											
a)	Physical Examination	Visual	MA	Visual	Random Sample	Approved drg/ doc & IS:10918	Approved drg/ doc & IS:10918	Test Cert.	3/2	1	-	
b)	Dimensions, Mass & Layout	Dimension	MA	Measurement	-do-	-do-	-do-	-do-	3/2	1	-	
c)	Cell marking	-do-	MA	-do-	-do-	-do-	-do-	-do-	3/2	1	-	
d)	Polarity & absence of short circuit	Electrical	MA	-do-	Sample Plan as per IS: 8320	-do-	-do-	-do-	3/2	1	-	By voltage measuremnet according to polarity

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S/ VENDORS COMPANY SEAL

BHEL	**STANDARD QUALITY PLAN**		CUSTOMER : NTPC			PROJECT: 1 X 660 MW PANKI TPEP			SPECIFICATION NO. PE-TS-426-508-E001			
			BIDDER/ VENDOR :			TITLE QUALITY PLAN NUMBER: PE-QP-999-508-E002 REV.01			SPECIFICATION TITLE			TECHNICAL SPECIFICATION FOR 220V DC BATTERY
	SHEET 4 OF 4		SYSTEM			ITEM : NI CD BATTERY			SECTION			VOLUME III

SL. NO.	COMPONENT/ OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
1	2	3	4	5	6	7	8	9	10			11
e)	Air pressure test	Visual	MA	Measurement	-do-	-do-	-do-	-do-	3/2	1	-	
f)	Insulation Resistance	-do-	MA	-do-	-do-	-do-	-do-	-do-	3/2	1	-	
g)	Ampere-hour capacity	Test	CR	As per IS: 10918	Sample Plan as per IS: 8320	-do-	-do-	Inspection Report	3/2	1	-	
h)	Endurance Test	-do-	CR	-do-	-do-	-do-	-do-	-do-	3/2	1	-	# Conduction of Type Tests from S.No. (g) to (j) shall be as per Annexure-C enclosed.
i)	Retension of Charge	-do-	CR	-do-	-do-	-do-	-do-	-do-	3/2	1	-	
j)	Test for discharge performance at low temp.	-do-	CR	-do-	-do-	-do-	-do-	-do-	3/2	1	-	
3.2	**Acceptance Test**											
a)	Physical Examination	Visual	MA	Visual	Random Sample	Approved drg/ doc & IS:10918	Approved drg/ doc & IS:10918	Test Cert.	3/2	1	-	
b)	Dimensions, Mass & Layout	Dimension	MA	Measurement	-do-	-do-	-do-	-do-	3/2	1	-	
c)	Cell marking	-do-	MA	-do-	-do-	-do-	-do-	-do-	3/2			
d)	Polarity and absence of short circuit	Electrical	MA	-do-	Sample Plan as per IS: 8320	-do-	-do-	Inspection Report	3/2	1	-	
e)	Air pressure test	Visual	MA	Measurement	-do-	-do-	-do-	-do-	3/2	1	-	
f)	Insulation Resistance	Electrical	MA	-do-	-do-	-do-	-do-	-do-	3/2	1	-	
g)	Ampere-hour capacity	Test	CR	As per IS: 10918	Sample Plan as per IS: 8320	-do-	-do-	-do-	3/2	1	-	
4.0	**ACCESSORIES**	Visual & Dimension	MA	-	100%	Approved drg/ doc	Approved drg/ doc	-do-	2	1	-	
5.0	**CABLE LUGS**	Visual	MA	-	100%	Approved drg/ doc	Approved drg/ doc	-do-	2	1	-	

NOTE:- Wherever IS is mentioned equivalent IEC is also acceptable. In case of any technical requirement not covered by IEC, technical requirement as per IS shall prevail.

LEGEND : P : PERFORMER W: WITNESSER V: VERIFIER CHP: CUSTOMER HOLD POINT SHALL BE DECIDED AT CONTRACT STAGE

1. End Customer/ End Customer's Consulatnt & BHEL
2. Vendor
3. Sub-Vendor of Vendor

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S/ VENDORS COMPANY SEAL

ANNEXURE-C

QUALITY PLAN
STANDARD QP NO. : PE-QP-999-508-E002, REV. 0

LIST OF TYPE TEST FOR Ni-Cd BATTERY

S No	Test	Type test description	Referred standard	Test to be specifically conducted (Yes/No)	BHEL/Customer's approval Req. on test certificate (Yes/No)
1	Type Test	• Ampere-hour capacity	IS:10918	NO	* YES
		• Test for discharge performance at low temp.	IS:10918	NO	* YES
		• Retension of Charge	IS:10918	NO	* YES
		• Endurance Test	IS:10918	NO	* YES