



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY NOTICE INVITING TENDER

Phone: +91 431 257 7421/7360/7833
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: ajayasalkar@bhel.in
: vijayak@bhel.in
Web : www.bhel.com

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2621800011	30.07.2018	24.08.2018

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	Job Rotator – 25 Ton Capacity as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com and https://eprocure.gov.in)	4 Sets.

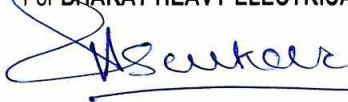
Important points to be taken care during submission of offer

1. Delivery terms shall be FOR BHEL Stores, HPBP, Trichy-620014.
2. Compliance Form No: TRY/IND/06 to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
3. Delivery period required is 18 weeks from the date of Purchase Order.
4. Erection and commissioning shall be done at BHEL Trichy by the supplier.
5. Time period required for Erection and Commissioning shall be 3 weeks from the date of intimation by BHEL
6. EMD applicable.
7. All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions compliance form and technical specification can be downloaded from BHEL web site <http://www.bhel.com> and <https://eprocure.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2621800011".

Note: this is not an E-tender, hence Vendors are requested to ensure that the offer is reaching physically at our office before 14:00 Hrs. on the date of tender opening.

Tenders should reach us before 14:00 hours on the due date
Tenders will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

A. JAY V. SALKAR
Sr. Manager / Capital Equipment / MM
BHEL, Tiruchirappalli – 620 014

PART - A
QUALIFYING CRITERIA FOR
25 TON VARIABLE SPEED JOB ROTATORS

S.No	BHEL Specification	Bidder's Offer
1.0	QUALIFYING CRITERIA	
1.1	Bidder / OEM must have manufactured, supplied and commissioned at least ONE 25 TON (OR) HIGHER CAPACITY VARIABLE SPEED JOB ROTATORS are eligible to quote.	
1.2	Bidder has to submit at least ONE Performance Certificate from their customer (end user), for satisfactory performance of 25 TON (OR) HIGHER CAPACITY VARIABLE SPEED JOB ROTATORS meeting the following conditions: a) The Equipment must have been supplied within the last five years as on the first date of tender opening. b) The Equipment must have performed satisfactorily for at least one year during this period. For obtaining the Performance certificate, a suggestive format is provided at the end of part-A.	
1.3	PO document for the above mentioned supplied equipment to be enclosed	
1.4	BHEL reserves the right to verify the information provided by the Bidder. In case the information provided is found to be false/ incorrect, the offer is liable for rejection.	

2.0	INFORMATION TO BE PROVIDED BY BIDDER	
2.1	Bidder shall provide contact details(phone no & email id) including the address of his Agents / Service Centres in India	
2.2	Details of VARIABLE SPEED JOB ROTATORS supplied to other BHEL units if any	
2.3	The BIDDER to furnish Reference List of Customers(max 10 customers) including Contact details(phone no & email id).	

SECTION 3

The BIDDER to note:

S. No.	PARTICULARS	Bidder's offer
3.1	The BIDDER shall submit the offer in Two Parts – 1. Technical [with PART A & PART B] & 2. Commercial and Price Bid.	
3.2	The Bidder's offer against each clause in PART A & B of the offer should be filled by the BIDDER compulsorily with complete details.	
3.3	The BIDDER shall assure a continuous support for Spares and Service for Ten Years, from the date of commissioning of the equipment at BHEL Works.	
3.4	The Technical Offer shall be supported by Product Catalogue and Data Sheets in original and complete technical details / literature on the quoted equipment.	
3.5	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation.	

Suggestive Format of Performance Certificate:

The performance certificate to be produced **on Customer's Letter Head.**

PERFORMANCE CERTIFICATE

- 1 Make of the equipment
- 2 Month & Year of Commissioning
- 3 Application for which the equipment is used
- 4 Capacity of the equipment in Tons
- 5 Variable Speed Type Yes/No
(Strike off whichever is not applicable)
- 6 Performance of the equipment Satisfactory / Not Satisfactory
(Strike off whichever is not applicable)
- 7 Service support after sales Satisfactory / Not Satisfactory
(Strike off whichever is not applicable)
- 8 Any Other remarks
- 9 This performance certificate was issued on: (DD/MM/YYYY)

Signature & Seal of the Authority
Issuing the Performance Certificate

Contact details of issuing authority
Name & Designation:
Office No/ Mobile no:
Email ID:

Part B**SPECIFICATION FOR 25 TON VARIABLE SPEED JOB ROTATORS**

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS	Bidder's OFFER
1.0	<u>APPLICATION:</u> For use in heavy fabrication of Pressure Vessels and Heat Exchangers which are cylindrical in shape and welded with attachments and nozzles.	Vendor to Confirm
2.0	<u>General Scope of Supply: Supply, Erection and Commissioning of:</u> 25 Ton Capacity Variable Speed Job Rotator - 02 Sets (One set consists of One drive unit & One idle unit) 25 T Capacity Variable Speed Job Rotator - 02 Sets (One set consists of One drive unit & Two idle units) <u>which includes:</u> - Manufacture and supply as per BHEL specifications. - Assembly and Testing before Dispatch at Vendors works. - Supply of Electrical & Mechanical Spares. - Erection (Assembly), Commissioning and Performance Prove-Out at BHEL. - Training on Maintenance for BHEL personnel. - Supply of O & M Manuals and related documents.	Vendor to confirm

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS		Bidder's OFFER
3.0	TECHNICAL SPECIFICATION		
3.1.0	DRIVE UNIT		
3.1.1	Rotating Capacity of each Drive Unit: 25 Metric Ton.	Vendor to confirm	
3.1.2	Weight Carrying Capacity of each Drive unit: 12.5 Metric Ton.	Vendor to confirm	
3.1.3	Eccentric Loading: 20 % of the maximum Weight carrying capacity.	Vendor to confirm	
3.1.4	Rotation direction: Both Clockwise and Anti clock wise rotation.	Vendor to confirm	
3.1.5	Wheel Surface Speed range: 50 mm to 1200 mm / minute (approx.), with step less speed variation.	Vendor to specify	
3.1.6	Electric Motor & Drive: AC Motor with suitable Variable Speed Drive, uniform job rotation in either direction. Vendor to mention motor capacity.	Vendor to confirm and provide the make and model details	
3.1.7	The induction motor shall be suitable for VFD application and shall be of energy efficient class IE2 conforming to IS standard. Electric motor make: ABB / SIEMENS / CROMPTON GREAVES / HINDUSTAN / BHARAT BIJLEE / KIRLOSKAR or any other make acceptable to BHEL. VFD make: ABB / SIEMENS/ MITSUBISHI / YASKAWA / TOSHIBA / PARKER / SCHNEIDER / AMTECH or any other make acceptable to BHEL.		
3.1.8	Motors and other the electrical components shall be properly earthed.		
3.1.9	Variable frequency drive: Total harmonic distortion values for current and voltage, introduced by the drives shall be within allowable limits, as specified by IEEE Std 519-1992. Vendor shall specify the values of THD(V) and THD(I) in %.	Vendor to specify	

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS		Bidder's OFFER
3.1.10	Gear Box Details: VENDOR to furnish complete technical details of the Gear Box used for mechanical power transmission. BHEL prefers vendor to use standard gear boxes rather than built in gear boxes. Planetary Gears not permitted. Gear Box make: Greaves / Elecon / Bonfiglioli/ Radicon / New Allenbury or any other make acceptable to BHEL.	Vendor to provide details	
4.0	Operator Panel and Controls: Main control panel and remote control pendent with the following features to be provided.		
4.1	The Main Control Panel shall have the following features: (a) A suitable capacity MCB as Main switch for On/ Off. The MCB shall be operable without opening the control panel door. (b) Indication lamp for the indication of Main On / Power On, Drive Trip. (c) Emergency Stop Push button. (d) 2 - way selector switch for rotator Forward / Reverse selection. (e) A single turn Potentiometer for setting the RPM. (f) Local / Remote selector switch. (g) Sufficient capacity Cooling fan with required Air filter. (h) Push button for Drive Reset (i) All the electrical components shall be mounted on 'DIN rail' and the panel shall have IP 54 protection. (j) Control Voltage: The control Voltage shall be 24 V AC / DC.	Vendor to confirm	
4.2	A hand held remote unit with the following features has to be provided: (a) Remote ON / OFF selector switch. (b) Single turn Potentiometer for speed variation. (c) Emergency Stop Push button. (d) 2-way selector switch for rotator forward / reverse operation. (e) Programmable Digital RPM Meter The remote cable shall be connected to the Main control panel through easily detachable Plug & sockets and length of the connecting cable shall be 15 mtrs. The cable shall be routed through a metallic braided hose and suitable provision shall be provided on the rotator to wind and keep the remote cable safely when the remote is not in use. Provision shall be provided near the control panel/on the rotator for suitably mounting the pendant after use.	Vendor to confirm	

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS		Bidder's OFFER
4.3	Rotator Operation: Shall be controllable either from Main control panel or from the hand held remote pendant. Suitable selector switch has to be provided for Local / Remote selection in Main control panel.	Vendor to confirm	
5.0	IDLER UNIT The Idler unit should be identical in all aspects with the Drive unit Except that it has no drive mechanism. Idler should have the following Features:		
5.1	Weight Carrying Capacity of each Idler unit : 12.5 Metric Ton.	Vendor to confirm	
5.2	Eccentric Loading: 20 % of the maximum Weight carrying capacity.	Vendor to confirm	
5.3	Welding return cable connection on the positioner: Suitable arrangement to be provided on the idler unit for connecting the welding return cables and to ensure the proper conductivity of welding current through job, rotator wheels to the welding machine. The maximum welding current to be carried is 1200A.	Vendor to confirm	
6.0	FEATURES Common for Drive & Idler units:		
6.1	Outer Diameter Range of Job (approx.): 400 to 4000 mm	Vendor to specify	
6.2	Size of Wheel (Diameter X Width (approx.): 500 X 140 mm	Vendor to specify	
6.3	Vendor to specify the height of roller top most point from shop floor level.	Vendor to specify	
6.4	Wheel Material : Solid Steel Forging.	Vendor to confirm	
6.5	Wheel Contact Surface Hardness : 300-350 BHN	Vendor to confirm	
6.6	Wheel Surface Profile : Crowning Surface with an angle of 3° .	Vendor to confirm	
6.7	Wheel Pitch Adjustment: Each wheel assembly with Housing/Bracket and Integral Drive Unit shall be movable on the Rotator Base Frame, through a manually driven screw-rod in Drive & Idler Unit. It shall be possible to position and lock each wheel assembly on the Rotator Base Frame at required pitches to cover the job diameter range. The drive arrangement to be designed to avoid loading on the screw-rod while loading / after loading the job on the wheels.	Vendor to confirm and provide details of pitch and locking arrangement	

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS		Bidder's OFFER
6.8	Wheel Alignment: The alignment of the wheel face in the plane perpendicular to the wheel shaft axis to be maintained within 1mm for the entire stroke of the wheel assembly positions on the base frame.	Vendor to confirm	
6.9	Wheel Positioning: There shall be suitable arrangement for locking the wheel assembly with the base frame, to prevent movement under working/loaded conditions.	Vendor to provide details	
6.10	Wheel Support: Wheels are to be supported on Heavy Duty Roller Bearings of TIMKEN / FAG / SKF make or any other make acceptable to BHEL.	Vendor to provide details	
6.11	Hardness and finish of Base frame slide: The sliding surfaces of the base frame in Drive & Idler units shall be hardened and machined.	Vendor to confirm	
6.12	Cover for Gears: Suitably profiled dismantling type of steel outer-covers are to be provided for the spur gears, to protect from welding flux, slag and other foreign materials, while in operation. The thickness of the cover plate shall be minimum 3mm. Vendor to ensure that these covers should not interfere with job while rotating.	Vendor to confirm	
6.13	Cover for base frame: Suitably profiled dismantling type of steel covers are to be provided to cover the sliding surface (top face) of the base frame, to protect from welding flux, slag and other foreign materials falling on it, while in operation. The thickness of the cover plate shall be minimum 3mm.	Vendor to confirm	
6.14	Lifting: Provision to be provided at 4 suitable locations for lifting the entire rotator unit by EOT Crane in a geometrically balanced state.	Vendor to confirm	

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS		Bidder's OFFER
7.0	STRUCTURAL FABRICATION		
7.1	Rotator Base Frame and Heavy Wheel Bracket / Housing: Steel Fabrication Procedures to be followed. The Base Frame work shall be with steel plates of sufficient thickness, including REINFORCING RIBS. Vendor to provide the load calculation details for the selected thickness of Base frame, Side plates, ribs and diameter of the screw rod.	Vendor to confirm and provide details	
7.2	Raw Material: Only certified steel plates shall be used for fabrication. Test Certificates to be produced for BHEL verification and it forms part of the documentation.	Vendor to confirm	
7.3	Welded Joints: No Butt Joints are allowed for Plate Build-Up to increase effective length.	Vendor to confirm	
7.4	Welding Electrodes: For all Welding E 7018 Electrode/higher grade shall be used.	Vendor to confirm	
7.5	Welded Joint Testing: All Fillet Welded Joints shall undergo Non Destructive Testing like Liquid Penetrant Test (LPI) and Magnetic Particle Inspection (MPI). Testing Documents to be produced for BHEL verification and forms part of the documentation.	Vendor to confirm	
7.6	Heat Treatment: The Structural Items (Base Frame / Wheel Housing, etc.) shall be Stress Relieved by thermal heat-treatment process after welding and NDT examinations.	Vendor to confirm	
7.7	Machining Operation: All mechanical mating sliding surfaces are to be machined and ground to the required finish after heat treatment.	Vendor to confirm	
7.8	Surface Cleaning: All steel parts are to be shot blasted or chemically treated for surface cleaning, after completion of all operations but prior to painting.	Vendor to confirm	

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS	Bidder's OFFER
8.0	General Points:	
8.1	Electric Power Input: BHEL will provide 3 phase, $415 \pm 10\%$ V, $50 \pm 3\%$ Hz AC input supply -3 wire system without neutral. All other cables/circuitry etc. is in supplier scope.	Vendor to confirm
8.2	Power Supply Cable: Power supply cable shall be of flexible copper and suitable capacity with 4 core (one for earth) of length 10 mtrs. with flexible rubber conduit for mechanical protection to be provided.	Vendor to confirm
8.3	Markings/Indications to be provided on Rollers: a. A scale to be fixed on the base frame to identify the range of job diameters that can be loaded at that particular pitch. b. The rotating and bearing capacities to be mentioned clearly on the Drive or Idler. c. Al so, Self-weight of the rotators should be painted legibly for lifting purpose.	Vendor to confirm
9.0	Working environment	
9.1	Job Temperature: The ROTATORS will be used in the Fabrication Shop floors, where the jobs are pre-heated / post-heated to a temperature of maximum 300°C and hence the mechanical parts coming in contact with the jobs are to be designed to withstand this high temperature.	Vendor to confirm
9.2	Ambient Condition: Indoor Working Environment with temperature up to 50°C and Humidity up to 85%, but both do not occur simultaneously.	Vendor to confirm
10.0	Painting: The ROTATORS are to be painted as follows: a. One coat of Primer (Zinc Chromate) with $25\ \mu$ of DFT (Dry Film Thickness) and 48 hours of compulsory curing after painting. b. Two coats of Enamel Paint [Colour Apple Green] each with a DFT of $25\ \mu$ and intermittent curing of 16 hours. c. Weight carrying capacity & Self weight shall be painted legibly on each unit.	Vendor to confirm

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS	Bidder's OFFER	
11.0	SPARES SUPPLY: VENDOR to Quote one set of spares as mentioned below: a. Bearings for each wheel assembly – 2 Sets b. Shrunk Disc- 2 Nos c. Box Nut- 1 Set d. Pulleys & Couplings used in the Rotator- 1 Set e. Variable Frequency Drive - 1 No. f. Selector switches- 2 Nos. in each type g. Push-buttons-2 Nos. in each type h. Potentiometer-2 Nos. in each type i. limit-switches-2 Nos. in each type Vendor to quote item wise unite price in price bid offer.	Vendor to provide a separate un priced complete list of spares	
11.1	Accessories: The following Electrical maintenance accessories 1 Set to be supplied (a) Electrical maintenance Tool kit (KENNEDY make, 46piece ratchet screwdriver bit and socket set, Order code: KEN5736360K) - 4 Nos (b) MECO make digital Multimeter, Model: 801 Auto – 4 Nos. (c) Hand wheel/ Ring spanner for driving the lead screw for pitch adjustment of wheels – 4 Nos.	Vendor to confirm	
12.0	Drawings / Documents / Details:		
12.1	Drawings and Documents after receipt of P.O.: The following documents and details are to be submitted for BHEL Approval, within one month after the receipt of PO - prior to taking up the manufacture of the ROTATORS: a. GA Drawing of the ROTATOR. b. GA Drawing of Wheel Drive Mechanism. c. GA drawing of wheel shifting mechanism in Drive Units. d. GA Drawing of Electric/Electronic System. e. Sub-Assembly Drawing for Wheels. f. Calculations for Selection of Electric Motors, Gear Reducers, etc. g. Wiring Diagram with Logic Circuits. h. Weight of the ROTATOR (Drive & Idler Unit) including all Electrical Equipment. Note: All the drawings should have the major & critical dimensions and list of bought out items with make and specification	Vendor to confirm	

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS	Bidder's OFFER	
12.2	Drawings and Documents along with Equipment supply: Each ROTATOR set shall be provided with THREE Copies of Erection / Assembly, Operation & Maintenance Manual, containing the following technical details: a. General Arrangement and Sub-assembly Drawings b. Electrical Wiring Schematics c. Detailed Wiring Diagrams for Control Panels and Remote Control d. Rotator Wheel Sub- Assembly Drawing e. Gear Box Details / Drawings. f. Specifications / Ratings of Bought-Out Items g. VFD drive Programming / User manual h. VFD drive Parameter manual i. Mechanical manufacturing drawings for all wearing components. (Screw rod, box nut, drive pinion, gears, bushes, etc.) j. Operation & Maintenance manual with complete specification of the equipment and Preventive Maintenance check list. Note: 1. One soft copy of the entire documents stated above to be provided in Pen drive/CD. 2. One Hard copy and one soft copy to be submitted at the time of inspection at suppliers works for checking the sufficiency of the documents. If any additional requirements are found needed for maintenance, it should be provided.	Vendor to confirm	
13.0	Pre Dispatch Inspection: Supplier to call BHEL for PDI before dispatch. The following Schedule of Inspection is to be carried out, prior to dispatch from the Supplier's Works: a. Verification of Test Certificate for Raw Materials & Bought-Out Items used. b. Random Testing on the Welds, by physical examination and NDT c. Wheel alignment as per clause 6.9. d. Idle Run Test and Test under simulated conditions (on mutually agreed basis) e. Verification of O&M Manuals.	Vendor to confirm	

Clause No.	PARTICULARS AND BHEL SPECIFICATIONS	Bidder's OFFER	
14.0	ROTATOR ERECTION & COMMISSIONING		
14.1	Erection / Assembly: Erection / Assembly of the ROTATORS will have to be done by the Technical Representative of the Supplier at BHEL Works	Vendor to confirm	
14.2	Commissioning: Commissioning of the ROTATOR and Performance Prove – Out for Carrying & Rotating Capacity and Smooth Functioning of the ROTATOR (at BHEL Works) shall be the RESPONSIBILITY of the supplier.	Vendor to confirm	
15.0	Training: After Erection & Commissioning, the Vendor shall give necessary training to Operators & Maintenance persons on Operation & Maintenance of the Unit.	Vendor to confirm.	
15.1	Training on VFD: Also, the Vendor shall arrange training at VFD manufacturer's work in India for 2 BHEL personal on VFD Programming, Maintenance & troubleshooting. The Boarding, Lodging & travelling expenses of BHEL personal will be borne by BHEL.	Vendor to confirm.	
16.0	Guarantee: 12 Months from the date of commissioning or 18 Months from the date of dispatch whichever is earlier	Vendor to confirm.	
17.0	The following to be necessarily enclosed with the offer:		
17.1	a) GA Drawing of Drive and Idler units with important Dimensions and BOM b) GA Drawing of Wheel Drive Mechanism with important Dimensions and BOM c) Wiring Diagram with Logic Circuits and BOM d) Main control unit and Handheld remote unit layout drawings. e) Catalogue.		