



RD-DP-MPT-04
Ref: 501900361

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

ENQUIRY

PHONE: 0177449 (EXT. 1004)
FAX: 91 882277649

Print Close

Date 18-05-2019

Enquiry for Supply of Fully Finish Machined Rotor Blades and Rotor Hub

Enquiry No:501900361

Enquiry Date : 18-05-2019

Due Date: 08-06-2019

Indicative Delivery Date : 16-12-2019

Sl No	Item Description	Unit	Qty
1	Supply of Fully Machined Rotor Blade as per drawing number RD-DG-3-50-19-0007 and attached specifications	NO	23
2	Supply of Fully Machined Rotor Blade as per drawing number RD-DG-3-50-19-0008 and attached specifications	NO	23
3	Supply of Fully Machined Rotor Hub as per drawing number RD-DG-3-50-19-0008 and attached specifications	NO	2

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, PQC, General Terms & Conditions, Commercial Terms & Conditions etc	Volume - 1
02	Technical specifications, Scope of Supply etc	Volume - 2

Paul
Moutusi Paul
Dy Manager
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18/5/19

	ENQUIRY & QUALIFYING CRITERIA	Volume - 1 Enquiry No 501900361
Supply of Fully Finish Machined Rotor Blades and Rotor Hub		

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) Supply of Fully Machined Rotor Blade as per drawing number RD-DG-3-50-19-0007 and attached specifications. - 23 NO 2) Supply of Fully Machined Rotor Blade as per drawing number RD-DG-3-50-19-0008 and attached specifications. - 23 NO 3) Supply of Fully Machined Rotor Hub as per drawing number RD-DG-3-50-19-0008 and attached specifications. - 2 NO
3	Enquiry Reference no.	501900361
4	Indicative Delivery Date	16-12-2019
5	Due date, Time and place for submission of tender	08-06-2019 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. 08-06-2019, 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: - Signed General Terms & Conditions (GTC) - Filled and Signed Commercial Terms & Conditions (CTC) - Filled and Signed Vendor Specifications against BHEL Specifications (Item wise) - Signed commercial bid - 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: 'md-eoffers@bhel.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 - Signed General Terms & Conditions (GTC) - Filled and Signed Commercial Terms & Conditions (CTC) - Filled and Signed Vendor Specifications against BHEL Specifications (Item wise) - Signed commercial bid - 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 501900361
Supply of Fully Finish Machined Rotor Blades and Rotor Hub		

SL.No.	Clause	BHEL REQUIREMENT
1	Preferences to MSEs	Preferences as mentioned in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 shall be given to Micro and Small enterprises. Main points which are mentioned in the above Policy are as follows: 1) In tender, participating Micro and Small Enterprises quoting price within price band of L1+15 percent shall also be allowed to supply a portion of requirement by bringing down their price to L1 price in a situation where L1 price is from someone other than a Micro and Small Enterprise and such Micro and Small Enterprise shall be allowed to supply at least 20 percent of total tendered value provided that the tendered quantity is divisible into two or more orders and adequate for the purpose; all qualifying bidders have agreed for acceptance of part-order quantity and participating MSE matches the L1 rate. 2) In case that two or more MSEs are within the L1 +15% band, all such MSEs will be offered the opportunity to match the L1 rate and 20% of the order will be shared equally by them. 3) Where the MSE is SC/ST owned, they shall be exclusively awarded a share of 4% of the above 20% in addition to equally sharing the balance 16% with other non-SC/ST MSEs . 4) In case of more than one SC/ST MSE matching the L1 price, they shall equally share 4% of the order , and additionally share the balance 16% with other non-SC/ST MSE bidders. 5) Up to 4% of the tendered quantity shall be procured from MSE's owned by SC/ST's at L1 price. Failure to participate by any MSE owned by SC/ST's this quantity shall be procured from other MSEs. 6) Above preferences are for procurement of only goods produced and services rendered by MSEs and not for any trading activities by them. An MSE Unit will not get any purchase preference over another MSE Unit. 7) MSE bidders must submit registration certificates from bodies specified by the Ministry of MSME. 8) SC/ST owned enterprises (i.e. SC/ST proprietorship, or holding minimum 51% shares in case of Partnership/Private Limited Companies) shall additionally submit relevant SC/ST certificates issued by any of the following: District/Additional District Magistrate /Collector/Deputy Commissioner/ Additional Deputy Commissioner/Deputy Collector/1st Class Stipendiary Magistrate/Sub-divisional Magistrate / Taluka Magistrate / Executive Magistrate/ Extra Assistant Commissioner Chief Presidency magistrate /Additional Chief Presidency magistrate /Presidency magistrate Revenue Officer not below the rank of Tehsildar Sub-divisional Officer of the area where the individual and/or his family normally resides a. The registration shall be valid as on date of placement of order. A self- attested photocopy of the relevant certificate shall be submitted as a support document. b. The registration must be for the items/category of items /services relevant to the tendered items/category of items/services All these benefits are subject to production of all statutory documents as per General Terms & Conditions (GTC) of enquiry along with Udyog Aadhaar Number
2	Preference to Make in India	For this procurement, Public Procurements (Preference to make in India), order 2017 dated 15.06.2017 & 28.05.2018 and subsequent orders issued by the respective Nodal Ministry shall be applicable even if issued after issue of this NIT but before finalization of contract / PO/ WO against this NIT. In the event of any Nodal Ministry prescribing higher or lower percentage of purchase preference and / or local content in respect of this procurement, same shall be applicable. Default margin of purchase preference shall be 20% to local suppliers with default minimum local content of 50%.
3	Late Tenders	Tenders received after due date/time(12:00hrs) will not be considered
4	Discrepancy 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.
5	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.
6	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.
7	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.
8	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.
9	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.
10	Risk Purchase	In case of default/late delivery, BHEL reserves the right to make alternate arrangement for procurement at suppliers risk and cost.
11	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
12	Over All L1	Order will be placed on overall L1 basis. Vendors should quote for all items, otherwise the offer will be rejected.
13	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.
14	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.
15	Arbitration	Subject to the jurisdiction of Hyderabad/Secunderabad, Andhra Pradesh, India in respect of any suit or other legal proceedings relating this contract.
		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 chartered Accountant on letter head This is to certify that M/s(hereinafter referred to as 'company') having its registered office

16	Micro Small Enterprises (MSEs)	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
17	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
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 501900361
Supply of Fully Finish Machined Rotor Blades and Rotor Hub		

SL.No.	Clause	BHEL REQUIREMENT	SUPPLIERS ACCEPTANCE / REMARKS
1	Late Delivery Penalty Clause	Failure to supply the goods and/or Failure to carryout the services within the stipulated delivery date will attract a penalty of 0.5% per week or part thereof for the value of the undelivered portion of the purchase order subject to a maximum of 10% of the total order value. The Penalty amount determined based on the delay in supply/services along with applicable GST thereon shall be recovered. In case of non acceptance to this LD Clause, 10% of basic material cost will be loaded on the quoted prices while cost comparison.(Please refer the enclosed 'Loading Factors' sheet).	
2	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 L1 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).	
3	Validity of Offer	90 days from date of techno-commercial bid opening.	
4	Agency Agreement	Guidelines regarding dealing with Indian agents of foreign suppliers 1. BHEL shall deal directly with foreign vendors, wherever 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.	
5	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 =====	
6	Nature of Vendor submitting the Offer	OEM / Agent / Representative / Dealer / Distributor / Stockist / Trader / Reseller / Channel Partner/ System Integrator / Any Other (Pl. Specify)	
7	Foreign Suppliers without Indian Agent	To be quoted in Foreign Currency. Purchase Order will be placed on Foreign Supplier.	
	Foreign Principal	Foreign principal should ensure compliance to regulatory guidelines which require mandatory submission of Agency agreement. (as per *) To be quoted in Foreign Currency.	

8	availing services of an Indian Agent	Purchase order will be placed on Foreign Supplier. Agency Commission will be paid to Indian Agent in Indian rupees. * The Agency Agreement shall specify 1) Agency commission, 2) Responsibilities of the Agent, 3) Territory, 4) Agreement Period	
9	Indian Agent desirous of quoting imported Equipment	Any Indian Agent desirous of quoting imported Equipment, they should submit the quote in foreign currency along with copy 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. * 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 considered 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 501900361
Supply of Fully Finish Machined Rotor Blades and Rotor Hub		

SL.No.	Clause	BHEL REQUIREMENT	SUPPLIERS ACCEPTANCE / REMARKS
1	Technical queries	Contact Mr. Nitish Mishra Sr Manager , Email id nitishmishra@bhel.in for any technical queries.	
2	Packing & forwarding charges, freight and insurance charges, if any	Mention the packing & forwarding , freight & insurance , if any in terms of % of basic cost.	
3	Regarding Concessional	Concessional taxes/duties: We are registered with DSIR vide TUV-RD/13/2017 dated 05-Feb-2018 as a research Institution, other than a Hospital, for the purpose of availing Customs duty exemption in terms of Government Notification no.51/96 – Customs dated 23-Jul-1996, Notification No. 24/2007 - Customs dated 01-Mar-2007 and Notification No. 43/2017 – Customs dated 30-June-2017; 45/2017-Central tax(rate) & 47/2017-Integrated tax(rate) dated 14-11-2017, No. 9/2018-Central tax(Rate) dated 25-01-2018, State & Union Territory Tax(Rate) and 10/2018-Integrated tax(Rate) dated 25-01-2018 as amended from time to time. Hence all offers falling under the said notifications shall be evaluated at available concessional rates. Please confirm acceptance.	
4	Details required	IT Permanent Account No. (PAN): GSTIN Registration Status: Tax type:CGST/SGST/IGST/UGST GSTIN No: GSTIN No. Issuance Date : Provisional/ Final Registration : Name of the Contact Person : Contact Phone / Mobile : Email id for correspondence : Address with PIN code and State: HSN code, service account code	
5	Force Majeure	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.	
6	General terms	1) Submission of GST Registration details along offer is required for consideration of the Offer. 2) Kindly provide the HSN code and the breakup of the tariff/taxes (CGST/SGST/IGST/UGST) based on from and to locations with individual components. 3.Concessional taxes/duties, if any, available to BHEL as on date of price bid opening shall be taken into account for evaluating landed cost. 4. Hence all offers shall be evaluated at available concessional rates of, if any, on or before opening of price bid date or otherwise it shall be evaluated with quoted/prevaling rates as on date of price bid opening for landed cost comparison. However, all suppliers have to accept Concessional taxes/duties in case if the same is available to BHEL as on date of dispatch. 3) Taxes and duties to be governed by GST acts. Strict adherence to new provisions by the vendors like timely submission of invoices, tax payment, filing of returns-GSTR-I etc. will form base of new regime for release of payment from BHEL. Hence, any financial loss occurred due to noncompliance of the GST provisions would be endured at defaulters end.	
7	Payment Term	a) For Indian Offers : BHEL standard payment term is "100% Basic value by EFT/RTGS within 30 days of receipt, acceptance and Installation of material at BHEL R&D Stores,Hyderabad". GST taxes subject to payment proof of GST taxes remittance to Govt. of India. For other payment terms there will be a loading on the offer as mentioned in our "Loading Factors" sheet which is enclosed to this enquiry. b) For Foreign Offers : BHEL standard payment term is "100% Invoice value by wire transfer within 30 days of receipt and acceptance of material at BHEL R&D Stores, Hyderabad". For other payment terms there will be a loading on the offer as mentioned in our "Loading Factors" sheet which is enclosed to this enquiry. All bank charges inside India shall be to BHEL account and outside India shall be to supplier's account	
8	Taxes and Duties	Vendor shall inform HSN/SAC code and the breakup of the applicable tariff/taxes (CGST/SGST/IGST/UGST) based on from and to locations with individual components in part 1 bid.	
9	Firm price and price basis	The prices shall be firm for entire period of contract. All Indian suppliers shall quote the lowest prices on'free delivery at BHEL R&D Stores or F.O.R destination' basis only.	

Signature of the bidder with Seal & Date



ITEM SPECIFICATIONS

 Volume - 2
 Enquiry NO
 501900361

Supply of Fully Finish Machined Rotor Blades and Rotor Hub

SL.No.	Item		
1	Supply of Fully Machined Rotor Blade as per drawing number RD-DG-3-50-19-0007 and attached specifications.		
	sl no	Descriptions	BHEL Specifications
	1.	Raw Material	The raw material for Rotor Blades as per drawing number RD-DG-3-50-19-0007 is X5CrNi13-4.
	2.	Manufacturing Process	The rotor blades have to be Close Die Forged, Heat Treated and Precision Finish Machined as per the above drawing.
	3.	Detailed Specifications	Kindly see the attached specification sheets titled "SUPPLY OF FULLY FINISH-MACHINED ROTOR BLADES AS PER THE FOLLOWING SPECIFICATIONS AND ATTACHED DRAWINGS".
		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. mention Time in days required from PDI to Despatch =====
		Manufactures Test Certificate	Manufacturer's Test Certificate required and shall be provided before dispatch.
2	Supply of Fully Machined Rotor Blade as per drawing number RD-DG-3-50-19-0008 and attached specifications.		
	sl no	Descriptions	BHEL Specifications
	1.	Raw Material	The raw material for Rotor Blades as per drawing number RD-DG-3-50-19-0006 is X5CrNi13-4.
	2.	Manufacturing Process	The rotor blades have to be Close Die Forged, Heat Treated and Precision Finish Machined as per the above drawing.
	3.	Detailed Specifications	Kindly see the attached specification sheets titled "SUPPLY OF FULLY FINISH-MACHINED ROTOR BLADES AS PER THE FOLLOWING SPECIFICATIONS AND ATTACHED DRAWINGS".
		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. mention Time in days required from PDI to Despatch =====
		Manufactures Test Certificate	Manufacturer's Test Certificate required and shall be provided before dispatch.
3	Supply of Fully Machined Rotor Hub as per drawing number RD-DG-3-50-19-0008 and attached specifications.		
	sl no	Descriptions	BHEL Specifications
	1.	Raw Material	The raw material for Rotor Hub as per drawing number RD-DG-3-50-19-0008 is SS410.
	2.	Manufacturing Process	The rotor hubs have to be Open Die Forged, Heat Treated and Precision Finish Machined as per the above drawing.
	3.	Detailed Specifications	Kindly see the attached specification sheets titled "SUPPLY OF FULLY FINISH-MACHINED ROTOR HUB AS PER THE FOLLOWING SPECIFICATIONS AND ATTACHED DRAWINGS".
		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. mention Time in days required from PDI to Despatch =====
		Manufactures Test Certificate	Manufacturer's Test Certificate required and shall be provided before dispatch.
G	General Specifications		
	sl no	Descriptions	BHEL Specifications
	1.	General	Manufacture and Supply of Rotor Blades as per drawing numbers RD-DG-3-50-19-0007 and RD-DG-3-50-19-0006 and Rotor Hub as per drawing number RD-DG-3-50-19-0008 and attached specifications.
	2.	Quantity	a. FULLY FINISH-MACHINED ROTOR BLADES as per Drawing Number RD-DG-3-50-19-0007 23 NUMBERS b. FULLY FINISH-MACHINED ROTOR BLADES as per Drawing Number RD-DG-3-50-19-0006 23 NUMBERS c. FULLY FINISH-MACHINED ROTOR HUB as per Drawing Number RD-DG-3-50-19-0008 2 NUMBERS
	3.	Printout of Drawings	The attached drawings have been made suiting to A3 size paper. The manufacturer is advised to take a print of the drawing in A3 paper and go through it carefully. IN CASE OF ANY DOUBT KINDLY ASK, DON'T ASSUME.
	4.	Availability of Solid Model	a. TML department is having solid model of the rotor blades (Var. NEW and Var. OLD), rotor hub and the assembly. For better understanding of our requirements, the vendor is advised to visit BHEL Corporate R&D, Balanagar and study the same before submitting his offer. b. This solid model(igs and parasolid format) will be shared with the manufacturer only when manufacturing order is placed on him. c. Further the manufacturer has to provide an undertaking in writing that this solid model will only be used for BHEL Corporate R&D's purpose and not for any other purpose.
	5.	Dimensions	All the major dimensions have been marked in the drawing. During the machining process, some dimensions are subjected to minor changes as per site requirements, which have to be taken into consideration by the

		manufacturer and the same will not have cost implications.	
6.	Raw Material	The raw material has to be necessarily procured from BHEL approved suppliers. For this the supplier has to furnish relevant PO copy.	
7.	Experience	The supplier should have necessarily supplied similar forged blades for turbomachines like Fans, Steam Turbines, Axial Compressors, etc. in the last two years to BHEL.	
8.	Threading on Rotor Blade and Rotor Hub	The external threading on the stem of all Rotor Blades should start from the same point on the circumference of the stem. Likewise the matching internal threading for all the 18 holes on the Rotor Hub should start from the same point. This is so because during PDI, when all the blades are hand-tightened onto the hub, all the blades should be at the same angle.	
9.	Stage-wise Inspection	As these blades and the complete assembly will be highly stresses during rotation, stage-wise inspection is planned to maintain the highest possible quality and the vendor has to abide by the same on placement of order. Stage-wise inspection at the following stages is planned. a. Raw material stage - for material composition b. Forging stage - for forging process adopted c. Post forging stage - for heat treatment regime followed, mechanical and metallographic properties achieved d. Post-machining stage - for blade profile validation through CMM, balance dimension measurement, surface finish, etc. e. Assembly stage - for smooth fitment of 18 blades in both the rotor hubs	
10.	Per Unit Price	The vendor should provide per unit price for a. Rotor Blades (Var. New, RD-DG-3-50-19-0007), b. Rotor Blades (Var. Old, RD-DG-3-50-19-0006) and c. Rotor Hub (RD-DG-3-50-19-0008)	
11.	Local Office Address	As the manufacturing of Rotor Blades and Rotor Hubs involves numerous stage-wise inspections, the supplier should have local office at Hyderabad / Secunderabad which will provide support to BHEL personnel and co-ordinate these inspections smoothly.	
	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. mention Time in days required from PDI to Despatch =====	
	Manufactures Test Certificate	Manufacturer's Test Certificate required and shall be provided before dispatch.	
	Minimum Acceptable Warranty	Supplier shall comply to the minimum acceptable warranty period. The offers of the suppliers not complying to the minimum warranty period will be rejected. The minimum acceptable warranty period is 12 months.	

* 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

LOADING FACTORS



NOTE : IN CASE OF DEVIATION TO BHEL TENDER SPECIFIED TERMS, LOADING FACTOR INDICATED IN FOLLOWING TABLE WILL BE APPLIED TO QUOTED PRICE WHILE EVALUATING THE LOWEST QUOTE

A. FOR INDIGENOUS PURCHASES								
SL.NO	SCOPE	COMMERCIAL TERMS	BHEL STANDARD TERM	AS OFFERED				
A.1	SUPPLY OF EQUIPMENT	PAYMENT TERMS	100% PAYMENT, WITH IN 30 DAYS FROM THE DATE OF RECEIPT AND ACCEPTANCE OF MATERIAL AT BHEL R&D	SAME				
				PAYMENT AGAINST PROFORMA INVOICE / DESPATCH DOCUMENTS				
				FULL ADVANCE PAYMENT WITH BANK GUARANTEE				
				PART ADVANCE (X%) PAYMENT WITH BANK GUARANTEE AND BALANCE PAYMENT WITH IN 30 DAYS FROM THE DATE OF RECEIPT AND ACCEPTANCE OF THE MATERIAL				
				PART ADVANCE (X%) PAYMENT WITH BANK GUARANTEE AND BALANCE PAYMENT ON RECEIPT AND ACCEPTANCE OF MATERIAL				
				SAME				
A.2	SUPPLY OF EQUIPMENT INCLUDING ERECTION AND COMMISSIONING (E&C)	PAYMENT TERMS	90% PAYMENT, WITH IN 30 DAYS FROM THE DATE OF RECEIPT AND ACCEPTANCE OF MATERIAL AND BALANCE 10% WITH IN 30 DAYS OF COMPLETION OF E&C.	100% PAYMENT WITH IN 30 DAYS AFTER COMPLETION OF SUPPLIES AND E&C				
				90% PAYMENT AGAINST PROFORMA INVOICE/ DESPATCH DOCUMENT AND BALANCE 10% WITH IN 30 DAYS AFTER COMPLETION OF E&C				
				90% PAYMENT AGAINST PROFORMA / DESPATCH DOCUMENT AND BALANCE 10% AFTER COMPLETION OF E&C				
				90% ADVANCE PAYMENT WITH BANK GUARANTEE AND BALANCE 10% PAYMENT WITH IN 30 DAYS AFTER COMPLETION OF E&C				
				PART ADVANCE (X%) PAYMENT WITH BANK GUARANTEE AND (90-X) % PAYMENT ON RECEIPT AND ACCEPTANCE OF THE MATERIAL AND 10% PAYMENT WITH IN 30 DAYS AFTER COMPLETION OF E&C				
				PART ADVANCE (X%) PAYMENT WITH BANK GUARANTEE AND BALANCE (90-X) % PAYMENT AFTER RECEIPT AND ACCEPTANCE OF THE MATERIAL AND 10% PAYMENT AFTER COMPLETION OF E&C				
				SAME				
				SAME				
								LOADING FACTOR FOR NON COMPLIANCE TO BHEL STANDARD TERMS
								NIL

B. FOR FOREIGN PURCHASES (IMPORTED)					
SL.NO	SCOPE	COMMERCIAL TERMS	BHEL STANDARD TERM	AS OFFERED	LOADING FACTOR FOR NON COMPLIANCE TO BHEL STANDARD TERMS
B.1	SUPPLY OF EQUIPMENT	PAYMENT TERMS	100% PAYMENT BY WIRE TRANSFER WITHIN 30 DAYS FROM THE DATE OF RECEIPT AND ACCEPTANCE OF MATERIAL AT BHEL. INVOICED DOCUMENTS WILL BE SENT TO BHEL HEAD OFFICE ALONG WITH BANK RECEIPTS.	NIGHT DRAFT ON PRESENTATION OF DESPATCH DOCUMENTS VIZ INVOICE, AWB ETC. TO OUR BANKERS.	NIL
				100% PAYMENT AGAINST DESPATCH DOCUMENTS	LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON THE BASIC VALUE FOR ONE MONTH PLUS PAYMENT RELATED BANK CHARGES INCURRED BY BHEL.
				FULL ADVANCE PAYMENT BY WIRE TRANSFER / LC WITH BANK GUARANTEE	LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON THE BASIC VALUE FOR ONE MONTH PLUS LC RELATED BANK CHARGES INCURRED BY BHEL.
				PART ADVANCE (X%) PAYMENT BY WIRE TRANSFER / LC WITH BANK GUARANTEE AND BALANCE PAYMENT WITHIN 30 DAYS FROM THE DATE OF RECEIPT AND ACCEPTANCE OF THE MATERIAL.	LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON THE PART ADVANCE AMOUNT (X%) FOR THE DELIVERY PERIOD (Rounded off to nearest month) + 1 MONTH PLUS LC RELATED BANK CHARGES INCURRED BY BHEL.
				PART ADVANCE (X%) PAYMENT BY WIRE TRANSFER / LC WITH BANK GUARANTEE AND BALANCE PAYMENT ON RECEIPT AND ACCEPTANCE OF MATERIAL.	LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON THE PART ADVANCE AMOUNT (X%) FOR THE DELIVERY PERIOD (Rounded off to nearest month) + 1 MONTH AND LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON BALANCE AMOUNT FOR ONE MONTH PLUS LC RELATED BANK CHARGES INCURRED BY BHEL.
B. FOR FOREIGN PURCHASES (IMPORTED)					
SL.NO	SCOPE	COMMERCIAL TERMS	BHEL STANDARD TERM	AS OFFERED	LOADING FACTOR FOR NON COMPLIANCE TO BHEL STANDARD TERMS
B.2	SUPPLY OF EQUIPMENT INCLUDING ERECTION AND COMMISSIONING (EAC)	PAYMENT TERMS	90% PAYMENT BY WIRE TRANSFER WITHIN 30 DAYS FROM THE DATE OF RECEIPT AND ACCEPTANCE OF THE MATERIAL AND BALANCE 10% WITHIN 30 DAYS AFTER COMPLETION OF EAC.	NIGHT DRAFT ON PRESENTATION OF DESPATCH DOCUMENTS VIZ INVOICE, AWB ETC. TO OUR BANKERS.	LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) FOR ONE MONTH PLUS PAYMENT RELATED BANK CHARGES INCURRED BY BHEL.
				100% PAYMENT BY WIRE TRANSFER / LC AGAINST DESPATCH DOCUMENTS BALANCE 10% WITHIN 30 DAYS AFTER COMPLETION OF EAC.	LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON 90% OF BASIC VALUE FOR ONE MONTH PLUS LC RELATED BANK CHARGES INCURRED BY BHEL.
				100% PAYMENT BY WIRE TRANSFER / LC AGAINST DESPATCH DOCUMENTS BALANCE 10% AFTER COMPLETION OF EAC.	LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON THE BASIC VALUE FOR ONE MONTH PLUS LC RELATED BANK CHARGES INCURRED BY BHEL.
				10% OF BASIC VALUE AS ADVANCE PAYMENT BY WIRE TRANSFER / LC WITH BANK GUARANTEE AND BALANCE 10% WITHIN 30 DAYS AFTER COMPLETION OF EAC.	LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON 90% OF THE BASIC VALUE FOR DELIVERY PERIOD (Rounded off to nearest month) + 1 MONTH PLUS LC RELATED BANK CHARGES INCURRED BY BHEL.
				10-X% PAYMENT BY WIRE TRANSFER / LC AFTER RECEIPT AND ACCEPTANCE OF THE MATERIAL AND 10% PAYMENT WITHIN 30 DAYS AFTER COMPLETION OF EAC.	LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON THE PART ADVANCE AMOUNT (X%) FOR THE DELIVERY PERIOD (Rounded off to nearest month) + 1 MONTH AND LOADING @ (SBI BASE RATE ON TENDER OPENING DATE + 0%) ON BALANCE AMOUNT (10-X%) FOR ONE MONTH.
D	GUARANTEE/WARRANTY PERIOD	MINIMUM ACCEPTABLE GUARANTEE / WARRANTY PERIOD (X)	NOT AGREED FOR STIPULATED BUT AGREED FOR MINIMUM GUARANTEE/WARRANTY (Y)	NOT AGREED	NIL
				AGREED	LOADING @ 10 % OF THE ORDER VALUE PER ANNUM FOR THE REDUCED GUARANTEE PERIOD (X-Y)
				NOT AGREED FOR STIPULATED BUT AGREED FOR MINIMUM GUARANTEE/WARRANTY (Y)	
				AGREED	
				NOT AGREED FOR STIPULATED BUT AGREED FOR MINIMUM GUARANTEE/WARRANTY (Y)	

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)	
Partnership	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 enclosed)

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 brochures, catalogues, technical literature etc)

6.0 ANY OTHER INFORMATION:

SIGNATURE OF SUPPLIER (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

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 Agency 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 relevant authorisation letter and agreement copy to be enclosed along with Technical bid to consider the offer.

SUPPLY OF FULLY FINISH-MACHINED ROTOR HUB AS PER THE FOLLOWING SPECIFICATIONS AND ATTACHED DRAWING

Manufacture and Supply of FULLY FINISH-MACHINED ROTOR HUB as per drawing number RD-DG-3-50-19-0008 and the following specifications.

1. QUANTITY

FULLY FINISH-MACHINED ROTOR HUB as per Drawing Number RD-DG-3-50-19-0008
2 NUMBERS

2. MATERIAL

The ROTOR HUB shall be manufactured from Stainless Steel grade SS410 forging (Grade : AISI 410S and as per ASTM A 240 standard) as per the specifications given below.

The open forged and precision machined blades shall be supplied in hardened and tempered condition with surface finish of at-least 5 micron.

2.1. CHEMICAL COMPOSITION

The chemical composition of the material (steel billets) used for making Rotor Hub shall be as follows.

Element		C	Si	Mn	Cr	S	P	Ni
Ladle / Billet Lot Analysis	Min.	---	---	---	11.5	---	---	---
	Max.	≤0.14	1.00	1.00	13.5	0.02	0.03	0.5
Allowable Percentage Variation in Composition		+0.01	---	---	---	+0.01	+0.01	+0.25

Note : The slight deviation in chemical analysis may be referred to Materials Engineering of BHEL for consideration, provided the mechanical properties given in Clause number 5 of this specifications are fully complied.

2.2. TEST SAMPLE FOR CHEMICAL ANALYSIS

A minimum of one sample per unit of rotor hub forging (melt / lot of steel) billet shall be tested for chemical composition and the test report shall be provided to BHEL R&D Engineers for approval before commencement of manufacture of rotor hub.

Utkish Mishra

3. MANUFACTURE

The steel shall be made in induction furnace / basic electric furnace and subsequently vacuum degassed. Any other process of steel making shall be mutually agreed upon by the manufacturer and BHEL. The steel shall be fully killed.

If steel billets are used for rotor hub manufacturing, the raw material has to be necessarily procured from BHEL approved vendor list like SAIL, Jindal, Tata, etc.

The forgings for rotor hub shall be made using Open Die Forging process, subsequently heat treated and then precision machined and finally machine ground to achieve the dimensions and surface finish as per the drawing RD-DG-3-50-19-0008 and this specifications.

The suggested initial forging temperature range for SS 410 is 1093 – 1204 °C. Forging or any hot working should always be followed annealing to avoid stress cracking.

3.1 DIMENSIONS & TOLERANCES

- a. The hub shall be forged reasonably close to the final size, taking into consideration machining allowances..
- b. Unless otherwise specified in the drawing, all finish machined surfaces shall have a general tolerances of ± 0.5 mm.
- c. Except for the threaded portion of the hub, all other surfaces shall be machine ground to a surface finish of 5 microns.

3.2 HEAT TREATMENT

The recommended heat treatment shall be as follows.

- a. **Hardening:** Hardening temperature shall be between 925 – 1010 °C and the soaking for not less than one hour per 25 mm of thickness of maximum section thickness followed by air or oil quenching (preferred).
- b. **Annealing:** Subsequent to hardening, the forging needs to be annealed. Heating the hardened section / unit to 816 – 899 °C, soaking for not less than one hour per 25 mm of maximum section thickness, followed by slow furnace cooling and air cooling. Cooling from annealing temperature shall be slow enough to minimise residual stresses.
- c. If required, the forging may be stress relieved by heating up to 149 – 427 °C for 1 to 2 hours and then slow air cooling. It is not recommended to perform tempering at temperatures from 400 – 580 °C owing to associated low impact resistance.
- d. The actual heat treatment parameters like temperature, rate of heating, soaking time and rate of cooling shall be submitted to BHEL R&D.
- e. Number of reheat treatment shall not exceed two.

3.3 MACINING

SS 410 alloy shall be machined in fully annealed condition using surface speeds of 18.3 – 24.4 m per minute. Post machining decontamination and passivation are recommended.

Krishna

3.4 FINISH

The rotor hub shall be thoroughly cleaned and flash shall be removed completely. As stated earlier, the surface finish shall be of the order of 5 micron.

3.4 FREEDOM FROM DEFECTS

The rotor hubs have to be free from cracks, waviness, laps and any other harmful defects. Special attention has to be paid by the manufacturer to the peripheral area (where the rotor blades will be attached) of the rotor hub and ensure without doubt that it is defect-free.

4. SELECTION OF TEST SAMPLES FOR MECHANICAL & METALLOGRAPHY TESTS

4.1 The rotor hub forgings after heat treatment (hardening and annealing) shall be tested for Brinell hardness. The Mechanical and Metallography tests shall be conducted on rotor hub obtained as above.

4.2 Supplier shall submit the sketches of rotor hub showing the test specimen locations for approval by BHEL before tests are conducted by them.

5. MECHANICAL PROPERTIES

Test samples shall conform to the following properties at room temperature.

Ultimate Tensile Strength, N/mm ² (MPa)	Yield Strength 0.2% offset, N/mm ² (MPa)	% Elongation L=5d (50 mm) Min.	Impact Charpy V		Hardness (max.)	Rockwell Hardness, When hardened at 982 °C
			Specimen Condition	Joules, Avg.,		
500 - 554	275(min.) - 313	16	Tempering Temperature being 650 °C	80	96 Rb	81 HRB

Note : i. Tensile test shall be done as per IS 1608 or any reputed standard.

ii. The Charpy impact test shall be performed on a ISO-specimen (2 mm V notch) as per IS:1757 on any reputed standard.

iii. Variation in hardness of the forging depends on the tempering temperature of hardened SS 410 and it shall be comparable with standard commercial data available.

6. NON-DESTRUCTIVE TEST

6.1 Ultrasonic Testing (on forgings)

a. The forging shall be ultrasonically tested according to pulse echo method with frequency 2 to 4 MHz.

b DSG method shall be used for evaluation of the indications.

c. The following indications shall not be permissible.

i. Individual indications scattered at random with an equivalent flaw size ≥ 2 mm diameter.

ii. All individual indications with more than 10% loss in back echoes.

iii. All the indications linear or globular forming cluster, with an extension greater than 10 mm in any direction.

iv. Local accumulation of indications with an equivalent flaw size ≥ 1 mm diameter.

Note : The above indications can be relaxed up to 25%, provided the strength of rotor hub is not compromised

6.2 Magnetic Particle Inspection

The forging shall be subjected to MPI as per ASTM A275. No cracks are acceptable. Special attention needs to be given to the peripheral area (where the rotor blades will be attached) to the rotor hub and ensure without doubt that it is defect-free.

6.3 Dye Penetrant Inspection (DPI or LPI)

The complete rotor hub shall be subjected to DPI in accordance with ASTM E165 and the same shall be witnessed by BHEL Engineers.

7. METALLOGRAPHIC TESTS

7.1 Microstructure : The microstructure shall be studied on the fractured tensile / impact specimens and the photo-micrographs shall be furnished to BHEL. The microstructure shall have a uniform tempered martensitic structure with grain size No. 5 or finer as per ASTM E112.

Non-metallic Inclusions : Non-metallic inclusions shall be evaluated as per ASTM E455, plate III, the inclusions rating shall not exceed the following norms.

"A" Sulphide type	:	This series 2
"B" or "D" Globular type oxide	:	Thin series 2
"C" Silicate type	:	Thin series 2

However, anyone of the above can be allowed upto 2.5, provided the other two do not exceed 2.

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7.2 Decarburisation Tests : The test for decarburisation shall be carried out by measurement of hardness, HV 0.3 at 0.1 mm below the surface. The hardness at these places shall not be less than 90% of the core hardness.

Alternatively decarburisation can be tested metallographically. In case of doubt hardness measurements shall be decisive.

8. RETEST

If any of the selected test specimen fails to meet the specified requirements due to some mechanical reasons, another specimen may be taken for testing.

In the event of failure due to heat treatment, not more than two reheat treatment shall be permitted.

9. INSPECTION AT SUPPLIER'S WORK

9.1 BHEL representative shall have free access to all the areas where the manufacturing of the forgings is carried out. All reasonable facilities shall be extended to him including labour where necessary.

9.2 BHEL Engineers shall be given sufficient advance intimation to witness the different processes, tests, etc. Punching, identification of test pieces and forgings and execution of various tests shall be done in the presence of BHEL representatives.

9.3 The rotor hub shall be checked by BHEL Engineers for various dimensions at vendor's works. Critical dimensions have a tolerance of the order of ± 0.10 mm and have been marked in the drawing number RD-DG-3-50-19-0008 accordingly. For the remaining dimensions deviation of more than ± 0.25 mm is not acceptable.

9.4 BHEL shall conduct stage-wise inspection as required and the vendor will be communicated accordingly.

9.5 Finished material shall be dispatched only after clearance from BHEL.

10. TEST CERTIFICATES

10.1 The supplier shall furnish three copies of the certificate containing the following.

- a. BHEL Order Number
- b. Item description
- c. Drawing Number
- d. Supplier's Name
- e. Raw Material procurement details like his PO copy
- f. Melt Number / Batch Number

Krishna

- g. Heat Treatment details
- h. Results of all the tests stipulated in this specification.

10.2 The test certificates shall be signed by the chief of his QC / chief metallurgist of the supplier and attested by BHEL R&D representative.

11. MARKING AND PACKING

The following details shall be punched clearly on each forging and the same shall be encircled by paint.

- a. Melt / Batch Number
- b. Serial Number of the forging

The fully finish machined rotor hub shall be suitably packed to prevent it from damage and corrosion during transit.

Uttish Mishra

**SUPPLY OF FULLY FINISH-MACHINED ROTOR BLADES AS PER
THE FOLLOWING SPECIFICATIONS AND ATTACHED DRAWINGS**

Manufacture and Supply of FULLY FINISH-MACHINED ROTOR BLADES as per drawing number RD-DG-3-50-19-0007 and RD-DG-3-50-19-0006 and the following specifications.

1. QUANTITY

- a. FULLY FINISH-MACHINED ROTOR BLADES as per Drawing Number RD-DG-3-50-19-0007
23 NUMBERS
- b. FULLY FINISH-MACHINED ROTOR BLADES as per Drawing Number RD-DG-3-50-19-0006
23 NUMBERS

2. MATERIAL

The ROTOR BLADES shall be manufactured from Stainless Steel grade X5CrNi 13-4 as per the specifications given below.

The Close Die forged and precision machined blades shall be supplied in hardened and tempered condition with surface finish of at-least 0.5 micron.

2.1. CHEMICAL COMPOSITION

The chemical composition of the material (steel billets) shall be as follows.

Element		C	Si	Mn	Cr	S	P	Ni	Mo
Ladle / Billet Lot Analysis	Min.	---	---	---	12.0	---	---	3.5	---
	Max.	≤0.05	1.00	1.50	13.5	0.02	0.02	5.00	0.70
Allowable Percentage Variation in Composition		+0.01	---	+0.04	+0.5	+0.005	+0.01	---	+0.05

Note : The slight deviation in chemical analysis may be referred to Materials Engineering of BHEL for consideration, provided the mechanical properties given in Cl. number 5 of this specifications are fully complied.

2.2. TEST SAMPLE FOR CHEMICAL ANALYSIS

A minimum of one sample per melt / lot of steel billet shall be tested for chemical composition and the test report shall be provided to BHEL R&D Engineers for approval before commencement of manufacture of rotor blades.

Uttish Mishra

3. MANUFACTURE

The steel shall be made in induction furnace / basic electric furnace and subsequently vacuum degassed. Any other process of steel making shall be mutually agreed upon by the manufacturer and BHEL. The steel shall be fully killed.

If steel billets are used for rotor blade manufacturing, the raw material has to be necessarily procured from BHEL approved vendor list. PO copy of the same has to be provided to BHEL R&D Engineers upon placement of order under this Purchase Enquiry.

The forgings for rotor blades shall be made using Close Die Forging / Impression Die Forging process, subsequently precision machined and finally machine ground to achieve the dimensions and surface finish as per the drawings and this specifications.

3.1 DIMENSIONS & TOLERANCES

- a. The forged blades shall be true to the forging die.
- b. Unless otherwise specified in the drawing, all finish machined surfaces shall have a general tolerances of ± 0.1 mm.
- c. The blade surfaces (except for the threaded portion) shall be machine ground to a surface finish of 0.5 microns.

3.2 HEAT TREATMENT

The recommended heat treatment shall be as follows.

- a. **Hardening:** Hardening temperature shall be between 1000 – 1050 °C and the soaking for not less than one hour per 25 mm of thickness of maximum section thickness followed by air or oil cooling.
- b. **Tempering:** Heating the hardened section to 580 – 620 °C, soaking for not less than one hour per 25 mm of maximum section thickness, followed by slow air cooling. Cooling from tempering temperature shall be slow enough to minimise residual stresses.
- c. If required, heat treated blades can be straightened. All straightened blades shall be stress relieved. The stress relieving temperature shall be 20 – 30 °C below the actual tempering temperature.
- d. The actual heat treatment parameters like temperature, rate of heating, soaking time and rate of cooling shall be submitted to BHEL R&D.
- e. Number of reheat treatment shall not exceed two. However, re-tempering is not considered as reheat treatment.

3.3 FINISH

The rotor blades have to be thoroughly cleaned by shot blasting and flash shall be removed completely. As stated earlier, the surface finish of the forging shall be of the order of 0.5 micron.

3.4 FREEDOM FROM DEFECTS

Ketish Mishra

The rotor blade forgings have to be free from cracks, laps and any other harmful defects. Special attention has to be paid by the manufacturer to the root-area of the rotor blades and ensure without doubt that it is defect-free.

4. SELECTION OF TEST SAMPLES FOR MECHANICAL & METALLOGRAPHY TESTS

4.1 All the blade forgings after heat treatment shall be tested for Brinell hardness to determine the hardest and softest blade per melt / lot per heat treatment batch. The Mechanical and Metallography tests shall be conducted on the hardest and softest blades of each melt / lot & heat treatment batch as per Cl. 4.2.

4.2 The number of sample blades for each melt / lot and heat treatment batch shall be as follows.

For a batch size of ≤ 50 : One blade sample (having lowest hardness). For a batch size of > 50 numbers : Two blade samples (one each of highest and lowest hardness).

4.3 The supplier may use the dimensionally rejected blades which have been heat treated along-with other dimensionally accepted blades and meet the above given conditions of hardness as per batch size.

4.4 The supplier has the option of selecting sub-size specimens, if required. The properties of sub-size impact specimen shall be as per Cl. 5 of this specification.

4.5 Supplier shall submit the sketches of blades showing the test specimen locations for approval by BHEL before tests are conducted by them.

5. MECHANICAL PROPERTIES

Test samples shall conform to the following properties at room temperature.

Tensile Strength, N/mm ²	0.2% Proof Stress, N/mm ² Min.	% Elongation L=5d Min.	Impact Strength ISO - V Notch		Hardness, Brinell
			Specimen Size	Joules, Avg., Min.	
760 - 960	550	15	Full size, 10 X 10 mm	70	220 - 320
			³ / ₄ th size, 10 X 7.5 mm	53	
			¹ / ₂ size, 10 X 5 mm	35	
			¹ / ₄ size, 10 X 2.5 mm	18	

Note : i. Tensile test shall be done as per IS 1608 or any reputed standard

ii. The charpy impact test shall be performed on a ISO-specimen (2 mm V notch) as per IS:1757 on any reputed standard. The impact strength value indicated above is average of 3 values. Only one value lower than the minimum specified value but not less than $2/3^{rd}$ of the same. All the three values shall be reported.

iii. Variation in hardness shall be 30 BHN maximum for a heat treatment batch.

6. NON-DESTRUCTIVE TEST

6.1 Ultrasonic Testing (on billets to be used for forgings)

- a. All the bars/billets shall be ultrasonically tested according to pulse echo method with frequency 2 to 4 MHz.
- b. DSG method shall be used for evaluation of the indications.
- c. The following indications shall not be permissible.
 - i. Individual indications scattered at random with an equivalent flaw size ≥ 2 mm diameter.
 - ii. All individual indications with more than 10% loss in back echos.
 - iii. All the indications linear or globular forming cluster, with an extension greater than 10 mm in any direction.
 - iv. Local accumulation of indications with an equivalent flaw size ≥ 1 mm diameter.

6.2 Magnetic Particle Inspection

Each blade shall be subjected to MPI as per ASTM A275. No cracks are acceptable. Special attention needs to be given to the root area of the rotor blade during MP testing.

6.3 Dye Penetrant Inspection (DPI or LPI)

The complete rotor blade shall be subjected to DPI in accordance with ASTM E165. Special attention shall be given to the root area of the rotor blade during inspection process.

7. METALLOGRAPHIC TESTS

7.1 Microstructure : The microstructure shall be studied on the fractured tensile / impact specimens and the photo-micrographs shall be furnished to BHEL. The microstructure shall have a uniform tempered martensitic structure with grain size No. 5 or finer as per ASTM E112.

Non-metallic Inclusions : Non-metallic inclusions shall be evaluated as per ASTM E455, plate III, the inclusions rating shall not exceed the following norms.

"A" Sulphide type	:	This series 2
"B" or "D" Globular type oxide	:	Thin series 2
"C" Silicate type	:	Thin series 2

Wishdesh

However, anyone of the above can be allowed upto 2.5, provided the other two do not exceed 2.

7.2 Decarburisation Tests : The test for decarburisation shall be carried out by measurement of hardness, HV 0.3 at 0.1 mm below the surface. The hardness at these places shall not be less than 90% of the core hardness. The test shall be carried out at 1/3rd distance from the blade tip.

Alternatively decarburisation can be tested metallographically. In case of doubt hardness measurements shall be decisive.

8. RETEST

If any of the selected test specimen fails to meet the specified requirements due to some mechanical reasons, another specimen may be taken for testing.

In the event of failure due to heat treatment, not more than two reheat treatment shall be permitted.

9. INSPECTION AT SUPPLIER'S WORK

9.1 BHEL representative shall have free access to all the areas where the manufacturing of the forgings is carried out. All reasonable facilities shall be extended to him including labour where necessary.

9.2 BHEL Engineers shall be given sufficient advance intimation to witness the different processes, tests, etc. Punching, identification of test pieces and forgings and execution of various tests shall be done in the presence of BHEL representatives.

9.3 Profile contours shall be checked by the vendor using CMM (Co-ordinate Measurement Machine) for at least 3 cross sections (A, B and C as per drawing numbers RD-DG-3-50-19-0007 and RD-DG-3-50-19-0006) along the rotor blade height for a minimum of 5 blades each and the co-ordinate data so obtained shall be superimposed on the rotor blade solid model provided by BHEL R&D. Dimensional deviation of more than ± 0.2 mm is not acceptable.

9.4 BHEL shall conduct stage-wise inspection as required and the vendor will be communicated accordingly.

9.5 Finished material shall be dispatched only after clearance from BHEL.

10. TEST CERTIFICATES

10.1 The supplier shall furnish three copies of the certificate containing the following.

Krishna

- a. BHEL Order Number
- b. Item description
- c. Drawing Number
- d. Supplier's Name
- e. Raw Material procurement details like his PO copy
- f. Melt Number / Batch Number
- g. Heat Treatment details
- h. Results of all the tests stipulated in this specification.

10.2 The test certificates shall be signed by the chief of his QC / chief metallurgist of the supplier and attested by BHEL R&D representative.

11. MARKING AND PACKING

The following details shall be punched clearly on each forging and the same shall be encircled by paint.

- a. Melt / Batch Number
- b. Serial Number of the forging

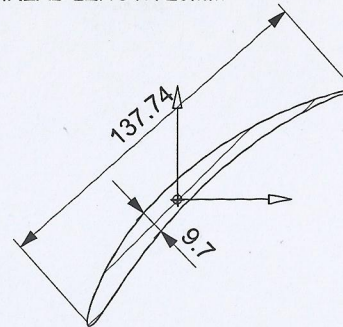
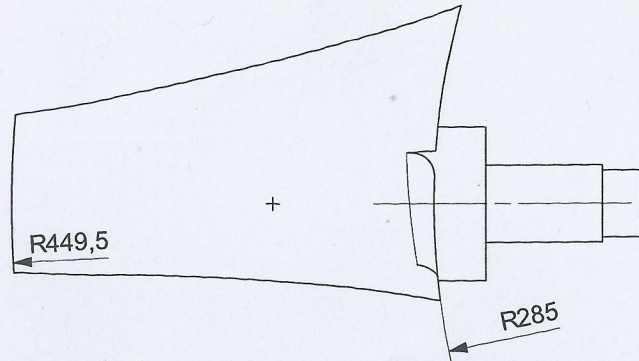
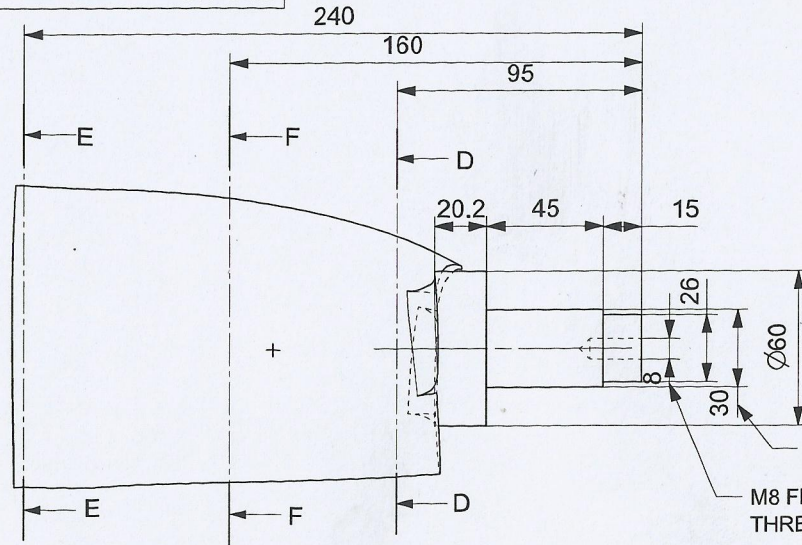
The fully finish machined rotor blades shall be suitably packed to prevent it from damage and corrosion during transit.

Uttish Mishra

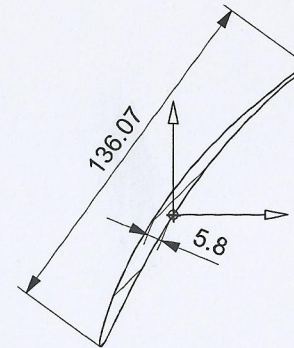
DRG. NO. RD DG 3 50 19 0006/0

FIRST ANGLE PROJECTION

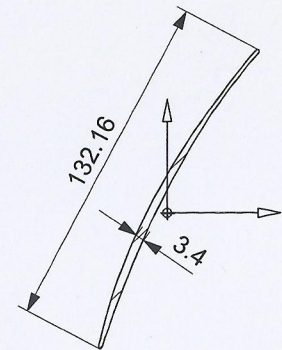
(ALL DIMENSIONS ARE IN mm)



SECTION D-D



SECTION F-F



SECTION E-E

NOTES:

1. BLADE PROFILE IS TO BE MANUFACTURED AS PER THE SOLID MODEL PROVIDED BY BHEL.
2. BLADE CONTOUR AT 3 SECTIONS AT THE CORRESPONDING HEIGHTS SHOULD BE MEASURED USING CMM AND COMPARED WITH THE BLADE PROVIDED BY BHEL. MAXIMUM ALLOWABLE DEVIATION BETWEEN MEASURED DATA AND SOLID MODEL IS ± 0.2 MM.
3. DIMENSIONS SHOWN ARE TENTATIVE, SUBJECTED TO MINOR CHANGES WHICH WILL NOT HAVE COST IMPLICATIONS.
4. GENERAL TOLERANCE IS ± 0.25 MM.
5. MATERIAL :CLOSE DIE FORGED X5CrNi 13.4 (REFER SPECIFICATION)
6. PLEASE CLARIFY FROM BHEL FOR ANY AMBIGUITY IN THE DRAWING OR SOLID MODEL OF THE BLADE BEFORE PROCEEDING FURTHER.
7. MINIMUM SURFACE FINISH OF 0.5 MICRON SHALL BE ENSURED ON THE SURFACE OF THE BLADE PROFILE.
8. NO OF BLADES 18

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT

FAN ASSEMBLY
(BF 011822RD50)



BHARAT HEAVY ELECTRICALS LTD.
CORP. R&D DIVISION
HYDERABAD - 500093

NAME	SIGN.	DATE	NO. OF VAR.
DRN. ALP	AB	17-04-2019	NA
CHD. SAROJ	SA	17-04-2019	NA
APPD. NM	nm	17-04-2019	NA

DEPT.	TML	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO. OF ITEMS
CODE 50		NA		NA	NA	1

TITLE
ROTOR BLADE VAR OLD

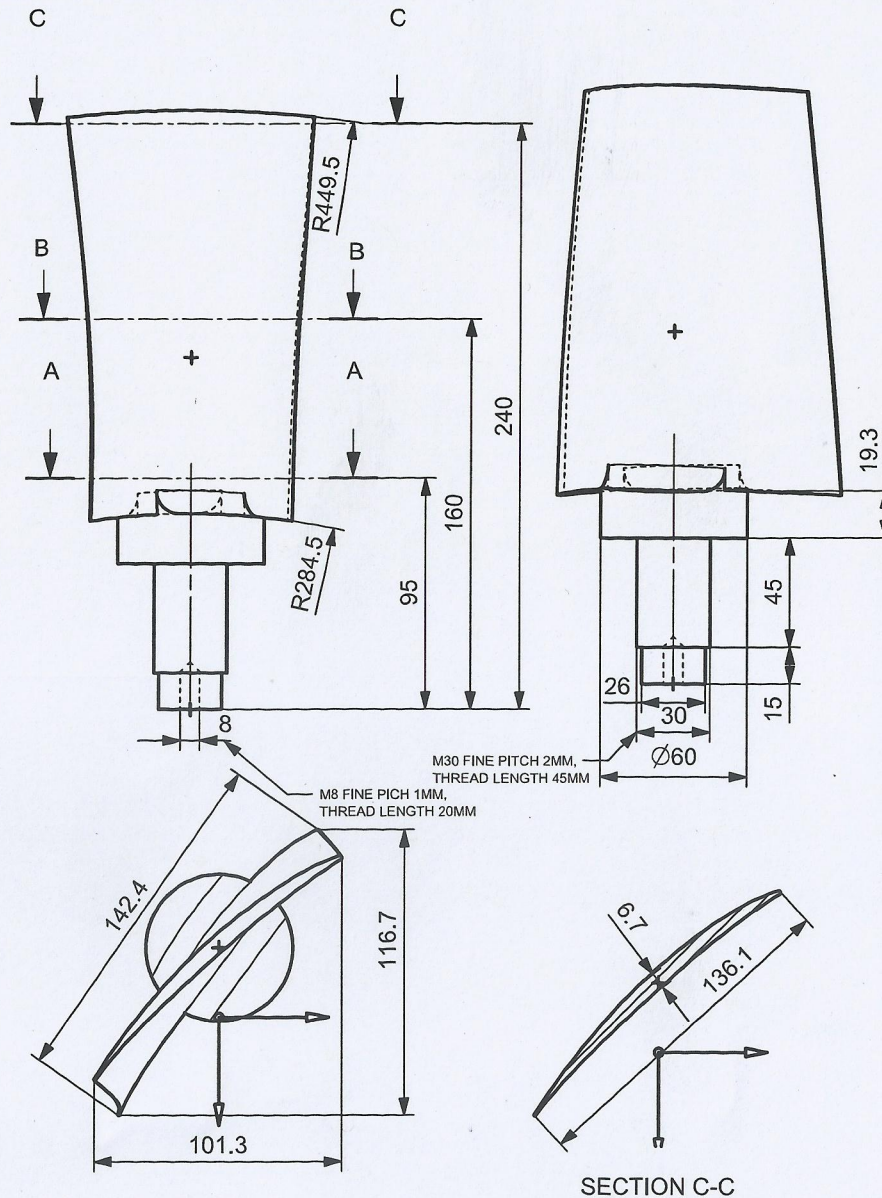
CARD CODE	DRAWING NO.	REV.
NA	RD DG 3 50 19 0006	00
	SHEET No.: 1	NO OF SHEETS: 1

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

INVENTORY NO. SIGN. AND DATE COMP. FILE NAME
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RD DG 3 50 19 0007/00
DRG. NO.



NOTES:

1. BLADE PROFILE IS TO BE MANUFACTURED AS PER THE SOLID MODEL PROVIDED BY BHEL.
2. BLADE CONTOUR AT 3 SECTIONS AT THE CORRESPONDING HEIGHTS SHOULD BE MEASURED USING CMM AND COMPARED WITH THE BLADE PROVIDED BY BHEL. MAXIMUM ALLOWABLE DEVIATION BETWEEN MEASURED DATA AND SOLID MODEL IS ± 0.2 MM.
3. DIMENSIONS SHOWN ARE TENTATIVE, SUBJECTED TO MINOR CHANGES WHICH WILL NOT HAVE COST IMPLICATIONS.
4. GENERAL TOLERANCE IS ± 0.25 MM.
5. MATERIAL : CLOSE DIE FORGED X5CrNi 13.4 (REFER SPECIFICATION)
6. PLEASE CLARIFY FROM BHEL FOR ANY AMBIGUITY IN THE DRAWING OR SOLID MODEL OF THE BLADE BEFORE PROCEEDING FURTHER.
7. MINIMUM SURFACE FINISH OF 0.5 MICRON SHALL BE ENSURED ON THE SURFACE OF THE BLADE PROFILE.

TYPE OF PRODUCT
OR
NAME OF CUSTOMER/PROJECT

FAN ASSEMBLY
(BF 011822RD50)



BHARAT HEAVY ELECTRICALS LTD.
CORP. R&D DIVISION
HYDERABAD - 500093

DEPT.	TML	SCALE	WEIGHT (KG)	REF. TO ASSY DRG.	ITEM NO.	NO. OF ITEMS
CODE	50	NA		NA	NA	1
TITLE				CARD CODE	DRAWING NO.	REV.
ROTOR BLADE VAR NEW				NA	RD DG 3 50 19 0007	00
SHEET No.: 1				NO OF SHEETS: 1		

NAME	SIGN.	DATE	NO. OF VAR.
DRN. ALP	AP	17-04-2019	
CHD. SAROJ	MM	17-04-2019	NA
APPD. NM	MM	17-04-2019	