



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirapalli – 620014, TAMIL NADU, INDIA

MATERIALS MANAGEMENT / CAPITAL EQUIPMENT

ENQUIRY NOTICE INVITING TENDER	Phone: +91 431 257 7653 Fax : +91 431 252 0719 Email : skaruna@bheltry.co.in Web : www.bhel.com
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TWO PART BID Tender to be submitted in Two Parts	Enquiry Number: 2731200001	Enquiry Date: dt.05.01.2012	Due date for Submission of quotation dt.06.02.2012
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You are requested to quote the Enquiry number date and due date in all your correspondences. 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 No.	Item Description	Quantity
10	Supply of CNC Lathe for Reaming as per the Technical Specification, & Commercial Conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	01 No.

Important Points to be taken care during the submission of offer:-

1. The delivery period required is 9 months.
2. Check list to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
3. Guarantee for the Items to be 18 months from the date of supply or 12 months from the date of commissioning.

BHEL's General guidelines /instructions including bank guarantee formats and list of consortium banks, commercial terms checklist can be downloaded from BHEL web site <http://www.bhel.com> or from the government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) Tender Enquiry reference "2731200001"

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 Engineer / MM / Capital Equipment
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CNC Lathe**SECTION – I : QUALIFYING CRITERIA**

The BIDDER has to compulsorily meet the following requirements to get qualified for considering the technical offer :

Sl. No.	REQUIREMENTS	BIDDER's RESPONSE
1	<p>Only those vendors (OEMs), who have supplied and commissioned at least ONE CNC Lathe (similar type being offered) in the past ten years (from the date of opening of Tender) and such machine is presently working satisfactorily for more than one year after commissioning (from the date of opening of Tender) should quote.</p> <p>However, if such machine had already been supplied to BHEL, then that machine should be presently working satisfactorily for more than six months after its commissioning and acceptance (from the date of opening of Tender).</p>	
	The vendor should submit following information where similar machine has been supplied for qualification of their offer.	
1.1	Name and postal address of the customer or company where similar machine is installed.	
1.2	Name and designation of the contact person of the customer.	
1.3	Phone, FAX no and email address of the contact person of the customer.	
1.4	Month and Year of commissioning of the machine.	
1.5	Application for which the machine is supplied	
1.6	Along with the Technical offer, the Vendor should submit one Performance certificate from the customer for the satisfactory performance of the machine supplied to them. For obtaining the Performance certificate, a suggestive format is provided in SECTION – IV .	
1.7	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/ incorrect, the offer shall be rejected.	
2.0	DELIVERY - The bidder shall quote the best possible delivery. However the delivery shall not exceed 9 months with an additional grace period of 3 months. The additional grace period will attract a penalty which is explained in the commercial terms of the enquiry. The delivery period shall be reckoned from date of purchase order to despatch from the vendor works.	

SECTION – II : The BIDDER / VENDOR is requested to provide the following information:

Sl. No.	REQUIREMENTS	VENDOR's RESPONSE
3.0	The BIDDER/VENDOR to furnish Reference List of Customers, with full address, details of contact person, where CNC Lathes have been supplied in the past.	
4.0	Details of CNC Lathes supplied to other BHEL units, if any. (Year of commissioning, Spindle size of machine, Spindle motor power)	
5.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Address of Agents / Service Centers in South India.	
6.0	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – III : The BIDDER to note:

S. No.	PARTICULARS	VENDOR'S RESPONSE
7.0	The BIDDER / VENDOR shall submit the offer in TWO PARTS. 1. Technical Offer [with PART A & PART B] & commercial offer 2. Price Bid.	
8.0	The Technical Offer shall contain a comparative statement of Technical Specifications demanded by BHEL and Offer Details submitted by the Bidder , against each clause. A just 'CONFIRMED' or 'COMPLIED' or 'YES' or 'NO-DEVIATION' or similar words in the technical comparative statement may lead to disqualification of the Technical Offer.	
9.0	The Technical Offer shall be supported by product Catalogues & Data Sheets and also technical details of Bought-Out-Items with copies of Product Catalogue to the extent possible.	
10.0	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.	

SECTION – IV

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

PERFORMANCE CERTIFICATE

1. Supplier of the machine	
2. Make & Model of the M/C	
3. Month & Year of Commissioning	
4. Application for which M/C is used	
5 <ul style="list-style-type: none"> a) Swing over Cross Slide b) Spindle Through bore Size c) Spindle Motor Power d) Spindle Speed range e) Cross Travel X- Axis f) Longitudinal travel Z-axis (beyond face of Chuck) g) CNC System h) Turret system i) Job clamping system 	
6. Performance of the Machine (Strike off whichever is not applicable)	Satisfactory / Good / Average / Not Satisfactory
7. Any Other remarks	
<div style="display: flex; justify-content: space-between; align-items: flex-end; padding: 10px;"> <div>Date:</div> <div>Signature & Seal of the Authority issuing the Performance Certificate</div> </div>	

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
1.0	<u>Purpose :</u> This CNC lathe is specifically intended for ID reaming of long tubes, Profile machining and threading of small components	
2.0	<u>Work Piece Dimensions</u>	
2.1	Tube: Outer Diameter range : 9.0 mm to 32 mm. Thickness range : 1.0 mm to 5.0 mm. Length : 3000 mm (Maximum)	
2.2	Other Components: Outer Diameter : 100 mm. (Maximum) Length : 150 mm (Approx.)	
2.3	Work Piece materials: Tensile Strength : 49 - 68 Kgf/mm ² & Yield Strength : 39 kgf / mm ² at Room temperature.	
3.0	<u>Construction:</u>	
3.1	<u>Head Stock & Spindle:</u>	
3.1.1	Swing over cross slide shall be 120 mm (min).	Bidder to confirm
3.1.2	Spindle run out shall not be more than 0.005mm	Bidder to confirm
3.1.3	Spindle bore shall have a through bore size more than 32 mm.	Bidder to confirm
3.1.4	Chuck shall be of self-centering 3-jaw chuck , hydraulic actuated, with a maximum run out of 0.005 mm. In addition to 3 jaw chuck, a Collet chuck , hydraulic actuated, with collets, suitable for tube OD of 9mm, 13.8mm, 17mm, 18mm, 28mm and 32 mm shall also be supplied. The run-out of the spindle mounted collet chuck system shall be 0.005 mm or better.	Bidder to confirm & specify
3.1.5	Mounting & dismantling of Collect Chuck & Three Jaw Chucks shall be easy to perform. Modifications required, if any is to be carried out by the Vendor.	
3.1.6	Spindle Motor Rating shall be minimum of 3.5 KW AC and the Spindle Motor shall be of either Siemens or Fanuc make of AC variable speed.	Bidder to confirm & specify
3.1.7	Spindle speed range: 50 - 4000 RPM (approx) and shall be selectable through CNC Program. Provision shall also be made available for rotation of spindle in both the directions and control for inching.	Bidder to confirm
3.1.8	Suitable provision shall be made available in the spindle control such as encoder to facilitate multistart threading cycle.	Bidder to confirm
3.2	<u>Machine Bed</u>	

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
3.2.1	Machine bed shall be of rigid construction.	Bidder to confirm
3.2.2	L.M guide ways are to be used. Bidder to specify the No. of Guide ways & Bed width across ways.	Bidder to confirm & specify
3.2.3	Oil Lubrication is to be used for Ball Screw & Nut arrangements.	Bidder to confirm
3.3	<u>Carriage, Cross slide and Tool Post</u>	
	The carriage shall have a 4 Station Linear Tool head. In addition, an 8 Station bi-directional Turret tool head is to be supplied as an optional accessory. It should be easy to perform the change of tool head from one to another.	Bidder to confirm
3.3.1	Both the tool holders shall able to hold a shank size of 12 x 12 (Minimum) and the boring bar holders shall able to hold boring bars of diameters up to 25 mm. Two numbers of each tool holders, sleeves and Morse taper sleeves for MT1 & MT2 suited to the turret shall also be supplied. Besides tool holder sleeves, the vendor to supply <u>50 nos. of carbide reamers</u> , of size 11mm and reaming length 120 mm for the prove out component <u>specified vide 21.1.3</u>	Bidder to confirm & specify.
3.3.2	The cross slide and turret tool head shall have a minimum travel of <u>150 mm from the face of the Collet or 3 jaw chuck - in Z direction coaxial to the spindle.</u>	Bidder to confirm
3.3.3	Movement of cross slide and tool posts shall be controlled through CNC program	Bidder to confirm
3.3.4	Mounting & dismantling of Turret / Linear tool holder shall be easy to perform. Modifications required, if any is to be carried out by the Vendor.	Bidder to confirm
3.4	<u>Lubrication system:</u> Suitable Centralized lubrication system - pump with motor, tank, fluid lines, controls etc., are to be provided for efficient lubrication.	Bidder to confirm
3.5	<u>Coolant system:</u> Separate Coolant system shall be provided.	Bidder to confirm
3.6	<u>Protective covers:</u> All precision sliding, rotating parts, Guide ways etc. shall be protected from ingress of dust, chips etc. Protective covers shall be of rust resistant material. Telescopic guard and Splash guard are to be provided.	Bidder to confirm
3.7	<u>Machine Lights:</u> Machine lights, preferably with white illumination shall be provided for sufficient illumination of complete working area.	Bidder to confirm
3.8	<u>Tube Support System:</u> Sketches and price for “Tube supporting arrangement” of tubes shall separately be provided as separate optional accessory. Automatic bar feeding is not essential. Manual feeding of Tubes is enough (Refer point 7.0).	Bidder to provide
4.0	<u>CNC control</u>	
4.1	Machine control system shall be latest version of either Fanuc or Siemens , which shall be acceptable	Bidder to specify

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
	to BHEL	
4.2	Spindle, Cross Slide and Turret tool head shall be controlled through programs. Speed and feed shall be infinitely variable within the given range.	Bidder to confirm
4.3	In addition to the rapid traverse of Cross Slide and Turret tool head, manual pulse generator control shall be provided for finer adjustment	Bidder to confirm
4.4	Programming shall be operator friendly.	Bidder to confirm
4.5	<u>Threading cycle (Multi start)</u> shall be included in addition to the other standard program cycles.	Bidder to confirm
4.6	Mechanism shall be provided for locking of the programmable axes.	Bidder to confirm & specify
4.7	The system should have full alphanumeric keyboard, TFT colour display (10.4" or more) of high quality and Key Board in suitable enclosure, Communication ports (USB ports / RS232C serial interfaces, parallel interface for printer, COM port for telediagnosics), network ready with LAN, electronic hand wheels for all axes, USB ports for data input/output, hard disk of sufficient capacity, graphic simulation and preinstalled system software & other required softwares etc. All relevant details shall be submitted by the Bidder.	Bidder to confirm & specify
4.8	<u>Manual Control:</u> Complete manual control of machine with required switches / keys including micro-level control switches shall be provided on operator's panel for selection of required axis, axis direction, cutting feed spindle rpm, cutting feed on/off, display of axis position values etc. and for manual turning operation without using CNC program, CNC option MANUAL TURN & MDI mode. Diagrams or Sketches for switches / keys provided on operators' pendant shall be submitted by the bidder.	Bidder to confirm & specify
5.0	<u>Servo Voltage Stabiliser</u>	
5.1	Indian make (NEEL / SERVOMAX) Oil / Air Cooled servo Controlled Voltage Stabilizer suitable for complete machine, its drives, controls, PLC etc with no undesirable Harmonics in the Stabiliser output. Bidder has to specify Make, Model & rating.	Bidder to confirm & specify
5.2	Spares Package for the Voltage Stabiliser for 2 years working should also be offered	Bidder to specify
5.3	Catalogue of the Voltage Stabiliser shall be submitted with the offer	Bidder to provide
6.0	<u>Isolation transformer:</u> Separate Indian make (NEEL / SERVOMAX) Isolation transformer is to be supplied. Bidder to specify the make, model, rating etc. catalogue shall be submitted with the offer	Bidder to confirm & specify
7.0	<u>Tube Support Stand :</u> Long tubes of lengths up to 3000 mm will be loaded from rear of the head stock and clamped with the chuck or the Collet chuck for boring, reaming, facing and other machining.	Bidder to confirm & specify

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
	These tubes shall be supported on the rear side by the tube support stand. The support locations shall be provided with Teflon pads. These pads shall be supplied suitable for tube outside diameters of 9mm, 14mm, 17mm, 18mm, 28mm and 32mm. The offer should include drawings of the tube support stand. As no automatic bar feeding mechanism is envisaged, manual loading of tube in the stand as well as in the spindle can be planned.	
8.0	<u>Hydraulics</u>	
8.1	Pumps, valves, accessories etc shall be of Rexroth / Vickers (Details to be submitted). The seals used in cylinders shall be of Merkel / Parker / Bushak + Shamban / Hunger / Simrit make – vendor to indicate the make of offered seals.	Bidder to specify
8.2	Suitable filtration system should be provided with Duplex / standby filter units. It is preferable to use re-usable type of filter elements in the system. The filter unit shall be of Hydac / Parker / Rexroth . - Details to be submitted with the offer	Bidder to specify
8.3	The flexible hoses used in the system shall be of Gates / Aeroquip / Parker - vendor to indicate the make of offered hoses.	Bidder to specify
8.4	It should be possible to replace hydraulic elements like valves, manifolds etc without disturbing the associated pipelines. The positioning of hydraulic elements should allow easy maintenance	Bidder to confirm
8.5	Maximum Operating Pressure of hydraulic system – Not to exceed 310 bar	Bidder to specify
8.6	Main Pump flow in LPM and Motor Power in kW	Bidder to specify
8.7	Reservoir capacity (in litres)	Bidder to specify
8.8	All oil pipelines shall be of seamless steel and should undergo pickling process.	Bidder to confirm
8.9	Pressure gauges with push lock type gauge isolator to be provided	Bidder to confirm
8.10	Cylinders used in the machine should have standard bore and rod sizes. The piston rod shall be hard chrome plated. – vendor to provide sizes and confirm	Bidder to confirm & specify
8.11	The pipe / hose end fittings shall be of standard weld nipple with O-ring seating type (DIN 3865 or equivalent) – female swivel nut with 24° cone and o-ring and no ferrule joints are to be used in the hydraulic system. All threaded connections shall be of metric sizes	Bidder to confirm
8.12	The hydraulic system shall preferably use SS 68 oil of IOC supply.	Bidder to confirm

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
8.13	The coil voltages for the Solenoids used in the machine shall be of 24-V DC and all solenoid operated DC valves should have provision for manual over-ride and light indication.	Bidder to specify
8.14	The pipelines to be painted with standard colours as per the colour coding accepted internationally for hydraulic systems.	Bidder to confirm
8.15	All hydraulic pipelines, hoses and electrical control cables to be neatly laid out with proper clamps and flexible hose conveyors wherever required.	Bidder to confirm
8.16	Suitable metallic tray for collecting leakage oil to be provided wherever required.	Bidder to confirm
8.17	Metallic identification number plates shall be pasted near all the components in the hydraulic power pack as per the numbering scheme used in the hydraulic circuit.	Bidder to confirm
8.18	First fill of oil shall be supplied by BHEL – Vendor to indicate the quantity of oil	Bidder to confirm
9.0	ELECTRICAL SYSTEM	
9.1	415V (fluctuation + 10% / -15%), 50HZ (fluctuation +/-3 Hz), 3 Phase AC (3 wire system with out neutral) Power Supply will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of vendor. Requirement of grounding/earthing with required material details should be informed by vendor well in advance so that same could be incorporated during construction of foundation.	Bidder to confirm & speicfy
9.2	Tropicalisation: All electrical / electronic equipment shall be tropicalised	Bidder to confirm
9.2	All electrical & electronic control cabinets & panels should be dust and vermin proof and shall have IP 54 protection.	Bidder to confirm
9.3	All electrical components in the cabinets should be mounted on DIN Rail. Control Transformer, if any, shall be mounted on the floor of the control cabinet, in such a way that it can be accessed easily.	Bidder to confirm
9.4	Motors shall conform to IEC or Indian Standards. The motors shall be of reputed make like Siemens, ABB, Kirloskar.	Bidder to confirm & specify
9.5	All electrics shall be of reputed make like Siemens, L&T, BCH, Tele-mechanique.	
9.6	The Servo & Spindle drives shall be of SIEMENS / FANUC make digital drives.	
9.7	All components / devices / terminals are to be incorporated with ferrules.	Bidder to confirm
9.8	Vendor should ensure the proper earthing for the machine and its accessories.	Bidder to confirm

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
9.9	Wiring: All electrical motors, limit switches etc, on the machine shall be wired using PVC sheathed cable running in conduits to common terminal block.	Bidder to confirm
9.10	External wiring from / to control panel, control desk, external motors etc shall be by means of unarmoured multi-core / multi strand copper cables.	Bidder to confirm
9.11	All cables/ hoses moving with traversing axes should be installed in cable drag chain. Additionally, all the cable trays required for laying of cables should be included in the offer.	Bidder to confirm
9.12	All solenoids shall be of LED type.	Bidder to confirm
9.13	All controls and Relays etc. shall be of reputed make such as Siemens, Telemechanic etc	Bidder to confirm
9.14	An energy meter with the following specifications shall be provided in the Main control panel. The accessories required for the energy meter shall be supplied and erected. a) Voltage (Ph to Ph, Ph to N) (Individual / Average) b) Current (I1,I2, I3)(Individual / Average) c) Frequency d) Power Factor e) Active, Reactive & Apparent Power (Individual / Average) f) % THD Display for Current & Voltage Harmonics g) Active, Reactive & Apparent Energy (Individual / Average) h) Inbuilt provision for RS 485 Communication with Modbus protocol i) Meters shall also support Minimum 2 Digital Inputs & 2 Digital Outputs and Shall be controlled from Remote monitoring System.	Bidder to confirm & give details.
10.0	SAFETY FEATURES	
10.1	All rotating parts of the machine should be provided with guards and should be statically & dynamically balanced to avoid undue vibration and noise	Bidder to confirm
10.2	Emergency Switches at suitable locations as per International Norms should be provided.	Bidder to confirm
10.3	Enclosures or protective covers shall be provided for the moving parts (either linear or rotary), as a safety measure, as per industry standards.	Bidder to confirm
11.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE : - vendor to confirm the following	Bidder to confirm

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
11.1	The Machine should confirm to following factors related to environment:	Bidder to confirm
11.2	Maximum noise level shall not exceed 85 dB(A) at normal load condition, 1 meter away from the machine.	Bidder to confirm
11.3	There shall not be any emissions from the machine except fumes of cutting fluid during machining.	Bidder to confirm
11.4	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Bidder to confirm
12.0	LEVELING & ANCHORING SYSTEM: Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc shall be supplied for the Machine, tube handling stand, electrical panel etc..	Bidder to confirm
13.0	TOOLS FOR OPERATION & MAINTENANCE: The vendor shall supply special tools required for the operation and maintenance of the machine. The vendor shall also supply necessary standard tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the machine. List of all such Special and standard tools shall be submitted with offer.	Bidder to confirm

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
14.0	<p>Spares: Vendor to list the operating spares for the machine, tube rotation system, tube feeding system etc. for two years trouble free operation.</p> <p>The list shall cover and identify the spares system-wise for mechanical, hydraulic and electrical system. Over and above the list of two years spares the following spares shall also be included:</p> <ol style="list-style-type: none"> 1. A set of spares of all machine wear parts shall be listed and included in the offer. 2. Filter element of coolant / lubricating system – 2 set 3. Filter elements of hydraulic system – 2 set 5. Drive belts (toothed, V-belt used on the machine - 1 set. 5. Hydraulic valves – 1 no. of each type 6. Seal kit for all hydraulic cylinder – 1 set in each type 7. All Oil seals and O rings – 2 sets 8. Spindle drive – 1 No. 9. All type of Limit switches, proximity switches, pressure switches, encoders – 1 No. in each type 	Bidder to confirm & specify
15.0	Documentation : vendor to confirm and submit the documents as mentioned below in 15.1 & 15.2	Bidder to confirm and submit

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
15.1	Documentation to be supplied along with the offer:	
	General Lay-out of the machine with major and critical dimensions in line with the specification	
	General Assembly drawing of the machine with bill of materials and critical dimensions.	
	List of bought out items with make and specification along with catalogues: Drives, Motors, Gear boxes, etc.	
	Hydraulic Circuit diagram with Bill of Materials	
	Electrical Circuit diagram with Bill of Materials.	
	CD /Hard copy of literature with photographs & drawings explaining the technical features.	
	Quality plan adopted in manufacture, assembly, testing and commissioning	
	Documents to be submitted after placement of order for approval / verification before manufacturing:	
	General Lay-out of the machine with major and critical dimensions in line with the specification	
	General Assembly drawing of the machine with bill of materials and critical dimensions.	
	Sub-assembly / Arrangement drawings with bill of materials and critical dimensions.	
	List of bought out items with make and specification along with catalogues: Drives, Motors, Gear boxes, etc.	
	Hydraulic Circuit diagram with Bill of Materials	
	Electrical Circuit diagram with Bill of Materials.	
15.2	Documents to be submitted along with machine:	Bidder to confirm and submit
	Three sets of following documents as Hard copies and 1 set of all documents including bought out item catalogues – soft copy in CD in English Language should be supplied along with the machine.	
	Operating Manuals of equipments	

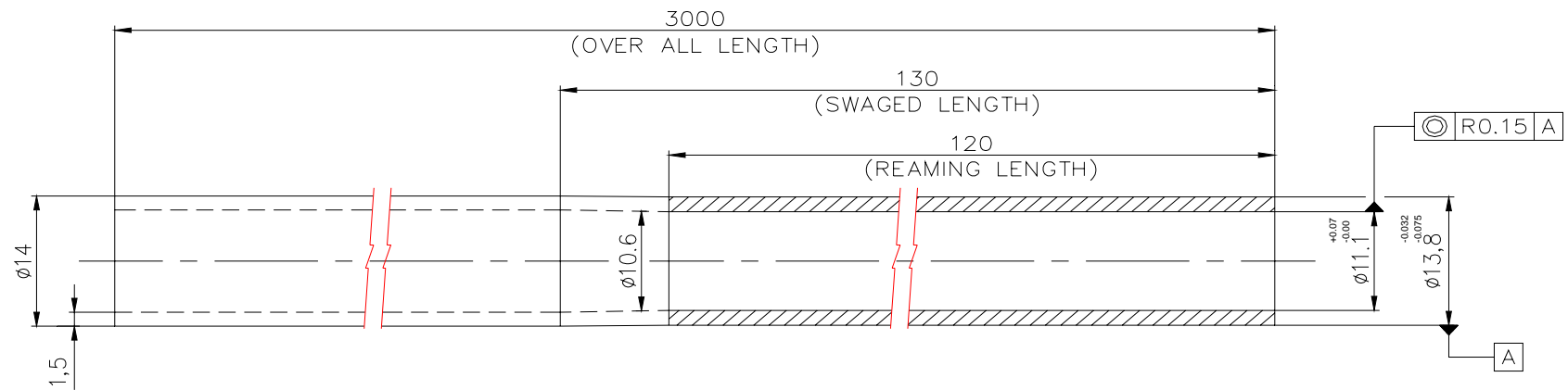
SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
	<p>Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical /-PLC logic / Hydraulic Circuit Diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list / Bill of Materials giving complete specification and make of components.</p> <p>Programming, Maintenance, Interface & Commissioning Manuals for the CNC system & drives</p> <p>Manufacturing drawings for all wearing components like bushes, pulleys, gears, etc.</p> <p>Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable, highlighting the specific model used in the supplied machine. After successful commissioning, the PLC, NC backup along with part program to be given in CD / Flash card.</p> <p>Detailed specification of all rubber items, hoses, fittings, etc. List of bearings, belts used</p> <p>Complete Master List of parts used in the equipment.</p> <p>Complete list of spares for equipments and accessories, along with item part no / specification / type / model, and name & address of the spare supplier shall be furnished.</p> <p>Drawings of reamer with cutting edge configuration shall be supplied for the purpose of Re-sharpening wings of the reamer</p> <p>One set of complete documents as Hard copy and complete documents in CD / Pen drive to be submitted during inspection at supplier's works for verification.</p>	
16.0	Training : -	
16.1	<p>BHEL Personnel shall be trained at Supplier's Works for a period of 3 Days in the area of</p> <p>a. Mechanical & Electrical Maintenance for Machine & other Accessories supplied</p> <p>b.. Operation of the Machine & other Accessories supplied</p>	Bidder to confirm
16.2	After commissioning the machine at BHEL, training to be provided to the operators and maintenance staff for a period of 6 days.	Bidder to confirm

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
16.3	Training for two operators & two maintenance persons at CNC system supplier's work (SIEMENS / FANUC) on machine programming, maintenance for a period of not less than five days each to be arranged by the supplier. Boarding, lodging, travelling charges will be borne by BHEL.	Bidder to confirm
17.0	FOUNDATION:	
17.1	Vendor to submit the layout and foundation drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI) / P.O. whichever is earlier. The layout should consist of all requirements pertaining to complete machine including space. BHEL shall construct complete foundation as per the drawing supplied by vendor.	Bidder to confirm
17.2	The Vendor shall indicate detailed specifications of grouting compound and Grouting procedure etc. for foundation bolts of the machine.	Bidder to confirm
18.0	ERECTION & COMMISSIONING:	
18.1	<ol style="list-style-type: none"> 1. Supplier to take full responsibility for erection, start up, testing of machine, it's control system & all other supplied equipment, test pieces etc. 2. Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by supplier in their foundation or layout drawings. 3. Crane will be provided by BHEL, free of cost. 4. Personnel required for erection shall be arranged by vendor. 	Bidder to confirm
18.2	Successful proving of BHEL components (by the supplier at BHEL shall be considered as part of commissioning.	Bidder to confirm
18.3	All tests, mentioned under the clause “ Machine Acceptance ” should form part of the commissioning activity.	Bidder to confirm
18.4	Tools, Tackles, Test Mandrels, instruments and other necessary equipments to erect, level, check geometric accuracies should be brought by the supplier.	Bidder to confirm
18.5	Special equipments, like test mandrel, straight edge, dial indicators with magnetic base, etc., should be supplied along with the machine.	Bidder to confirm
18.6	The supplier shall arrange commissioning spares required for commissioning of the machine.	Bidder to confirm
18.7	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colors of paint used.	Bidder to confirm
18.8	Schedule of Erection and Commissioning shall be submitted with the offer.	Bidder to confirm

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
18.9	Charges, duration, terms & conditions for Erection & Commissioning should be furnished in detail separately by Vendor along with the Technical Offer.	Bidder to confirm
20.0	ACCURACY TESTS: Geometrical accuracies as per applicable standard test chart recommended by the Vendor. Detailed Test Charts for the same, clearly showing the accuracies to be achieved on the machine, shall be submitted with the offer.	Bidder to confirm & provide.
21.0	MACHINE ACCEPTANCE:	
22.1	Tests/Activities to be carried out at supplier's works on the machine before dispatch	
21.1.1	Machine Positioning accuracy & repeatability: Machine Positioning accuracy & repeatability should be measured as per VDI/DGQ 3441 (Latest Revision) using LASER INTERFEROMETER Vendor to provide values for the following: Positioning accuracy in X axis (Pa) per 1000 mm Positioning accuracy in Z axis (Pa) per 1000 mm Repeatability in X axis (Ps) Repeatability in Z axis (Ps) Positioning accuracy over entire traverse in X axis (Pa) Positioning accuracy over entire traverse in Z axis (Pa) Total positioning error along X & Z axes per 1000 mm (P) Total positioning error along X & Z axes over entire traverse (P)	Bidder to confirm
21.1.2	Geometrical Accuracy Tests as per test chart provided by the vendor	Bidder to confirm
21.1.3	Prove out component- Reaming of Tubes. – Vendor to prove out reaming on Titanium tube of OD 14 mm (nominal), ID to be reamed from 10.6 mm to 11 mm. Reaming length shall be 120 mm. Sketch given in Annexure I. Reaming of 10 ends to be proved. Tube OD at the holding portion will be 13.8 mm. Carbide reamer shall be used. Carbide reamers for prove out shall be supplied as specified vide 3.3.2	Bidder to confirm
21.1.4	Demonstration of all features of the machine, control system & accessories using sample work pieces.	
21.2	Tests/Activities to be carried out at BHEL works while commissioning the machine: All tests performed vide Point No. 21.1.1, 21.1.2 21.1.3 & 21.1.4 (including prove out) – shall be performed at BHEL after Commissioning.	Bidder to confirm
22.0	One set of test mandrels required for the above mentioned geometrical tests are to be supplied along with the machine.	Bidder to confirm

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
23.0	PACKING: Sea worthy & rigid packing for all items of complete machine, control panels , all accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes.	Bidder to confirm
24.0	Painting of Machine / Electrical Panels : SYNTHETIC ENAMEL GLOSSY FINISH APPLE GREEN PAINT AS PER IS 5/1995. Shade : (ISC)NO-281.	Bidder to confirm
25.0	<u>GUARANTEE:</u> The machine along with all systems, sub-systems, bought-out items have to be guaranteed for its performance for a minimum period of 12 months from the date of commissioning at BHEL Works. OR 18 months from dispatch.	Bidder to confirm
26	GENERAL : Vendor to furnish the following information:	Bidder to provide
26.1	Machine Model No.	
26.2	Total connected load (KVA):	
26.3	Floor area required (Length, Width, Height) for complete machine & accessories	
26.4	Total weight of the machine	

SL. No.	Description / BHEL Spec.	BIDDER'S OFFER With Technical Details
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ANNEXURE – I

PROVE OUT COMPONENT: REAMING OF TUBE