BHARAT HEAVY ELECTRICALS LIMITED
CORPORATE RESEARCH & DEVELOPMENT DIVISION
VIKASNAGAR, HYDERABAD - 500 093, INDIA

PHONES:23774494 (EXT:9804)
FAX : 91 40 23770698

RD:DP:MPX:F-04

ENQUIRY

Ref: 431700241

Date 06-05-2017

Enquiry for **High Temperature Vertical Spin Test Rig and Auxiliaries**

Enquiry No:431700241 Enquiry Date : 06-05-2017 Due Date: 06-06-2017 Indicative Delivery Date : 30-11-2018

Sl.No	Item Description	Unit	Qty
1	High Temperature Vertical Spin Test Rig & Auxiliaries as per attached specification	SET	1
2	Erection, Commissioning, Demonstration and Training as per attached specification	L.S.	1

Please submit your quotation for the above material in sealed cover superscribed with enquiry no, enquiry date and due date subject to our enclosed terms and conditions. The quotations shall reach us on or before the due date by 12 noon. The tenders can also be dropped in the tender box kept at the security gate,BHEL R&D. In case you are not in position to submit the offer,please send reply suitably specifying the reasons.

Sl.No	**Description**	**Document Ref.**
01	Enquiry, General Terms & Conditions, Commercial Terms & Conditions etc.	Volume - 1
02	Technical specifications, Scope of Supply etc.	Volume - 2

Virendra Dixit
Sr Dy General Manager
virendra@bhelrnd.co.in

	ENQUIRY & QUALIFYING CRITERIA	Volume - 1 Enquiry No 431700241
High Temperature Vertical Spin Test Rig and Auxiliaries		

1	Tendor inviting officer / Authority, Designation and Address	Additional General Manager(MM) BHEL R & D, Vikas Nagar (Near Balanagar), Hyderabad -500093
2	Item Description - Qty	1) High Temperature Vertical Spin Test Rig & Auxiliaries as per attached specification - 1 SET 2) Erection, Commissioning, Demonstration and Training as per attached specification - 1 L.S.
3	Enquiry Reference no.	431700241
4	Indicative Delivery Date	30-11-2018
5	Due date, Time and place for submission of tender	06-06-2017 upto 12 noon. Sealed Quotations shall be addressed to Additional General Manager(MM), BHEL R & D Division, Vikas Nagar (Near Balanagar), Hyderabad AP,India Pin - 500 093 Quotations can also be deposited in the Tender box located at Security Gate of BHEL R & D BHEL shall not be responsible for any postal/courier delay.
6	Place, Date and time of Tech.Bid opening	Tender Opening Cell (Sangam) BHEL R & D Office. 06-06-2017, 2 PM
7	Mode of Submission of Tender	Please submit your offer in one common sealed cover containing two parts in separate sealed covers as detailed below. 1) First Cover shall contain: a. Signed General Terms & Conditions (GTC) b. Filled and Signed Commercial Terms & Conditions (CTC) c. Filled and Signed Vendor Specifications against BHEL Specifications (Item wise) d. Signed commercial bid e. Copy of Price-bid with price(s) cells blank (un-priced price bid)as per annexure 2) Second cover shall contain Price Bid Containing Price quotes, applicable taxes, installation and/or commissioning charges shall be spelt out clearly taking into account total charges rather than quoting vaguely such as charges per man-day or charges per engineer per day etc as per annexure. If the price bid was found later to be different from the unpriced pricebid format in any way, the offer will be rejected summarily. The rates shall be quoted both in figures and in words. The offers can also be submitted through e-mail and have to be sent in PDF format (files with PDF extension only). Files having extensions other than PDF like RAR, EXE,JPEG etc. and with external links will not be considered. They have to be sent to e-mail id: 'eoffers@bhelrnd.co.in' only. Copies should not be marked to anyone. If the offers are marked to anyone other than to eoffers, their offer will not be considered. The e-mail offers should have two attachments. 1) One attachment shall contain a. Signed General Terms & Conditions (GTC) b. Filled and Signed Commercial Terms & Conditions (CTC) c. Filled and Signed Vendor Specifications against BHEL Specifications (Item wise) d. Signed commercial bid e. Copy of Price-bid with price(s) cells blank (un-priced price bid), as per annexure 2) Second attachment shall contain Price Bid Containing Price quotes, applicable taxes, installation and/or commissioning charges shall be spelt out clearly taking into account total charges rather than quoting vaguely such as charges per man-day or charges per engineer per day etc as per annexure. The subject of the e-mail should contain Enquiry No, Enquiry Date and Due date.

	GENERAL TERMS & CONDITIONS (GTC)	Volume - 1 Enquiry No 431700241
High Temperature Vertical Spin Test Rig and Auxiliaries		

SL.No.	Clause	BHEL REQUIREMENT
1	General	a. All offers must include name of the contact person, phone no/mobile no, Fax no, email-id. Unsigned offers are liable for rejection. b. We, BHEL R&D, is registered with Department of Scientific and Industrial Research (DSIR) for the purpose of availing Customs Duty exemption in terms of Government Notification no.24/2007-Customs dated 01-Mar-2007 & Central Excise Duty Exemption in terms of Government Notification No. 16/2007-Central Excise dated 01-Mar-2007 as amended from time to time. Hence suppliers are requested to submit their bids clearly stating applicable taxes/duties. All foreign quotes will be evaluated with custom duty @ 5.15% for cost comparison. c. Taxes & Duties quoted will be taken for evaluation of landed cost & order placement and no change will be entertained later except in the case of changes made by the government. However please note that we are availing cenvat credit for service tax and hence service tax will be excluded in calculation of landed cost to BHEL. In case any Taxes/ Duties exempted, a self declaration for the same may be attached to the offer. Changes in taxes and duties because of the changes in turn over etc will be to supplier's account. d. Where ever vendor registration form and EFT details have been submitted earlier, the same need not be submitted again unless there is a change. e. BHEL R&D do not issue 'C' form . f. L1 status shall be decided on Cost to BHEL Basis.
2	Late Tenders	Tenders received after due date/time(12:00hrs) will not be considered
3	Descrepancy in words and 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. (d) If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date upto 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.
4	Two Part bid clarifications	In the case of Two-part bid, the vendor should furnish technical and commercial clarifications, if any, within stipulated time mentioned, failing which, it will be construed that the vendor is not interested in the tender and BHEL shall not consider the offer for further evaluation.
5	Price Impacts	In the event of any bidder, after finalizing the technical specifications and scope of supply, opting to revise their original bid, they have to submit the Price-Impact only. The Original price bid along with Price-Impact bid shall be opened during price bid opening. Unsolicited price impacts will not be considered.
6	Price bid evaluation	All offers in price bid opening or reverse auction shall be evaluated in Indian currency based on unit price, packing & forwarding, taxes/duties, freight charges if any, exchange rate. Loading due to non-acceptance of our standard commercial terms will be evaluated as per the LOADING FACTORS form as enclosed along with the enquiry.The exchange rate declared by State Bank of India under TT Selling rate on the technical bid open date shall be adopted for evaluating foreign currency bids.
7	Packing	The supplier shall be responsible for the goods being properly and adequately packed so as to prevent any loss, damage or deterioration during transit.
8	Withdrawal	In case the supplier withdraws their offer before placement of order, BHEL reserves the right not to send next enquiry(ies). In case the supplier withdraws the quotation after its acceptance by BHEL or fails to supply the goods as per the terms and conditions of contract, or at any time repudiated the contract wholly or in part, BHEL shall be at liberty to cancel the Purchase Order and to recover from the supplier the extra cost and other loss,incidentals due to the breach of contract on the part of the supplier through risk purchase.
9	Risk Purchase	In case of default/late delivery,BHEL reserves the right to make alternate arrangement for procurement at suppliers risk and cost.
10	Banned List	The offers of the bidders who are in the banned list and 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 website www.bhel.com. Guidelines for suspension of business dealings with suppliers/contractors are available on www.bhel.com under supplier registration page
11	Over All L1	Order will be placed on overall L1 basis. Vendors should quote for all items, otherwise the offer will be rejected.
12	Additional Information	Suppliers are requested to visit our web site regularly for any updates and additional information, "All corrigenda, addenda, amendments, time extensions clarifications, etc. to the tender will be hosted on BHEL website only". The corrigendum will not be published in news paper.

13	Destination	Indian Vendors: Destination shall be Stores,BHEL R&D, Vikasnagar, Hyderabad-500093. Foreign Vendors: 1) BHEL R.O.D Office, Mumbai, India for sea consignments and 2) BHEL R&D, Hyderabad, India for air consignments.
14	Arbitration	Subject to the jurisdiction of Hyderabad/Secunderabad,Andhra Pradesh,India in respect of any suit or other legal proceedings relating this contract.
15	Micro Small Enterprises (MSEs)	MSE suppliers can avail the intended benefits only if they submit along with offer, attested copies of either EM II certificate having deemed validity (Two years from the date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM II certificate along with CA certificate (Format as below)applicable for the year, certifying quantum of investment in plant and machinery within the permissible limit as per the act for relevant status (Micro or small) Where the deemed validity of EM II is over. Date to be reckoned for determining the deemed validity will be the last date of technical bid submission. Non submission of such documents will lead to consideration of their bids at par with other bidders and MSE status of such suppliers shall be shifted to Non MSE supplier till the supplier submits these documents. Certificate by charted 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) ..... dtd....., Category..... (Micro/Small). (Copy enclosed). Further verified from the Books of Accounts that the investment of the company as on date..... 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. 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 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. Date: (Signature) Name- Membership number -- Seal of Chartered Accountant
16	Foreign Vendors	BHEL will deal directly with foreign vendors, where ever required, for procurement of goods.However, if the foreign principal desires to avail of services of an Indian agent,then foreign principal should ensure compliance to regulatory guidelines which require mandatory submission of agency agreement (as per *). * The Agency Agreement shall specify 1) Agency commission, 2) Responsibilities of the agent, 3) Territory, 4) Agreement Period
17	Inspection	On receipt, the goods shall be subjected to inspection and our decision regarding the acceptability of the goods shall be final and binding on the suppliers.
18	Fraud Prevention Policy	The Bidder along with its associate/collaborators/sub-contractors/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 any fraud or suspected fraud as soon as it comes to their notice.
19	Signing & Stamping	Documents of BHEL's all Terms and conditions submitted with the offer shall be signed and stamped in each page of authorized representative of the bidder

Documents submitted with the offer shall be signed and stamped in each page of authorized representative of the bidder

Read and agreed for all the above general terms and conditions

Signature of the bidder with Seal & Date

	COMMERCIAL TERMS & CONDITIONS (CTC)	Volume - 1 Enquiry No 431700241
High Temperature Vertical Spin Test Rig and Auxiliaries		

SL.No.	Clause	BHEL REQUIREMENT	SUPPLIERS ACCEPTANCE / REMARKS
1	Reverse Auction	BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com). The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates. If it is found that Ll bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).	
2	Two part	Please submit your offer in one common sealed cover containing two parts in separate sealed covers as detailed below. 1) First Cover shall contain: a. Signed General Terms & Conditions (GTC) b. Filled and Signed Commercial Terms & Conditions (CTC) c. Filled and Signed Vendor Specifications against BHEL Specifications (Item wise) d. Signed commercial bid e. Copy of Price-bid with price(s) cells blank (un-priced price bid)as per annexure 2) Second cover shall contain Price Bid Containing Price quotes, applicable taxes, installation and/or commissioning charges shall be spelt out clearly taking into account total charges rather than quoting vaguely such as charges per man-day or charges per engineer per day etc as per annexure. If the price bid was found later to be different from the unpriced pricebid format in any way, the offer will be rejected summarily. The rates shall be quoted both in figures and in words. The offers can also be submitted through e-mail and have to be sent in PDF format (files with PDF extension only). Files having extensions other than PDF like RAR, EXE,JPEG etc. and with external links will not be considered. They have to be sent to e-mail id: 'eoffers@bhelrnd.co.in' only. Copies should not be marked to anyone. If the offers are marked to anyone other than to eoffers, their offer will not be considered. The e-mail offers should have two attachments. 1) One attachment shall contain a. Signed General Terms & Conditions (GTC) b. Filled and Signed Commercial Terms & Conditions (CTC) c. Filled and Signed Vendor Specifications against BHEL Specifications (Item wise) d. Signed commercial bid e. Copy of Price-bid with price(s) cells blank (un-priced price bid), as per annexure 2) Second attachment shall contain Price Bid Containing Price quotes, applicable taxes, installation and/or commissioning charges shall be spelt out clearly taking into account total charges rather than quoting vaguely such as charges per man-day or charges per engineer per day etc as per annexure. The subject of the e-mail should contain Enquiry No, Enquiry Date and Due date.	
3	Weight and Packing Dimensions.	The Supplier shall indicate the shipping weight (Kgs) and dimensions(L x W x H in cms) clearly along with offer.	
4	Validity of Offer	90 days from date of techno-commercial bid opening.	
5	LD Clause	Please refer Clause #4 under "OTHER TERMS AND CONDITIONS .	
6	PBG	Please refer Clause #3 under "OTHER TERMS AND CONDITIONS.	
7	Freight &	Insurance will be arranged by BHEL in case of FOB basis supplies. In such cases ,an amount of 3% towards	

	Insurance	freight and insurance will be added for cost comparison.	
8	Agency Agreement	Guidelines regarding dealing with Indian agents of foreign suppliers 1. BHEL shall deal directly with foreign vendors, whereever required, for procurement of goods. However, if the foreign principal desires to avail of services of an Indian agent, then the foreign principal should ensure compliance to regulatory guidelines which require mandatory submission of agency agreement. 2. It shall be incumbent on the Indian agent and the foreign principal to adhere to the relevant guidelines of government of India, issued from time to time. 3. The agency agreement should specify the precise relationship between the foreign OEM and services to be rendered by Indian agent / associate, whether general in nature or in relation to the particular contract, must clearly be stated by the foreign supplier / Indian Agent. Any payment, which the Indian agent / associate receives in India or abroad from the OEM, whether as commission or as a general retainer fee shall be brought out in record in the agreement and be made explicit in order to ensure compliance to the laws of the country. 4. Any agency commission to be paid by BHEL to the Indian agent shall be Indian currency. 5. When ever Indian agents are representing on behalf of their principals, the relevant authorization letter and agreement copy to be enclosed along with technical bid to consider the offer.	
9	Delivery Period	FOR INDIAN SUPPLIES : ========== Suppliers are requested to quote within the delivery date mentioned in the enquiry. They shall also mention one of the following delivery periods compulsorily. 1) Delivery Period from date of Purchase order ========== 2) Delivery Period from receipt of material / input data / drawings etc. from BHEL========== (if applicable) 3) Delivery Period from receipt of approval of design documents / drawings etc. by BHEL========== (if applicable) However BHEL shall inform the vendor about rejection of the offer before price bid opening in case of not meeting the delivery requirements of BHEL. FOR FOREIGN SUPPLIES : ========== Suppliers are requested to quote within the delivery date mentioned in the enquiry. They shall also mention one of the following delivery periods compulsorily. 1. Delivery Period from date of Purchase order :========== 2. Delivery Period from receipt of input data / drawings etc. from BHEL ========== (if applicable) 3. Delivery Period from receipt of approval of design documents / drawings etc. by BHEL ========== (if applicable) 4. Delivery Period from date of LC Opening ========== (if applicable) 5. Delivery Period from date of PO acceptance ========== However BHEL shall inform the vendor about rejection of the offer before price bid opening in case of not meeting the delivery requirements of BHEL. Pl. mention any other issues/constraints like export clearance etc. explicitly, if any ==========	
10	E&C	Supplier to quote Supply and E&C portion with relevant taxes and time requirement seperately.BHEL reserves the right to issue two seperate orders.	
11	Nature of Vendor submitting the Offer	OEM / Agent / Representative / Dealer / Distributor / Stockist / Trader / Reseller / Channel Partner/ System Integrator / Any Other (Pl. Specify)	
12	Foreign Suppliers without Indian Agent	To be quoted in Foreign Currency. Purchase Order will be placed on Foreign Supplier.	
13	Foreign Principal availing services of an Indian	Foreign principal should ensure compliance to regulatory guidelines which require mandatory submission of Agency agreement. (as per *) To be quoted in Foreign Currency. Purchase order will be placed on Foreign Supplier. Agency Commission will be paid to Indian Agent in Indian rupees.	

	Agent	* The Agency Agreement shall specify 1) Agency commission, 2) Responsibilities of the Agent, 3) Territory, 4) Agreement Period	

Note : All the clauses of the above format should be filled and submitted with the Techno Commercial Bid (Part-1). The filled in BHEL Commercial terms & Conditions format submitted with technical bid, responding to all the clauses duly signed with seal **only shall be considered**. Any other Commercial terms & conditions of bidders entered else where in their offer shall not be considerd and are liable for rejection.

Read and understood the above commercial terms and conditions

Signature of the bidder with Seal & Date

	OTHER TERMS & CONDITIONS	Volume - 1 Enquiry No 431700241
High Temperature Vertical Spin Test Rig and Auxiliaries		

SL.No.	Clause	BHEL REQUIREMENT	SUPPLIERS ACCEPTANCE / REMARKS
1	Integrity Pact & Details of Independent External Monitor (IEM)	Integrity Pact (IP) (a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. A panel of Independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL. The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial bid. Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification. Details of IEM for this tender is furnished below: Name: Mrs. Pravin Tripathi, IA & AS (Retd.) D-243, Anupam Gardens, Lane IB, Neb Sarai, Sainik Farms, New Delhi – 110 068 Ph : +91 11 29533206 / 29531715. E-MAIL: pravin.tripathi@gmail.com (b) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender. Note: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing(procurement) department For all clarifications/ issues related to the tender, Please contact: Name: VIRENDRA DIXIT, SR DGM Deptt: MATERIALS MANAGEMENT Address: BHARAT HEAVY ELECTRICALS LIMITED, CORPORATE R&D, VIKASNAGAR, HYDERABAD-500093 Phone: (Landline): +91 40 23882304; MOBILE: +91 9818115562 Email:virendra@bhelrnd.co.in (likely to be changed to virendra@bhel.in) Fax:+91 40 23770698	
2	General Terms and Conditions (GTC) - 1.b General (Contd.)	The DSIR registration certificate was valid up to 31-Mar-2017 and is under renewal. c). The current procurement is under Government of India funded project. Concessional duties, if any, available to BHEL at price bid opening shall be taken into account for evaluating landed cost calculation. Hence suppliers are requested to submit their bids clearly stating applicable taxes/duties. All offers shall be evaluated at concessional rates of duties in case the registration certificate is renewed or Government of India funded project concessions available, if any, on or before opening of price bid date or otherwise it shall be evaluated with quoted/prevailing rates at price bid opening for cost comparison. However, all suppliers have to accept Concessional duties in case if the same is available to BHEL at dispatch.	
		1) Through L/C:Please note Payment through Letter of Credit (L/C) is for foriegn currency payments only. Where the payments are through L/C (L/C opening charges shall be loaded for landed cost evaluation), payment of Supply value shall be 80% on dispatch and 20% on issue of E&C Certificate. Payment of E&C Value shall be made against E&C certificate issued by BHEL. E&C certificate shall be issued on satisfactory completion of erection, commissioning, job proving, performance test, training to operators etc, and Submission of Performance Bank Guarantee (PBG). The L/C shall be opened by BHEL as per following: (i) With in 30 days of receipt of acceptable CEBG, an irrevocable unconfirmed L/C will be opened for 30% of the payment towards supply, due on shipment i.e. 24% of the Supply value of PO (30% of 80%) Not earlier than 60 days before the shipment date, the value of this irrevocable unconfirmed L/C would be enhanced from 24% to 80% of the Supply value of PO The above L/C can be negotiated after the Shipment against submission of B/L or AWB and such other documents as mentioned in the	

3	Payment Term	in the PO. The above L/C will be valid for a period extending 21 days beyond the shipment date for negotiation of documents. (ii)15 days prior to the scheduled &confirmed arrival of the technicians of supplier with their names, an irrevocable unconfirmed L/C will be opened for a value equal to 20% of the Supply value of PO plus 100% of the E&C value of PO. The validity of L/C would be sufficient to cover the period required for the completion of E&C plus 21 days as negotiation period. This L/C can be negotiated after: (a) Completion of E&C of the equipment in BHEL and against E&C certificate issued by BHEL and (b) Submission of Performance Bank Guarantee (PBG) by Supplier in the prescribed Format valid for 30 days beyond the warranty period with an additional claim period of 2 months by Supplier from any of the Consortium Banks of BHEL for 10% of total PO Value in the prescribed Format. The PBG confirmation charges shall be borne by vendor. Under all circumstances, CEBG shall be kept valid till be PBG becomes operational. 2 Direct Payment. (foreign and Indian Suppliers): In case of direct payment , 80% payment of Supply value shall be made with in 45 days form the date of receipt of material with clear documents at BHEL. Balance 20% of supply value plus 100% of the E&C portion of PO Value will be paid against E&C certificate issued by BHEL and Submission of Performance Bank Guarantee (PBG) by Supplier in the prescribed Format valid for 30 days beyond the warranty period with an additional claim period of 2 months by Supplier from any of the Consortium Banks of BHEL for 10% of total PO Value in the prescribed Format.. The PBG confirmation charges shall be borne by vendor. 3. Bank Guarantee and Loading against non acceptance of BHEL,s Payment Terms: If payment terms as mentioned by BHEL are not agreed by bidder, such bidder have to submit Bank Guarantee at the time of payment/opening of LC in the prescribed Format of the amount, exceeding 80% of the PO value, valid till issue of E&C Certificate for the equipment. However, in no case, payment against dispatch shall exceed 90% of the PO Value. Additionally, for any deviation sought including as mentioned above, in Payment Terms by bidder w.r.t. tender conditions, following loading shall be followed: (A) Base rate of SBI as applicable on the date of tender opening + 6%, for the amount & period of relaxation sought by bidder. (B) On account of payment through LC if insisted by bidder , bank charges shall also be loaded for the deviation in (i) opening of LC by BHEL and (ii) period and amount of LC as per prevailing bank rates.	
4	Penalty for Delay in supply and E & C	1 For the purpose of penalty for delay in E&C of the equipment the duration will be reckoned from the date of intimation by BHEL to vendor for readiness of site. 2 Penalty on delay in ‘Supply’ and/or ‘E&C’ will be applicable to the delays attributed to vendor . Penalty will be considered separately for ‘Supply’ and ‘E&C’. The rate of penalty for delayed Supply shall be @ 0.5% per week of delay of total PO value(Supply+E&C). in supply subject to a maximum of 10% of total PO value (Supply+E&C). The rate penalty for delayed E&C shall be @0.5% per week of delay of total PO Value (Supply+E&C) in E&C subject to a maximum of 10% of total PO value (Supply+E&C) Maximum penalty for delay in Supply and E&C together shall be limited to 15% of total PO value (Supply+E&C). In case PO includes more than one machine, the penalty shall be limited to 0.5% per week of delay on total PO Value (Supply+E&C) for the delayed machine. 3 Loading on account of nonacceptance of Penalty for delayed Supply and /or E&C shall be as under: In case any bidder is not accepting the above penalty for delayed Supply and/or E&C, the offer of bidder shall be loaded to the extent to which it is not agreed by the bidder.	
		Installation & Commissioning Charges value will include services to be rendered at BHEL like erection, commissioning, job proving, performance tests, and on-site training to operators etc. The estimated percentage value of these charges as per BHEL is 10% of basic	

5	Installation & Commissioning Charges	equipment price including accessories and auxiliaries, excluding spares. The Supplier should quote these charges as % of basic equipment price including accessories and auxiliaries, excluding spares in technical bid. Only in case where quoted value is less than the value (in %) specified in the NIT or separate value is not mentioned in the offer, value for E&C portion shall be deemed to be considered as the value indicated in NIT & accordingly supply value will be adjusted from that quoted value and balance will be released as E&C payment as per Payment terms of enquiry.	
6	Force Majeure clause	If at any time during the continuance of the contract the performance in whole or in part by either party of any obligations under the contract is prevented or delayed by reason, of any war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, explosions, epidemics, quarantine, restrictions or acts of GOD (hereinafter referred to as events) and notice of happening of any such events is given by either party to other within twenty one days from the date of occurrence thereof then neither party shall by reason of such events be entitled to terminate the contract. If the performance in whole or part of any obligation under this contract is prevented or delayed by reason of occurrence of such events, then claims for extension of time shall be granted for period considered reasonable by the purchaser subject to prompt notification by the seller to the purchaser the particulars of the events, if required with supporting evidence. Any waiver of time in respect of partial instalment shall not be deemed to be a waiver of time in respect of remaining deliveries.	
7	Contract execution Bank Guarantee(CEBG)	The successful vendor shall have to furnish a Contract Execution Bank Guarantee (CEBG) for 10% of the Total PO value in the prescribed format within 30 days from the date of P.O. but before L/C opening. CEBG shall be from one of the Consortium Banks of BHEL or from a reputed Bank and confirmed by any Consortium Bank of BHEL . All bank charges on account of issuance and conformation of CEBG whether incurred in India or outside India will have to be borne by the vendor. CEBG shall be kept valid until 30 days after the date of E&C Certificate, which will be issued on completion of Erection & Commissioning of equipment which includes erection, commissioning, job proving, performance test, training to operators etc. as prescribed in PO. If the supplier fails to submit the CEBG even with in 60 days from the date of PO, BHEL reserves the right to cancel PO & forfeit the EMD, if any, given by the supplier. In addition, in such case, action will be initiated in line with extant guidelines for Suspension of Business dealings with Suppliers.	
8	Price Basis	The prices shall be firm for entire period of contract. The suppliers shall indicate packing and forwarding charges,if any, separately. All foreign suppliers shall quote the lowest prices on a) CFR-ICD-Sanathnagar, Hyderabad, India or b) CFR-Mumbai or Nhava sheva or Chennai seaport. An amount of Insurance @1% of PO Value (Supplier’s seaport to BHEL R&D Stores, Hyderabad) + local transport charges (Mumbai/Nhavasheva/ Chennai Seaport to BHEL R&D Stores, Hyderabad) @2% of PO value shall be added for landed cost evaluation. All Indian suppliers shall quote the lowest prices on 'free delivery at BHEL R&D Stores or F.O.R destination' basis only in which Freight and Insurance charges to be quoted separately.	

Signature of the bidder with Seal & Date

	ITEM SPECIFICATIONS	Volume - 2 Enquiry NO 431700241
High Temperature Vertical Spin Test Rig and Auxiliaries		

SL.No.	Item
1	**High Temperature Vertical Spin Test Rig & Auxiliaries as per attached specification**

sl no	Descriptions	BHEL Specifications	Vendor Specifications/ Deviations
1	SCOPE	Refer S.No.1,CRD/HTVSTR/2017/01	
2	PURPOSE & TEST ROTOR DETAILS	Refer S.No.2,CRD/HTVSTR/2017/01	
3	SPIN SYSTEM CONFIGURATION	Refer S.No.3,CRD/HTVSTR/2017/01	
3.1	SPIN CHAMBER	Refer S.No.3.1,CRD/HTVSTR/2017/01	
3.2	CHAMBER LID	Refer S.No.3.2,CRD/HTVSTR/2017/01	
3.3	DRIVE SYSTEM	Refer S.No.3.3,CRD/HTVSTR/2017/01	
3.4	ROTOR ASSEMBLY STAND	Refer S.No.3.4,CRD/HTVSTR/2017/01	
3.5	LUBE OIL SYSTEM	Refer S.No.3.5,CRD/HTVSTR/2017/01	
3.6	VACUUM SYSTEM	Refer S.No.3.6,CRD/HTVSTR/2017/01	
3.7	INTEGRATED HEATING SYSTEM FOR TEST ROTORS	Refer S.No.3.7,CRD/HTVSTR/2017/01	
3.8	INTEGRATED COOLING SYSTEM FOR TEST ROTORS	Refer S.No.3.8,CRD/HTVSTR/2017/01	
3.9	INSTRUMENTATION & SENSOR SYSTEM	Refer S.No.3.9,CRD/HTVSTR/2017/01	
3.10	DATA ACQUISITION & CONTROL SYSTEM	Refer S.No.3.10,CRD/HTVSTR/2017/01	
3.11	ELECTRICAL SYSTEM	Refer S.No.3.11,CRD/HTVSTR/2017/01	
3.12	ESSENTIAL TOOL KIT	Refer S.No.3.12,CRD/HTVSTR/2017/01	
3.13	RECOMMENDED SPARES BEYOND WARRANTY PERIOD	Refer S.No.3.13,CRD/HTVSTR/2017/01	
4	AMBIENT CONDITIONS	Refer S.No.4,CRDHTVSTR2017V1	
5	FOUNDATION REQUIREMENTS	Refer S.No.5,CRD/HTVSTR/2017/01	
6	OPERATIONAL SAFETY	Refer S.No.6,CRD/HTVSTR/2017/01	
7	ENVIRONMENTAL SAFETY	Refer S.No.7,CRD/HTVSTR/2017/01	
8	DOCUMENTATION	Refer S.No.8,CRD/HTVSTR/2017/01	
9	PRE-QUALIFICATION CRITERIA (PQC)	Refer S.No.9,CRD/HTVSTR/2017/01	
10	WARRANTY	Refer S.No.10,CRD/HTVSTR/2017/01	
11	PRE DISPATCH INSPECTION (PDI) AND TRAINING AT OEM WORKS	Refer S.No.11,CRD/HTVSTR/2017/01	
12	PACKING	Refer S.No.12,CRD/HTVSTR/2017/01	
13	OPERATION AND MAINTENANCE (O&M) MANUALS	Refer S.No.13,CRD/HTVSTR/2017/01	
14	AFTER SALES SUPPORT AND NON-COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT (AMC)	Refer S.No.14,CRD/HTVSTR/2017/01	
15	COMPLIANCE STATEMENT	Refer S.No.15,CRD/HTVSTR/2017/01	
16	DELIVERY PERIOD	Refer S.No.16,CRD/HTVSTR/2017/01	
17	FUTURE UPGRADATION	Refer S.No.17,CRD/HTVSTR/2017/01	
	TEST CERTIFICATES		

	18	REQUIRED	Refer S.No.18,CRD/HTVSTR/2017/01	
	19	MONTHLY PROGRESS REPORT	Refer S.No.19,CRD/HTVSTR/2017/01	
		Pre Dispatch Inspection	Inspection shall be carried out by BHEL.The Vendor shall give minimum of 7 days notice for inspection along with internal test certificates. Pl. menstion Time in days required from PDI to Despatch ==========	
		Manufactures Test Certificate	Manufacturer's Test Certificate required and shall be provided before dispatch.	
		Spares	Offer shall include all the spares required for normal operation of equipment.	
		Accessories	Offer shall include all the accessories required for normal operation of equipment.	
		Training	Shall be quoted separately as optional.	
		Minimum Acceptable Warranty	Supplier shall comply to the minimum accepatble warranty period.The offers of the suppliers not complying to the minimum warranty period will be rejected.The minimum acceptable warranty period is 36 months.	

2

Erection, Commissioning, Demonstration and Training as per attached specification

sl no	Descriptions	BHEL Specifications	Vendor Specifications/ Deviations
1	ERECTION & COMMISSIONING (E&C) or INSTALLATION	Refer S.No.20, CRD/HTVSTR/2017/01	
2	DEMONSTRATION AT SITE	Refer S.No.21, CRD/HTVSTR/2017/01	
3	OTHER INSTALLATION REQUIREMENTS AT SITE	Refer S.No.22, CRD/HTVSTR/2017/01	
4	POST INSTALLATION TRAINING	Refer S.No.23, CRD/HTVSTR/2017/01	
	Training	Shall be quoted separately as optional.	

* Vendors are advised to write specifications in detail and not to write like 'Complied/ Yes / No ' etc. in specifications.

Signature of the bidder with Seal & Date

BHEL R&D

Terms & Conditions of Reverse Auction

Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to "REVERSE AUCTION PROCEDURE" i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

1. For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
2. Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit online sealed bid in the Reverse Auction. Non-submission of online sealed bid by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
3. BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
4. In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
5. Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
6. Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
7. In line with the NIT terms, BHEL will provide the calculation sheet (e.g. EXCEL sheet) which will help to arrive at "Total Cost to BHEL" like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.
8. Reverse auction will be conducted on scheduled date & time.
9. At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
10. The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.
11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL standard practice.
12. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the „Business Rules of Reverse Auction?, which will be communicated before the Reverse Auction.
13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines, shall be initiated by BHEL and the results of the RA scrapped/ aborted.
14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
15. In case BHEL decides to go for reverse auction, the H1 bidder (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.

AUTHORISATION LETTER FOR E-PAYMENT/ NEFT / RTGS

(PLEASE FILL UP THE FORM COMPLETELY IN CAPITAL LETTERS ON YOUR COMPANY LETTERHEAD ONLY)

Vendor Code (to be filled by BHEL)	

Type of Request (Tick one)		NEW	CHANGE
1	Company Name		
2	Address		
3	City with PIN Code		
4	State		
5	PAN Number		
6	TIN/ VAT No.		
7	CST No.		
8	Service Tax No.		
9	Name of Contact Person		
10	Mobile number		
11	Ph. no. with STD Code		
12	Fax No. with STD Code		
13	Email ID		
14	Website (URL)		

BANK DETAILS FOR EFT / RTGS

1	Bank Name	
2	Branch	
3	Branch Code	
4	Branch Address	
5	Branch Phone No	
6	Account No.	
7	Account Type: SB/ Current/ other (Specify)	
8	MICR Code	
9	IFSC Code	

I, as an authorized representative / owner of the above named company, hereby state as under:

1. Enclosed here with a cancelled cheque in support of our company's bank details.
2. Authorize BHEL R&D Hyderabad, to electronically make payments to the designated bank account with bank charges, if any, to our account.
3. If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL / transferring Bank responsible.
4. I hereby certify that the particulars given above are true, complete and correct.
5. This authority remains in full force until BHEL receives and acknowledge written notification requesting change or cancellation.

Date :

Company Seal

Authorised Signatory

Designation :

RD:MPX:F-13

Bharat Heavy Electricals Limited

Corp. R&D DIVISION
VIKAS NAGAR,
HYDERABAD- 500 093 (INDIA)

VENDOR REGISTRATION FORM

(Indigenous supplier)

[FORM TO BE SUBMITTED* BY THE BIDDER ALONG WITH TECHNICAL-BID]

Before filling, please refer to instructions on page-4

1.0 VENDOR PROFILE:

1.1 Name and address of the vendor:

_____
_____
_____

Phone Nos.:
Fax No.:
Email: 1. 2.

1.2 Local representative name & address in Hyderabad/Secundrabad :

_____
_____
_____
_____

Phone Nos.:
Fax No.:
Email:
Contact Person:
Mobile No:

2.0 TYPE OF ORGANISATION:

PROPRIETORSHIP	Company:	Sister Concern (mention vendor registration number of main organization)	
Patnership	CORPORATION	Small Scale Industry	ANY OTHER(Please specify)

In case of SSI unit, copy of registration to be enclosed. It is requested that MSME registration certificate to be enclosed and tick the following:

Type of Major Activity: Manufacturing / Service
Category of Enterprise: Micro / Small / Medium
Social Category : GENERAL / SC / ST / OBC
Udyog Adhaar Number (UAN):_____

3.0 ANNUAL TURN OVER:

#	Year	Turn-Over, Rs.
1	Current Year(budgeted)	
2	Previous year (200 - 0)	
3	Prior Year (200 - 0)	

4.0 NAME AND ADDRESS OF THE BANKER:

4.1 Bank Name
4.2 Branch name
4.3 Account number
4.4 Account Type
4.5 MICR Code:
4.6 IFSC Code(RTGS/NEFT):
4.7 Bank Phone number(s),

Blank cheque, duly cancelled, to be enclosed.
Please note that all payments shall be made through Electronic clearance services to your above account against the orders executed, if any.

5.0 REGISTRATION PARTICULARS(relevant copies to be enclosd)

5.1 IT Permanent Account No.(PAN):
5.2 State Sales Tax/VAT Registration No:
5.3 Central Sales Tax Registration No:
5.4 ED Registration No:
5.5 Service Tax Registration No:
5.6 PF Account No:
5.7 Labour Licence No:
5.8 ESI Account No:

6.0 CONTACT PERSON: S/Sri:

Designation: Phone / Mobile No:

7.0 TOTAL NUMBER OF EMPLOYEES:

Graduates(Engr/Scientists/Mgmt/Fin.)	Consultants	Workers		
		Sup./Skilled	Semiskilled	Unskilled

8.0 LIST OF PRODUCTS/ SERVICES OFFERED:

#	Products/ Services	Capacity
1		
2		
3		
4		
5		

9.0 REFERENCE LIST :

(Only recognized public and private sector companies, attach if printed copy available)

#	Customer	Volume / Year
1		
2		
3		
4		
5		

10.0 INFRASTRUCTURE / FACILITIES:

#	Facility (with specifications)	Age/ Year procured
1		
2		
3		
4		
5		

11.0 REGISTRATION WITH OTHER BHEL UNIT/UNITS:

#	Unit	Registration No	Year
1			
2			
3			
4			

12.0 ANY OTHER INFORMATION :

DECLARATION:

The information furnished above is true and authentic.

(CEO / PROPRIETOR)

SEAL:

DATE:

Note:

1. Registered bidders, having BHEL (R&D) registration no. or have submitted this format for registration, need not furnish this information again.
2. The competent authority reserves the right to accept or reject the registration.
3. Vendors approved for registration will be informed by mail / email, as convenient. A separate communication will be sent in case of non-registration also, citing reasons thereof.
4. BHEL reserves the right to take penal action as deemed fit if any of the information provided by the vendor(s) is found to be incorrect.
5. AGM, Head (MM) may be contacted for clarification/additional information on registration.

Instructions

1. Fill all items. Please mention “N.A.” for items/ clauses not applicable.
2. Use A4 sheets for this document and the enclosures. Use of additional sheets is permitted if space provided is not adequate.
3. Attach copies of latest documents in respect of items 5.0 (Registration no.s)
4. Photographs of registered office and the chief executive/proprietor shall be furnished.

RD:MPX:F-14

Bharat Heavy Electricals Limited

Corp. R&D DIVISION
VIKAS NAGAR,
HYDERABAD- 500 093 (INDIA)

SUPPLIER REGISTRATION FORM

(FOREIGN SUPPLIER)

ALL COLUMNS SHOULD BE PROPERLY FILLED IN THE SPACE PROVIDED FOR.WHEREVER IT IS NOT APPLICABLE PLEASE WRITE “NOT APPLICABLE”.INCOMPLETE OR INCORRECT FORMS MAY NOT BE CONSIDERED.

1.0 GENERAL INFORMATION:

1.1 NAME OF COMPANY

1.2 DETAILS OF HEAD OFFICE:

ADDRESS :
TELEPHONE :
FAX :
EMAIL :
WEB SITE :

1.3 DETAILS OF FACTORY/WORKS:

ADDRESS :
TELEPHONE :
FAX :
EMAIL :
WEB SITE :

1.4 DETAILS OF MARKETING AGENT

ADDRESS :
TELEPHONE :
FAX :
EMAIL :
WEB SITE :

1.5 CHIEF EXECUTIVE

1.6 CONTACT PERSON(S)
FOR PRODUCT OFFERED
NAME(S) :
OFFICIAL CPACITY :
ADDRESS :
TELEPHONE :
FAX :
EMAIL :

1.7 YEAR OF ESTABLISHMENT

1.8 PRODUCTION CAPACITY PER ANNUM

1.9 PARTICULARS OF PRODUCT INCLUDING SPECIFICATION AND RANGE OFFERED FOR REGISTRTION
(Attach brouchers and catalogues)

1.10 NAME(S) OF BANKERS

1.11 BANKER’S CERTIFICATE

1.12 PORT OF LOADING

1.13 NEAREST AIRPORT

1.14 NAME OF THE INDIAN AGENT, IF ANY
WITH AUTHORIZATION LETTER

2.0 FINANCIAL INFORMATION:

2.1 TOTAL CAPACITY

2.2 ANNUAL TURN OVER FOR LAST 3 YEARS

2.3 WHEHER CREDIT LICENSE ACCEPTABLE YES/NO

3.0 QUALITY MANAGEMENT SYSTEMS
ENCLOSED FORMAT PART-B

3.1 EXPERIENCE LIST FOR SAME/ SIMILAR ITEMS
TO BE ENCLOSED

4.0 FUTURE EXPANSION PLANS:
(Give details)

5.0 LIST OF ENCLOSURES:
(Including brouchers, catalogues, technical literature etc)

6.0 ANY OTHER INFORMATION:
SIGNATURE OF SUPPIER (Authorized signatory)

NAME :
DESIGNATION :
DATE :
OFFICIAL SEAL

Note:

1. BHEL Reserves the right to take penal action as deemed fit if any of the information provided by the vendor is found to be incorrect.
2. Please attach separate sheets, if space found is inadequate

RD:MPX:F-13

Bharat Heavy Electricals Limited
Corp. R&D DIVISION
VIKAS NAGAR,
HYDERABAD- 500 093 (INDIA)
Ph: 040 – 23772704, Fax: 040 – 23770698, email: mpx@bhelrnd.co.in

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GUIDE LINES REGARDING DEALINGS WITH INDIAN AGENTS OF FOREIGN SUPPLIERS

i. BHEL shall deal directly with foreign vendors, wherever required, for procurement of goods. However, if the foreign principal desires to avail of the services of an indian agent, then the foreign principal should ensure compliance to regulatory guidelines - which require mandatory submission of an Agnecy Agreement.

ii. It shall be incumbent on the Indian agent and the foreign principal to adhere to the relevant guidelines of Government of India, issued from time to time.

iii. The Agency Agreement should specify the precise relationship between the foreign OEM / foreign principal and their Indian agent and their mutual interest in the business. All services to be rendered by agent/ associate, whether of general nature or in relation to the particular contract, must be clearly stated by the foreign supplier/ Indian agent. Any payment, which the agent or associate receives in India or abroad from the OEM, whether as commission or as a general retainer fee should be brought on record in the Agreement and be made explicit in order to ensure compliance to laws of the country.

iv. Any agency commission to be paid by BHEL to the Indian agent shall be in indian currency only.

v. Whenever Indian agents are representing on behalf of their principals the relevent authorisation letter and agreement copy to be enclosed along with Technical bid to consider the offer.

SPECIFICATIONS FOR HIGH TEMPERATURE VERTICAL SPIN TEST RIG SYSTEM

S.No	Description	BHEL Specification(s)	Vendor Specification	Remarks
1.	**SCOPE**	**Design, Supply, Erection and Commissioning of High Temperature Vertical Spin Test Rig System** for LCF and Creep testing consisting of 1.1 Test Chamber to spin a heavy rotor with a highly controlled heating and cooling system 1.2 Safety provisions for rotor burst conditions 1.3 Heating system to provide radiation heating 1.4 Cooling system by Nitrogen gas 1.5 Sensor system consisting of high temperature strain measurement system using high temperature strain gauges, Digital Image Correlation (DIC) technique, crack monitoring system, temperature measurement sensors and accessories, 1.6 Control logics for all the above 1.7 Data acquisition system **Complying with specifications as detailed in the following sections.**		
2.	**PURPOSE & TEST ROTOR DETAILS**	**2.1** This specification is intended for spinning a test rotor continuously for 200 cycles (Refer **Annexure-I** for spin parameters and **Annexure-II** for test rotor drawing details)		
		2.2 Test rig should be capable of handling the test rotor with the following details**:** a) Test rotor Weight: 1000 to 9000kgs b) Speed: 0 - 3800 rpm c) Diameter: 500-1500 mm d) Temperature range: 0 - 820 deg. C e) Height of rotor: 100 to 1500 mm **(Note: For Details of Spin Parameters Refer Annexure-I)**		
		2.3 Proposed Spin System will be used for spinning of test rotor. Spinning of test rotors shall be carried out at high temperature up to 800 deg. C at specified speeds and at less than one Torr absolute pressure, for continuous operation of 200 cycles (**Refer Annexure-I)**.		

		2.4 Spin test methodology: a) Test Rotor shall be mounted on the Rotor Assembly Stand. b) Strain gauges and thermocouples shall be mounted at various pre-selected points as per **Annexure-IIIA & IIIB**. c) Chamber Lid shall be lifted from Spin Chamber by Lid Vertical Lift Mechanism and aligned with rotor on the assembly stand by Lid Swivel Arrangement. The rotor shall be assembled and secured with lid spindle. d) The Chamber Lid along with the test rotor shall be swiveled back and aligned to Spin Chamber, secured and vacuum sealed with Automatic Lid Locking Device. e) Vacuum System shall be switched on, if required, after the lid is properly sealed. f) Coast up, Heating, cooling cycle and coast down shall be as per **Annexure-I**		
		2.5 The spin test facility should have feature for in-situ balancing		
3.0	**SPIN SYSTEM CONFIGURATION**	The spin test system shall consist of the following subsystems/components: **3.1** Spin chamber **3.2** Chamber Lid with swivel arrangement for loading/unloading of rotor and with automatic locking and vacuum sealing system. **3.3** Drive system **3.4** Rotor Assembly Stand **3.5** Lube oil system **3.6** Vacuum system **3.7** Integrated heating System for test rotors **3.8** Integrated cooling System for test rotors **3.9** Instrumentation & Sensor system **3.10** Data Acquisition & Control System **3.11** Electrical System **3.12** Essential Tool kit **3.13**Recommended Spares Beyond Warranty Period **Note:** The make and model of the components which goes into the above systems and subsystems including software have to be mentioned. If any subsystem or component procured from India shall be complied to BSI.		
3.1	**SPIN CHAMBER**	The spin chamber shall be designed to meet the parameters and test conditions **refer clause 2.2**		

		3.1.1 The Spin Chamber shall be so designed to withstand any failure of the test rotor during spinning and the damage shall be contained within the chamber **3.1.2** The Spin Chamber system shall have thermal insulation to maintain the metal temperature outside the chamber less than 50 deg. C **3.1.3** The spin chamber shall contain Viewports with special glass to be provided for pyrometer, DIC strain measurement system, visual inspection of the test rotor during testing **(refer clause 3.9.10)** and any other requirement for the safe and continuous operation of the system. **3.1.4** The spin chamber shall have provision for installation of high speed video camera **(refer clause 3.9.11)**		
3.2	**CHAMBER LID**	**3.2.1** Vendor should ensure the following in chamber lid: a) Holding of test rotor which spins up to 3800 rpm b) Holding of entire drive system, coupling, thrust bearing, telemetry system, etc. c) Facilitate routing of electrical, control & instrumentation and sensors cables d) Vacuum sealing, thermal insulation and rotor expansion e) Automatic lid locking system with indicators f) Lifting and swivel mechanism with necessary lift and swivel angle with required clearances to bring the rotor outside the spin chamber and to park the rotor on the stand and vice versa g) Enable all operations such as rotation, opening, closing, lifting up and down etc. only if all the interlock permissive are cleared h) Ambient temperature of the Chamber lid outside the chamber shall be maintained less than 50 deg. C.		
3.3	**DRIVE SYSTEM**	**3.3.1** The drive shall be capable of handling the test rotors with all the parameters mentioned in **Annexure-II**. **3.3.2** Vendor should provide the details of holding/coupling arrangement of the test rotor with the drive spindle and provision to be made in the test rotors for assembling in the test rig within 60 days of PO acknowledgment. **3.3.3** Schematic of the Drive system along with bearing and supports details to be provided within 60 days of PO acknowledgment **3.3.4** The drive shall have automatic stop for emergency situations such as abnormal increase in temperature of rotor, chamber temperature, excessive vibration and speed, vacuum drop, cooling gas pressure, bearing temperature, crack initiation and propagation beyond permissible limits as set by the user and any other situations envisaged by the vendor which do not meet the safety requirements. An option for manual override of any set		

limit should be provided. Vendor also to provide manual switch for stopping the system.

3.3.5 Drive power (continuous duty) suitable for acceleration of rotors to rated speeds (refer **Annexure-I**) The acceleration time shall be as per **Annexure-I**

3.3.6 Vendor shall provide variable frequency drive for drive system. **Offers with hydraulic or pneumatic drive are not acceptable and they will be summarily rejected without any further correspondence**

3.3.7 The speed shall be regulated within +/- 10 rpm.

3.3.8 One additional drive motor to be supplied along with the system and the cost shall be included in the offer.

3.3.9 Drive system shall have thermal insulation to maintain the temperature of the drive shaft outside the chamber less than 50 deg. C

3.3.10 Local on/off switches to operate the system independent of control system shall be provided, without affecting safety interlocks.

3.3.11 The AC drive system shall have protection for

- Short-circuits between motor and phases
- Over current between motor phases and earth
- Overheating (thermal protection)
- Input phase loss protection, in three-phases
- Line over voltage and under voltage
- Short circuit, over current, earth fault & winding temperature high for Converter transformer if used
- Over frequency/speed operation

3.3.12 The following minimum controls shall be provided as a part of the Operator Control Panel or through separate switches on the front panel door.

- Start / stop(in local/remote mode)
- Speed control (Raise / lower)
- Acknowledge/Accept/ Test Push Button for annunciation
- Auto / Manual / Test Mode select
- Emergency stop
- Trip-Remote Breaker
- Local Remote

		3.3.13 Vendor shall provide indications as required for normal operation and for easy maintenance, which shall not be limited to the following indications • Motor running/Motor stopped • VFD System Fault and VFD ON & OFF • System ready to start • Motor zero speed and Motor over speed • AC mains ON • Remote breaker trip • Speed reference fail • Input and output Isolator ON & OFF • Rectifier output ON & OFF **3.3.14** Digital display of the following parameters shall be as a part of the Operator Control Panel, selectable by the operator • Input AC voltage, frequency and Current • Output voltage • Output current VFD • Output frequency • Motor speed • Hour Run • Necessary transducer shall be provided with 4-20mA output for indicating motor speed and motor current in Owners SCADA system. • KW monitoring • KWh monitoring • Power factor		
3.4	**ROTOR ASSEMBLY STAND**	**3.4.1** Vendor shall design and supply suitable assembly stand to hold, assemble the rotor and its tooling on to the lid cover. **3.4.2** Vendor shall incorporate suitable tool to measure the rotor diameter on the assembly stand.		
3.5	**LUBE OIL SYSTEM**	**3.5.1** Vendor to supply Lube Oil Tank with initial fill and specify the tank capacity (in liters) to meet the continuous operations. Frequency of replenishment and replacement of lube oil to be specified.		

		3.5.2 Motor driven oil pump shall be provided by the vendor. **3.5.3** Filters, valves, mist elimination system, piping, auxiliaries and all necessary systems to be supplied. **3.5.4** Heat exchanger to cool lube oil. **3.5.5** Emergency lube oil supply in case of power failure, till the test rotor comes to stand still. **3.5.6** Monitoring and control equipment for oil level, oil temperatures, oil quality checking test kit, duplex filters with differential pressure measurements, discharge pressure, flow and any other control parameters which are essential for safe & continuous operation of the test rig are to be provided. **3.5.7** Necessary interlock in controls shall be provided to safe guard the test rig and rotor in case of failure in lube oil system. Interlock integration with main control and instrumentation to be provided. **3.5.8** Schemes, equipment technical data sheets and lube oil specification with grade to be submitted with the offer **3.5.9** Local on/off switches to operate the system independent of control system shall be provided without affecting safety interlocks		
3.6	**VACUUM SYSTEM**	**3.6.1** Vacuum System shall be capable to create & maintain required vacuum in spin chamber to meet the requirement of test cycles as given in **Annexure-I**. **3.6.2** Vacuum system shall have instrumentation to measure, indicate and record vacuum level and any other control parameters which are essential for safe & continuous operation of the system. **3.6.3** System shall have suitable provision to kill the vacuum in spin chamber whenever required, in the shortest possible time **3.6.4** All piping and conduit works between spin chamber and vacuum system shall be provided by vendor **3.6.5** 100% redundancy in vacuum system to continuously maintain the required vacuum during heating cycle and steady state operation of the test rotor. In case of failure of one set of vacuum system, the redundant vacuum system should start automatically for uninterrupted testing. **3.6.6** Local on/off switches to operate the system independent of control system shall be provided without affecting safety interlocks **3.6.7** Vendor to supply Nitrogen gas Tank and specify the tank capacity (in liters) to meet the continuous operations. Frequency of replenishment and replacement of Nitrogen gas to be specified.		

3.7	**INTEGRATED HEATING SYSTEM FOR TEST ROTORS**	**3.7.1** Vendor shall provide heating system for heating of the rotors inside spin chamber to temperatures as per the test cycle indicated as per **Annexure-I** **3.7.2** The system shall be capable of heating of the test rotor up to 820 deg. C **3.7.3** Instrumentation for monitoring and recording of rotor surface temperature and difference between rotor surface & rotor bulk mean temperature during heating shall be provided along with audio visual indicator once the set value is reached. **3.7.4** Instrumentation for monitoring and recording of temperature of heating elements, chamber and any other control parameters which are essential for safe & continuous operation of the system. **3.7.5** Heating system shall have instrumentation to control heating power, temperature of heating elements for maintaining of rotor surface temperature and temperature difference between rotor surface & rotor bulk mean during heating as per **Annexure-I**. **3.7.6** Details of the proposed heating system shall be provided along with thee offer. Vendo shall provide detailed design calculation for heating time along with the offer. **3.7.7** 100% redundancy in heating system for continuous operation during heating cycle and steady state operation of the test rotor. In case of failure of one set of heating system, the redundant heating system should start automatically for uninterrupted testing. **3.7.8** Heating system should continue to meet the heating requirements even if 10% of heating elements fail during operation. **3.7.9** Vendor shall provide control logic of heaters for achieving required heating cycle. **3.7.10** Local on/off switches to operate the system independent of control system shall be provided without affecting safety interlocks		
3.8	**INTEGRATED COOLING SYSTEM FOR TEST ROTORS**	**3.8.1** Vendor shall provide closed loop nitrogen gas based cooling system for cooling of the rotors inside spin chamber to temperatures as per the test cycle indicated in **Annexure-I** **3.8.2** The system shall be capable of cooling the test rotors up to ambient temperature **refer clause 4.2** **3.8.3** Instrumentation for controlling, monitoring and recording of rotor surface temperature and rotor bulk mean temperature during cooling shall be provided along with audio visual indicator once the set value is reached. **3.8.4** Cooling system shall have instrumentation to measure, indicate and record temperature, pressure, flow rate and any other control parameters which are essential for safe & continuous operation of the system **3.8.5** Details of the proposed cooling system shall be provided along with the offer document. Vendor shall provide detailed design calculation for cooling time along with the offer		

		document. **3.8.6** 100% redundancy in cooling pumping system for continuous operation during cooling cycle of the test rotor. In case of failure of one set of cooling system, the redundant cooling system should start automatically for uninterrupted testing. **3.8.7** Vendor to provide control logic of cooling system to achieve the required cooling rate as per **Annexure-I**. **3.8.8** Local on/off switches to operate the system independent of control system shall be provided without affecting safety interlocks **3.8.9**. Statutory approvals for nitrogen handling system shall be in the scope of the vendor		
3.9	**INSTRUMATION &SENSOR SYSTEM**	**The Instrumentation & sensor systems shall be provided as per the following:** **3.9.1** Instrumentation to monitor the parameters for the main & sub systems such as speed of the test rotor, temperature of the heaters, chamber, lid, flow rate and pressure (nitrogen, lube oil and any other cooling medium), vacuum, accumulated test time etc. and any other control parameters which are essential for safe & continuous running of the test rig. **3.9.2** Strain measurement system with strain gauges at different locations on the test rotor (in two perpendicular directions) at elevated temperatures up to 820 deg. C. Suitable high temperature strain gauges with a minimum drift and compensation for continuous operation, for 200 cycles **(refer Annexure-III)**. **3.9.3** Temperature measurement system with temperature sensors at different locations on the test rotor at elevated temperatures. Suitable temperature sensors for continuous operation, for 200 cycles **(refer Annexure-III**) **3.9.4** Hundred channel Digital Telemetry system for strain (60 no of channels) and for temperature (40 no of channels) of the test rotor during the testing as per **Annexure-IIIC.** **3.9.5** DIC (Digital Image Correlation) system for strain measurement on the rotor surface throughout the length of the test rotor for temperature up to 820 deg. C (refer **Annexure-IV**) **3.9.6** Rotor Radial growth measurement system. **3.9.7** Crack detection & monitoring system **3.9.8** Drive Shaft and bearing housing Vibration monitoring system (minimum three for shaft and three for bearing housing in triaxle directions) at suitable locations which are useful for ensuring the safe operation of the system **3.9.9** Rotor residual unbalance severity monitoring and assessment system meeting balance quality G2.5 grade of ISO 1940/1		

		3.9.10 The Viewports in the chamber shall facilitate measurement using pyrometer, DIC strain measurement system, visual inspection of the test rotor during testing and any other requirement for the safe and continuous operation of the system. **3.9.11** High speed (minimum 10000 frames/sec and minimum resolution of (512x512) video recording system to record events inside the chamber.		
3.10	**DATA ACQUISITION & CONTROL SYSTEM**	**The Data Acquisition & Control System shall be provided as follows:** **3.10.1** System shall continuously acquire, monitor and store data for the parameters as mentioned in **clause 3.9** during the test rig operation. Conventional signals can be logged in the data acquisition system. Data from specialized systems like DIC, crack detection, video recording etc. shall be logged into the main or designated computer **3.10.2** All the above data must be acquired with sampling rate as required for the respective parameters and time stamped in HH:MM: SS format for logging **3.10.3**All the systems shall be operable from the control system through Human Machine Interface (HMI) and operations (including interlocks) required for functioning of all the systems as mentioned in the relevant sections **(refer clause 3.1 to 3.8).** **3.10.4**The sequence of operations that needs to be ensured before starting of the automatic test cycle. **3.10.5** Automatic control and operation of the test cycle for the test rotor as per **Annexure-I**. For the test cycle, user configurable parameters for automatic test cycle and corresponding default set values are mentioned in table:1 of **Annexure-1**. Start and stop of automatic operation through HMI shall be provided. Stop operation should enable the operator to resume or restore the cycle to starting condition of the test cycle. **3.10.6** Configurable alarm and trip system for any abnormal operations & parameters like temperature, vacuum, speed, pressure, vibration etc. **3.10.7** Single pushbutton to shut down the entire system through HMI. **3.10.8** Automatic Protection system (with all safety interlocks) to shut down the system and ensure the rotor to stand still in case of any malfunction or trip conditions such as motor overload, lube oil low pressure, lube oil high temperature, vacuum failure, high vibration, erratic power supply, under voltage or over voltage etc. and any other control parameters which are essential for system safety **3.10.9.** Display in HMI for the following i. Flow diagram of the Spin Test rig with all auxiliaries and their operating parameters.		

		ii. Voltage, Current and power for the main drive and all the auxiliaries iii. Test rotor surface temperature iv. Test rotor bulk mean temperature v. Temperature difference between rotor surface and rotor bulk mean vi. Chamber wall, lid surface and ambient temperature vii. Heating element temperature viii. Speed of the test rotor ix. Test duration x. No of test cycles completed, current test cycle number and current cursor position in the test cycle xi. Vibration level xii. Crack growth xiii Vacuum level xiv Lube oil parameters like flow rate, pressure, temperature, level, pump ON/OFF etc. xv Nitrogen (Coolant) parameters like flow rate, pressure, inlet & Outlet temperature at chamber, inlet & Outlet temperature at cooler, tank level indicator, pumping system ON/OFF etc. xv KW and KWh of entire test rig for monitoring xvi AC mains ON, VFD ON & OFF, Remote breaker trip, Speed reference fail, Input Isolator ON & OFF, Output Isolator ON & OFF, Rectifier output ON & OFF xvii Any other control parameters which are essential for safe & continuous monitoring of the test rig **3.10.10** Data storage, online trending, retrieval of data to suitable formats (i.e. MS Excel, MS Access, ". CSV") and provision for data backup. **3.10.11** Customized post processing software tools for analyzing the stored data. **3.10.12** Data acquisition and control will be through standalone hardware (Input/ Output i.e. I/O modules and real time operating system (RTOS) based controller). The controller should NOT be computer (PC) or non-RTOS based. The hardware should be housed in panel or cabinet. Provision for addition of extra I/O modules in panel or cabinet for future use. Specialized sensing systems like crack growth, radial growth, DIC, video recording etc. can have separate hardware (data acquisition system i.e. DAS) to send the data to main console. **3.10.13** Hardware console (100% redundancy) with configuration as detailed in **Annexure-V**		

		for HMI, display, data storage, online trending, retrieval of data, provision for data backup and Customized post processing software tool. Communication between real time controller and hardware console through LAN. Specification as per **Annexure-V** **3.10.14** Control system panel or cabinet shall have bottom entry for signal and electrical cables. Suitable no. of cable glands (weather proof) shall be supplied. **3.10.15** Vendor to supply requisite backup power to the control system with online UPS in case of power failure till the main system shuts down safely. **3.10.16** If the offered system **(refer clause 3.0)** requires pneumatic/hydraulic control for any control operations, corresponding power pack shall also be supplied by vendor. **3.10.17** Supply of all the signal/control cables shall be in the scope of the vendor. **3.10.18 Vendor shall supply the suitable control room/Cabin with required Heating, Ventilation and Air Conditioning (HVAC)**		
3.11	**ELECTRICAL SYSTEM**	**3.11.1** AC Power Supply 415V + 10% / -10%, 50 Hz +/-3 Hz, 3 Phase will be provided by BHEL at a single point near the Test Rig, as per layout proposed by vendor and approved by BHEL. All types of switches, cables, connections, circuit breakers/switchgear etc. required for connecting BHEL's power supply point to different parts of the Test Rig/control cabinets including UPS shall be supplied by the vendor. If UPS is Indian Make, then it should be Bureau of Indian Standards (BIS) compliant and quoted in INR only. All the electrical components shall have protection, control, indication and metering provisions. **3.11.2** Tropicalisation: All electrical & electronic equipment shall be suitable to the city of Hyderabad, Telangana, India **refer clause 4.2** **3.11.3** All electrical & electronic control cabinets & panels should be dust proof, vermin proof, flame proof (standard BIS/IEC 60079 or equivalent) and water proof (standard IP65 or equivalent). **3.11.4** All electrical & electronic panels including operator's panel to be provided with adequate door locks, sufficient illumination, power receptacles and plug points of 230 +/-10 %Volts,50Hz,5&15Amp AC with on/off switches. All electrical adapters/receptacles, fittings, consumables etc. should have compatibility with Indian equivalent standards. Indian make items should be BIS compliant and quoted in INR only. **3.11.5** All motors shall conform to IEC standard. If the motor is Indian make it should be BIS compliant and quoted in INR only. **3.11.6**All cables moving with traversing axes should be installed in Caterpillar/ Drag chain. Additionally, all the cable trays required for laying of cables should be included in the		

		offer. **3.11.7** Vendor should ensure the proper earthing for the Test Rig and its peripherals/accessories. Any material requirement for the same should be informed with design/drawings. The vendor can take earthing connection from the nearest point at the test facility premises. **3.11.8** All the equipment, cards and modules shall be identified with appropriate permanent name plates with equipment description and designation/part No. **3.11.9** All electrical cables shall be tagged on terminal boards and at the panel mounted equipment. **3.11.10** All the control, power and signal cable shall be separately routed to protect from induced electromagnetic interference. **3.11.11** Required firefighting system and safety measures to be followed are to be provided. Vendor shall provide detailed bill of quantity for the system in the offer.		
3.12	**ESSENTIAL TOOL KIT**	Vendor shall design, manufacture and supply one set of necessary fixtures and fasteners required for spinning of two test rotors as indicated in **Annexure-II.** Successful vendor shall provide complete details of all fixtures and fasteners within 60 days of purchase order acknowledgement.		
3.13	**RECOMMENDED SPARES BEYOND WARRANTY PERIOD**	Necessary mechanical, electrical, electronic and hydraulic spares parts for three years of trouble free continuous operation after warranty period to be indicated. Itemized breakup price of spares for the following systems shall be quoted in the price bid. 3.13.1 Spin chamber 3.13.2 Chamber Lid 3.13.3 Drive system 3.13.4 Lube oil system 3.13.5 Vacuum system 3.13.6 Heating System for test rotors 3.13.7 Cooling System for test rotors 3.13.8 Instrumentation & Sensor system 3.13.9 Data Acquisition & Control system. 3.13.10 Electrical System 3.13.11 Any other spares which may be required **Note-1: Price of recommended spares beyond warranty period will be included in cost comparison.** **Note-2**: Availability of spares is to be ensured for ordering beyond the warranty period, for a		

		min. of 10 years.		
4.0	**AMBIENT CONDITIONS**	**4.1** Total system including all supplied items should work trouble free and should give specified performance under existing power supply and ambient operating conditions, as mentioned below. **4.2 Ambient Operating Conditions:** Temperature = 5 to 45 deg. C; Relative Humidity = 95% max. Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. The test rig and all the subsystems other than the control room equipment shall be kept in the normal shop floor condition without temperature and humidity controlled enclosure/shop. Max. Temperature variation is 25 deg. C in 24 hours. **Location:** Corp. R&D, BHEL, Hyderabad, Telangana India		
5.0	**FOUNDATION REQUIRMENTS**	The layout to be proposed by vendor and approved by BHEL. The vendor shall supply 3 copies of equipment General Arrangement and foundation drawings and acceptance norms within 60 days of purchase order acknowledgement. Vendor should supply the design and drawing details to BHEL which should include information like reinforcement details, construction joints details, details of load considered, Grade of concrete to be used, any anti-vibrational mounting if required. BHEL will provide the foundation as per vendor design. Vendor shall also indicate detailed specifications of grouting compound and any additives, grouting procedure and grouting bolts or any special parts required during the foundation. Any special foundation accessories to be supplied by the vendor shall be listed, quoted and supplied separately ahead of main supply. Vendor may indicate to BHEL for any site data like Soil investigation data, foundation data of adjacent buildings. INDIAN STANDARDS code of practice (for machine foundation, other foundations, for geotechnical data, concrete design etc.) to be followed for the foundation design. Foundation will be made by BHEL. Soundness of the foundation to be checked and certified by the vendor within 30 days of work completion intimation by BHEL.		
6.0	**OPERATIONAL SAFETY**	Following safety features shall be provided: **6.1** Emergency Switches along with safety alarm provisions at suitable locations. **6.2** Automatic Alarms and protections for over load, overheating, excessive vibration and		

		fire **6.3** Adequate protection for all moving and rotating parts to be ensured. **6.4** All the rotating parts used in the equipment should be statically & dynamically balanced to avoid undue vibrations & noise. **6.5** Any other safety provisions required for the safe operation of the system to be included		
7.0	**ENVIRONMENTAL SAFETY**	The Test Rig should conform to following factors related to environment: **7.1** Maximum noise level shall not be more than 85 dB (A) at one meter away. Vendor to demonstrate compliance to noise level during PDI and during installation at BHEL R&D. **7.2** No hazardous chemicals shall be used in the equipment. **7.3** If any safety /environmental protection enclosure is required it should be built in the system by the vendor. **7.4** Paint of the equipment should be oil/ coolant resistant and should not get peeled off and mixed up with coolant.		
8.0	**DOCUMENTATION**	**8.1** Vendor shall submit following mandatory documents along with offer (all units shall be in SI) in English: **8.1.1** Technical description of complete system, working methodology with detailed write ups/sketches/figures, wherever required along with tentative activity schedule/bar chart. Detailed catalogues and Brochures/Technical details / supporting information of the system & its accessories. **8.1.2** Proposed heating system **8.1.3** Design calculation for heating time and power required **8.1.4** Proposed cooling system **8.1.5** Design calculation for cooling time and coolant (Nitrogen gas) requirement **8.1.6** Make and model of the systems, subsystems **8.1.7** All required consumables with in BHEL Scope along with quantities, make, grade are to be specified **8.1.8** Vendor should provide tentative scheme of the holding/coupling arrangement of the test rotor with the drive spindle. Vendor shall also provide the additional required length and size for test rotor for holding/coupling.		

		8.2 Vendor shall submit following documents within 60 days from purchase order acknowledgement (all units shall be in SI) in English: **8.2.1** Final General Arrangement (GA) layout drawings systems including control room location, for the complete system consisting of drive train, assembly stand **8.2.2** All sub system data sheets, schematics, circuit diagrams, electrical system write-up **8.2.3** Vendor should provide the details of holding/coupling arrangement of the test rotor with the drive spindle **8.2.4** Bill of materials (BOM) indicating all loose items, component detail drawings, catalogues, Cable schedules, Interconnection diagrams, termination details and detailed activity schedules/bar chart. **8.2.5** Carpet area required (Length, Width and Height) for layout of complete system & accessories. **8.2.6** Vendor shall take the necessary approval and operating license from Chief Controller of Explosive, Nagpur, India prior to installation & commissioning of nitrogen cooling system. **8.2.7** Required firefighting system and safety measures to be followed are to be provided as well as detailed bill of quantity for the same. **8.2.8** Schemes, equipment technical data sheets and lube oil specification **8.2.9** Vendor has to state probable number of packages, their dimensions, Gross weight and Net weight. **8.2.10** Foundation documentation details to be provided **8.2.11** Overall power requirement in kVA for continuous operation of test rig with all subsystems working.		
		8.3 Vendor shall submit following details during the process of execution and before the Pre Dispatch Inspection (PDI) (all units shall be in SI): a) Total load (kVA) requirement of complete system b) Max Drive System Load (kVA) c) Max Heating System Load (kVA) d) Painting of Complete system / Electrical Panels: Colour as per vendor standard, e) Total weight of the system f) Weight of heaviest part g) Weight of the heaviest assembly/ subassembly h) Dimensions of largest part/ subassembly/ assembly i) Hydraulic, Pneumatic & oil pipings should be preferably metallic except places		

		where flexible pipings are essential. All the pipes required for the same shall be included in the standard scope of the equipment. j) Quantity and parameters of cooling medium k) Redundancy of systems l) Make-up of consumables. m) Storage and handling of equipment prior to erection. n) Details of the heating system with all the sub systems like heaters, vacuum pump etc., with capacities and power consumption for each sub-system along with P&I diagram and relevant calculations on heating source. o) Details of the closed loop cooling system with all the subsystems like coolant storage system, blower/compressor, heat exchanger etc. with capacities and power consumption by each subsystem along with P&I diagram and coolant requirement for continuous operation with calculation of sizing of different sub systems. p) Details of Drive arrangement and power requirements for the test rotor. q) Schematic of the Drive system along with bearing and supports details r) Details of loading and unloading system for the test rotor along with capacities and power consumption. s) Details of lube oil system, oil tank capacity and oil grade. t) Details of vacuum system and sealing system. u) Details of coupling system between the test rotor and drive including thermal isolation. v) Details of the strain and temperature measurement system using telemetry system. w) Details of the DIC strain measurement system, x) Details of the test chamber along with calculations for burst withstand ability for the maximum weight of the test rotor up to maximum operating temperature and speed. y) Space requirement and lay out of the test set-up & Details of running cost z) Non-Disclosure Agreement (NDA) between BHEL and the development partners to maintain confidentiality.		
9	PRE-QUALIFICATION CRITERIA (PQC)	**9.1.** Vendor on whom PO will be placed must be the Original Equipment Manufacturer (OEM) and supplier of this "High Temperature Vertical Spin Test Rig System". Country of OEM must also be the country of origin. Country of origin certificate issued by the chamber of commerce to be submitted as a proof of compliance. **9.2.** Only those vendors who have supplied and commissioned at least one test rig for spinning of Test rotors of weight 1000 kg (or more) and at temperature 600 deg. C or more and at speeds of 3600 rpm (or more) operable in vacuum (1 Torr absolute or		

		better), in the past ten years as on date of enquiry and the supplied test rig is working satisfactorily for a cumulative operating hours of minimum 500 hours in the last three years, prior to date of this enquiry. **9.3.** The vendor should have a D&B rating of 2A2 or better and an annual turnover of five million dollars in the last two years. **9.4.** Prospective vendor shall furnish capacity details of High Temperature Vertical Spin Test Rig System as given in the **Annexure-VI.** **9.5.** The vendor shall furnish following details (details to be given in the format as enclosed in **Annexure-VII**) of such customer to whom such equipment has been supplied, which is required from all the vendors for qualification of the offer. a) Name of the customer / company where such equipment is installed. b) Complete postal address of the customer c) Month and Year of commissioning d) Parameters of supplied spin facility: i. Capacity of test rig supplied, kg ii. Maximum spinning speed for 1000 kg (or more) test rotor. iii. Vacuum Level (in Torr) iv. Maximum uniform rotor temperature achieved in deg. C v. Time taken to reach the maximum temperature for the maximum rotor weight vi. Maximum Temperature difference achieved between the surface and volumetric bulk mean during heating and cooling e) Name and Designation of the contact of the customer f) Phone, Fax no., and E-mail address of the contact person of the customer. g) Equipment Performance certificate shall not be older than 18 months from the enquiry date. **9.6.** BHEL will carry out independent verification of performance certification. Hence, prospective vendors are required to give only reference of those customers who are willing to confirm independent verification and not refrain from the same on the grounds of confidentiality. **9.7.** BHEL will verify the information provided by the vendor during the technical evaluation. In case the information provided by the vendor is found to be false / in-correct, the offer shall be rejected. If at any time during the execution of the order, it comes to the knowledge of BHEL that the vendor has made a fraudulent declaration, BHEL reserves the right to take appropriate action as per extant rules. **9.8.** Both unpriced and priced bids must be quoted only as per formats enclosed as		

		Annexure-VIII and **Annexure-IX**, respectively.		
10	**WARRANTY**	**10.1.** Warranty for all parts (for all systems and sub-systems): Warranty for 36 months from the date of successful demonstration and acceptance at R&D. Vendors shall quote and supply the spares (including low-shelf life spares) required for this warranty period. Warranty spares are to be identified (both in quantity and nomenclature) in the technical bid and supplied along with the equipment. All the warranty spares are to be classified and tagged along with the respective sub-systems for ease of identification. Unutilized warranty spares shall be retained by BHEL after expiry of warranty period. For low shelf-life items less than three years spares to be supplied at appropriate time for enabling continuous operation of entire system. **10.2.** During warranty period, the repairs and maintenance of the system and sub-systems shall be carried out by the vendor free of cost at BHEL R&D, Hyderabad. **10.3.** Replacements of system and sub-systems shall be carried out at BHEL R&D, Hyderabad. All incidental costs related to replacement (including freight, duties etc.) shall be to the account of the vendor. **10.4.** During warranty period, all upgrades to the operation related to data acquisition, processing and data-logging software must be provided free of cost. **10.5.** During warranty period, recommended spares procured along with equipment, intended to be used after warranty, shall not be utilized by vendor. If utilized during the warranty period, they shall be replaced free of cost within 15 days. All incidental costs related to replacement (including freight, duties etc.) shall be to the account of the vendor. **10.6.** If during warranty period, there is any breakdown of the equipment for duration of 15 days cumulatively from the date of reporting, warranty period will be extended by that duration. This is to be complied by the vendor. **10.7.** Contact information of service engineers MUST be provided at the time of installation or E&C. **10.8.** Availability of trained service engineers in India for attending to the problem in at most 7 days has to be ensured and complied to. **Note: Price of mandatory spares will be included in cost comparison.**		
11	**PRE DISPATCH INSPECTION (PDI) AND TRAINING**	**11.1.** The vendor should intimate for PDI and Training at least 45 days in advance from the proposed PDI and Training date at vendor works. **11.2.** Scope, Duration and daily schedule for PDI for 4 BHEL officials should be indicated in the offer. **11.3.** Soft copies of all valid test reports of the main and sub systems shall be furnished to		

	AT OEM WORKS	the satisfaction of BHEL review authorities fifteen days before starting for PDI. Consequences, if any, due to delay in furnishing valid and satisfactory certificates shall be to the account of vendor **11.4. Demonstration during PDI:** **11.4.1.** Vendor should demonstrate one test cycle as mentioned in **Annexure-Ia** on a sample plane cylindrical solid forged test rotor (material: SS316 or any other equivalent material with respect to thermal conductivity, emissivity, density and specific heat, mechanical strength) of at least 1000mm diameter and length of 1000mm while measuring/achieving the following i. Maximum surface temperature of the test rotor ii. Computation of bulk mean temperature iii. Difference between above i and ii iv. Vacuum level v. Strain on the circumferential and axial direction on the rotor **11.4.2.** Test cycle to be demonstrated in the automatic control mode. **11.4.3.** The total system to be demonstrated compatible with Indian power supply requirements with three phase 415 +/-10% Volts, 50 Hz, AC power source. **11.4.4.** Sample rotor shall be in the scope of the vendor and the same shall be supplied along with the test rig to BHEL. **11.5.** During PDI, suggested modifications/ changes, if any by BHEL official should be carried out and intimated to BHEL for dispatch clearance. If suggestions/corrections warrant one more PDI, the additional travel costs shall be to vendor's account, **11.6.** Dispatch clearance for consignment will be given by BHEL Official after carrying out PDI at OEM's works after coming back to India. **11.7.** Training at OEM works shall be conducted subsequent to PDI. Detailed training at OEM work's / factory has to be provided by factory engineer to 4 BHEL officials on working of all modes of the equipment along with the accessories, handling the software for operation or data acquisition and maintenance procedures. Training should also be provided on safety features, tasks to be performed in case of emergency, etc. **11.8.** Detailed scope, duration and daily schedule for training at OEM works has to be indicated in the offer. The training charges, if any, have to be quoted separately as per **ANNEXURE-X** enclosed with the enquiry. The duration and total charges for the same has to be indicated appropriately in unpriced and priced bids as enclosed as **Annexure-VIII** and **Annexure-IX,** respectively.		

		11.9. Training certificate/ report should be submitted to BHEL official after successful completion of the same. **11.10.** Travel and stay for personnel deputed for PDI and Training will be borne by BHEL		
12	**PACKING**	Sea worthy & rigid packing shall be provided for system, control and all other supplied items to avoid any damage/loss in transit. All small/loose items should be suitably packed in boxes.		
13	**OPERATION AND MAINTENANCE (O&M) MANUALS**	2-sets of Operation & Maintenance Manuals in English language in hard copy and one set in soft copy shall be supplied along with the equipment. The manuals shall contain all revised drawings, sub-vendors catalogues, O&M instructions, Do's & Don'ts, warnings & the spares information duly identified.		
14	**AFTER SALES SUPPORT AND NON-COMPREHENSIVE ANNUAL MAINTENANCE CONTRACT (AMC)**	a) Non-comprehensive AMC charges shall be quoted for 3 years beyond the stipulated warranty period (of 3 years) quoted on per year basis as a % of basic equipment cost as per **Annexure-XII** enclosed with the enquiry b) These charges have to be valid for 5 years beyond the stipulated warranty period. c) BHEL will add the quoted AMC charges of three years for cost evaluation while deciding the tender priorities d) BHEL reserves the right to place a separate order/ orders for AMC contract for 3 years and/ or part thereof, at the rates quoted after warranty period. e) All software upgrades have to be provided free of cost during service AMC period. f) AMC charges will be paid on half yearly basis after completion of services including mandatory visit to BHEL Site, failure of which shall entail forfeiture of the half yearly payment and extension of warranty at the discretion of BHEL. Consequential impact on any failure due to the above shall be to the account of the vendor g) If during AMC period there is any breakdown of the equipment for a cumulative duration beyond 15 days from the date of reporting, AMC period will be extended by that duration. This shall be complied by the vendor. h) Scope of AMC is indicative but not limited to the following i. Vendor shall make mandatory visit biannually and check the following ii. Heating system iii. Cooling system iv. Drive system v. Control and instrumentation system vi. Vendor shall make break down visit within seven days wherever necessary. To the		

		extent possible online support in the form of SMS/telephone/email/chat shall be within 24 hours. Reprisal mechanism to be indicated by the vendor vii. During preventive visit, the vendor to ensure all the software upgrades are in place		
15	**COMPLIANCE STATEMENT**	**15.1.** The vendor should clearly indicate whether they are able to supply as per BHEL specifications for each item description. Vendors are advised to write specifications in detail and not to write like 'Complied/ Yes / No ' etc.in specifications. **15.2.** The vendor may mention reasons for deviations from specifications		
16	**DELIVERY PERIOD**	The equipment enquired forms a part of a Government of India funded Project (Scheme) and the delivery period mentioned below has been derived keeping in view of the Scheme completion date. Vendor shall comply with this required period. Vendor should quote time period separately for 'Supply' and 'E&C' of equipment **16.1. Supply period:** For Supply portion, duration shall be counted from the date of Purchase Order. Vendors are required to indicate the best delivery period i.e., Order acceptance, submission of drawings etc., should not be linked to the delivery period. Supply period indicated by vendor should include reasonable time required for approval of drawings and other inputs from BHEL. In the Techno-Commercial Bid, the vendor shall submit milestones for various activities in co-relation with Supply and E&C period quoted by him. Time period required for dispatch Ocean Bill of Lading (OBL) date for out-side India Suppliers / Lorry Way Bill(LWB) date for FOR-BHEL R&D Stores for Indian Suppliers) from the date of Purchase Order in the "Vendor's confirmation" below. DELIVERY PERIOD (in Weeks) REQUIRED BY BHEL (SUPPLY PORTION) (PO date to OBL/LWB date): **52 Weeks** DELIVERY PERIOD (in Weeks) OFFERED BY VENDOR(SUPPLY PORTION) (PO date to OBL/LWB date):_____ **16.2. E&C and demonstration period:** – within 8 weeks after intimation of readiness of the site. E&C start date within 30 days from the intimation of site readiness by BHEL. E & C and DEMONSTRATION PERIOD (in Weeks) REQUIRED BY BHEL: 08 Weeks E & C PERIOD (in Weeks) OFFERED BY VENDOR (E & C PORTION): _____		

		However, while evaluating the offers, those offers which are not conforming the requested delivery and E & C and demonstration period by BHEL, COMMERCIAL LOADING @½% of the purchase order value per week will be done for the EXTRA PERIOD requested. Commercial loading on the offered price will be done during evaluation of the offers.		
17	**FUTURE UPGRADATION**	List of all upgradable components/features of "High Temperature Vertical Spin Test Rig System" supplied as per PO to be provided		
18	**TEST CERTIFICATES REQUIRED**	**18.1.** Manufacturer's test certificate shall be provided along with the items **18.2.** Calibration certificates from internationally recognized authorities for the strain & temperature measurement systems should be provided.		
19	**MONTHLY PROGRESS REPORT**	Vendor to submit the monthly progress report along with photographs and relevant documents as per the bar chart schedule.		
20	**ERECTION AND COMMISSIONING (E&C) OR INSTALLATION**	**20.1.** E&C or Installation has to be carried out at BHEL Corporate R&D Division, Hyderabad – 500093, India, by the OEM or their authorized service agency/ personnel only. **20.2.** OEM to take full responsibility for carrying out the unpacking, erection, start-up, testing of the system, its control & all types of other supplied equipment / accessories etc. Service requirement like Power & water shall be provided by BHEL at only one point to be indicated by vendor in their foundation / layout drawings. **20.3.** Other requirements like crane shall also be provided by BHEL. **20.4.** Vendor should indicate Broad Schedule of Erection and Commissioning in the offer and number of days required to start the E&C after receiving intimation from BHEL on readiness of the site for E&C. **20.5.** Vendor should indicate duration (in week's) for completion of E&C, demonstration and post-installation training at R&D. **20.6.** Delay in completion of E&C within stipulated time indicated earlier will attract penalty as per Late Delivery (LD) clause mentioned in commercial terms and conditions (CTC) as applicable. **20.7.** All cables, adapters, etc. required for integration of each and every component of "High Temperature Spin Test Rig System" must be supplied along with the system.		

		Any requirement for handling, etc. the equipment(s) during E&C/ Installation should be arranged by the vendor. It is the responsibility of the vendor to integrate all the systems (including accessories, auxiliaries, if any) and ensure the functionality of the entire system and accessories, auxiliaries as per technical scope of the enquiry. **20.8.** E & C charges will include services to be rendered at R&D for installation like erection, commissioning, rotor test running, performance tests, and onsite training to operators etc. **20.9.** The estimated percentage value of these charges as per BHEL: 10% of basic equipment priced (i.e., price of equipment with accessories and auxiliaries (if any), excluding spares). **20.10.** The Vendor should quote these charges as % of basic equipment price also separately in un-priced and priced bids as per enclosed **Annexure-VII** and **Annexure-IX** respectively. Only in case where quoted value is less than the value (in %) specified above or separate value is not mentioned in the offer, value for E&C shall be deemed to be considered as the value indicated above (10%) and accordingly supply value will be adjusted from that quoted value and balance will be released as E&C payment as per Payment terms- under Commercial terms and conditions of enquiry. **20.11.** E&C report should be submitted to BHEL after successful completion of the same. E&C charges will be paid only after successful completion of E&C and submission of report subjected to BHEL certification. **20.12.** Successful spinning of BHEL components by the vendor shall be considered as part of commissioning of the Test Rig **20.13.** All travel, boarding, lodging and other charges (if any) for authorized personnel deputed for E&C/ Installation and demonstration should be borne by the vendor. **20.14.** Portion, if any, of the equipment, accessories and other supplied items where paint got rubbed or peeled off during transit or erection should be repainted and matched with the original adjoining paint by the vendor before final acceptance.		
21	**DEMONSTRATION AT SITE**	**21.1.** Vendor should demonstrate the achievement/ monitoring of the temperature difference and measurement of strain & temperature using telemetry system on one of the two test rotors as per the test cycle mentioned in the **Annexure-I** for at least two cycles at BHEL R&D, after successful erection & commissioning of the system. **21.2.** Demonstration report should be submitted to BHEL after successful completion of the same. **21.3.**Demonstration charges at R&D for installation should be quoted separately in un-priced and priced bids as per **Annexure-VIII** and **Annexure-IX** respectively.		

		21.4. All travel boarding, lodging and other charges (if any) for authorized personnel deputed for demonstration should be to vendors account.		
22	**OTHER INSTALLATION REQUIREMENTS AT SITE**	**22.1.** Vendor should intimate all pre-installation and utility requirements such as: (a) Power requirement(s); (b) Earthing / grounding requirement(s); (c) Temperature, humidity control requirement(s); (d) Dimensions of equipment, weight and space requirements; (e) Civil works such as head room requirement, special foundation requirement with drawings and procedure for laying foundation, crane etc.) along with the technical bid. **22.2.** Any parts/ accessories of the equipment(s) to be incorporated in the civil works (such as steel reinforcements for foundation of equipment, etc.) have to be dispatched within 90 days from the receipt of the purchase order acknowledgement (from the OEM), to the site of installation. These have to be indicated in detail and quoted separately in the price bid.		
23	**POST-INSTALLATION TRAINING**	**23.1.** Post-installation training shall also be provided by the installation engineer(s) for all modes of "High Temperature Spin Test Rig System" along with accessories (if any) being provided, at site of installation for at least 4 officials from BHEL **23.2.** Scope of training and schedule to be worked out mutually. **23.3.** Post-installation charges at site of installation should be quoted separately in unpriced and priced bids as per **Annexure-VII** and **Annexure-VIII** respectively. **23.4.** Post-installation training certificate/ report should be submitted to BHEL after successful completion of the same. **23.5.** All travel, boarding, lodging and other charges (if any) for authorized personnel deputed for post installation training should be to vendors account.		

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Annexure-I
Test cycle details

Each test rotor will be continuous tested for **200 cycles** (approximately 18000 Hrs.) and one tentative test cycle is as follows:

Tentative Test cycle for Monometallic Rotor (Ref: Figure II (a) of Annexure II) One Test cycle of duration less than 90 hours as detailed below (schematic of the cycles is given in Figure I (a) and Figure I (b)).

a) Purging of the chamber with pressurized nitrogen to drive out the trapped air at the start of the first cycle

b) Maintain the required vacuum or pressurized nitrogen before the start of heating cycle

c) Preheating of the test rotor from ambient to uniform metal temperature of 200 deg. C in case of cold start.

d) Speed coast up from 0 rpm to 600 rpm in 1 minute at the start of the pre-heating followed by steady state speed of 600 rpm during the preheating.

e) Heating of the test rotor from uniform metal temperature of 200 deg. C to 800 deg. C while maintaining any specified radial temperature difference of 100 deg. C to 250 deg. C between test rotor surface temperatures to test rotor bulk mean temperature.

f) Speed coast up from 600 rpm to 3000 rpm in 4 minutes at the start of the heating from uniform metal temperature of 200 deg. C followed by steady state speed of 3000 rpm shall be achieved.

g) Test rotor should reach uniform metal temperature of 800 deg. C at the end of heating cycle (isothermal condition)

h) The above heating time including cold start should be less than 20 hours while maintaining a temperature difference of 180 deg C between test rotor surface temperatures to test rotor bulk mean temperature. However the heating system should have a capability for temperature difference between test rotor surface temperatures to test rotor bulk mean temperature to vary from 100 deg. C to 250 deg. C for heating (Refer Fig: I (a)), hence vendor shall submit the heating, soaking times for 100, 150, 200 and 250 deg. C temperature difference between test rotor surface temperatures to test rotor bulk mean temperature.

i) Test rotor temperature is to be maintained at 800 deg. C (steady–state) for 50 hours.

j) During steady state at 800 deg. C rotational speed is to be increased from 3000 rpm to 3600 rpm in 1 minute, to be maintained at 3600 rpm for 1 min and to be decreased to 3000 rpm in 1 minute in each cycle.

k) Cooling of the test rotor within 20 hours from uniform metal temperature of 800 deg. C to test rotor core temperature of 200 deg. C or less by maintaining radial temperature difference between test rotor surface temperatures to test rotor bulk mean temperature of not more than 144 deg. C. However the cooling system should have capability for Temperature difference between test rotor surface temperatures to test rotor bulk mean temperature to vary from 80 deg. C to 200 deg. C for cooling (Refer Fig: I (a)), hence vendor shall submit the cooling time for 80, 120, 160 and 200 deg. C temperature difference between test rotor surface temperatures to test rotor bulk mean temperature

l) Test rotor speed coast down from 3000 rpm to 600 rpm at the end of the cooling cycle followed by steady state speed of 600 rpm.

m) Test rotor should be heated to reach uniform metal temperature of 200 deg. C (i.e. no radial temperature difference/isothermal condition) and isothermal condition to be maintained for at least 5 mins. The above cooling time and preheating time together should be less than 20 hours for temperature difference of 140 deg. C Indicative set points for setting automated test cycle are given as 1,2,3 & 4in the calloutsgiven in Figure Ia

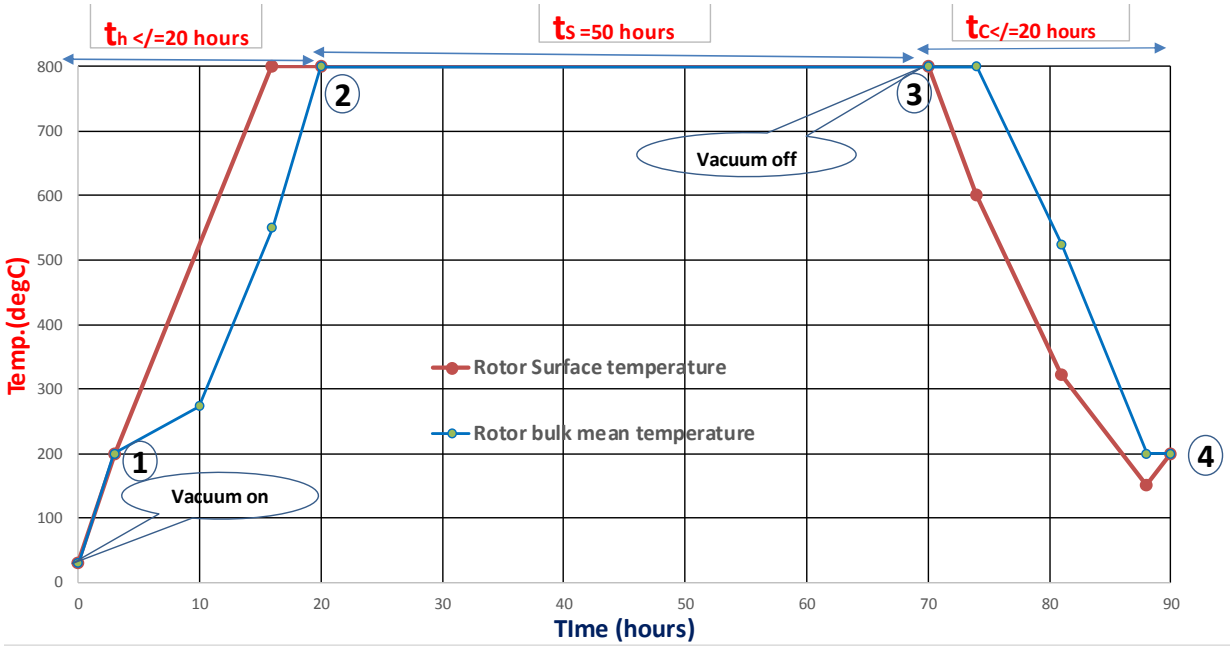

Figure I(a): Schematic of typical test (Heating –Steady State-Cooling) cycle (Temp vs time)

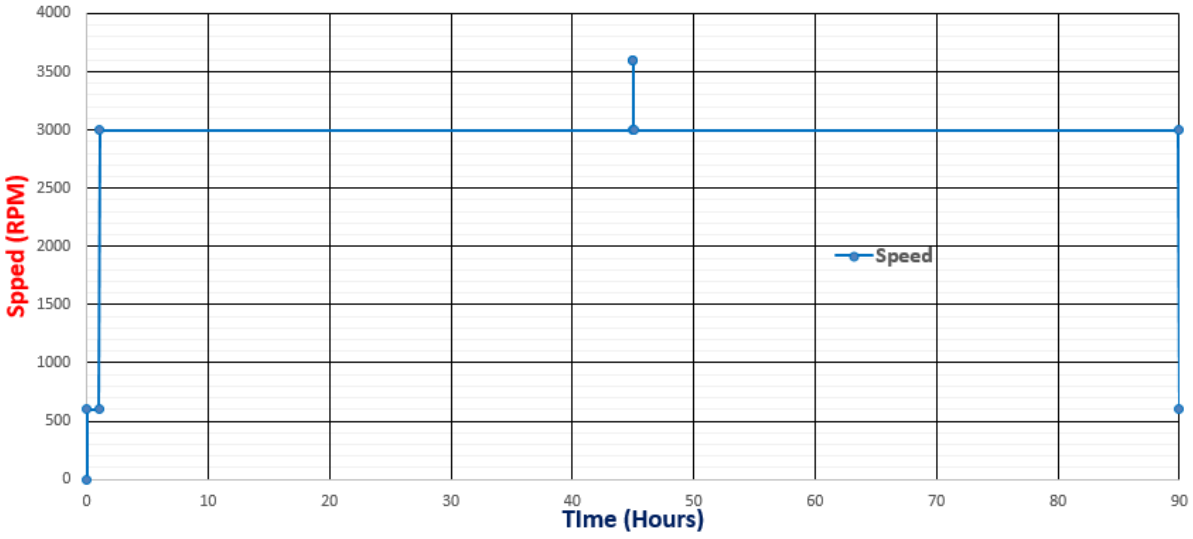

Figure I(b): Schematic of typical test cycle- speed Vs time

Table 1. User configurable parameters for Automatic test cycle (Figure 1a &1b)		
Sl. No.	**Parameters for test rotor**	**Default Values**
1.	Initial temperature	Ambient Temperature
2.	Speed during preheating	600 rpm
3.	Speed during steady state	3000 rpm
4.	Speed during over speed	3600 rpm
5.	Acceleration	600 rpm/min
6.	Deceleration	600 rpm/min
7.	Uniform rotor temperature after preheating	200 deg. C
8.	Uniform rotor temperature at the end of heating cycle	800 deg. C
9.	Maximum Temperature difference between rotor surface and rotor bulk mean to be achieved at least once during heating	200 deg. C
10.	Duration of steady state heating	50 hours
11.	Uniform rotor temperature at the end of cooling cycle	200 deg. C
12.	Maximum Temperature difference between rotor bulk mean and rotor surface to be achieved at least once during cooling	160 deg. C
13.	Speed at the end of cooling	600 rpm

Annexure-I(a)
PDI sample rotor and test cycle details

PDI on sample test rotor of sample plane cylindrical solid forged test rotor (material: SS316 or any other equivalent material with respect to thermal conductivity, emissivity, density and specific heat, mechanical strength) of at least 1000mm diameter and length of 1000mmwill be carried out as follows:

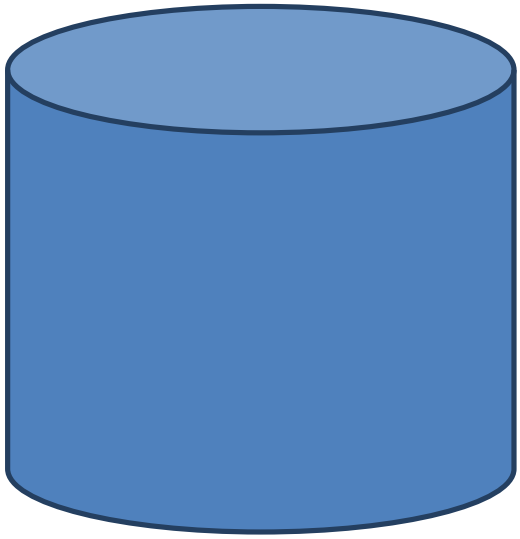

Figure I (c): PDI sample test rotor (length 1000mm and diameter 1000mm)

PDI Test cycle for full speed (refer Fig: I(d))

i. Purging of the chamber with pressurized nitrogen to drive out the trapped air at the start of the first cycle

ii. Maintain the required vacuum or pressurized nitrogen before the start of heating cycle

iii. Speed coast up from 0 rpm to 600 rpm in 1 minute at the start of the pre-heating followed by steady state speed of 600 rpm during the preheating.

iv. Heating of the test rotor from ambient metal temperature to 450 deg. C

v. Speed coast up from 600 rpm to 3000 rpm in 4 minutes at 450 deg C.

vi. Test rotor should reach uniform metal temperature of 450 deg. C at the end of heating cycle (isothermal condition)

vii. Test rotor temperature is to be maintained at 450deg C (steady–state) for 50 hours.

viii. During steady state at 450 deg. C rotational speed is to be increased from 3000rpm to 3600 rpm in 1 minute, to be maintained at 3600 rpm for 10 min and to be decreased to 3000 rpm in 1 minute in each cycle.

ix. Cooling of the test rotor from uniform metal temperature of 450 deg. C to ambient temperature Test rotor speed coast down from 3000rpm to 600rpm at the end of the cooling cycle followed by steady state speed of 600rpm.

PDI Test cycle for maximum temperature (refer Fig: I(e))

i. Purging of the chamber with pressurized nitrogen to drive out the trapped air at the start of the first cycle

ii. Maintain the required vacuum or pressurized nitrogen before the start of heating cycle

iii. Speed coast up from 0 rpm to 600 rpm in 1 minute at the start of the pre-heating followed by steady state speed of 600 rpm during the preheating.

iv. Preheating of the test rotor from ambient to uniform metal temperature of 200 deg. C

v. Heating of the test rotor from 200 deg. C temperature to 800 deg. C while maintaining radial temperature difference of 180 deg. C or less between test rotor surface temperatures to test rotor bulk mean temperature in less than 20 hours. The radial temperature difference of 180 deg. C between test rotor surface temperatures to test rotor bulk mean temperature shall be achieved at least once in heating cycle.

vi. Speed coast up from 600 rpm to 1500 rpm in 2 minutes at 800 deg. C.

vii. Test rotor should reach uniform metal temperature of 800 deg. C at the end of heating cycle (isothermal condition)

viii. Test rotor temperature is to be maintained at 800 deg. C (steady–state) for 50 hours.

ix. Cooling of the test rotor from uniform metal temperature of 800 deg. C to 200 deg. C by maintaining radial temperature difference of 144 deg. C or less between test rotor bulk mean temperatures to test rotor surface temperature. The radial temperature difference of 144 deg. C between test rotor surface temperatures to test rotor bulk mean temperature shall be achieved at least once in cooling cycle.

x. Test rotor speed coast down from 1500 rpm to 600 rpm at the end of the cooling cycle followed by steady state speed of 600 rpm.

Indicative set points for settingautomated test cycle are given as 1,2,3 & 4 in the callouts given in Figure I (a)

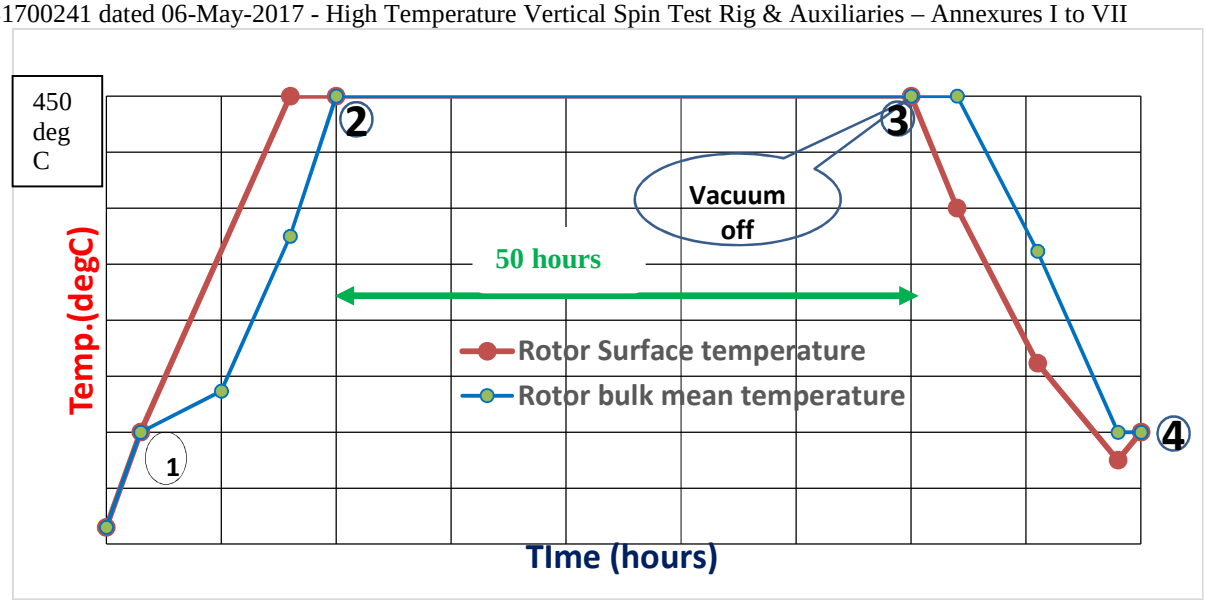

Figure I(d): Schematic of typical test cycle- speed Vs time (Maximum temperature 450 deg C and maximum speed 3600 rpm)

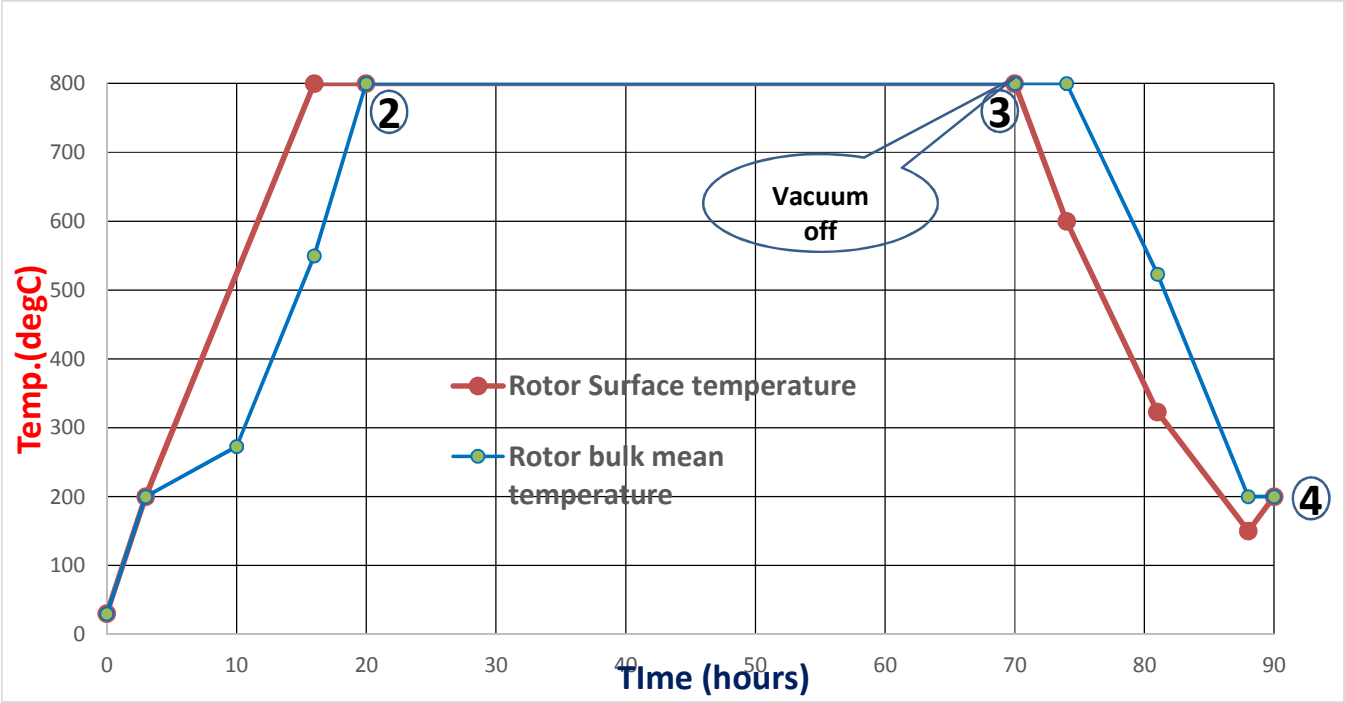

Figure I(e): Schematic of typical test (Heating –Steady state-Cooling) cycle (Temp vs time) (Maximum speed 1500 rpm)

Annexure-II

Test Rotor details

A schematic of the two test rotors is given in Figure II (a) and Figure II (b). (Test rotors are in the scope of BHEL).

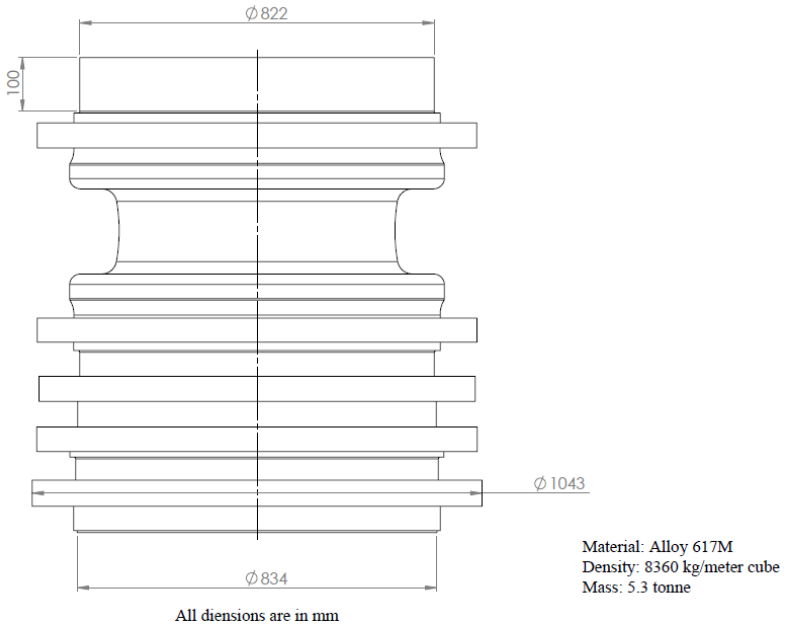

Figure II (a): Mono metallic Test Rotor

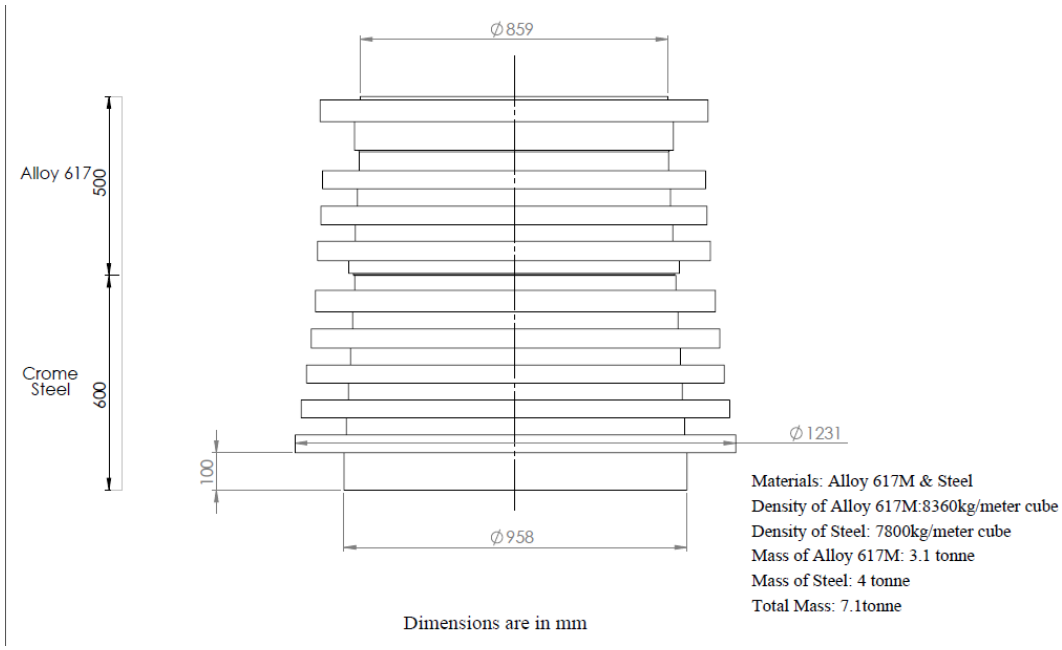

Figure II (b). Bi-metallic Test Rotor (to indicate minimum and maximum dimensions and rounded off to tons)

- Material of test rotor: Test rotor 1: Alloy 617M (Ni Based alloy)
- Test rotor 2: welded piece of Alloy 617M and 9-10% Chrome steel
- Tentative Length: 1000mm + 100mm extra (provisional) for holding – However holding arrangement details to be provided by the vendor including allowance in the test rotor for holding.

Annexure-III

Specification of strain and temperature measurement system on test rotor		
S.No	**Description**	**Specification**
1	Thermal transients subjected by the test rotor	Thermal cycling i.e. heating, steady state, cooling and no of cycles as per Annexure-I
2	Speed/orientation of the test rotor	0 to 3600RPM / Vertical
3	Operating Environment	Air and Nitrogen
4	Chemical exposure	No chemical
5	Pressure of Environment	50 micro bar to 5 bar
6	Duration of Test	18000hrs continuous
7	Min / Max Strain (Range / Resolution)	+/- 10000 micro strain/ 1 micro strain
8	Mean static value and pk-pk dynamic value of strain	Max mean static value +/- 9000 micro strain and pk-pk dynamic 1000 micro strain
9	Min / Max temperature (Accuracy / Resolution) of temperature sensor	20 to 820 deg. C (+/- 0.5%/ 1^{o}C)
10	Lead wire length	Minimum 5 meters for all the strain gauges and temperature sensors.
10	Drift compensation for strain gauges and lead wires	Provision for drift compensation to limit the measurement error not more than 1% of measurement value.
11	Location and number of measurements	As per Annexure-IIIA (strain measurements – 52 nos) Annexure -IIIB (Temperature measurements- 34 nos)
12	Signal transmission methodology for strain and temperature	Telemetry system as per Annexure-IIIC

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Annexure-IIIA

Location and number of strain gauges

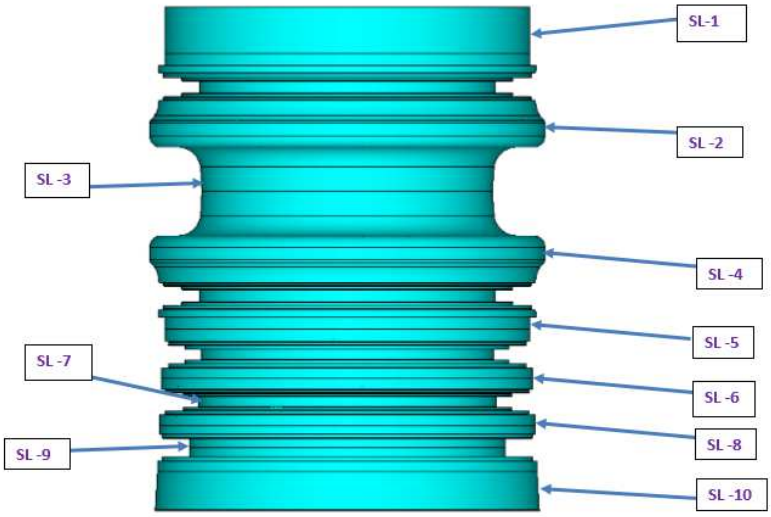

Figure III (a). Location for strain gauges at different axial positions on the test rotor

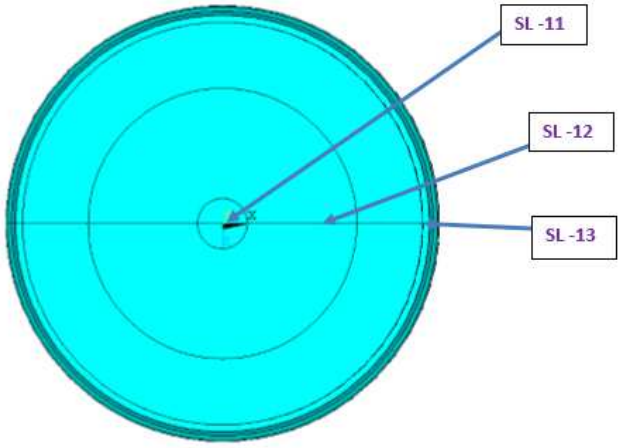

Figure III(b). Location for strain gauges at different radial positions on the test rotor bottom end

Total no of strain gauges with 2 gauges in perpendicular direction at each location and with dual redundancy for each test rotor	**13x2x2=52**

Annexure-IIIB
Location and number of temperature sensors

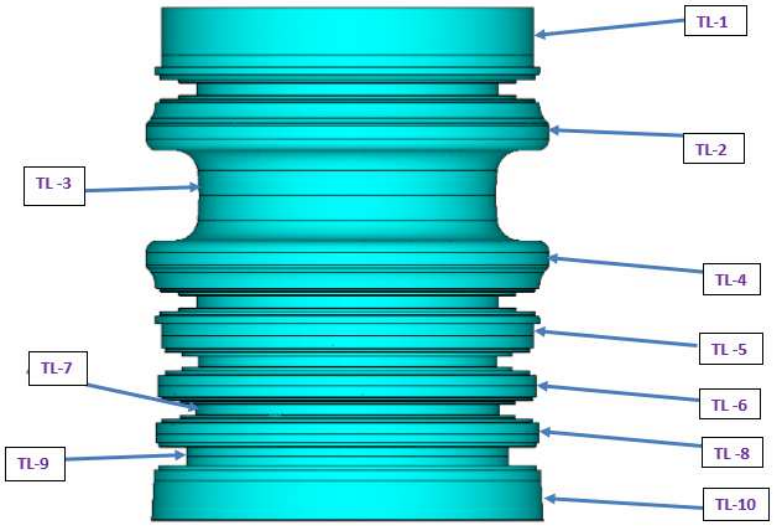

Figure III(c). Locations of thermocouples at different axial positions on the test rotor

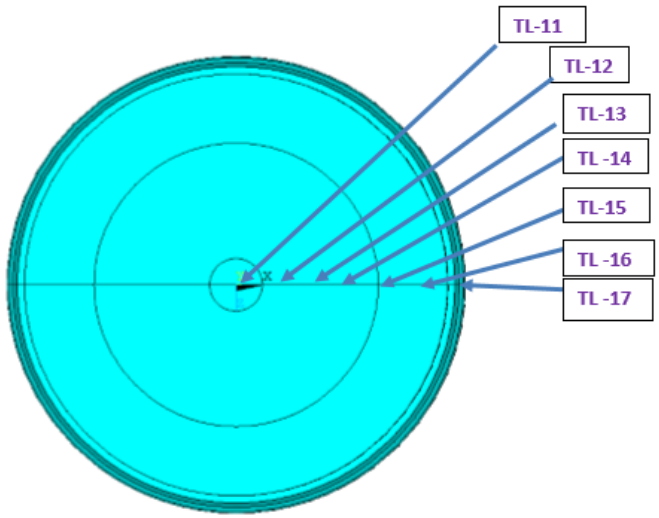

Figure III(d). Locations of thermocouples at different radial positions on the test rotor bottom end

Total no of temperature sensors on test rotor with dual redundancy for each test rotor	**17x2=34**

Annexure-IIIC

Specification of digital telemetry system		
S.No.	**Description**	**Specifications**
1	Mounting configuration	Middle of Shaft
2	Number of Channels	minimum 100 (40 channels for temperature sensors and remaining 60 channels for strain gauges 120ohms/350ohms with half and quarter bridge configuration) including redundancy
3	Signal bandwidth	DC -Minimum 5KHz
4	Auto balance	System should have auto balance capability to automatically balance all the channels
5	Measurement range	**Strain range(strain gauges)** : Max mean static value +/- 10000 micro strain and pk-pk dynamic 1000 micro strain **Temperature range :** 20 to 820 deg. C
6	Accuracy	Strain: +/-1 micro strain Temperature: +/- 0.5%
7	Environmental conditions	Minimum 85 deg. C for all components of the telemetry system to be mounted on the test rotor and adjacent to the test rotor and up to 60 deg. C for receiver which can be kept away from the test rotor. (on test rotors the components may be subjected to high temperature environment) • Vibration: min 20g(for components mounted on test rotor) • Speed: up to 5000rpm
8	Power Supply	Inductive power sources
9	Temperature overload indicator for telemetry system	The system should have status indicator to check the temperature within the telemetry system to prevent overheating.

Annexure-IV

Specification of DIC(Digital Image co relation) strain measurement system for the test rotor		
S.No	**Description**	**Specification**
1.	Test rotor dimensions	Cylindrical rotor(curved surface) of 1000mm diameter and 1000 mm length
2.	Speed/orientation of the test rotor	0 to 3600RPM / Vertical
3.	Operating Environment of the test rotor	Air and Nitrogen
4.	Chemical exposure of the test rotor	No chemical
5.	Temperature of the test rotor	20 to 800 deg. C
6.	Duration of Test	18000hrs continuous
7.	Painting	To withstand up to 820 deg. C and for long duration as per S.N0-6
8.	Min / Max Strain (Range)	+/- 10000 micro strain/ 1 micro strain
9.	Measurement accuracy	+/- 0.5 % of the full scale range
10.	Mean static value and pk-pk dynamic value of strain	Max mean static value +/- 9000 micro strain and pk-pk dynamic 1000 micro strain
11.	Min / Max temperature (Accuracy / Resolution) of temperature sensor	20 to 820 deg. C (+/- 0.5%/ 1^{o}C)
12.	Measurement locations	3D strain measurement for the entire length of the rotor surface
13.	Data acquisition software/display unit	Should contain the following features: • Display of directional strain/displacement vs time plot • Computation of principal strains and von Mises strains from the measured strains • Strain contour plot for the measured surface • FFT analysis

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Annexure-V

Vendor should supply hardware console for Data recording, processing, display and storage with the following features, with 100 % redundancy

SL No	Description	Specification
1	Operating System/platform	Windows 10 Professional 64-bit with Restore / Recovery CD/disk & with OS media CD/DVD
2	Display	Shall have sufficient no of displays with 36 inch LED Backlit IPS Monitors, Resolution 1920X1200@60 Hz or Better, for displaying all the data as per **clause: 3.10.9** of BHEL Specification No: CRD/HTVSTR/2017/01**.**
3	Memory (RAM)	Shall be sufficient to handle and process the multiple data with minimum lag. Should able to accommodate any future upgrades in next 5 years.
4	Graphic Controller	Sufficient enough to display clear images without out lag. . Should able to accommodate any future upgrades in next 5 years.
5	Storage with fail safe back up	Should be sufficient to store 40000 hrs continuous running data with proper back up, in case of failure data shall be retrievable.
6	Optical Drive	16x DVD +/- RW Drive (DVD Reader & writer)
7	IO Ports	Minimum 4 USB 3.0 port for data backup
8	Accessories	Keyboard and mouse

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Annexure- VI

A. Capacity Details of High Temperature Vertical Spin Test Rig System

Manufacturing Capacity (Major Vertical Spin Test Rig with Quantity)	Type of Major Vertical Spin Test Rig	Quantity
Vertical Spin Test Rig Supplied during last 10 Years (Year wise with quantity)	Scheduled Supply Period	Actual Supply Period
Outstanding Order Book Position(Type ofVertical Spin Test Rig with quantity and Name of Customers)		
Liquidation plan of all Vertical Spin Test Rig including BHEL test rig under consideration of ordering		

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Annexure -VII

Reference List: The Prospective supplier shall furnish a summary of their product reference as detailed below for major supplies in last 10 years with copies of the following

a. Letter of award and completion certificate

b. Executing strategy along with details of subcontracting of any part of the test facility

c. Scope of subcontracting if applicable need to be identified in the proposal along with the past experience of the subcontracting agency in the corresponding subcontracting work

Sl. No	Name of the project, client, Geographical Location and contact details	Brief scope of work	Month, Year of Purchase order	Contract value in US Dollars	Month, year of delivery completed/ under supply	Month, year of commission completed/ under commission	Weight of the test rotor (kg)	Rotor Diameter (mm)	Max Length of Rotor (mm)	Max temperature (Deg. C)	Max. Radial temp. difference	Remarks, if any

d. The offers of the vendors who are in the banned list and the offers of the vendors who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website at www.bhel.com.

NOTE: BHEL will carry out independent verification of performance certification. Hence, prospective vendors are required to give only reference of those customers who are willing to confirm independent verification and not refrain from the same on the grounds of confidentiality

(SIGNATURE)

SIGNATURE OF THE BIDDER WITH SEAL

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at —BHEL House“, Siri Fort, New Delhi œ 110049 (India) hereinafter referred to as —The Principal“, which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____,

(description of the party along with address), hereinafter referred to as —The Bidder/ Contractor“ which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART.

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for

_____

_____

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 - Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 - Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution:-

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal‘s employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 - Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the bidder(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors" framed by the Principal.

Section 4 - Compensation for Damages

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

Section 5 - Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 - Equal treatment of all Bidders/ Contractors/ Sub-contractors

6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from all subcontractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20 % of Bidder‘s/ Contractor‘s contract value with the Principal. The Bidder(s)/ Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).

6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section 7-Criminal Charges against violating Bidders/Contractors/Sub-contractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 -Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word ”Monitor‘ would include both singular and plural.

Section 9 - Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 - Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders/ contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

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For & On behalf of the Principal	For & On behalf of the Bidder/ Contractor
(Office Seal)	(Office Seal)

Place----------

Date----------

Witness: _____ Witness: _____

(Name & Address) ___ _____ (Name & Address) ___ _____

_____ _____

PROFORMA OF CONTRACT EXECUTION BANK GUARANTEE (CEBG)

In consideration of the Bharat Heavy Electricals Limited [1] (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at BHEL House, Siri Fort, New Delhi - 110 049, India through its Unit at Corporate R&D, Vikasnagar, Hyderabad - 500 093, Telangana, (name of the Unit) having agreed to accept (Name of the Vendor / Contractor / Supplier) having its registered office at_____ [2] (hereinafter called the said Contractor which term includes supplier), under the terms and conditions of the Contract reference No._____ dated _____ [3] valued at Rs……[4] (Rupees ----------)[4] (hereinafter called the said Contract) of Contract Execution Bank Guarantee for the due fulfilment by the said contractor of the terms and conditions contained in the said Contract, on production of a Bank Guarantee for Rs._____ [5] (Rupees _____ only), we ____(indicate the name and address of the Bank) having its Head Office at _____(address of the head Office) (hereinafter referred to as the Bank) at the request of _____ [Contractor(s)] do hereby undertake to pay to the Employer an amount not exceeding Rs._____ in the event of any breach by the said Contractor(s) of any of the terms and conditions contained in the said Contract.

We, _____(indicate the name of the Bank), do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Employer. Any such demand made on the bank, shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this guarantee shall be a valid discharge of our liability for payment hereunder and the Contractor(s) shall have no claim against us for making such payment.

We, further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till erection and commissioning is completed and Performance Bank guarantee is submitted or till _____ [6] office/Department/Division of Bharat Heavy Electricals Limited certifies that the terms and conditions of the said Contract have been fully and properly carried out by the said contractor(s) and also including the satisfactory commissioning of the equipment and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the _____[7], we shall be discharged from all the liability under this guarantee thereafter.

We, ____(indicate the name of the Bank)____ further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by any reason of any such variation or extension being granted to the said contractor(s) or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).
We,…… BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed…… [8]
b) This Guarantee shall be valid up to ……[9]
c) Unless the Bank is served a written claim or demand on or before _____[10] all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, ____(indicate the name of the Bank)____ lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Date _____ Day of _____

for____(indicate the name of the Bank)__

(Signature of Authorised signatory)

* This date to be indicated should not be earlier than 60 days after the date contemplated under the contract.

[1] *NAME AND ADDRESS OF THE EMPLOER. I.e Bharat Heavy Electricals Limited*

[2] *NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER .*

[3] *DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE*

[4] *PROJECT/SUPPLY DETAILS*

[5] *BG AMOUNT IN FIGURES AND WORDS*

[6 and 9] *VALIDITY DATE: One Month beyond completion of E&C date*

[7 snf 10] *DATE OF EXPIRY OF CLAIM PERIOD: two months beyond validity date*

[8] *BG AMOUNT IN FIGURES AND WORDS.*

Note:

1. **In Case of Bank Guarantees submitted by Foreign Vendors-**

   a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

   b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**

   b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter-Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.

b.2 **In case, Foreign Vendors intend to provide BG from** Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.

b.4 The BG should clearly specify that the demand or other document can be presented in electronic form.

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of the Bharat Heavy Electricals Limited [1] (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at BHEL House, Siri Fort, New Delhi - 110 049, India through its Unit at Corporate R&D, Vikasnagar, Hyderabad - 500 093, Telangana, (name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) having its registered office at_____[2] hereinafter referred to as the 'Contractor/Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No……dated ……[3] valued at Rs……[4] (Rupees ----------)/FC……(in words……..) for ……[5] (hereinafter called the 'Contract') and the Contractor having agreed to provide a Contract Performance Guarantee, equivalent to ……% (…. Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we, ……, (hereinafter referred to as the Bank), having registered/Head office at ……. and inter alia a branch at ……. being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer a maximum amount Rs ---------- (Rupees ----------) without any demur, immediately on a demand from the Employer, .
Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____ _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Contractor/ Supplier in any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the contractors/supplier shall have no claim against us for making such payment.

We the ……bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract and that it shall continue to be enforceable till all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We …….. BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Contractor/Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Contractor/Supplier and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor/Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Contractor/Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

This Guarantee shall remain in force upto and including…….. [6] and shall be extended from time to time for such period as may be desired by Employer.
This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Contractor/Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the ……[7]we shall be discharged from all liabilities under this guarantee thereafter.

We, …….. BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.
Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceed…… [8]
b) This Guarantee shall be valid up to ……[9]
c) Unless the Bank is served a written claim or demand on or before _____[10] all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of

(Name of the Bank)

Dated……

Place of Issue……

[1] *NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited*

[2] *NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.*

[3] *DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE*

[4] *PROJECT/SUPPLY DETAILS*

[5] *BG AMOUNT IN FIGURES AND WORDS*

[6 and 9] *VALIDITY DATE: warranty period from Commissioning date.*

[7 and 10] *DATE OF EXPIRY OF CLAIM PERIOD: 2 months beyond validity date*

[8] *BG AMOUNT IN FIGURES AND WORDS.*

Note:

1. **In Case of Bank Guarantees submitted by Foreign Vendors-**

   a. **From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India)** can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

   b. **From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)**

   b.1 In such cases, in the Tender Enquiry/ Contract itself, it may be clearly specified that Bank Guarantee issued by **any of the Consortium Banks only** will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter- Guarantee by Foreign Bank in favour of the Indian Bank (BHEL's Consortium Bank). It is advisable that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor. The tender stipulation should clearly specify these requirements.

   b.2 **In case, Foreign Vendors intend to provide BG from** Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at **sl.no. b.1** will required to be followed.

   b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time). In case, of Foreign Vendors, the BG Format provided to them should clearly specify the same.

   b.4 The BG should clearly specify that the demand or other document can be presented in electronic form.

CHECK POINTS FOR FURNISHING THE BANK GUARANTEE (BG) AND CEBG

1. The bank guarantee (BG) should be submitted on Rs. 100/- Non judicial stamp paper or part values totaling to Rs.200/-

2. The Non-judicial stamp paper should be purchased by the issuing bank.

3. The BG should be forwarded along with Banker's covering letter, with signature and seal. The contact details of the Issuing Bank such as Contact person(s), designation, Email ID, Phone No. and Fax No. should be indicated in the document

4. All the details in the blanks to be filled by typing, failing which every hand written entry / corrections should be attested with stamp.

5. The executor (bank authorities) is required to mention the power of attorney no. and date of execution in his favour authorizing him to sign the document.

6. Witnesses column should invariably be signed by the bank officials with name and designation.

7. Clear cut claim period of 2 months beyond the validity date, should be provided as per clause 14.

8. BG No. and date should be mentioned in all pages of BG. All pages should be endorsed/ signed by the executor(s)

9. Please note BG. from co-operative banks are not acceptable.

10. BG. from our consortium banks are preferable. (Our consortium banks list is enclosed).

11. **In case of BG. from non consortium bank (private or public sector bank) the clause no. 11 has to be mentioned with full address of the bank's branch at Hyderabad**.

12. In case of BG issued by foreign Bank, it may be confirmed by our consortium bank in India.

13. BG. of other banks (banks other than consortium banks, public sector banks and cooperative banks), can be accepted if their net worth is more than Rs. 500 crores as on last balance sheet date.(a certificate and copy of latest balance sheet to be given by the bank at the time of giving bank guarantee)