



Bharat Heavy Electricals Limited

(A Government of India Undertaking)

BOILER AUXILIARIES PLANT

RANIPET – 632 406, INDIA

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WORKS CONTRACT MANAGEMENT DEPARTMENT

REGISTERED POST WITH ACK.DUE

INVITING TENDER

Tender Notice No	9870025E DT: 29.08.2017.
Name of work	Fatigue life cycle testing (FLCT) of metallic Expansion bellows.
Period of contract	Four months.
Earnest Money Deposit (EMD) Amount	Rs.8,000/- (Rupees Eight thousand Only)
Last date & Time for Receipt of the Tender	05.09.2017 at 14.00 hrs
Date of Tender (Technical bid) Opening	05.09.2017 at 14.30 hrs on wards.
(Please obtain updated information from the BHEL website about the latest applicable dates & other changes if any in the tender contents)	
Date of Price Bid Opening	Bidders whose technical bids are found acceptable will be intimated separately about the status of their offers and the date of opening of Price Bid.
Place of submission of Tender	Tender Box placed in WCM Department (Engg. Building – Ground Floor (West side), BHEL –BAP- Ranipet – 632 406.
Address on the Sealed Tender Cover to be:	DGM / WCM DEPARTMENT ENGG. BUILDING – GROUND FLOOR(WEST SIDE), BHARAT HEAVY ELECTRICALS LIMITED RANIPET , VELLORE DISTRICT TAMIL NADU– 632 406.
Venue of the Tender Opening	WCM DEPARTMENT

Note:

- The Tender documents can be down loaded from BHEL website (http://www.bhel.com/tender/list_tender.php) and Govt tender web site: <http://tenders.gov.in/> and also in Central Public Procurement Portal (CPP) website: <http://eprocure.gov.in/epublish/app>
- The bidders who registered in other units of BHEL for this type of works may also participate with proper supporting documents. After technical evaluation and acceptance, their offer will be considered for price bid opening. Unregistered bidders who are having experience in this type of works, they may also submit their technical bid. After technical evaluation they may be considered for future tenders.
- BHEL reserves the right to accept or reject any or all tenders without assigning any reasons whatsoever.
- All corrigenda, addenda, amendments, clarifications etc. to tender specification will be hosted in the web pages (www.bhel.com > **Tender notifications** > **view corrigendum**) only and not in the news papers. **Bidders shall keep themselves updated with all such developments.**
- BHEL reserves the right to reject any tender on the basis of unsatisfactory performance of the bidder in any on going job or any similar job in the past.

**DGM/WCM
ISSUING OFFICER**

**SIGNATURE OF THE TENDERER
WITH SEAL AND ADDRESS**

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BRIEF DESCRIPTION AND SCOPE OF WORK

We have pleasure in sending this Tender Enquiry to carry out Fatigue life cycle testing of Metallic Expansion Bellows (NTPC project contract requirement) as per BHEL technical specification and quality documents. The vendors shall quote their rate for the Schedules as per the **ANNEXURE "I"**. In this regard, please ensure the essential features and specific guidelines are as follows.

1. **ESSENTIAL FEATURE AND SPECIFIC GUIDELINES:**

- ◆ The broad scope of work is indicated at **2.0**.
- ◆ It will be the vendor's responsibility to ensure that the Tender Documents, Quality Documents and related Technical and Commercial conditions are studied before submitting the offer. The Standard Inspection Procedure (SIP) is indicated as **Annexure "B"**. The Vendor shall have to study the document in detail for understanding the Scope of Work and the processes involved. **Any Technical Clarification required can be sought in person with prior intimations as well as by e-mail well before the scheduled tender opening date.**
- ◆ While quoting, the vendor shall ensure to quote their rate as per our Quality Plan.
- ◆ The Vendor shall have to submit their offer as per "**ANNEXURE "I"**" in a sealed cover. No deviation in the tender conditions will be entertained and BHEL reserves the right to reject such offers.
- ◆ Techno—Commercial bid along with price bid is to be submitted in a sealed cover.

2. **SCOPE OF WORK:**

Vendor has to conduct Two fatigue life cycle test for the Expansion bellows (2 Nos. 1 carbon and 1 Corten)) supplied by BHEL for 20,000 cycles as per Standard Inspection Procedure - SIP NP 016 (Annexure B). Test is to be witnessed by BHEL and NTPC officials. Expansion Bellows of size 2488 x 1650 mm of one no. made of Carbon steel (Wt:1.1MT) and another one no. made of Corten Steel(Wt:1.6MT) will be issued by BHEL Ranipet free of cost and vendor has to collect these from BHEL Ranipet. After completion of Fatigue Life Cycle Test, Vendor has to hand over Expansion bellows (2 nos.) to BHEL Ranipet.

At BHEL, Ranipet, Material handling and loading / unloading facilities will be arranged by BHEL. Two nos. Expansion bellows will be made readily available for transporting by the contractor in single trip. After testing also, contractor shall send back the materials in a single trip.

Quotations are invited for Fatigue life cycle test of Metallic Expansion Bellows for two pieces.

3. **TENDER EVALUATION AND ORDERING:**

Tender will be evaluated for competitiveness of the vendor for carrying out the Fatigue Life Cycle Test and fulfilment of tender requirements.

4. **BANK GUARANTEE:**

Since BHEL will issue the material for testing, successful L1 bidder has to furnish the Bank Guarantee (in BHEL, Ranipet format) for Rs. 1 Lakh before taking BHEL materials. The period of **Bank guarantee** is **Seven months**. (i.e. **Four months** for Contract period and another three months for reconciliation (if any)). The contractor has to handed over the Bellows to BHEL, Ranipet Stores within the contract period.

5. RATES:

Vendor should quote for their Rates for two pieces. Expansion Bellows for conducting FLCT will be issued from BHEL, Ranipet (Vendor scope includes collection the Bellows from BHEL/Ranipet and after completion of fatigue Lift Cycle Test and to hand over Expansion bellows to BHEL/Ranipet -2 nos.).

6. QUALITY PLAN:

Quality Plan to be followed: SIP: NP: 016 / 03 & CQP 5082, Rev.01, Dt. 09/01/2015.
The Firm shall confirm to BHEL's Quality requirements.

7. DELIVERY TERMS:

- ◆ Two weeks from the date of collection of material from BHEL and clearance for test by BHEL. The test will be witnessed by BHEL and NTPC officials. Bidder has to submit test report in two sets immediately after test.

8. TECHNICAL REQUIREMENTS:

- ◆ Testing of Expansion Bellows is to be carried out as per BHEL Quality plan.
- ◆ Vendors must ensure that correct dimensions and deviations, if any, are recorded properly in the Dimension Record books and the same shall be witnessed by BHEL Officials or their authorized agencies.
- ◆ Calibrated testing equipment's only to be used for conducting FLCT.

9. INSPECTION:

- ◆ Inspection shall be by our Quality Control Department and /or by our customers and /or by an appointed agency or persons authorized by us. Vendor shall provide all facilities and equipment, Calibrated instruments and standard gauges required for inspection, free of cost.

10. PAYMENT :

- ◆ Invoices in Triplicate shall be raised after completion of Work Order and as per the- agreed rate.
- ◆ 100% payment shall be made against submission of invoices supported by final test report clearance by BHEL and LR acknowledgment (for proof of handing over of Bellows to BHEL, Ranipet Stores) within 30days. Payment will be released through electronic mode by NEFT / RTGS.

11. LIQUIDATED DAMAGES / PENALTY & RISK PURCHASE :

- ◆ **Timely delivery is the essence of the Contract.**
- ◆ The Fatigue Life Cycle Test has to be Conducted as per the date stipulated in the Work Order.
- ◆ Where the Vendor completes the test beyond the specified delivery period, liquidated damages at the rate of ½% of the Purchase order value for each week will be levied subject to a maximum of 15% without prejudice to any other relief compensation to BHEL, under any other condition of the contract.
- ◆ Further, BHEL, will get these items tested elsewhere without the notice of the vendor; on their account and at the risk of the vendor, the test not so completed without cancelling the contract in

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respect of no of tests not yet due for delivery or cancel the contract or a portion thereof and if so desired, order elsewhere at the risk and cost of the vendor.

- ◆ The contractor shall be liable for any loss, which BHEL may sustain by reason of such risk purchases in addition to liquidated damages as mentioned above. No request for refund will be entertained.
- ◆ The contractor has to perform the test as per BHEL Quality plan. Damages of job(if any) due to non-compliance of Quality plan instruction, the contractor has to take total responsibility and loss incurred by BHEL will be recovered from the contractor.

12. SUBLETTING:

- ◆ The vendor shall, not sublet or assign this work or any part thereof without the written permission of BHEL.
- ◆ In the event of the vendor subletting or assigning this work or any Part thereof without such permission, BHEL shall be entitled to cancel the Order and execute the same elsewhere at the risk and cost of the vendor and the vendor shall be liable for any loss or damage which BHEL may sustain in consequence of or arising out of such supplies elsewhere and also cancellation of registration or temporary suspension.

13. OTHER CONDITIONS:

- ◆ Partnership firms should have the latest Form-A (Rule 5) Declaration issued by Registrar of Firms and the copy of the same should be produced at the time of signing of the Contract.
- ◆ In addition to the above, our Standard General Conditions shall also apply.
- ◆ All the Statutory Obligations such as ESI, PF, Labour Acts, Factories Act, Service Tax, etc. will have to be taken care of by the vendor. BHEL will have- no liability on them. Notwithstanding the above, if any demand notice is served by the concerned Statutory Authorities for recovery of any of their dues on BHEL, the same would be paid without notice to the vendor and recovered as a due. from any Pending / future bills.
- ◆ All Precautions and use of Safety Equipment's are to be followed while carrying out the fabrication and Dispatch of the same The vendor must have proper tools and handling equipment. There should always be a responsible person available to oversee the operation and compliance of safety regulation etc. If any non-compliance with respect to proper safety Conditions/requirements, BHEL may withhold visit/inspection, instruct stoppage of work till such time the desired safety requirements/conditions are met with.
- ◆ Vendors are required to equip themselves with communication facilities like Telephone, separate Fax and e-mail, etc. BHEL will have the right not to consider those vendors who do not equip themselves with these facilities.

14. DOCUMENTS:

- ◆ All the documents of BHEL (Quality plans) made available to the vendor should be kept in strict confidence and under no circumstance be made available to others or allow Others to make use of them. Such documents should be returned to us after completion. This SECRECY CLAUSE is binding on the employees of the vendors also.
- ◆ Any contravention will be viewed very seriously to cancelling the contract.

15. ENCLOSURES:

1. Annexure-B Quality Work Instructions
2. QAP for FLCT – SIP:NP:16/03
3. CQP 5082, Rev.01, Dt. 09/01/2015.

16. TENDER SUBMISSION DOCUMENTS:

- ◆ The Tenderer shall furnish a certificate along with the offer stating that the Enquiry Terms and conditions have been fully read and understood and the prices quoted are in accordance with the same.
- ◆ The Tenderer shall submit the **Tender Documents and Price Quotation- Annexure I** –duly signed by Competent Authority of the Vendor.
- ◆ In case of any clarifications, contact WCM Department/ BHEL Ranipet by mail, or in Person.

BHEL reserves the right to

- i) **Reject the offer which does not meet their technical and commercial conditions.**
- ii) **To reject any or all the Tenderers either in full or part thereof or short close the tender at their discretion without assigning any reason.**

TENDER CONDITIONS:

S NO	DESCRIPTION	BHEL REQUIREMENT	BIDDER'S CONFIRMATION
1	EMD	Rs.8,000/- (or) MSME valid certificate(as per MSE Clause listed in point no.20).	DD/Ref. No.
2	Bank guarantee	Acceptance for Submission of Rs. 1 Lakh BG in BHEL, Ranipet format (validity for Seven months) before start of work in case of becoming successful L1 bidder.	Yes
<ol style="list-style-type: none"> 1. BHEL reserves its right to reject the tender on account of unsatisfactory past performance by the bidder in other projects awarded under different enquiry. 2. Tender without EMD / without MSME valid certificate(as per MSE Clause listed in point no.20) will be summarily rejected. 3. Submission of BG by the successful L1 Bidder is compulsory. 			
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DETAILS TO BE FILLED BY THE BIDDER

1a	Name of the Bidder	
1b	Full address	
1c	Nationality	
1d	Email Cell Phone Fax	
2	Whether the firm is individual firm or Sole proprietorship firm or partner ship firm or Hindu undivided Family or association of persons or Private Limited company or Public Limited company or any other please specify.	
3	Whether the contractor has registered his workmen under employees State Insurance Act. If so, the Registration No./ Enrolment Number may be furnished.	
4	PAN no and documentary proof (Photo copy has to be enclosed)	
5	The GST heads under which the enlisting person registered with GST Authorities and copy of GST registration certificate has to be enclosed	
6	Whether the contractor has registered his workmen under Employees Provident Fund and Miscellaneous Provisions Act. (Photo copy is to be enclosed)	
7	Applicable GST quoted Note: Please refer clause no.26 (page no. 28) of Important Note to Bidders of this Tender regarding GST.	Central tax@ _____% State tax @ _____% Integrated tax@ _____% Union territory tax@_____%

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IMPORTANT NOTE TO BIDDERS

Bidders are requested to submit their offers 'in a sealed cover' consisting of three inner sealed covers such as (1) EMD cover containing DD/Online payment receipt (or) MSME copy, (2) Technical Bid cover & (3) Price Bid cover, all super scribing the name of the work, Tender Number, Due date etc.

- 1) EMD cover shall contain requisite EMD in the form of Demand Draft (DD)/Online payment receipt. Tender without EMD / without MSME valid certificate(as per MSE Clause listed in **point no.20**) will be summarily rejected. EMD in any other form will not be accepted.
- 2) Technical/Qualification bid cover shall contain duly filled in qualification bid document signed by the bidder in all the pages with documentary evidences for pre-qualification such as Balance sheet, P&L A/c, experience, value of work executed in the similar nature of work etc. Any bid without proper documentary evidence for pre-qualification shall not be considered for further evaluation.
- 3) The price bid cover shall contain price bid document (BHEL format only) duly filled in and signed by the bidder in all the pages. The bidder has to quote most competitive rates for all the items in the price bid. The completed qualification bid and price bid along with requisite **EMD of Rs 8,000/-** for the work in the form of Demand Draft drawn from any Nationalized bank, in favor of **"BHEL, Ranipet"** payable at Ranipet (or) SBI, Mukundarayapuram Branch (Code: 7013) / Pay online (**please ref. page no.26 -Note**) and enclose the payment details in the EMD cover and shall reach the Office of the undersigned on or before 05.09.2017 at 14.00 Hrs.

(This earnest money deposit will be refunded to the unsuccessful Bidders after finalization of the award of work. In case of successful bidder, the earnest money will be retained as part of the Security Deposit for satisfactory completion of the work in accordance with BHEL's General Conditions of Contract enclosed. No interest will be paid on the earnest money deposit. EMD by the bidder will be forfeited if i) After opening the tender / price bid the bidder revokes his tender within the validity period or increases his earlier quoted rates ii) The bidder does not commence the work within the period as per work order / Contract. In case the Work order / Contract is silent in this regard then within 15 days after award of contract).

- 4) The Qualification/ Technical bid will be opened on 05.09.2017 at 14.30 hrs onwards. In case of opening day falls on holiday or happened to be declared as a holiday the receipt and opening of the Tender shall automatically fall at the same timing on the next working day. Date and time of opening of the price bid shall be intimated to those bidders who have qualified in the technical bid. The bidders or their authorized agents can participate in the tender opening for which they shall bring authorization letter for attending tender opening. Late offers & incomplete offers shall become liable for rejection.
- 5) **Bidders are required to submit their price bid in the BHEL format only.**
- 6) **Seeking clarification on Tender Specification:** Clarifications on tender specification if any may be sought by the bidders during the office hours only from the **DGM/WCM- Phone no- 04172-284259.**
- 7) All the information as called for in the various clauses and annexure of tender specification should be furnished. The details so furnished should be complete in all respects and as per the formats prescribed in the Tender specification (Statutory requirement of Contract). The bidder may have to produce original documents for verification, if so decided by BHEL.

- 8) Offers received with any deviation or without relevant information are liable to be rejected.
- 9) Price bids received in any form other than prescribed in PRICE BID are liable to be rejected.
- 10) **The bidder has to quote his Rate for all individual items in the Rate Schedule of Price Bid. If the bidder has not quoted the Rate for any item(s), it is considered as incomplete tender and tender can not be accepted.**
- 11) **The tender offer should be kept valid for 3 MONTHS from the date of technical bid opening** for acceptance by BHEL. No unsolicited revision in the tender offer shall be entertained after opening of tenders and till expiry of the validity period.
- 12) Quoted rates shall be firm through out the contract period and extended contract period also and no cost escalation is allowed on any account.
- 13) **The similar works executed in the own name of the bidder only will be considered for eligibility / qualification criteria.**
- 14) BHEL reserves the right to increase or decrease the tendered quantity.
- 15) Lowest prices received against BHEL tenders need not be the technically acceptable one, and in that case, BHEL reserves the right not to consider the same.
- 16) BHEL reserves the right to negotiate or refloat the tender opened, if L1 Price is not lowest acceptable price to them inter-alia other reasons.
- 17) BHEL reserves the right to negotiate the L1 rate.
- 18) **The contract may be pre closed as decided by BHEL during tenure of the contract with one month prior intimation.**
- 19) **The contract will be finalized based on the overall LOWEST value and to be awarded to single party only since split in schedules is not possible.**

20) Proof of MSE Certificate:

If vendor have their MSE Certificate, EMD need not to pay for this work.

MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either EM II certificate having deemed validity (Five years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (as below) where deemed validity of EM II certificate of five years has expired) applicable for the relevant financial year(latest audited). Date to be reckoned for determining the deemed validity will be the last date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiencies in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal.

Documents should be notarized or attested by a Gazettes officer.

All MSE suppliers shall continue to be in PMD with MSE status based on the EM II certificate or valid NSIC certificate. Any new supplier will be eligible for registration with BHEL as MSE supplier provided at least any one of the following documents are submitted along with application for registration.

- a) Valid NSIC certificate or
- b) Entrepreneurs Memorandum part II(EM II) certificate (valid based on deemed validity of 5 years) or
- c) EM II certificate along with attested copy of CA certificate (as per prescribed format as below applicable for the relevant financial year(latest audited) , where the deemed validity of EM II is over.

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However credentials of all MSE suppliers will be verified before considering the intended benefits for MSE suppliers as per clause9(ii) at the time of tender evaluation.

Certificate by Chartered Accountant on Letter head

This is to certify that M/s....., (hereinafter referred to as 'Company') having its registered office at..... is registered under MSMED Act 2006,(Entrepreneur memorandum No(Part-II))..... dt:.....Category:.....(Micro/Small).(Copy enclosed)

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year as per MSMED Act 2006 is as follows:

1. For Manufacturing Enterprises: Investment in plant and machinery(i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722(E) dated October 5, 2006:
Rs..... Lacs
2. For Service Enterprises: Investment in equipment(original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006.
Rs..... Lacs

(Strike off whichever is not applicable)

The above investment of Rs.....Lacs is within permissible limit of Rs.....Lacs for.....Micro/Small(Strike off which is not applicable)Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/Small)(Strike off which is not applicable) and the date of graduation of such enterprise from its original category is..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O.No.3322(E) dated 01-11-2013 published in the gazette notification dated 04-11-2013 by Ministry of MSME.

Date:

(Signature)

Name:

Membership number:

Seal of Chartered Accountant:

21. a) Arbitration

- i) All disputes between the parties to the Contract, arising out of or relation to the Contract shall after written notice by either party to the Contract to the other party be referred to the sole Arbitration of Executive Director, BAP or any designate nominated by the Executive Director of BHEL in his sole discretion.
- ii) The venue of Arbitration shall be Ranipet, Tamil Nadu. The arbitrator may hold meetings for convenience in such a place or places discretion.
- iii) The award of the Arbitrator shall be final, conclusive and binding on both parties to the Contract.
- iv) The Contractor shall, not with standing any disagreement, dispute, protest, request for arbitration, court or other proceedings, continue to perform the Services in accordance with the determinations, instructions and clarifications of BHEL.

- b) Subject to the above, the appropriate court in Ranipet shall have the exclusive jurisdiction over any disputing arising out of or in connection with this Contract.
- c) **Risk Purchase**

- i) In case of any neglect or refusal on the part of the Contractor to:
- commence the Contract, or
 - provide sufficient labour for the Contract or
 - if in the opinion of BHEL, the Contract performed by the Contractor are not satisfactory, or
 - if the Contractor fails to carry out the Contract or as per instructions of the BHEL or officer authorized by it,

BHEL shall have the right to have the Work done by any means, including by engaging a new contractor, at the Contractor's sole risk and expenses.

- ii) The above shall be without prejudice to any other remedy that may be available to BHEL whether as per law, contract, equity or otherwise.
- iii) In the event, the cost of the work so done (as certified by BHEL which is final and conclusive) is less than the Contract cost, the advantage shall accrue to the BHEL and if the cost exceeds the money due to Contractor under the Contract, the Contractor shall either pay the excess amount ordered by BHEL or the same shall be recovered from the Contractor by other means.
- d) Contractor shall indemnify and keep indemnified BHEL, its other contractors and/or sub-contractors and its/their employees from all actions, proceedings, suits, claims, demands, liabilities, damages, losses, costs, charges, expenses, judgments and fines arising out of or in the course of, or caused by the execution of work under the Contract or other obligations hereunder directly or indirectly associated herewith which may arise due to:
- i) Breach of law by the Contractor, or any of its sub-contractor, or any of their respective employees.
 - ii) Negligence or willful default by the Contractor, or any of its sub-contractor, or any of their respective employees.
 - iii) Failure by Contractor to proceed with Project in accordance with the determinations, instructions and clarifications of Company pending disagreement, dispute, protest, request for arbitration/ court proceedings
 - iv) Loss of property or death of any employee of BHEL or of its other contractors/ sub-contractors.

The above shall be without prejudice to any other remedy that may be available to BHEL whether as per law, contract, equity or otherwise.

22. FORCE MAJEURE CLAUSE:-

If, at any time during the continuance of this Contract the performance in whole or in part by either party of any obligations under this Contract shall be prevented or delayed by reason of any War, Hostile acts of the public enemy Civil Commotion, Epidemics, or Acts of God (Floods, Storm/Cyclone, Hurricane, Earth Quake etc.) then provided notice of happening of any such event is given by either party to other within 7 days from the date of occurrence therefor neither party shall by reason of such event be entitled to terminate this Contract nor shall either party have any claim for damages against the other in respect of such non-performance and delay in performance under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist.

If the performance in whole or part of any obligation under this Contract is prevented or delayed by reason of any such event, claims for extension of time / waiver of penalty/liquidated damages shall be granted for periods considered reasonable by AGM/WCM subject to prompt notification by the contractor.

23. All corrigenda, addenda, amendments, time extensions clarifications, etc., to the tender will be hosted on BHEL website (www.bhel.com) only. Bidders should regularly visit BHEL website to keep themselves updated.

24. Multiple Bids:

The bidder in his own interest shall submit only one bid. If a bidder submits Multiple bids, all the bids are liable for rejection. Bids shall be considered "Multiple" in the following circumstances:

- a) Two bids by the same party.
- b) If one bidder is the Affiliate of another bidder.

For the purpose of this clause "Affiliate" shall mean with respect to any Person, any other Person that, directly or indirectly, controls, is controlled by, or is under direct or indirect common control with, such Person, or is a director/ member / officer/ employee of such Person or of any Person who would otherwise qualify as an Affiliate of such Person pursuant to this definition;

"Person" for the purposes of this definition shall mean any natural person, individual, corporation, limited partnership, co-operative, general partnership, joint stock company, joint venture, association, company, trust, bank, trust company, land trust, business trust, corporate body or other organization, whether or not a legal entity."

25. Fraud Prevention Policy:

The bidder along with its associate / collaborators / sub-vendors / consultants / service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about fraud or suspected fraud as soon as it comes to their notice.

26. Suspension of Business Dealings:

The bidder along with its associate / collaborators / sub-vendors / consultants / service providers shall strictly adhere to "Guidelines for Suspension of Business Dealings with Suppliers/ Contractors" AA/MM/SB/01 Rev: 02, Dt.22.07.2016 displayed on BHEL website <http://www.bhel.com>. (http://www.bhel.com/vender_registration/pdf/Suspension_guidelines_adbridged.pdf).

27. Discrepancy in "words " & " Figures ":

- a) If, in the price structure quoted for the required goods/services/works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of the purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly.
- b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and
- c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject of (a) and (b) above.

- c) If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date up to which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the purchaser, the bid is liable to be ignored.
- 28. Set of Clause:** "BHEL shall have the right to recover any money which in the sole opinion or BHEL is due from the Contractor from any money due to the Contractor under this Contract or any other contract or from the Security Deposit furnished by the Contractor under this Contract or any other contract. "
- 29.** "Notwithstanding anything to the contrary, including, but not limited to, provisions relating to extension of time and compensation/or delay, time shall be the essence of the Contract."
- 30.** In case a contract labourer meets with an accident while on duty, the contractor shall immediately intimate the information to Safety Department, Contracting Agency and Human Resources Department and submit the Accident Report duly filled in all respect and send a copy to ESI local office, ESI Dispensary and Inspector of Factories (for major accidents) with in 24 hours of accident through Safety and Human Resources Departments. All assistance for the injured workman such as to taking him to ESI Dispensary for treatment must be rendered by the contractor.
- 31.** Compliance of the above provisions does not absolve the obligation of contractor arising out of other statutory obligations.
- 32.** Contractor should employ only persons having sound health and not above the age of 58 years, and not below the age of 18 years.
- 33.** **The offers of the bidders who are under suspension as also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com.**
- 34.** If the contractor is not able to provide the Service, BHEL reserves the right to terminate the contract and to take appropriate action against the Contractor. In the event of contract termination, the security deposit paid by the contractor will be forfeited.
- 35.** BHEL reserves the right to reduce the contract period (pre-close the contract), with 30 days notice period depends on the requirement / without assigning any reason. Security Deposit will be refunded, if the contract is pre-closed for non-requirement by BHEL.
- 36.** The contractor shall be responsible for obtaining necessary comprehensive insurance policy, appropriate driving license.
- 37.** The contractor shall be responsible for obtaining necessary comprehensive insurance policy, appropriate driving license with proper endorsement etc, and complying with all the statutory requirements including labour laws that may be necessary in this respect. BHEL will not be responsible for any consequences out of any violation of rules or acts by the contractor. If BHEL is liable to pay any such amount due to violation of the relevant laws by the contractor the amount so paid would be recovered from the contractor.
- 38.** The contractor shall pay necessary taxes and keep the fitness certificate for the vehicle valid during the contract period.
- 39.** The contractor shall check for exhaust emission test and obtain fitness for their vehicle once in 6 months in meeting the statutory norms laid by Tamil Nadu Motor Vehicle Rules.

40. The driver should keep the copy of relevant documents (Driving license, Road tax token, Registration Certificate, Insurance, Fitness Certificate, and Permit etc.) with the vehicle and produce as and when required by us or any government transport authorities. In case the original documents are required for verification it should be produced on demand.
41. Subject as aforesaid the provisions of the Motor Vehicle Act or any statutory modification or amendments or re-enactment there of and the rules made there under from time to time have to be followed by the contractors.
42. The contractor shall take Comprehensive Insurance Cover for all the Man power engaged.
43. In case of breach of any or whole of the above terms and conditions by the contractor BHEL will have the liberty to cancel the registration and contract either in part or in full and entrust in part or in full of the work to any other contractor and the contractor shall be liable to pay extra cost involved in the execution of cancelled part of the contract.

SAFETY RULES

1. The Contractor must inspect the area of work to decide the safety precautions necessary for executing this contract.
2. Whenever people work at height more than six feet, platform shall be provided or the workers shall wear safety belt to avoid fall from the height.
3. Wherever any area declared dangerous, the workers shall not be allowed to work till a written clearance is obtained from appropriate authorities.
4. No material of any kind shall be dropped or allowed to be dropped from any height.
5. Defective ladders shall not be used at all.
6. Inflammable materials shall not be stored near places where the sparks are likely to occur.
7. The necessary safety equipment such as gloves, helmet etc. must be issued to the workmen by the contractor and strictly to be used while carrying out the work.
8. Gloves, safety belt, helmet, safety boot etc. must be issued to the workmen and strictly to be used while carryout the work. If Personal Protection Equipment not provided by the contractor, BHEL shall provide the required PPEs on chargeable basis, depending upon the stock availability.
9. If the contractor's workmen found violating the safety precautions, punitive action will be taken and or a penalty of Rs.500/- to Rs.1000/- will be imposed and deducted from the contractor bill for each violation.
10. The working area shall be kept clean and free from all obstructions.
11. All safety precautions are to be taken by the contractor at his cost.
12. All temporary electrical connections shall be properly earthed, insulated and periodically checked.
13. The contractor should arrange WORKMEN COMPENSATION / INSURANCE POLICY covered for all his workmen. A copy of the policy has to be submitted before commencement of work.
14. These safety measures shall be deemed to form an integral part of the Work Order/ Agreement.

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GENERAL CONDITIONS OF CONTRACT

1) DESPATCH INSTRUCTIONS:

- 1.1. This tender specification as a whole, duly furnishing all the details required and other documents as required in the following pages, shall be duly signed and sent in a sealed cover duly super scribing the name of work as given in the tender notice.
- 1.2. The tender shall be addressed to Officer inviting tender as indicated in the tender notice.
- 1.3. Tenders submitted by post shall be sent by “**REGISTERED POST WITH ACKNOWLEDGEMENT DUE**” and shall be posted with the due allowance for any postal delay. The tenders received after the due date and time of opening is liable to be rejected. Telegraphic offers and offers received by telex may not be considered.
- 1.4. Tenders shall be opened by authorized officer of BHEL at his office at the time and date as specified in the tender notice in the presence of such of those bidders or their authorized representatives who may be present.
- 1.5. The Tenders shall closely pursue all the clauses, specifications and drawings indicated in the tender documents before quoting. Should the bidder have any doubt the meanings of any portion of the tender specification or find discrepancies or omission in the drawings or the tender documents issued are in complete or shall require clarification on any of the technical aspect, scope of work etc., he shall at once contact the authority inviting the tender for clarification before the submission of the tender.
- 1.6. Before tendering, the bidders are advised to inspect the site of work and the environments and be well acquainted with the actual working and other prevalent conditions, facilities available, position of material and labour. No claim will be entertained later, on the ground of lack of knowledge.
- 1.7. Bidder must fill up all the schedules and furnish all the required information as per the instructions given in various sections of the tender specification. Each and every page of the Tender Specification must be signed and submitted along with the offers by the bidder in token of complete acceptance thereof. The information's furnished shall be completed by itself.
- 1.8. The bidders shall quote the rates for each item of the tender schedules in rupees and paise only. These rates shall be entered in figures as well as in words. In case of any difference in the rates quoted in figures and in words, words will be taken as the tendered rate.
- 1.9. All entries in the tender documents should be in one ink. Over-writing and corrections should be avoided. The Bidders concerned should duly sign for all corrections and over-writings.

2) DATA TO BE FURNISHED :

- 2.1. Full information shall be given by the bidder in respect of the following. Non-submission of this information may lead to rejection of the offer.
- 2.2. An attested copy of the Power of Attorney, in case the tender is signed by an individual other than the sole proprietor, shall also be attached. (If it is a Company or Firm, etc., Director/Managing Partner as the case may be is required to sign).

2.3. IN CASE OF AN INDIVIDUAL:

His full name, address and place and nature of business shall be indicated.

2.4. IN CASE OF PARTNERSHIP FIRMS:

The names of all the partners and their addresses be furnished along with a copy of the partnership deed/instrument of partnership duly certified by Notary Public shall be enclosed.

2.5. IN CASE OF COMPANIES:

Date and place of registration including date of commencement certificate in case of public companies (certified copies of Memorandum and Articles of Association are also to be furnished) are to be furnished.

2.6. Nature of business carried on by the Company and the provisions of the Memorandum relating there of shall be furnished.

2.7. Names and particulars including addresses of the Directors and their previous experiences shall be furnished.

2.8. A list of tools and tackles that the bidder is having and those that will be used on this job shall be furnished.

2.9. In addition to the above, the particulars required in annexure shall also be furnished.

3) EARNEST MONEY DEPOSIT (EMD) :

3.1. EMD shall be in the form of DD / Online pay receipt. Tender without EMD / Valid MSME Certificate will be summarily rejected. In cash of Demand Draft the same shall be drawn in favour of " **BHEL, Ranipet**" payable at Ranipet (or) SBI, Mukundarayapuram Branch (Code: 7013), Ranipet -6.

3.2. "No interest shall be payable by BHEL on Earnest Money or Security Deposit, if applicable, or any money due to the Contractor by BHEL."

3.3. Tenders received without Earnest Money in full in the manner prescribed above are liable to be rejected.

3.4. The Earnest Money Deposit of the successful tenders may be retained towards part of Security Deposit.

3.5. In the case of unsuccessful bidders, the Earnest Money will be refunded to them within a reasonable time after finalization of the tender.

3.6. Earnest Money Deposit by the bidder will be forfeited as per tender documents if the bidder :

3.7. Fails to communicate unqualified acceptance of Letter of Intent within 15 days of date of Letter of Intent.

3.8. Does not commence the work within the period as per LOA / Contract. In case the LOA/Contract is silent in this regard then within fifteen days after award of contract.

3.9. After opening of Tender, revokes / withdraws his tender within the validity period or revises / alters his earlier quoted rates / conditions.

3.10. Fails to submit SD as indicated in the Letter of Intent.

4) AUTHORISATION AND ATTESTATION:

Tenders shall be signed by persons duly authorized /empowered to do so. Certified copies of such authority and relevant documents shall be submitted along with the tenders.

5) VALIDITY OF OFFER:

The rates in the Tender shall be kept open for acceptance for a minimum period of **THREE MONTHS** from the date of tender opening. In case the Bharat Heavy Electricals Limited calls for negotiations such negotiations shall not amount to cancellation or withdrawal of the original offer, which shall be binding on the bidders.

6) EXECUTION OF CONTRACT:

The successful bidder's responsibility under this contract commences from the date of issue of the Letter of Award by Bharat Heavy Electricals Limited. The successful bidder shall be required to execute an agreement in the prescribed form with BHEL within a reasonable time after the acceptance of his tender and in any case before submitting the first bill for payment. The expenses for completion, stamping and registration of the agreement with prescribed authority, if necessary, shall be borne by the Contractor.

7) SECURITY DEPOSIT (SD):

SECURITY DEPOSIT shall be collected from the successful tenderer. The total amount of security deposit will be 5% of the contract value. EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.

Modes of deposit:

The balance amount to make up the required Security Deposit of 5% of the contract value may be accepted in the following forms:

- i) Cash (as permissible under the extant Income Tax Act)
- ii) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL
- iii) Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL
- iv) 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)
- v) 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)

(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)

- a. At least 50% of the required Security Deposit, including the EMD, should be collected before start of the work. Balance of the Security Deposit can be collected by deducting 10% of the gross amount progressively from each of the running bills of the Contractor till the total amount of the required Security Deposit is collected.
- b. If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or recovered from payment/s due to the Contractor. The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of the authority competent to award the work.

**SIGNATURE OF THE TENDERER
WITH SEAL AND ADDRESS**

- c. EMD of the successful tenderer will be converted and adjusted against security deposit.
 - d. EMD and security deposit shall not carry any interest.
- 7.1.1.** Acceptance of security deposit as per clause (iv) & (v) above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, 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.
- 7.1.2.** If the value of the work done at any time exceeds the accepted agreement value, the security Deposit shall be correspondingly enhanced and the extra Security Deposit shall be immediately deposited by the Contractor or recovered from payments due to him.
- 7.1.3.** Failure to deposit the Security Deposit within the stipulated time, may lead to forfeiture of Earnest Money and cancellation of the award of work.
- 7.1.4.** If any part of Security Deposit of the Contractor is held in the form of approved securities it shall be kept transferred in the name of Bharat Heavy Electricals Limited, Ranipet, in such a manner that the same can be realized fully without referring to the Contractor, BHEL shall not be responsible for any depreciation in the value of the Security while in BHEL's custody or for any loss of interest thereon.

BHEL reserves the right to forfeiture of Security Deposit in addition to the other claims and penalties in the event of the Contractor's failure to fulfill any of the Contractual obligation including liquidation or bankruptcy of the contractor, non-payment of money payable by means of arbitration award in favour of BHEL or in the event of termination of Contract as per terms and conditions of Contract. BHEL reserves the right to set off the Security Deposit, against any claims of any other contracts with BHEL.

8.0 RETURN OF SECURITY DEPOSIT:

If the Contractor performs and completes the work in all respects to the entire satisfaction of BHEL and presents an absolute "**No Demand Certificate**" in the prescribed form and returns properties belonging to BHEL handed over, lent or hired by him for carrying out the said works, Security Deposit will be released to the Contractor after deducting all cost of expenses or other amounts that are to be paid to BHEL under this or other contracts entered into with the Contractor. It may be noted that in no case the Security Deposit shall be refunded/released prior to passing of final bill.

9.0 REJECTION OF TENDER AND OTHER CONDITIONS

- 9.1** The acceptance of tender will rest with BHEL which does not bind itself to accept the lowest tender or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever.
- 9.1.1.** To reject any or all of the bidders.
 - 9.1.2.** To award the work in part.
 - 9.1.3.** Either of the contingencies stated in (9.1.2) above to modify the time for completion suitably.
- 9.2.** Conditional and Un witnessed tenders, tenders containing absurd or unworkable rates and amounts and tenders which are incomplete and otherwise considered defective and tenders not in accordance with the tender conditions, specifications, etc., are liable to be rejected.
- 9.3.** If a bidder expires after the submission of his/her tender or after the acceptance of his/her tender, BHEL may at their discretion cancel such tender. If a partner of a firm expires the submission of the

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tender or after the acceptance of the tender, BHEL may cancel such tender at their discretion unless the firm retains its character.

- 9.4. BHEL will not be bound by any power of Attorney granted by the bidder or by changes in the composition of the firm made subsequent to the execution of the Contract. They may, however recognize such power of Attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contractor concerned.
- 9.5. If the bidder deliberately gives wrong information in his tender, BHEL reserves the right to reject such tender at any stage or cancel the contract, if awarded. The Earnest Money/Security Deposit /any other money due shall also be forfeited.
- 9.6. Canvassing in any form in connection with the tender is strictly prohibited and the tender submitted by the contractor's who resort to canvassing in any form are liable to rejection.
- 9.7. Should a bidder or contractor or in the case of a firm or company of contractor's one or more of its partners/share holders/Directors have a relation or relations employed in BHEL, the authority inviting tender shall be informed of the fact along with the offer, failing this BHEL may, at its sole discretion reject the tender or cancel the contract and forfeit the Earnest Money/Security Deposit.
- 9.8. The successful bidder should not sub-contract the part or complete work detailed in the tender specification undertaken by him without written permission of BHEL. The bidder is solely responsible to BHEL for the work awarded to him.
- 9.9. No deviation from the tender specification shall be acceptable to BHEL. Bidders shall confirm their unqualified acceptance of the terms and conditions by giving an undertaking to this effect in a separate letter as specified by BHEL.

10.1 DEFINITION:

The following terms shall have the meaning hereby assigned to them except where the context otherwise requires.

10.2 **BHEL or (B.H.E.Ltd)** shall mean Bharat Heavy Electricals Limited a Company registered under Indian Companies Act 1956, with its Registered Office at BHEL House, Siri fort, New Delhi 110 049 or its Authorized Officers or its Resident Engineer or other employees authorized to deal with any matters with which these persons are concerned on its behalf.

10.3 "GENERAL MANAGER"

Shall mean the officer in Administrative charges of contracting unit of BHEL.

10.4 "ENGINEER" or "ENGINEER IN CHARGE" shall mean Engineer who is in-charge for the works referred.

10.5 "SITE" shall mean the place or places at which the plants/equipments are to be erected and services are to be performed as per the specification of this contract.

10.6 "CONTRACTOR" shall mean the individual, firm or company who enters in to this contract with BHEL and shall include their executors, administrators and successor and permitted assignees.

10.7 "CONTRACT" or "CONTRACT DOCUMENT" shall mean/and include the agreement or work order, the accepted appendices of rates, schedules, quantities, if any and general conditions of contract, the special conditions of contract, instructions to the bidders, the drawings, the technical specifications, the special specifications, if any, the tender documents and the Letter of

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Intent/Acceptance Letter issued by BHEL. Any conditions or terms stipulated by the contractor in the tender document or subsequent letters shall not form part of the contract unless specially accepted in writing by BHEL, in the Letter of intent and incorporated in the agreement.

10.8 “GENERAL AND SPECIAL CONDITIONS OF CONTRACT” shall mean the “Instructions to Bidders and General and Special Conditions of Contract” pertaining to the work for which the bidders are called for.

10.9 “TENDER SPECIFICATIONS” shall mean the “SPECIFIC CONDITIONS, Technical specifications, appendices, site information’s and drawings” pertaining to the work in which the bidders are required to submit their offer, Individual specification number will be assigned to each tender specification..

10.10 “TENDER DOCUMENTS” shall mean the General and Special Conditions of Contract (10.8) and tender specification (10.9).

10.11 “LETTER OF INTENT” shall mean the intimation by a letter to the bidder that the tender has been accepted in accordance with provisions contained in that letter. The responsibility of the contractor commences from the date of issue of this letter and all the terms and conditions of contract are applicable from this date.

10.12 “COMPLETION TIME” Shall mean the period by date specified in the acceptance of tender or date mutually agreed upon for handing over of the erected equipment/plant which is found acceptable by the Engineer being of required standard and conforming to the specifications of the contract.

10.13 “PLANT” shall mean and cannot the entire assembly of the plant and equipments covered by the contract.

10.14 “EQUIPMENT” shall mean all equipments, machinery, materials, structural, electrical and their components of the plant covered by the contract.

10.15 “TESTS” shall mean and include such test or tests to be carried out on the part of the contractor as are prescribed in the contract or considered necessary by BHEL in order to ascertain the quality, workmanship, performance and efficiency of the contract work or part thereof.

10.16 “APPROVED” “DIRECTED” or “INSTRUCTED” shall mean approved, directed or instructed by BHEL.

10.17 “WORK OR CONTRACT WORK” shall mean and include supply of all categories of labour specified consumables, tools and tackles required for complete and satisfactory site transportation handling, stocking, storing, erecting, testing, and commissioning of the equipments to the entire satisfaction of BHEL.

10.18 “SINGULAR AND PLURAL ETC” works carrying singular number shall also include plural and vice versa, where the context so required. Words importing the masculine gender shall be taken to include the feminine gender and words imparting persons shall include any company or association or body of individuals, whether incorporated or not.

10.19 “HEADINGS”

The headings in these general conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.

10.20 “MONTH” shall mean calendar month, unless specified otherwise in the tender.

10.21 "WRITING" shall include any manuscript typewritten or printed statement under the signature of BHEL.

10.22 LAW GOVERNING THE CONTRACT AND COURT JURISDICTION

The contract shall be governed by the Law for the time being in force in the Republic of India, and shall be subject to the Jurisdiction of the courts having Jurisdiction over RANIPET (VELLORE Dist, Tamil Nadu).

10.23 ISSUE OF NOTICE:

The Contractor shall furnish to the BHEL ENGINEER the name, designation and address of his authorized agent and all complaints, notices, communication and reference shall be deemed to have been duly given to the contractor or his authorized agent or left or posted to the address of either the contractor or of his representative and shall be deemed to have been so give in the case of posting on the day on which they would have reached such address in the ordinary course of post or on which they were so delivered of / or left.

10.24 USE OF LAND:

No land belonging to BHEL or their customer under temporary possession of BHEL shall be occupied by the Contractor without the written permission of BHEL.

11 COMMENCEMENT OF WORKS:

11.1 The Contractor shall commence the works within the time indicated in the Letter of Intent from BHEL and shall proceed with the same with due expedition without delay.

11.2 If the successful bidder fails to start the work within the stipulated time, BHEL, at his sole discretion will have the right to cancel the contract. His earnest money and/or Security Deposit with BHEL will stand forfeited without any further reference to him without prejudice to any and all of BHELs other rights and remedies in this regard.

11.3 All the works shall be carried out under the direction and to the satisfaction of BHEL.

11.4 The erected/constructed plant or work performed under this contract shall be taken over when it has been completed in all respects and/or satisfactorily put in to operation at site.

12.MODE OF PAYMENT AND MEASUREMENT OF THE WORK COMPLETED:

12.1 All payments due to the contract shall be paid through E-PAYMENT (EFT / RTGS) only. The contractor has to furnish acceptance for e-payment, duly indicating the bank account details in the prescribed format.

12.2 For Processing running bill payment :

The contractor shall present detailed measurement working sheets, in quadruplicate, duly indicating all relevant details based on technical documents and connected drawings for work done during the month/period under various categories in line with terms of payment as per letter of intent. The basis of arriving at the quantities/weight shall be the relevant documents and drawings released by BHEL.

12.3 These measurement working sheets will be checked and vetted by BHEL Engineers and quantities and percentage eligible for payment under various groups shall be decided by BHEL engineers. The abstract of quantities and percentage so arrived based on the terms of payment shall

be entered in Measurement Book and signed by both the parties.

- 12.4** Based on the above quantity, contractor shall prepare the bills in prescribed Performa and work out the financial value. These will be entered in Measurement Book and signed by both the parties and paid duly effecting recoveries due.
- 12.5** All recoveries due from the contractor for the month/period shall be effected in full from the corresponding running bills unless specific approval from the competent authorities is obtained otherwise.
- 12.6** Measurement shall be restricted to that for which it is required to ascertain the financial liability of BHEL under this contract.
- 12.7** The measurement shall be taken jointly by persons duly authorized on the part of BHEL and by the contractor.
- 12.8** The contractor shall bear the expenditure involved, if any, in making the measurement. The contractor shall, without extra charges provide all the assistance with appliances and other things necessary for measurement.
- 12.9** If, at any time due to any reason, whatsoever, it becomes necessary to re-measure the work done in full or in part, the expenses towards such re-measurements shall be borne by the contractor.
- 12.10** Passing of measurement as per bills does not amount to acceptance of the completion of the work mentioned. Any left out work has to be completed if pointed out at a later date by BHEL.
- 12.11.** Final measurement bill shall be prepared in the final bill preformed prescribed for the purpose based on the certificate issued by BHEL Engineer that entire work as stipulated in the tender specification has been completed in all respects to the entire satisfaction of BHEL. Contractors shall give unqualified „No Due and „No Demand certificate. All the tools and tackles loaned to them should be returned in condition satisfactory to BHEL. Quantities/Weight erected shall be prepared and paid, within a reasonable time after completion of work. After payment of final bill, only guarantee obligation percentage shall remain unpaid which shall be released in accordance with terms of payment. The final bill quantities and financial value shall also be entered in Measurement Book and signed by both the parties to the contract.

13 RIGHTS OF BHEL

BHEL reserves the following rights in respect of this contract without entitling the contractor for any compensation.

13.1 To get the work done through other agency at the risk and cost of the Contractor, in the event of Contractor's poor progress, or inability to progress the work, persistent disregard in instruction of BHEL, assignment transfer, subletting of the contract without permission of BHEL, non fulfillment of any contractual obligation etc., and to recover compensation for such losses from the contractor including BHELs supervision charges and overheads from Security Deposit / other dues.

13.2 To withdraw any portion of work and/or to restrict/alter quantum of work as indicated and get it done through other agency and/or with departmental labour to suit BHEL's commitment to its customer or in case BHEL decides to advance the date of completion due to other emergency reasons/BHELs obligation to its customer.

13.3 To terminate the contract after due notice to cause forfeiting of Security Deposit and recover the loss sustained in getting the balance work done through other agencies in addition to liquidated damages in the event of:

- 10) Contractor's continued poor progress.
- 11) Withdrawal from or abandonment of the work before completion of the work.
- 12) Corrupt act of contractor.
- 13) Insolvency of the contractor.
- 14) Persistent disregards to the instructions of BHEL.
- 15) Assignment transfer, sub-letting of the contract without BHEL's permission.
- 16) Non-fulfillment of any contractual obligations.

13.4 To recover any money due from the contractor from any money due to the contractor under this contract or any other contract or from the Security Deposit.

13.5 LD/Penalty: To claim compensation for losses sustained including BHEL's supervision charges and overheads for completion on termination of contract and to impose penalty for delay in completion of the work at the rate of ½% of the contract value per week of delay or part thereof subject to a ceiling of 15% of contract value.

13.6 To terminate the contract or to restrict the quantum of work and pay for the portion of work executed in case BHEL's contracts with their customers are terminated for any reason.

13.7 To affect recovery from any amount due to the contractor under this or any other contractor in any other form the moneys BHEL is forced to pay to anybody, due to contractor's failure to fulfill any of his obligation.

13.8 To restrict or increase the quantity and nature of work to suit the site requirements since the tender specification is based on preliminary documents and quantities furnished there in are indicative and approximate and the rates quoted shall not be subject to revision.

13.9 To deploy BHEL's fitters, welders, operators and technicians in case of emergency/poor progress/deficiency in skill on the part of employees of contractor's and to recover the expenditure on account of the same from contractor's bills.

13.10 While every endeavor will be made by BHEL they cannot guarantee un-interrupted work to the contractor due to conditions beyond their control. Contractor will not be entitled for any compensation extra payment on his account.

13.11 In the event of any dispute of any nature, the decision of BHEL shall be final and binding on the contractor.

14) RESPONSIBILITIES OF THE CONTRACTOR IN RESPECT OF LOCAL LAWS, EMPLOYMENT OF WORKERS Etc.

The following are the responsibilities of the Contractor in respect of observation of local laws, employment of personnel, payment of taxes etc.

14.1 As par as possible unskilled workers shall be engaged from the local areas in which the work is being executed.

14.2 The contractor at all times during the continuance of this contract shall, in all his dealings with

local labour for the time being employed on or in connection with the work, have due regard to all local festivals, religious and other customs.

- 14.3** The contractor shall comply with all state and Central Laws, Statutory Rules, Regulations etc., inclusive of those regarding labour and industrial laws which are applicable from time to time and they shall comply with the provisions of the said labour legislations, rules and regulations framed under the provisions of Employees Provident Fund and Miscellaneous Provisions Act 1952 shall be strictly followed.
- 14.4** The contractor shall pay all taxes, including sales Tax on works contract if any fees, license, charges, deposits duties, tool royalty commissions or other charges which may be leviable on account of any of his operations in execution of the contract in case BHEL is forced to pay any of such taxes. BHEL shall have the right to recover the same from the contractor either from his bills or other wise as deemed fit.
- 14.5** The contractor shall be responsible for provision of health and sanitary arrangements (more particularly described in Contract Labour Regulation & Abolition Act) safety precautions etc., as may be required for safe and satisfactory execution of the contract.
- 14.6** The contractor shall be responsible for providing proper accommodation including adequate medical facilities for the personnel employed by him.
- 14.7** The contractor shall be responsible for the proper behavior and observance of all regulations by the staff employed by him.
- 14.8** The contractor shall ensure that no damage is caused to any person/property of other parties working at site. If any such damage is caused it is the responsibility of the contractor to make good the losses or compensate for the same.
- 14.9** All the properties/equipments/components of BHEL their client loaned with or without deposit to the contractor in connection with contract shall remain the properties of BHEL/their client. The contractor shall use such properties for purpose of execution of this contract, all such properties/equipments/components shall be deemed to be in good condition when received by the Contractor's unless he notifies within 48 hours to the contrary. The Contractor shall return them in good condition as and when required by BHEL/their client. In case of non-return, loss, damage, repairs etc, the cost thereof, as may be fixed by the site Engineer, will be recovered from the Contractor.
- 14.10** It is not obligatory on the part of BHEL to supply any tools and tackles or other materials other than those specifically agreed to do so by BHEL. However, depending upon the availability/ possibility BHEL's customer's handing equipment and other plants may be made available to the contractor on payment of the hire charges/free of charges, as fixed subject to the conditions laid down by BHEL/Customer from time to time. Unless paid in advance such hire charges if applicable shall be recovered from contractor's bills/security deposit in one installment.
- 14.11** The Contractor shall fully indemnify BHEL against all claims of whatsoever nature arising during the course of erection/construction/performing work under the contract.
- 14.12** In case the Contractor is required to undertake any work outside the scope of this contract the rate payable shall be those mutually agreed upon.
- 14.13** Any delay in completion of works/non-achievement of periodical targets, due to reasons attributable to the contractor, the same will have to be compensated by the Contractor either by

increasing manpower and resources or by working extra hours and/or by working more than one shift. All these are to be carried out by the contractor at no extra cost.

- 14.14** The contractor shall arrange and co-ordinate his work in such a manner as to cause no hindrance to other agencies working in the same premises.
- 14.15** All safety rules and codes applied by the client/BHEL at site shall be observed by the contractor without exception. The contractor shall be responsible for the safety of the equipment/material and works to be performed by him and shall maintain all light, fencing guard's signs etc, or other protection necessary for the purpose. Contractor shall also take such additional precautions as may be indicated from time to time by the Engineer with a view prevent pilferage, accidents, fire hazards and due precautions shall be taken against fire hazards and atmospheric conditions. Suitable number of clerical staff, watch and ward, store keepers to take care of equipment, materials and construction tools and tackles shall be posted at site by the contractor till the completion of the work under this contract. The contractor shall arrange for such safety devices as are necessary for such type of work and carry out the requisite site tests of handling equipments, lifting tools, tackles, etc., as per prescribed standards and practices.
- 14.16** The contractor will be directly responsible for payment of wages to his workmen. A pay roll sheet giving all the type payments given to the workers and duly signed by the contractor's representative should be furnished to BHEL Site office on or before 15th of every succeeding month.
- 14.17** In case of any class of work for which there is no such specification as laid down in the Contract, such work shall be carried out in accordance with the instructions and requirements of the Engineer.
- 14.18** No levy of payment or charge made or imposed shall be impeached by reason of any clerical error or by reason of any mistake in the amount levied or demanded or charged.
- 14.19** Also no idle labour charges will be admissible in the event of any stoppage caused in the work resulting contractor's labour being rendered idle due to any cause at any time.
- 14.20** The contractor shall take all reasonable care to protect the materials and work till such time the plant/equipment has been taken over by BHEL/their client.
- 14.21** Contractor shall not stop the work or abandon the site for whatsoever reason or dispute, excepting for force major conditions. All such problems/dispute shall be separately discussed and settled without affecting the progress of work. Such stoppage or abandonment shall be treated as breach of contract and dealt with accordingly.

15) CONSEQUENCES OF CANCELLATION:

- 15.1** Whenever BHEL exercises its authority to terminate the contract/withdraw a portion of work under the clause 13 they may complete the work by any means. In the event of the cost of completion as certified by the site Engineer which is final and conclusive being less than the contract cost, the advantage shall accrue to BHEL and that if the cost of completion exceeds the moneys due to the contractor under the contract, the contractor shall either pay the excess amount ordered by BHEL or the same shall be recovered from the contractor by any other means. This will be in addition to the forfeiture of Security Deposit and recovery of liquidated damages as per the relevant clauses.
- 15.2** In case BHEL completes the work under the provision of this condition, the cost of such Completion to be taken into account in determining the excess cost to be charged to the contract under

this condition, shall consist of materials purchased and/or labour provided by BHEL with an addition of such percentage to cover supervision and establishment charges as may be decided by BHEL.

16) INSURANCE:

- 16.1** It is sole responsibility of the contractor to insure his workmen against accidents and injury while at work as required by relevant Rules and to pay compensation, if any, to workmen as per workmen's Compensation Act. The work will be carried out in a protected area and all the rules and regulations of the client/BHEL in the area of project which are in force from time to time will have to be followed by contractor.
- 16.2** If due to negligence and/or non-observance of safety and other precautions, any accident/injury occurs to any other persons/public, the contractor shall have to pay necessary compensation and other expenses if so decided by the appropriate authorities.
- 16.3** If due to contractor's carelessness, negligence of non-observance of safety precautions damage to BHELs /customers property and personnel should occur and if BHEL is unable to recover in full cost from the insurance company, the same will be recovered from the contractor.
- 16.4** It shall be the responsibility of the contractor to provide security arrangement for the materials belonging to BHEL and handed over to the contractor for erection/transportation till the same are taken over by BHEL after erection/returned to BHEL stores.

17) STRIKES & LOCKOUTS:

- 17.1** The contractor will be fully responsible for the entire dispute and other issues connected with his labor. In the event of the contract labor resorting to strike or the contract resorting to lock-out and if the strike or lock-out declared is not settled within a period of one month, BHEL, shall have the right to get the erection work executed employing its won labor or through any agencies or both and the cost so incurred by BHEL be deducted from the contractor's bills.
- 17.2** For any purpose whatsoever the employees of the contractor shall not be deemed to be in the employment of BHEL.

18. Note: BHEL has now made arrangements for payment of EMD thru' Online. The steps to make online payment is detailed as below:

- 1) Visit <https://www.onlinesbi.com/prelogin/icollecthome.htm>
- 2) Click 'Proceed' button
- 3) Select '**Tamilnadu**' in the drop down menu under 'State of Corporate/Institution **'
- 4) Select '**PSU-PUBLIC SECTOR UNDERTAKING**' in the next drop down menu under " Type of Corporate/Institution"
- 5) Click 'Go' button
- 6) Select '**BHEL BAP RANIPET**' in the drop down menu under "PSU-PUBLIC SECTOR UNDERTAKING'
- 7) Click 'Submit' Button
- 8) Select '**EMD**' in the drop down menu under ' Select Payment Category'
- 9) Now Fill in the required details and ensure correctness of data filled. Ensure that you are entering correct enquiry/tender number and other details correctly.
- 10) Make payment for EMD as required in tender after entering the details and enclose copy of receipt along with tender documents.

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GENERAL INSTRUCTIONS TO BIDDERS

1. Sealed Tenders for the work mentioned in the Schedule are invited from Contractors experienced in works of similar kind and magnitude.
2. Tenders must be submitted **in sealed covers** and should be addressed to
**DGM, WCM DEPARTMENT,
ENGG. BUILDING –GROUND FLOOR(WEST SIDE),
BHARAT HEAVY ELECTRICALS LIMITED,
RANIPET – 632 406.**
The Name, Address of the Bidder and the name of work shall be clearly mentioned on the cover.
3. Tenders will be received up to **14.00 hrs. on 05.09.2017** in the prescribed form and will be opened on **05.09.2017 at 14.30 hrs** onwards at WCM Office Conference Hall in the presence of such of those Bidders or their agents who may choose to attend.
4. Bidder should sign and seal each and every page of the tender document including the drawings/annexure attached thereto before submitting the tender.
5. Tenders not submitted in the prescribed forms are liable for rejection.
6. In quoting the rates, the Bidders are advised to take into account all factors including any fluctuations in the market rates etc. No claim will be entertained on this account after acceptance of the tender or during the currency of the contract.
7. GENERAL CONDITIONS OF CONTRACT FOR WORKS, GENERAL INSTRUCTIONS TO BIDDERS , drawings, specifications and other documents also form part of the agreement to be entered into.
8. In the event of tender being submitted by a firm, the tender must be signed separately and legibly by each partner or member of the firm or in their absence, by the person holding the Power of Attorney on behalf of the firm concerned. In the latter case, a copy of the Power of Attorney duly attested by a Gazette Officer must accompany the tender.
9. The Bharat Heavy Electricals Limited, reserves the right to reject any or all the tenders received or accept any tender or part thereof without assigning any reason there for. In case of acceptance of a part of tender, time for completion may also be reduced to the extent considered appropriate by the accepting authority.
10. Unit rates should be quoted in figures as well as in words with reference to each item and for all the items shown in the attached schedule.
11. The quoted rates shall also include expenditures towards complying statutory payments like Provident fund, ESI payments, bonus etc for the labourer & staff deployed in the work.
12. The contractor will have to submit the GSTIN Registration certificate to BHEL and claim the GST from BHEL by submitting Tax invoice as per Rules & Regulations of GST and the documentary evidence will have to be submitted along with the next bill. If for any reason, the contractor has to pay penalty, interest on GST, the contractor has to bear such additional payment. BHEL will pay only the GST at actual. **The Bharat Heavy Electricals Limited will not entertain any claim in this regard.**
13. If the bidder find discrepancies or omissions in the tender documents or should be in doubt as to their meaning, he should at once address the authority inviting the tender for clarification. Every endeavor is made to avoid any error which can materially affect the basis of the tender but the

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successful Bidder shall take up on himself to provide for the risk of any error which may be subsequently discovered and shall make no subsequent claim on account thereof.

14. Quantities shown in the attached schedules are only approximate.
15. Should a Bidder or a contractor has a relative or in the case of a firm or company of contractors any of its shareholders or share holder's relative, employed in Bharat Heavy Electricals Limited, the authority inviting tenders shall be informed of this fact at the time of submission of the tender failing which tender may be disqualified or if such fact subsequently come to light, the contract may be rescinded.
16. If the Bidder expires after submission of his tender, the Bharat Heavy Electricals Limited may be at the discretion of cancel such tender.
17. If a partner of a firm expires after submission of the tender or after the acceptance of the tender, Bharat Heavy Electricals Limited may cancel such tender at the discretion unless the firm retains his character.
18. The Bharat Heavy Electricals Limited will not bound by any Power of Attorney granted by the Bidder or changes in the composition of the firm made subsequent to the execution of the contract. They may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the contract concerned.
19. The contractor deliberately, gives wrong information in his tender or creates conditions favorable for the acceptance of his tender; Bharat Heavy Electricals Limited reserves the right to reject the tender at any stage.
20. Words imparting the singular number shall also deem to include the plural number and vice versa where the context so requires.
21. The General and Special Conditions of Contract are complimentary to each other and where they are in conflict, the Special Conditions shall prevail. In regard to matters not covered by the General or Special Conditions of Contract, those contained in the specifications approved by Bharat Heavy Electricals Limited shall apply.
22. Canvassing in any form in connection with the tender is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable for rejection.
23. All contractors will have to produce Income Tax clearance certificate from the Income Tax authorities concerned along with their tenders. Those contractors whose income is not taxable will be required to give an affidavit of their income on the prescribed form.
24. **The contractor should possess necessary licenses, Permanent PF A/c No, and should take Insurance for his workers and produce them before commencement of work. The Contractor shall insure all his materials, tools, tackles etc. and also for third party.**
25. **COMPLIANCE TO REGULATIONS AND BY-LAWS:**

The Contractor shall conform to the provisions of any statute relating to the work and regulations and By-laws of any local authority. The Contractor shall be bound to give all notices required by statute regulations or By-Laws as aforesaid and to pay all fees and taxes payable to any authority in respect thereof.

26. **GST :**

Registration & GST Rate

1. Bidder should indicate GSTIN No. (Copy of GST registration to be enclosed) and PAN No. (copy of PAN to be enclosed).

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2. Tender will be considered/ accepted, if & only if the vendor has a valid GST Registration No.
3. Central Tax/ State Tax/ Integrated Tax/ Union Territory tax to be quoted as extra in %.
4. Bidders to ensure correct applicability of Central Tax/ State Tax/ Integrated Tax/ Union Territory tax based on the Inter / Intra state movement Supply of goods and provision services or both.

Invoicing & Payment

5. The Tax Invoice for supply of Goods & Services should be raised as per the provision of GST Act & Rules and must compulsorily mention the following :-
 - a. BHEL-RANIPET GSTIN: 33AAACB4146P2ZL or GSTIN of BHEL Nodal Agency as mentioned in NIT or informed subsequently.
 - b. HSN Code or Service Accounting Code for supply of goods or services.
 - c. Name & address of supplier
 - d. GSTIN of Supplier
 - e. Consecutive Serial Number & date of issue
 - f. Description of goods or services
 - g. Total value of supply
 - h. Taxable value of supply
 - i. Tax Rate – Central Tax & State Tax or Integrated Tax, Cess
 - j. Amount of Tax charged
 - k. Place of supply
 - l. Address of delivery if different from place of supply
 - m. Signature of authorized signatory
6. Reimbursement of GST to the vendor is contingent upon complying with the following condition by the service provider:-
 - i. Uploading the onward GST Return (**GSTR-1**) in GSTN Network portal within the statutory time period.
 - ii. Discharging the GST tax liability to the Government.
 - iii. Submission of Tax Invoice to BHEL.
 - iv. Submission of proof of payment of GST to BHEL.
 - v. Availment of Input Tax Credit by BHEL.

Input Tax Credit

7. In case GST credit is delayed/ denied to BHEL, due to non/delayed receipt of goods and/or services and/or tax invoice or expiry of timeline prescribed in GST Law for availing such ITC, or any other reason not attributable to BHEL, GST amount shall be recoverable from Vendor along with interest & penalty levied/ leviable.
8. In case vendor delays declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from vendor/contractor along with interest & penalty levied/ leviable on BHEL.
9. In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any incomplete work/service, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal).
10. For any such delay in availing of tax credit for reasons attributable to vendor (as mentioned above), interest as per the GST Act & Rules, along with penalty, if any will be deducted for

the delayed period i.e. from the month of receipt till the month tax credit is availed, from the running bills.

Penalty for Non-compliance of GST Act

11. Penalty amount so determined along with GST if applicable thereon shall be recovered from the contractor.

Anti-profiteering Measure

12. Any reduction in rate of Tax on any supply of goods or services or the benefit of input tax credit shall be passed on to the recipient by way of commensurate reduction in prices.

Other Provision

13. The agency should quote the applicable taxes and duties in the technical bid (part-A) as well as in price bid (part-B).
14. All the terms & conditions of the contract with respect to Taxes & Duties are subject to the new taxation laws introduced from time to time (e.g., GST). The terms & conditions will be modified in accordance with the provisions of new laws (e.g., GST).
15. The Prices quoted above must be inclusive of all taxes and duties and exclusive of GST, which will be payable extra as per applicable rules and subject to Submission of documentary evidence.
16. **In case any changes in taxes and duties as per Gov. Notification (including GST), the same shall be applicable from time to time.**
17. **If the Contractor is not registered for any statutory obligation and not liable there to, then a declaration shall be submitted along with offer that they are within the threshold limit.**

The following details to be furnished by the bidder:

S.No.	Details	To be filled by the bidder
1	GSTIN No. (Copy to be enclosed)	
2	PAN No (Copy to be enclosed)	
3	HSN Code & SAC Code (Copy to be enclosed)	

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SPECIAL CONDITIONS OF THE CONTRACT

1. BHEL reserves the right to increase or decrease the tendered quantity.
2. Lowest prices received against BHEL tenders need not be the technically acceptable one, and in that case, BHEL reserves the right not to consider the same.
3. BHEL reserves the right to negotiate or refloat the tender opened, if L1 Price is not lowest Acceptable price to them inter-alia other reasons.
4. BHEL reserves the right to negotiate the L1 rate.
5. **The contract will be finalized based on the overall LOWEST value and to be awarded to single party only. Clarification if any can be obtained from the undersigned before submitting the offer.**
6. This work shall be in force for **Four months** from the date of commencement of work. The period of the contract may be renewed or extended at the discretion of Bharat Heavy Electricals Limited.
7. The contractor should carryout the work at the place identified by the authority concerned within the premises of BHEL.
8. Tenderers are advised to go through the Scope of the work, Special conditions of the contract and the General conditions of the contract and understand fully before quoting. Any doubt in the documents should be clarified from Local Site Fabrication Department of BHEL, Ranipet before submitting their offer.
9. This original "Tender Documents" should be submitted to us duly signed and stamped in all the pages of the Tender Specification, General conditions and special conditions etc. by the Tenderer including any deviations from tender conditions.
10. All entries in the tender documents should be in one ink. Tenderer shall duly sign all cancellations & insertions. The quoted rates shall be firm for the contract period of **Four Months**. In quoting the rates, the tenderers are advised to take in to account all factors including any fluctuations in the market rates etc. No claim will be entertained on this account after acceptance of the tender and during the currency of the contract.
11. Before submitting offer, the tenderers are advised to inspect the site of work and its environments and be well acquainted with actual working and other prevalent conditions, position of materials and labour. The rates quoted shall remain valid for a period of 90 days from the date of opening of the tender.
12. Rates for each item of works in the Rate Schedule should be quoted in Rupees & Paise only. The rates shall be for the finished work at site. Rates shall be both in figures and words. In case of any difference in the rates quoted in figures & words, the lower of the two rates will be taken as the tendered rate.
13. The scheduled period of completion for this work will be **Four months** and the contractor will have to plan this work accordingly. Quantities shown in the attached schedules are indicative only and they are liable to vary depending upon the shop production. Any claim on account of variation of quantity will not be entertained. The period of contract may be extended on mutual agreement.
14. Rates quoted shall include all applicable terminal taxes leviable under the state and central government rules, except GST (will be reimbursed by BHEL) . Bharat heavy Electricals Limited (BHEL) will not entertain any claim whatsoever in this respect. The quoted rates shall also include expenditures towards complying statutory payments like Provident fund, ESI payments, bonus etc for the labours & staff deployed in the work.
15. BHEL will not be responsible for any loss / delay of documents sent by post / Courier.

16. All the information as called for in the various clauses and annexure of tender specification should be furnished. Please refer to the check list. The details so furnished shall be complete in all respects and as per the formats prescribed in the Tender Documents. The bidder may have to produce original documents for verification, if so desired by BHEL.
17. The Tenderers should specify whether they are doing any other work of same nature within the State of TAMIL NADU at present.
18. In case of labour strength/working time has to be increased to complete the work within the stipulated period, no extra claim for payment under any circumstances will be entertained.
19. The contractor shall name a place of business, which is to be approved by the Officer-in-charge for the purpose of his office. At this office, there shall be a person (contractor's representative) present during the regular business hours to receive and carry out instructions.
20. The contractor shall be solely responsible for the safe custody for the materials from the time the materials are handed over to him till the materials are delivered at the places specified and will indemnify the Bharat Heavy Electricals Limited against any loss, damage, breakage, shortage and pilferage of any materials while in his custody.
21. In case of any neglect or refusal on the part of the contractor to provide sufficient labour for the aforesaid work or if in the opinion of Officer-in-charge, the services provided by the contractor are not satisfactory, the Officer-in-charge shall be at liberty to make such arrangement as he may deem fit at the cost and expense of the contractor. The contractor shall be advised of the amount so incurred and he shall be bound to remit the sum within three days from the date of receipt of such advice. Failure to do so will entitle the Officer-in-charge to deduct the sum from the money due to the contractor.
22. The contractor shall either supervise the work or provide sufficient supervisors to supervise the work of his staff. The supervisors employed by the contractor shall ensure proper outturn of work and discipline is maintained by the labours and in general to see that the works are carried out in a safe and proper manner.
23. BHEL will not be responsible for the idle labour of the contractor for whatever reasons.
24. Should any error or ambiguity be discovered in the specification or information, the contractor shall forthwith bring the same to the notice of Bharat Heavy Electricals Limited before commencement of work. The BHEL's interpretation in such cases shall be final and binding on the contractor.
25. Bharat Heavy Electricals Limited reserves the right to decide the suitability of the workers and other personnel who may be employed by the contractor.
26. In case of any loss to Bharat Heavy Electricals Limited, caused due to stoppage of work without sufficient reason or damage to any equipment or components or any property thereof, due to the negligence and carelessness of the contractor's men, the responsibility shall rest with the contractor. The actual cost of the loss or damage together with the overhead will be recovered from the contractor's bill. The decision of BHEL regarding the cost of loss as well as the extent of cost of damage shall be final and conclusive.

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ACCEPTANCE FOR ELECTRONIC FUND TRANSFER / RTGS TRANSFER

01	NAME & ADDRESS OF THE SUPPLIER / VENDOR PHONE NO. WITH STD CODE	PAN NO. <input type="text"/>
02	VENDOR CODE (as in WORK ORDER)	<input type="text"/>
03	Details of Bank Account:	
A)	NAME & ADDRESS OF THE BANK (WITH PIN CODE)	<input type="text"/>
B)	BANK TELEPHONE NUMBER (WITH STD CODE)	<input type="text"/>
C)	BANK BRANCH CODE:	<input type="text"/>
D)	MICR CODE	<input type="text"/>
E)	ACCOUNT NUMBER	<input type="text"/>
F)	TYPE OF ACCOUNT	CURRENT / OD / CASH CREDIT
G)	VENDOR NAME AS PER BANK RECORDS	<input type="text"/>
H)	BANK BRANCH RTGS IFSC CODE	<input type="text"/>
I)	BANK BRANCH NEFT IFSC CODE	<input type="text"/>
J)	VENDOR'S EMAIL ID (give two ids)	<input type="text"/> <input type="text"/>
K)	NAME OF AUTHORISED SIGNATORY	<input type="text"/>

CERTIFICATE

I / We hereby agree to receive the payments due from BHARAT HEAVY ELECTRICALS LIMITED, RANIPET by the National Electronic Funds Transfer and/or RTGS Transfer mode by credit to my / our above mentioned Bank Account. I / We also agree that payments made to the above mentioned Account is a valid discharge of the liability of Bharat Heavy Electricals Limited, Ranipet. I / we also agree to bear the applicable Bank Charges for the above mode of transfer.

AUTHORISED SIGNATORY OF VENDOR WITH SEAL

Banker's Certification

We confirm that we are enabled for receiving RTGS and NEFT credits and we further confirm that the account number of _____

(name of account holder), the signature of the authorized signatory and the MICR and IFSC codes of our Branch mentioned above are correct.

PLACE:

DATE:

(Manager / Officer's
Signature Under Bank stamp)
Authorisation No. _____

Note: This EFT Form is to be submitted duly filled in manually in all fields and duly signed by Authorised Signatory and certified by Banker.

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ANNEXURE "I"**PRICE BID (PART-II)**

S. NO	DESCRIPTION	UNIT	QTY. (a)	Rate / Unit (b)	Total Amount in Rs. (c)=(a) * (b)
1	To carry out Fatigue life cycle testing of Metallic Expansion Bellows as per BHEL technical specification and quality documents. Metallic Expansion Bellows for FLCT has to be collected from BHEL Ranipet stores and after testing handed over to BHEL Ranipet stores by the vendor. Vendor has to duly take care of this while quoting	No	2		
2	SUB TOTAL in Rs. (I)				
3	Applicable GST @ _____% . GST AMOUNT in Rs. (II)				
4	GRAND TOTAL in Rs. (III) = (I) + (II)				

(Lump sum Amount including GST in Words _____
 _____ only)

NOTE:

1. If GST is applicable, then the rate of GST shall be clearly indicated. The GST amount paid by the contractor shall be fully reimbursed by BHEL.
2. If not specified in the tender separately, the rates quoted will be treated as inclusive of GST.
3. The above rates are quoted after having fully read and understood the enquiry terms and conditions.

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QUALITY ASSURANCE PROCEDURE FOR
FATIGUE LIFE CYCLE TESTING (FLCT) OF
DUCT METALLIC EXPANSION JOINTS ISSUED AS
ANNEXURE – B TO

CONTENTS

Sl. No.	TITLE
1.	REFERENCE
2.	TEST SCOPE
3.	BELLOW PROTOTYPE
4.	TEST METHOD
5.	ACCEPTANCE NORMS
6.	Annexure – A (Design data for prototype testing of expansion bellows)
7.	Annexure – B (Equivalent movement calculation for single bellow)
8.	Annexure – C (Fatigue Life Testing Report)

DUCT METALLIC DUCT EXPANSION JOINTS**TYPE TEST PROCEDURE AS PER EJMA**

1. REFERENCE

EJMA 2008 – 10th Edition, Clause 7.3 (Destructive Testing).

2. TEST SCOPE

- a. The objective of this test is to verify the capability of the rectangular metallic duct expansion bellow for fatigue working for the desired number of cycles, with the values arrived as per EJMA design calculation attached as Annexure – A (EJMA section 5).
- b. The cyclic Movement of the rectangular metallic duct expansion bellow shall be axial compression from the free length (Initial Position), with equivalent maximum axial movement, as permitted by clause 7.3 of EJMA and calculated as per section 5 of EJMA.
- c. The bellow is said to make one full load cycle when it starts from its free length position and makes one compression and then reverses to its free length position (Initial Position).
- d. The rectangular metallic duct expansion bellow to be tested, subjected to fatigue life testing shall not be supplied to customer, as it has consumed its working life.

3. BELLOW PROTOTYPE

SI.NO	EJMA requirement and reference	Prototype Bellow selected and Testing parameter
4.1	<p><u>Prototype Expansion joint: EJMA Clause 7.3</u> A prototype Expansion joint is defined as one having the same pressure and temperature rating as production models, identical diameter, height, pitch, and general shape of the convolution, the thickness and type of bellows materials, bellows reinforcement, method of manufacture, and maximum movement per convolution.</p>	<ul style="list-style-type: none"> Prototype selected for fatigue life testing is as given in the BHEL Engineering Drawing .
4.2	<p><u>TESTING TEMPERATURE: EJMA Clause 7.3.1</u> It is also acceptable to cycle test at room temperature any expansion joint which will be furnished for operating temperature up to the active creep range.</p>	<ul style="list-style-type: none"> The testing temperature of bellow is ambient, as the design temperature of the selected bellow is 312 Deg. C within active creep range of carbon steel material. All the other bellows used are also operating within the creep range
4.3	<p><u>MOVEMENT: EJMA Clause 7.3</u> Since it is more practical to test an expansion joint under axial movement rather than combined movement it is acceptable to use equivalent maximum axial movement as calculated in EJMA Section 5.</p>	<ul style="list-style-type: none"> The selected bellow has following movements: axial compression of 30 mm and no lateral movement. Hence equivalent maximum axial movement calculated as per EJMA section 5 is 30 mm
4.4	<p><u>APPLIED TESTING PRESSURE</u> The testing pressure shall be design pressure of 0.109kgf/ cm² (gauge) or 1.139kgf/ cm² (absolute)</p>	<ul style="list-style-type: none"> The testing is being done at ambient pressure of approx. 1.03kgf/ cm² (absolute), as the selected bellow meridional bending stress due to design pressure (sidewall) of 0.109kgf/ cm² (gauge) is negligible (S9=5388psi=37.1MPa). The major stress is 'S10' meridional bending stress due to deflection of 63848 psi (440Mpa). The total stress is summation of 'S9' and 'S10' values as per EJMA Equation 5.35, Refer Annexure – A for 'S9' and 'S10' values.

4.5	<p><u>TESTING CYCLES</u></p> <p>The expansion bellow shall have trouble free operational life of 20000 cycles, as per NTPC contract specification.</p>	<p>As per NTPC specification, the expected number of steam Generator start-ups during 25 years of design life is as follows:</p> <ul style="list-style-type: none"> • Cold start (after 72 hrs. of unit shut down) = 150 (Affecting the Movement of the selected bellow) • Warm start (after 36 hrs. of unit shut down) = 1000 (Affecting the Movement of the selected bellow) • Hot start (after 8 hrs. of Unit shut down) = 4000 (Not Affecting the Movement of the selected bellow) <p>But BHEL proposed to conduct Fatigue Life cycle test for 20000 cycle as given below.</p> <table border="1" data-bbox="963 808 1501 1111"> <thead> <tr> <th>No. of Cycles to be tested</th> <th>Axial Movement for testing</th> </tr> </thead> <tbody> <tr> <td>5150</td> <td>30 mm (100%)</td> </tr> <tr> <td>4850</td> <td>18 mm (60%)</td> </tr> <tr> <td>10000</td> <td>9 mm (30%)</td> </tr> </tbody> </table>	No. of Cycles to be tested	Axial Movement for testing	5150	30 mm (100%)	4850	18 mm (60%)	10000	9 mm (30%)
No. of Cycles to be tested	Axial Movement for testing									
5150	30 mm (100%)									
4850	18 mm (60%)									
10000	9 mm (30%)									

4. TEST METHOD

1) Prototype, selected for fatigue life, testing is as given in the Schedule of Expansion Joint (Size :2488x1650; No. of Convolutions=2) With. Following parameters

(i) Size	:2488 mmx1650 mm
(ii) Bellow convolution pitch	:
(iii) Bellow convolution height	:
(iv) Bellow convolution width	:
(v) No. of plies	:
(vi) Material of Ply	:
(vii) Reinforcing ring dimension	: Not Applicable
(viii) Test pressure	: Atmospheric
(ix) Pressure range	: Not Applicable
(x) Equivalent axial movement for bellow	:30 mm
(xi) Number of convolution	:2 Nos
(xii) Number of fatigue life testing cycles	:20000

2) The rectangular metallic expansion bellow shall be duly inspected and cleared for all stages as per approved quality plan prior to testing. The convolution length of rectangular metallic expansion bellow is initially measured. The bellow element is kept in pre-compression equal to stroke (movement) length of equivalent axial Movement of 30mm. minimum. When upward stroke is applied, the bellow comes to initial position from compressed position. Then when-the downward stroke is applied, the bellow gets compressed again.

3) The Fatigue Life Testing machine is power operated with Hydraulic system and the movement is controlled with two Limit Switches at either positions.

4) The test shall be carried out with the gradual travel speed. The pressure to the ram is supplied by a power-operated pump.

5) The No. of cycles undertone during the test is indicated by an electromechanical counter.

6) The bellow will be tested for 20000 cycles and no crack shall be observed on the bellow surface during Liquid Penetrant testing.

7) Fatigue Life Testing Report shall be as per Annexure-C.

5. ACCEPTANCE NORMS:

The bellow element shall not have any failure till the completion of 20000 cycles. The type test report shall be submitted to NTPC for approval.

Annexure –A

BHARAT HEAVY ELECTRICALS LIMITED/ SUB CONTRACTOR WORKS

Design data sheet for Prototype testing of Metallic Expansion Joints

CUSTOMER : M/s NTPC.

PROJECT : North Karanpura

Bellow Specification: (RECTANGULAR)		
Type of Expansion joint	FRCEJ - Full Round Corner Expansion Joint	
Nominal size	2488x1650	Duct inside
Design Pressure		
Design temperature		
Test Temperature		
Overall/ 'Installation length		
Spool piece		
Bellow I.S (Li x Ls)		
Bellow O.S (Oi x Os)		
Thickness of ply		
No. of Plies		
Depth of Convolution		
Pitch of bellow		
Total no of Convolutions		
Bellow active length over control		
Axial Extension		
Axial Compression		
Lateral in Long side		
Lateral in Short side		
Angular Rotation in Long side		
Angular Rotation in Short side		
Axial spring rate		
Lateral spring rate (Long side)		
Lateral spring rate (Short side)		
Angular spring rate (Long side)		
Angular Spring rate (Short side)		
Material of Construction		
Bellow	Carbon and corten	
Bending stress analysis		
Allowable stress		
Longitudinal Membrane Stress Long side due to Pressure		
Longitudinal Membrane Stress short side due to Pressure		
Longitudinal Bending Stress Long side due to Pressure		
Longitudinal Bending Stress Short side due to Pressure		
Meridional Bending Stress due to Pressure (Side Wall)		
Meridional Bending Stress due to Deflection		
Meridional Bending Stress due to Pressure (Tangent)		
Total Stress		
Fatigue Life theoretical value		
Design Code	EJMA (2008, 10 TH Edition)	
Life cycle test to be carried for 20000 Cycles		
*** Axial Compression movement considered from the total equivalent movement arrived based on calculation of EJMA. Axial movement 30mm and Lateral movement 0 mm.		

ANNEXURE—B**Equivalent Movement Calculation for Single Bellow:**

- 1) Axial Movement (X): -30 mm
- 2) Lateral Movement in Long Side (Y1): - 0 mm
- 3) Lateral Movement in Short Side (Ys): - 0 mm
- 4) Angular Movement in Long Side (qi): - 0 Deg.
- 5) Angular Movement in Short Side (qs):- 0 Deg.
- 6) Mean length of long side(LI): -
- 7) Mean length of short side(Ls): =
- 8) Convolution (N): - 2 Nos.
- 9) Active length of bellow (lb): -

EJMA SECTION-5 (Clause 5.1)

- a. Axial Movement per Conv.= $(X/N) = 1.125$ inch/ conv. (28.575 mm/ Conv.)
- b. Axial Movement per Conv. from lateral(LS) =0 inch/Conv.
- c. Axial Movement per Conv. from lateral(SS)= 0 inch/Conv.
- d. Axial Movement per Cony. From Angular (LS) Movement =0.00 Inch/conv.
- e. Axial Movement per Cony. From Angular (SS) Movement =0-.00 Inch/conv.

EJMA SECTION-5 (Clause 5.2)

Total Equivalent movement in compression (ec)- $(a+b+c+d+e) = 1.125$ inch/conv.

Total Equivalent movement in Extension (ee) = 1.125 inch/conv.

EJMA SECTION-5 (Clause 5.3)

Total Equivalent axial movement (e): - Maximum of 'ec' & 'ee' values = 1-.125 inch conv.

Total. Equivalent. axial movement (e): - 1.125 inch/ conv.

Annexure – C**Fatigue Life Testing Report**

Client : Report No :
P. O. No : Date :
Drawing No : Rev. :
Item No : Size :
Inspection by : Date :
Minimum required equivalent axial movement in compression = 30 mm.

Sl. NO	Date	Temp-erature	Start Time	Stop Time	No. of Cycles	Observed Axial Movement (mm) Min./Max	Ram Rate inch/min Min./Max	Total Cycle/day	Checked by
Total number of cycles									

Observation after 20000 cycles Fatigue Life Testing:

Sl. No	Type of Inspection	Result
1.0	Visual insp. (for defects like crack, buckling; bulging,-dent, etc.)	OK/NOT OK
2.0	Dimensional inspection	
	- Bellows convolution pitch after testing	
	- Bellows convolution height after testing	
	- Bellows convolution width after testing	
3.0	Liquid Penetrant Test of-Bellow after testing	OK/NOT OK

BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI 620014

MDL Number: 9575-102-01-TR-PVM-B-0857

QUALITY ASSURANCE PROCEDURE FOR
FATIGUE LIFE CYCLE TESTING (FLCT) OF
DUCT METALLIC EXPANSION JOINTS

Prepared By	A.Francis/ AE/ QA	<i>ADm</i>
Reviewed by		
Product Engineering	Muthukumar.B/SM/ Product Engineering	<i>Muthu</i>
Out Sourcing	Sankar.S.Mohan/ Engineer/ OS/ ACF	<i>S</i>
Quality Control	Bikramaditya Roy/ DGM/ QC	<i>Roy</i>
Quality Assurance	H.Manu Shankar/ Manager/ QA	<i>Manu Shankar</i>

Revision No	Date	Approved	Signature
00	13-12-2013	U.Revisankaran/ AGM/ QA	<i>Revisankaran</i>
01	30-12-2013	U.Revisankaran/ AGM/ QA	<i>Revisankaran</i>
02	09-01-2013	U.Revisankaran/ AGM/ QA	<i>Revisankaran</i>
03	25-01-2013	U.Revisankaran/ AGM/ QA	<i>Revisankaran</i>

RECORD OF REVISIONS

Rev. No.	Clause No.	Details of Revision
00		New Release.
01	2.	Equation-4 from EJMA changed to Annexure –A for clarity.
	4.1	Bellow Selected and Testing parameter refers to Duct Schedule for Mouda Stage-II, 2x660MW projects.
	4.5	Number of cycles changed from 5000 with 30mm movement to the 5150 (minimum total cycles in specification), 4850, 10000 with consideration to Hot Start, Warm Start and Cold Starts.
	5.0	Number of Cycles and Annexure reference changed.
	Annexure-A	Stress Values added.
02	4.1	Material Selection as per NTPC requirement of including CORTEN Steel
	4.5, 5 1, Annexure-A	Corten Steel Specification A588 Gr.A added at all applicable sentences.
	Annexure-D	Schematic Diagram for Fatigue Life Cycle Testing.

CONTENTS

Sl. No.	TITLE
1.	REFERENCE
2.	TEST REQUIREMENTS
3.	TEST SCOPE
4.	BELLOW PROTOTYPE
5.	TEST METHOD
6.	ACCEPTANCE NORMS
7.	Annexure – A (Design data for Prototype testing of Expansion bellows)
8.	Annexure – B (Equivalent movement calculation for single bellow)
9.	Annexure – C (Fatigue Life Testing Report)
10.	Annexure – D (Schematic Diagram for Fatigue Life Cycle Testing.)

DUCT METALLIC DUCT EXPANSION JOINTS**TYPE TEST PROCEDURE AS PER EJMA****1. REFERENCE**

EJMA 2008 – 9TH Edition, Clause 7.3 (Destructive Testing).

2. TEST REQUIREMENTS

EJMA Standard calls for three tests are for type test (i.e., Fatigue Life Testing, Squirm Testing and Meridional Yield-Rupture Testing).

Only Fatigue Life Testing is considered for BHEL designed Duct Metallic Expansion Joints, Squirm Testing and Rupture Testing are applicable for circular piping expansion bellows owing to absence of equations to calculate Limiting Design Pressure based on movement instability as per EJMA Section 5 for rectangular metallic duct expansion bellow. The same is however, referred in EJMA Section 4 for circular metallic expansion bellows (Equation 4-60)

Since rectangular metallic expansion bellow are meant for low pressure ducting applications, only fatigue life testing has been considered. This is because the rectangular metallic expansion bellow is not expected to squirm or rupture under this low pressure.

3. TEST SCOPE

- a. The objective of this test is to verify the capability of the rectangular metallic duct expansion bellow for fatigue working for the desired number of cycles, with the values arrived as per EJMA design calculation attached as Annexure – A (EJMA Section 5).
- b. The cyclic Movement of the rectangular metallic duct expansion bellow shall be axial compression from the free length (Initial Position), with equivalent maximum axial movement, as permitted by clause 7.3 of EJMA and calculated as per Section 5 of EJMA.
- c. The bellow is said to make one full load cycle when it starts from its free length position and makes one compression and then reverses to its free length position (Initial Position).
- d. The rectangular metallic duct expansion bellow to be tested, subjected to fatigue life testing shall not be supplied to customer, as it has consumed its working life.

4. BELLOW PROTOTYPE

Sl. No.	EJMA requirement and reference	Prototype Bellow Selected and Testing Parameter
4.1	<p><u>Prototype Expansion Joint: EJMA Clause 7.3</u> A prototype Expansion Joint is defined as one having the same pressure and temperature rating as production models, identical diameter, height, pitch, and general shape of the convolution, the thickness and type of bellows materials, bellows reinforcement, method of manufacture, and maximum movement per convolution</p>	<p>Prototype selected for fatigue life testing is as referred from MDL No.9575-102-01-TR-PVM-B-0855 (Schedule of expansion joint) & 9575-102-01-TR-PVM-B-0856. (Typical Detail of MEJ General Arrangement)</p> <ul style="list-style-type: none"> The selected Bellow Location is near Hot Primary Air Duct to Mill-J.
4.2	<p><u>TESTING TEMPERATURE: EJMA Clause 7.3.1</u> It is also acceptable to cycle test at room temperature any expansion joint which will be furnished for operating temperatures up to the active creep range.</p>	<ul style="list-style-type: none"> The testing temperature of bellow is ambient, as the design temperature of the selected bellow is 312 Deg. C within active creep range of carbon steel material. All the other bellows used are also operating within the creep range.
4.3	<p><u>MOVEMENT: EJMA Clause 7.3</u> Since it is more practical to test an expansion joint under axial movement rather than combined movement it is acceptable to use equivalent maximum axial movement as calculated in EJMA Section 5.</p>	<ul style="list-style-type: none"> The selected bellow has following movements: axial compression of 30 mm and no lateral movement. Hence equivalent maximum axial movement calculated as per EJMA Section 5 is 30 mm.
4.4	<p><u>APPLIED TESTING PRESSURE</u> The testing pressure shall be design pressure of 0.109 kgf/cm² (gauge) or 1.139kgf/ cm² (absolute)</p>	<ul style="list-style-type: none"> The testing is being done at ambient pressure of approx. 1.03 kgf/cm² (absolute), as the selected bellow meridional bending stress due to design pressure (sidewall) of 0.109 kgf/cm² (gauge) is negligible (S₉=5388psi=37.1 MPa). The major stress is 'S₁₀' meridional bending stress due to deflection of 63848 psi (440 MPa). The total stress is summation of 'S₉' and 'S₁₀' values as per EJMA Equation 5.35, Refer Annexure-A for 'S₉' and 'S₁₀' values.

4.5 **TESTING CYCLES**

The expansion bellow shall have trouble free operational life of 20000 hours, as per clause 15.01.11 of NTPC contract specification CS-9548/9549/9566/9573-102-2(Part B; Sub-Section-II:M1).

As per NTPC specification clause 1.09.00 of NTPC contract specification CS-9575-102-2(Part B; Sub-Section- II:M1), the expected numbers of Steam Generator start-ups during 25 years of design life is as follows:

- Cold start (after 72 hrs. of unit shut down) = 150 (Affecting the Movement of the selected bellow)
- Warm start (after 36 hrs. of unit shut down) =1000 (Affecting the Movement of the selected bellow)
- Hot start (after 8 hrs. of unit shut down) = 4000 (Not affecting the movement of the selected Bellow).

Hence the test conducted for 7725 (225+1500+6000) cycles is adequate as given below

Boiler Status	No.of Starts	No. Of Cycles to be tested (1.5 Times)	Axial Movement for testing
COLD	150	150x1.5 = 225	30 mm (100%)
WARM	1000	1000x1.5=1500	18 mm (60 %)
HOT	4000	4000x1.5=6000	9 mm (30%)

But BHEL proposed to conduct Fatigue Life Cycle test for 20000 cycles for Carbon Steel and Corten steel each, as given below.

No. Of Cycles to be tested	Axial Movement for testing
5150	30 mm (100%)
4850	18 mm (60 %)
10000	9 mm (30%)

5. TEST METHOD

- 1) Prototype selected for fatigue life testing is as given in the Schedule of Expansion Joint (NTPC Drg. No. 9575-102-01-TR-PVM-B-0855/Rev.00) Tag No. 234E (Size 1930x2040; No. of Convolutions=2). with following parameters

[i] Size	: 2040x1930 mm
[ii] Bellow convolution pitch	: 86.5mm
[iii] Bellow convolution height	: 216mm
[iv] Bellow convolution width	: 272mm
[v] No. of plies	: 1
[vi] Material of Ply	: IS 1079 ST34 / A 588 Gr.A
[vii] Reinforcing ring dimension	: Not Applicable
[viii] Test Pressure	: Atmospheric
[ix] Pressure range	: Not Applicable
[x] Equivalent axial movement for bellow	: 30 mm
[xi] Number of convolution	: 2 Nos.
[xii] Number of fatigue life testing cycles	: 20000.

- 2) The rectangular metallic expansion bellow shall be duly inspected and cleared for all stages as per approved quality plan prior to testing. The convolution length of rectangular metallic expansion bellow is initially measured. The bellow element is kept in pre-compression equal to stroke (movement) length of equivalent axial movement of 30mm minimum. When upward stroke is applied, the bellow comes to initial position from compressed position. Then when the downward stroke is applied, the bellow gets compressed again.
- 3) The Fatigue Life Testing machine is power operated with Hydraulic system and the movement is controlled with two Limit Switches at either positions.
- 4) The test shall be carried out with the gradual travel speed. The pressure to the ram is supplied by a power-operated pump.
- 5) The No. of cycles undergone during the test is indicated by an electromechanical counter (Tamper proof).
- 6) The bellow will be tested for 20000 cycles and no crack shall be observed on the bellow surface during Liquid Penetrant testing.
- 7) Fatigue Life Testing Report shall be as per Annexure-C.

6. ACCEPTANCE NORMS:

The bellow element shall not have any failure till the completion of 20000 cycles. The type test report shall be submitted to NTPC for approval.

Annexure – A**BHARAT HEAVY ELECTRICALS LIMITED/ SUB-CONTRACTOR WORKS**

Design data sheet for prototype testing of Metallic Expansion Joints

CUSTOMER :M/s NTPC
WBS ELEMENT : U6/1711-SB-437-1-48-234 ; DU 004
PROJECT : Mouda Stage-II STPP Unit-3

Bellow Specification: (RECTANGULAR)		
Type of Expansion Joint	FRCEJ – Full Round Corner Expansion Jont	
Nominal Size	2000x1890	Duct Inside
Design pressure	0.109	Kg/cm ²
Design temperature	312	°C
Test Temperature	38	°C Room temperature
Overall/ Installation length	272	mm
Spool piece	0	mm
Bellow I.S (Li x Ls)	2040x1930	mm
Bellow O.S (Oi x Os)	2472x2362	mm
Thickness of Ply.	2.50	mm
No. of Plies	1	Nos
Depth of Convolution	216	mm
Pitch of bellow	86.5	mm
Total no of convolutions	2	Nos.
Bellow active length over control	272	mm
Axial Extension	0	mm
Axial Compression	30	mm
Lateral in Long Side	0	mm
Lateral in Short Side	0	mm
Angular Rotation In Long Side	0	Degree
Angular Rotation In Short Side	0	Degree
Axial spring rate	117	Kg/mm
Lateral spring rate (Long side)	N.A	Kg/mm
Lateral spring rate (Short side)	N.A	Kg/mm
Angular spring rate (Long side)	N.A	Kgm./Deg.
Angular spring rate (Short side)	N.A	Kgm/Deg.
Material of construction		
Bellow	Carbon Steel IS1079 ST34/ A588 GrA	
Bending stress analysis		
Allowable stress	SA	39160 PSI
Longitudinal Membrane Stress Long side due to Pressure	S7I	125 PSI
Longitudinal Membrane Stress Short side due to Pressure	S7S	131 PSI
Longitudinal Bending Stress Long side due to Pressure	S8I	1249 PSI
Longitudinal Bending Stress Short side due to Pressure	S8S	1130 PSI
Meridional Bending Stress due to Pressure (Side Wall)	S9	5388 PSI
Meridional Bending Stress due to Deflection	S10	63848 PSI
Meridional Bending Stress due to Pressure (Tangent)	S11	336 PSI
Total Stress	St	121163 PSI
Fatigue Life theoretical Value	NC	42528 Cycles
Design Code	EJMA (2008 9 th Edition)	
Life Cycle test to be carried out for 20000 Cycles.		
*** Axial Compression movement considered from the total equivalent movement arrived based on calculation of EJMA. Axial movement 30 mm and Lateral movement 0 mm.		

Annexure – B**Equivalent Movement Calculation for Single Bellow:**

- 1) Axial Movement (X):- 30 mm
- 2) Lateral Movement in Long Side (Yl):- 0 mm
- 3) Lateral Movement in Short Side (Ys):- 0 mm
- 4) Angular Movement in Long Side (ql):- 0 Deg.
- 5) Angular Movement in Short Side (qs):- 0 Deg.
- 6) Mean length of long side(L):- 88.81 inch (2040+216=2256mm)
- 7) Mean length of short side(Ls):- 84.48 inch (1930+216)=2146mm)
- 8) Convolution (N):- 2 Nos.
- 9) Active length of bellow (lb):- 10.708 inch (272mm)

EJMA SECTION-5 (Clause. 5.1)

- a. Axial Movement per Conv. $= (X/N) = 1.125$ inch/ conv. (28.575 mm/ conv.)
- b. Axial Movement per Conv. from lateral (LS) $= 0$ inch/Conv.
- c. Axial Movement per Conv. from lateral(SS) $= 0$ inch/Conv
- d. Axial Movement per Conv. From Angular (LS) Movement $= 0.00$ Inch/conv.
- e. Axial Movement per Conv. From Angular (SS) Movement $= 0.00$ Inch/conv.

EJMA SECTION-5 (Clause. 5.2)

Total Equivalent movement in compression (ec) $-(a+b+c+d+e) = 1.125$ inch/conv.

Total Equivalent movement in Extension (ee) $= 1.125$ inch/conv.

EJMA SECTION-5 (Clause. 5.3)

Total Equivalent axial movement (e):- Maximum of 'ec' & 'ee' values $= 1.125$ inch/conv.

Total Equivalent axial movement (e):- 1.125 inch/ conv.

Total Equivalent Axial Movement for 2 Convolution $= 1.125 \text{ inch} \times 2 \text{ convolutions} = 2.25$ inch

Annexure – C
Fatigue Life Testing Report

Client : **Report No.** :
P. O. No. : **Date** :
Drawing No. : **Rev.** :
Item No. : **Size** :
Inspection by : **Date** :

Maximum required equivalent axial movement in compression = 30 mm

Sl. No	Date	Temperature	Start time	Stop time	No. of Cycles	Observed Axial Movement (mm) Min./Max.	Ram Rate inch/min Min./Max.	Total Cycle/day	Checked by
Total number of cycles									

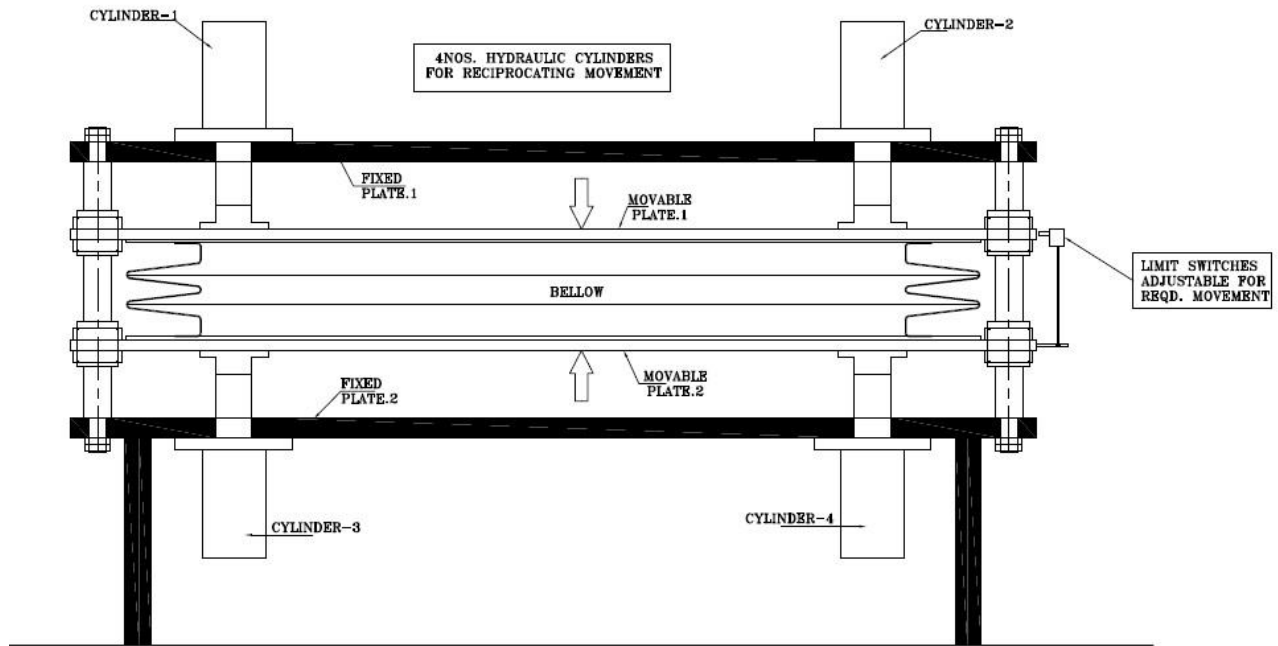
Observations after 20000 cycles Fatigue Life Testing:

Sl. No.	Type of Inspection	Result
1.0	Visual insp. (for defects like crack, buckling, bulging, dent, etc.)	OK/NOT OK
2.0	Dimensional inspection	
	- Bellows convolution pitch after testing (86.5mm as per drawing)	
	- Bellows convolution height after testing (216mm as per drawing)	
	- Bellows convolution width after testing (272mm as per drawing)	
3.0	Liquid Penetrant Test of Bellow after testing	OK/NOT OK


Annexure-D

Schematic Diagram for Fatigue Life Cycle Testing.

SCHEMATIC ARRANGEMENT OF ENDURANCE TESTING MACHINE


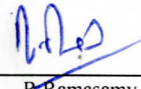



Tamper Proof Electromechanical Counter will be there to count the number of cycles.

	MANUFACTURER'S NAME & ADDRESS: NTPC APPROVED SUB-CONTRACTORS/ VENDORS	MANUFACTURING QUALITY PLAN				CQP 5082 Rev 01 DATE : 09 /01/ 15 PAGE : 1 OF 3		PROJECT: NORTH KARANPURA STPP 3 X 660 MW PACKAGE : SG (3 X 660 MW) CONTRACT NO.: BHEL CUST.NO. 1720, 1721 & 1722			
		ITEM : Metallic Expansion Joints SUB-SYSTEM : SG									
		NTPC MDL No:4410-001-102-QVM-Q-062									

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	Class	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/N			D	M	C	N	
1	2	3	4	5	6		7	8	9	10			11



1.0	MATERIALS*	* Materials shall be as per relevant drawing											
1.1	PLATES: IS 2062 Gr A & B, IS513 Type D, IS 1079, ASTM A36, ASTM A588 Gr A, CORTEN STEEL, STEN 1	Chemical and Mechanical Properties.	A	T.C Verification.	100%	100%	As per material Specification.	R	√	P	V	V	The Material used shall be as per drawing.
2.0	INPROCESS CONTROL :												
2.1	Marking ,cutting and preparation & Fabrication	Shape, Size	B	Measurement and Visual	100%	--	Drawings Note - 1	R		P	V	-	
2.2	Inspection Before Forming	Profile, Finish	B	Visual Inspection	100%	---	Drawing			P	-	-	
2.3	Welding	Procedure Qualification	B	Review of Documents/ Records	100%	100%	SIP: NP:07 Rev. 02	WPS	√	P	V	V	
		Personnel Qualification	B	-do-	100%	100%	SIP: NP:07 Rev. 02	R		P	V	-	
2.4	NDE After Forming	Profile, Finish	B	Visual Examination	100%	10%				P	V	--	
				DPT	100%	10%			√	P	V	V	


		LEGEND : *M: Manufacturer / Sub- contractor C : BHEL / Nominated Inspection agency. N: Customer/ Nominated Inspection agency. P: Perform, W: Witness, " R" -Records V: Verification of records for "W" Marked items	*D: Records for Data folder. R: Test/Dimensional Reports. TC: Mill/ Mfr. Test certificate WPS: Weld Procedure Specification PQR: Procedure Qualification Record WQR: Welder Qualification Record A: Major B Minor C: Critical	FOR CUSTOMER USE	DOC NO.
K. Anbu	R. Ramasamy				
PREPARED BY	REVIEWED & APPROVED BY				
NAME & SIGNATURE				REVIEWED BY	NAME & SIGN. OF APPROVING AUTHORITY & SEAL

	MANUFACTURER'S NAME & ADDRESS: NTPC APPROVED SUB-CONTRACTORS/VENDOR S	MANUFACTURING QUALITY PLAN				CQP 5082 Rev 01 DATE: 09/01/15 PAGE 2 OF 3		PROJECT: NORTH KARANPURA STPP 3 X 660 MW PACKAGE : SG (3 X 660 MW) CONTRACT NO.: BHEL CUST.NO. 1720, 1721 & 1722.			
		ITEM : Metallic Expansion Joints SUB-SYSTEM : SG NTPC MDL No:4410-001-102-QVM-Q-062									

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	Class	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/N				M	C	N	
					6					10			
1	2	3	4	5	6		7	8	9	10			11

2.5	Weld Inspection	Weld Size, Butt Joints Leak Test	B	Visual, LPI/MPI	10%	10%	BHE: NDT: PB: PT01/ 13 BHE: NDT: PB: MT01/ 11 SIP:NP:05	R		P	W	V	For single side welding only * For A588 Corten Steel full size round corner 2.5mm thickness and above. Review of reports by NTPC if Type test is already conducted and accepted by NTPC Engineering on a prototype. Refer Note 2.
3.0	Stress Relieving	Temp= 720±10°C Time= 60 Minutes	B	Kerosene leak test	100%	100%/10%		R	√	P	W	V	
3.1	Type Test	Fatigue Life Cycle Test (FLCT)	A	FLCT Reports	100%	1 per project	NTPC Engineering Approved Procedure (SIP:NP:16/03)	R		P	W	W	
4.0	FINAL INSPECTION												
4.1	Dimensions Check & Trial Assembly.	Overall Dimensions, Length, Width Orientation, Diagonal, Visual & Match Marks	B	*Measurement	100%	10%	The mismatch for round corner to straight piece welding shall be limited to 2mm (Max).	R	√	P	W	W	* The split pieces shall be assembled for dimension and dismantled for dispatch, in case of split MEJs.

		LEGEND : *M: Manufacturer / Sub- contractor C : BHEL / Nominated Inspection agency. N: Customer/ Nominated Inspection agency. P: Perform, W: Witness, " R" -Records V: Verification of records for "W" Marked items	*D: Records for Data folder. R: Test/Dimensional Reports. TC: Mill/ Mfr. Test certificate WPS: Weld Procedure Specification PQR: Procedure Qualification Record WQR: Welder Qualification Record A: Major B Minor C: Critical	FOR CUSTOMER USE	DOC NO.
				PREPARED BY	REVIEWED & APPROVED BY
NAME & SIGNATURE					

	MANUFACTURER'S NAME & ADDRESS: NTPC APPROVED SUB-CONTRACTORS/VENDOR S	MANUFACTURING QUALITY PLAN ITEM : Metallic Expansion Joints SUB-SYSTEM : SG NTPC MDL No:4410-001-102-QVM-Q-062				CQP 5082 Rev 01 DATE. 09/01/15 PAGE 3 OF 3		PROJECT: NORTH KARANPURA STPP 3 X 660 MW PACKAGE : SG (3 X 660 MW) CONTRACT NO.: BHEL CUST.NO. 1720, 1721 & 1722.				
		SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	Class	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMA T OF RECOR D	AGENCY	

1	2	3	4	5	M	C/N	6	7	8	9	D	10	11
---	---	---	---	---	---	-----	---	---	---	---	---	----	----

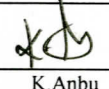
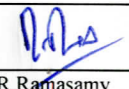
4.2	Painting and Preservation	Paint finish, Coat Thickness	B	Visual, Measurement	100%	--	NTPC Approved Painting Scheme					P	V	-	
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NOTES

Note .1 MARKING, CUTTING, PREPARATION AND FABRICATION

- 1.1 Corten steel material shall be identified by suitable color coding.
- 1.2 Sheets for bellows shall be marked and cut to size by shearing. Gas cutting of sheets shall be avoided.
- 1.3 Bend lines shall be marked and checked for correctness before pressing/ bending.
- 1.4 For bellow corners received as fabricated, dimension shall be ensured before taking up for fit-up.
- 1.5 Tolerances Applicable.
 - 1.5.1 Length/ Width 2mm/ Meter, limited to 5mm Max
 - 1.5.2 Pitch ±1mm.
 - 1.5.3 Bellow Height ±3mm in free condition.
 - 1.5.4 Profile of bellow shall be checked with shop made templates (GO/ NO-GO).
 - 1.5.5 The level difference shall be checked as per sketch for straight portion of the bellow and sketch-3 for Round corner expansion bellow
- 1.6 All welds on bellow sheets shall be done with electrode diameters not exceeding 2.5mm.

Note .2 Forming of straight & corner convolutes shall be as per EJMA standards.

 K.Anbu PREPARED BY	 R.Ramasamy REVIEWED & APPROVED BY	LEGEND : *M: Manufacturer / Sub- contractor C : BHEL / Nominated Inspection agency. N: Customer/ Nominated Inspection agency. P: Perform, W: Witness, " R" -Records V: Verification of records for "W" Marked items	*D: Records for Data folder. R: Test/Dimensional Reports. TC: Mill/ Mfr. Test certificate WPS: Weld Procedure Specification PQR: Procedure Qualification Record WQR: Welder Qualification Record A: Major B Minor C: Critical	FOR CUSTOMER USE	DOC NO.
				REVIEWED BY	NAME & SIGN. OF APPROVING AUTHORITY & SEAL
NAME & SIGNATURE					