



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY	Phone: +91 431 257 79 38 Fax : +91 431 252 07 19 Email : tvenkat@bheltry.co.in Web : www.bhel.com
NOTICE INVITING TENDER	

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2620900211	29.09.2009	04.11.2009

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	Description	Quantity
10	Heavy Duty CNC Lathe as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	1 No.

Important points to be taken care during submission of offer:

1. Delivery required 8 months from the date of purchase order.
2. Grace period of 2 months beyond the above delivery period will be considered.
3. Check-list to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.

BHEL's General guidelines / instructions including bank guarantee formats and list of consortium banks, Commercial terms check-list 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) under Enquiry reference "2620900211".

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 Manager / Capital Equipment / MM
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PART A**HEAVY DUTY CNC LATHE****SECTION – I : QUALIFYING CRITERIA**

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

S. No.	REQUIREMENTS	Vendor's Response
1	<p>Only those vendors (OEMs), who have supplied and commissioned at least one Heavy Duty CNC Lathe with</p> <p>1. Spindle power 20 KW or more and</p> <p>2. Turning length between centers 2000 mm or more</p> <p>in the past ten years and such machine should at present be working satisfactorily for a minimum period of one year after commissioning, as on the date of opening of this Tender are eligible to quote.</p> <p><i>(However, if such machine is already supplied to BHEL, then that machine should at present be working satisfactorily for a minimum period of six months after commissioning, as on the date of opening of this Tender.)</i></p>	
The vendor should submit the following information where similar machine has been supplied, for qualification of this 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	Parameters of machine supplied, viz. Spindle power, Max Turning length etc and the application for which the machine is supplied.	
1.6	Along with the Technical offer, the Vendor should submit one Performance certificate from a customer for the satisfactory performance of the machine supplied to them. A suggestive format of the Performance certificate is provided below 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	<p>DELIVERY: The bidder shall quote the best possible delivery. However the delivery shall not exceed 8 months with an additional grace period of 2 months. The additional grace period will attract a penalty, which is explained in the commercial terms of the enquiry.</p> <p>The delivery period shall be reckoned from the date of purchase order to dispatch from the vendor works.</p>	
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SECTION – I I

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

S. No.	REQUIREMENTS	Vendor's Response
3.0	The BIDDER/VENDOR to furnish Reference List of Customers, with full address, details of contact person, where Heavy Duty CNC Lathes have been supplied in the past.	
4.0	Details of Heavy Duty CNC Lathes supplied to other BHEL units, if any. (Year of commissioning, Turning length and Spindle 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] and 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. Machine Manufacturer's name			
2. Make & Model of the Machine			
3. Month & Year of Commissioning			
4. Application for which the Machine is used			
5	1. Spindle Power in KW (cont. rating) 2. Max Turning length between centers 3. Swing over carriage 4. Spindle nose		
6. Performance of the Equipment (Tick whichever is applicable)		Best in the market	
		Satisfactory	
		Good	
		Average	
		Not Satisfactory	
7. Any Other remarks			
<div style="text-align: right; margin-right: 100px;"> Signature & Seal of the Authority (customer) Issuing Performance Certificate </div> Date:			

TECHNICAL SPECIFICATION FOR HEAVY DUTY CNC LATHE

Clause No	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical Details									
1.0	<p>PURPOSE: This Lathe is intended for machining and threading of Boiler components. The machine shall be used for Turning, Boring, Facing, threading (external / Internal) etc. on the below mentioned components.</p> <p>Drum U rod nut, Electronic water level indicator body, and Matching piece for 80 PGMA – lower dia, Blanks for dished ends and FEC up to 600 mm dia etc.</p>	Vendor to confirm										
1.1	<p>WORK PIECE DETAILS:</p> <table><tr><th>Specification</th><th>Hardness</th></tr><tr><td>SA 299</td><td rowspan="2">180- 200 BHN</td></tr><tr><td>SA 515 Gr 70</td></tr><tr><td>SA 106 Gr B</td><td>150- 180 BHN</td></tr><tr><td>Other Alloy steels</td><td>260- 300 BHN</td></tr></table> <p>Max weight of Work-piece = 1500 Kg</p>	Specification	Hardness	SA 299	180- 200 BHN	SA 515 Gr 70	SA 106 Gr B	150- 180 BHN	Other Alloy steels	260- 300 BHN	Vendor to confirm	
Specification	Hardness											
SA 299	180- 200 BHN											
SA 515 Gr 70												
SA 106 Gr B	150- 180 BHN											
Other Alloy steels	260- 300 BHN											
2.0	MACHINE CONSTRUCTION:											
2.0.1	Vendor to furnish constructional details of the machine including explanatory drawings of various components/ assemblies like Head stock, carriage, Turret, Tailstock, Machine Bed, Feed Transmission System, Feed back System etc. of the machine with details of material & their hardness.	Vendor to specify										

Clause No	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical Details
2.0.2	Video images on CD / Hard copy of literature with photographs & drawings explaining the technical features shall be enclosed with the offer	Vendor to specify	
2.0.3	Sliding door shall be provided with sufficient transparent windows to view machining progress and to avoid Chip / coolant Splash.	Vendor to confirm	
2.0.4	Machine should be metric execution.	Vendor to confirm	
2.1	MACHINE SPECIFICATION:		
2.1.1	Type of Bed	Flat Bed	
2.1.2	Turning Diameter over cross slide:	450 mm	
2.1.3	Swing Over Carriage	Vendor to specify	
2.1.4	Maximum dia of chucking Job	600 mm	
2.1.5	Turning length required between centers: 2000 mm minimum	Vendor to specify	
2.1.6	Z-axis travel	Vendor to specify	
2.1.7	Max. Weight carrying capacity with / without tailstock	Vendor to specify.	
2.1.8	Chuck: Hydraulic 3 Jaw self-centering hollow chuck 500 mm with one set of hard Jaws and chuck flange complete with clamping cylinder.	Vendor to confirm	
2.1.9	Provision of Dual chucking pressure for selection of two pre-set chucking pressures.	Vendor to confirm	
2.2	SPINDLE:		
2.2.1	Spindle nose:	A1- 11"	
2.2.2	Spindle power (continuous rating)	Around 22 KW	
2.2.3	Hole through Spindle	Vendor to specify	
2.2.4	Spindle Motor Make: Fanuc or siemens & Model No:	Vendor to specify	
2.2.5	Spindle speed (Infinitely variable): 10 to 450 rpm	Vendor to confirm	
2.2.6	Number of speed ranges (Selectable through program):	Vendor to specify.	
2.3	FEEDS AND DRIVE SYSTEM:		
2.3.1	Feed Rate in X & Z Axes (Infinitely variable):	Vendor to specify	
2.3.2	Rapid Feed Rate in X & Z Axes:	Vendor to specify	
2.3.3	Maximum threading rate	Vendor to specify	

Clause No	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical Details
2.3.4	Feed drive motors [AC servo motors] shall be digital type of Fanuc or Siemens. (Details of model, make, type etc. to be submitted with the offer)	Vendor to specify
2.3.5	Feed back system for X, & Z axes: Fanuc / Siemens / Heidenhain encoders (Details to be submitted with the offer.)	Vendor to specify
2.3.6	Mechanism for locking / clamping the axes:	Vendor to specify
2.3.7	Type of power transmission: Pre-loaded backlash-free re-circulating ball screw drive for feed drive axes. Detailed Specification for all ball screws used in the machine shall be submitted. The specification shall address the following points: (a) Diameter, (b) Pitch (c) Length (d) Make (e) Model	Vendor to specify
2.4	METALLIC TELESCOPIC COVERS	Vendor to specify
2.4.1	Metallic Telescopic Covers of rust resistant material shall be provided with wipers for guide ways of traversing axes. Provision should be made to avoid mixing of coolant & hydraulic oil.	Vendor to specify
2.5	ROLLER STEADY REST & FOLLOW REST:	
2.5.1	Ordinary Manual centering type steady rest dia 70 –400 mm (with provision for lubrication of rollers)	Vendor to confirm
2.5.2	Clamping range:	Vendor to specify
2.5.3	Steady rest shall be with central lubrication, supplied with mounting elements and programmable positioning and arm control	Vendor to specify.
2.5.4	Follow rest dia 80 –300 mm	Vendor to confirm
2.6	TAIL STOCK:	
2.6.1	Quill: Built-in type, rotating tailstock quill.	Vendor to confirm.
2.6.2	Quill stroke:	Vendor to specify.
2.6.3	Quill movement by Hydraulic	Vendor to confirm.
2.6.4	Quill diameter:	Vendor to specify.
2.6.5	Quill taper:	MT4

Clause No	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical Details
2.6.6	Tail stock center- cone angle	60 degree	
2.6.7	Max thrust on the Quill:	Vendor to specify.	
2.7	TOOL POST:		
2.7.1	4 Way manual indexing tool post for tool shank size 40x40 mm	Vendor to confirm	
2.8	TURRET:		
2.8.1	Type: Disc VDI 60 with hydraulic Indexing	Vendor to confirm	
2.8.2	Turret indexing positions:	8	
2.8.3	Turret indexing- bi-directional, Random:	Vendor to confirm	
2.8.4	Type of Tool Holders: VDI 60	Vendor to specify	
2.8.5	Tool Shank size: 32mm × 32mm	Vendor to confirm	
2.8.6	Turret indexing repeatability	2 arc sec	
2.8.7	Coolant should reach up to tool tip in the tool holders:	Vendor to confirm	
2.8.8	Automatic operation / selection / indexing of turret through CNC program:	Vendor to confirm	
2.8.9	Manual operation of indexing through push buttons also	Vendor to confirm	
2.9	OPERATION AND CONTROL SYSTEM:		
2.9.1	OPERATOR'S PANEL:		
2.9.2	Preferably Swiveling type operator's panel having complete CNC and machine control system with CRT of required configuration shall be provided at an ergonomically suitable location. All switches should be within reach of operator for easy & safe operation. All displays/indications should also be conveniently placed accordingly. Layout showing complete details should be submitted.	Vendor to submit	
2.10	CNC SYSTEM & FEATURES:		
2.10.1	Make: Fanuc / Siemens	Vendor to specify	
2.10.2	Type: PC based latest version (With Simultaneous interpolation of two axes)	Vendor to Confirm	

Clause No	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical Details
2.10.3	Model: Suitable and Latest version, as available at the time of ordering, should be supplied.	Vendor to specify
2.10.4	Details of Standard features: List to be submitted by Vendor.	Vendor to specify
2.10.5	Details of optional features, recommended by vendor:	Vendor to specify
2.10.6	The system should have full alphanumeric keyboard, TFT colour display (preferably 17"), additional draw-out type QWERTY Key Board and mouse in suitable enclosure, Ports for printer, network ready for LAN, electronic hand wheels for all axes, CD/DVD drive unit with CD/DVD writer for data input/output, hard disk of sufficient capacity (not less than 80 GB), graphic simulation and preinstalled system software & other required software etc. (Details should be submitted by Vendor)	Vendor to confirm & submit details
2.11	MANUAL CONTROL:	
2.11.1	Complete manual control of machine with required switches/ keys should be provided on operator's panel for selection of required axis, axis direction, cutting feed, spindle speed, cutting feed on/off, display of axis position values etc. for manual operation without using CNC program, CNC option Manual Turn or MDI mode. Diagrams/ sketches for switches/ keys provided on operator pendent should be submitted.	Vendor to confirm
2.12	UPS FOR CNC SYSTEM:	
2.12.1	UPS of 30 minutes for CNC system with inbuilt cooling and charge status display	Vendor to specify
2.13	MACHINE LIGHTS:	
2.13.1	Halogen machine lamp	Vendor to confirm
2.13.2	Provision of 24 V hand lamp with sufficient cable length.	Vendor to confirm
2.13.3	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents	Vendor to confirm
2.13.4	Flashing / rotary type End of Cutting and Program Stop Light.	Vendor to confirm

Clause No	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical Details
2.14	AIR CONDITIONERS:	
2.14.1	Air Conditioners with Dehumidifiers of suitable capacity to be provided for all Electrical / Electronic Panels / Cabinets including Operator's Panel considering specified ambient conditions. Make: Rittal / Warner & Finley or any other reputed make acceptable to BHEL. Specification to be submitted	Vendor to Confirm Vendor to submit
2.15	HYDRAULIC SYSTEM:	
2.15.1	Make: Rexroth / Vickers Sperry or any other reputed make acceptable to BHEL	Vendor to specify
2.15.2	Hydraulic system should be centralized. Hydraulic Tank shall preferably be located at floor level All hydraulic pipelines to be neatly laid out. (Details should be furnished at contract stage)	Vendor to confirm
2.15.3	Hydraulic circuits shall be designed with minimum number of control valves and to suit oil of ISO VG 46 or 68 only. Also minimum number of check- points to be provided wherever pressure is required to be measured for setting and trouble shooting. MINIMESS Pressure Gauge - 1 No with Connecting Hose to be provided.	Vendor to confirm
2.15.4	Control voltage for all solenoid operated valves shall be 24V DC	Vendor to confirm
2.15.5	Filtration System:	Vendor to specify
2.15.6	Failure indication:	Vendor to specify
2.15.7	Automatic shut off provision.	Vendor to submit
2.15.8	Refrigerated type cooling system of sufficient capacity to maintain complete Hydraulic System, including lubrication oil, hydraulic oil and gearbox oil, etc. at a temperature not exceeding 50 °C irrespective of the ambient conditions. Vendor should submit complete details.	Vendor to specify
2.15.9	Hydraulic pump capacity (flow / pressure):	Vendor to specify
2.15.10	Each pump should have an independent motor.	Vendor to confirm

Clause No	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical Details
2.16	First filling of all required Oils & Grease etc. Should be supplied by vendor. Oil grade: ISO VG46 or 68 Grease: Servo gem grade 2 (preferred.) Indigenous (Indian) source or Indian equivalent and specifications of oils/ greases are also to be provided by the vendor.	Vendor to specify	
2.17	COOLANT SYSTEM:		
2.17.1	Recirculating type Coolant System for all 12 positions of turret with all accessories shall be provided.	Vendor to confirm	
2.17.2	Coolant operation shall be enabled through program.	Vendor to confirm	
2.17.3	Coolant on / off by push buttons on the Operator's panel also.	Vendor to confirm	
2.17.4	Coolant Pressure:	Vendor to Furnish	
2.17.5	Coolant flow rate:	Vendor to Furnish	
2.17.6	Coolant collection and recirculation system should be leak proof to avoid spillage on shop floor.	Vendor to Confirm	
2.17.7	Coolant Filtration System: Re-circulating type with suitable filtration unit. Vendor shall give details of offered filtration unit.	Vendor to submit	
2.17.8	Coolant flow diagram showing filters, pumps, valves, tanks etc. to be submitted.	Vendor to submit	
2.17.9	Coolant pump & coolant motor detail to be submitted.	Vendor to submit	
2.17.10	Coolant Tank Capacity:	Vendor to specify	
2.17.11	The coolant tank should be fitted with skimmer for regular cleaning of coolant from contamination with tramp oil.	Vendor to Confirm	
2.18	ELECTRICAL:		
2.18.1	415V \pm 10%, 50 HZ \pm 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	Vendor to Confirm	

	is to be informed by vendor well in advance so that the same could be incorporated during construction of foundation.		
Clause No	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical Details	
2.18.2	Tropicalisation: All electrical / electronic equipment shall be tropicalized.	Vendor to Confirm	
2.18.3	All electrical & electronic control cabinets & panels should be dust and vermin proof and shall have IP 54 protection.	Vendor to Confirm	
2.18.4	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to Confirm	
2.18.5	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents.	Vendor to Confirm	
2.18.6	Motors shall conform to IEC or Indian Standards	Vendor to Confirm	
2.18.7	All cables moving with traversing axes should be installed in caterpillar / Drag chain. Additionally, all the cable trays required for laying cables should be included in the offer.	Vendor to Confirm	
2.18.8	Vendor should ensure proper earthing for the machine and its peripherals.	Vendor to Confirm	
2.18.9	In-cycle hour counter with reset facility and digital energy meter shall be provided	Vendor to Confirm	
2.19	SAFETY ARRANGEMENTS:		
2.19.1	Machine should have adequate and reliable safety interlocks or devices to avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes. Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm number with messages (on CNC display and panels) should be available.	Vendor to Confirm	
2.19.2	A detailed list of all alarms / indications provided on machine should be submitted by the supplier.	Vendor to specify	

Clause No	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical Details
2.19.3	All the pipes, cables etc. on the machine should be well supported and protected. These should not create any hindrance to machine operator's movement.	Vendor to Confirm
2.19.4	All the rotating parts used on machine should be guarded and statically & dynamically balanced to avoid undue vibrations.	Vendor to Confirm
2.19.5	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to Confirm
2.19.6	Oil & water lines should not run with electrical cable in the same tray / trench.	Vendor to Confirm
2.20	ENVIRONMENTAL PERFORMANCE OF THE MACHINE:	
2.20.1	Noise level shall not exceed 85 dB(A) at normal load condition, 1 meter away from the machine.	Vendor to Confirm
2.20.2	There shall not be any emissions from the machine except fumes of cutting fluid during machining.	Vendor to Confirm
2.20.3	There should not be any effluent from the machine. In case there are any effluents from the machine, requisite effluent treatment plant or pollution control device should be built into the machine by the supplier.	Vendor to Confirm
2.20.4	No hazardous chemicals shall be used in the machine.	Vendor to Confirm
2.20.5	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to Confirm
2.20.6	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to Confirm
2.21	CHIP CONVEYOR:	
2.21.1	A chip conveyor to convey short and curly chips to the chip bin. A Chip bin of appropriate size, with wheels and handle for movement, should also be supplied.	Vendor to confirm
2.21.2	Type of chip conveyor:	Vendor to specify
2.21.3	Width of conveyor	Vendor to specify
2.21.4	Elevation of chip conveyor for chip bin:	Vendor to specify

Clause No	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical Details
2.21.5	Material of chip conveyor	Vendor to specify
2.21.6	Provision for smooth flow of chips to the conveyor:	Vendor to specify
2.21.7	Operation of chip conveyor (forward & reverse) through push buttons on operator's panel should be possible.	Vendor to confirm
2.21.8	Layout showing location of chip conveyor should be submitted.	Vendor to submit
3.0	ULTRA ISOLATION TRANSFORMER:	
3.1	Indian make Ultra Isolation Transformer suitable for complete machine, its drives, controls, PLC etc. shall be offered.	Vendor to confirm
3.2	Make: NEEL / DELTA / AEI / POWER AID	Vendor to specify
3.3	Model & Rating:	Vendor to specify
3.4	Spares Package for the Ultra Isolation Transformer for 2 years working should also be offered.	Vendor to confirm
3.5	Catalogue of the Ultra Isolation Transformer shall be submitted.	Vendor to submit
4.0	SERVO VOLTAGE STABILIZER:	
4.1	Indian make Oil / Air Cooled servo Controlled Voltage Stabilizer suitable for complete machine, its drives, controls, PLC etc with no undesirable Harmonics in the stabilizer output.	Vendor to specify
4.2	Make. : NEEL / DELTA / AEI / POWER AID	Vendor to specify
4.3	Model & Rating (Suitable for the machine load. Vendor to specify the noise level also)	Vendor to specify
4.4	Spares Package for the Voltage Stabilizer for 2 years working should also be offered.	Vendor to Confirm
4.5	Catalogue of Voltage Stabilizer to be submitted.	Vendor to Submit
5.0	COMPRESSED AIR POINTS:	
5.1	Compressed air at 60 to 70 psi will be made available at one point if required. The vendor shall indicate the inlet point for compressed air in the layout drawing of the machine.	Vendor to Confirm
6.0	TOOLING:	
6.1	Radial Tool Holder (Turning)	3 Nos
6.2	Reverse Tool Holder	2 Nos

Clause No	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical Details
6.3	Axial Tool Holder	2 Nos	
6.4	Boring holder dia 50 mm	3 Nos	
6.5	Drill Adaptor	1 No	
7.0	ACCESSORIES:		
7.1	Vendor has to furnish a list of standard accessories along with the offer.	Vendor to furnish	
7.2	4 Jaw independent manually operated chuck dia 630 mm with set of hard and chuck flange.	1 No	
7.3	Cast iron face plate dia 900 mm with 4 Jaws	1 No.	
7.4	Additional set of Hard jaw for 4 Jaw chuck	1 set	
7.5	Additional set of soft jaw for 4 Jaw chuck	2 sets	
7.6	Additional set of Hard jaw for 3 Jaw hydraulic chuck	1 set	
7.7	Additional set of Soft jaws for 3 Jaw hydraulic chuck	2 sets	
7.8	Spare rollers & bearings for steady rest:	1set	
7.9	Additional Tail stock centers:	1 No	
7.10	OPTIONAL ACCESSORIES:		
7.11	Air gun with pneumatic hose for cleaning	1 No	
7.12	Tool collision monitoring system	1 No	
8.0	FAULT DIAGNOSTIC SYSTEM:		
8.1	Supplier's own diagnostic system with required hardware and software should be supplied and installed on the CNC system. This should include standard auto-diagnostic system with supporting hardware and software which shows detailed cause and remedy for the fault on the display and supplier's smart diagnostic system for full video diagnostic help for faults related to mechanical and electrical maintenance.	Vendor to confirm	
8.2	Help guide should be provided to use both diagnostic systems	Vendor to confirm	

Clause No	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical Details
9.0	PORTABLE DATA LOADING DEVICE: (optional)		
9.1	Portable Data loading device with sufficient length of interface cable, HDD of size not less than 40GB, CD Drive, TFT Display of size 14" and suitable preinstalled software for loading PLC program, RS 232 Port, Ethernet chord, USB port, Machine data and CNC part programs shall be supplied with the machine. Vendor should furnish details.	Vendor to confirm	
10.0	LEVELING & ANCHORING SYSTEM:		
10.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc should be supplied.	Vendor to confirm	
11.0	TOOLS FOR OPERATION & MAINTENANCE:		
11.1	Necessary tools like Torque Wrench, Spanners, Keys, grease guns etc for operation and maintenance of the machine should be supplied. List of such tools should be submitted with offer.	Vendor to confirm Vendor to submit	
12	SPARES:		
12.1	<p>1) The Vendor shall recommend and submit list of spares required for the machine for two years of trouble free operation on three shifts /day basis under two headings as</p> <p>a) Mechanical & hydraulic spares and</p> <p>b) Electrical & electronic spares.</p> <p>The list shall generally include the following items.</p> <p>a) Mechanical & Hydraulic Spares: All types of pumps, All types of Valves, All types of pressure switches / transducers, All types of filters, All types of seals</p> <p>b) Electrical & Electronic Spares: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, Encoders, Scanning Heads for Linear Scales,</p>	Vendor to Submit	

	MMC module, NCU module, Operator's panel with Display Unit, Floppy Disk Unit, I/O Cards for PLC, Servo Motors for Feed Drives, Power Module & Control Cards for Main Drive as well as Feed Drives etc. c) Un-priced list of spares with quantities, specified at a&b above, should be submitted with this technical offer. d) Unit Price of each item figuring in c shall be submitted with the price bid.		
12.2	All types of spares for the machine and its accessories should be available for minimum ten years, after supply of the machine. If any spares or controls are likely to become obsolete within this period, the vendor should inform BHEL and provide details of it's suppliers to enable BHEL to procure them in advance.	Vendor to Confirm	
12.3	In case of ordering, a complete list of spares for the machine and its accessories along with spares specification / type / model, and name & address of the spare supplier shall be submitted along with documentation while supplying the machine.	Vendor to confirm	
13.0	DOCUMENTATION:		
13.1	3 sets of following documents (3 Hard copies) in English language should be supplied along with the machine	Vendor to confirm	
13.2	Operating manuals of Machine & CNC system	Vendor to confirm	
13.3	Programming Manuals of Machine & CNC system	Vendor to confirm	
13.4	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic/ Coolant / Hydraulic circuit diagrams.	Vendor to confirm	
13.5	Maintenance, Interface & commissioning manuals for CNC system, spindle & feed drives.	Vendor to confirm	
13.6	Manufacturing drawings for all supplied tool holders, coolant connections, adapters, sleeves, fixtures etc.	Vendor to confirm	
13.7	Catalogues / O&M Manuals of all bought out items.	Vendor to confirm	
13.8	Detailed specification of all rubber items and hydraulic/lube fittings	Vendor to confirm	

Clause No	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical Details
13.9	Bearings: Make& Specification for all bearings used in the machine.	Vendor to Specify	
13.10	Ball Screws: Detailed Specification for all ball screws used in the machine shall be submitted. The specification shall address the following points: (a) Diameter, (b) Pitch, (c) Length, (d) Make (e) Model	Vendor to specify	
13.11	Operating Manuals, Maintenance Manuals & Catalogues for Isolation Transformer and voltage stabilizer.	Vendor to confirm	
13.12	PLC program printouts (Ladder diagram & Statement list) with comments in English.	Vendor to confirm	
13.13	PLC program on CD, NC data & PLC data on CD.	Vendor to confirm	
13.14	Complete back up of hard disk on GHOST CD and clear written Instructions (1 copy) to take back up and reloading of a new hard disk.	Vendor to confirm	
13.15	The vendor shall submit complete Master List of parts used in the machine.	Vendor to Submit	
13.16	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to confirm	
14.0	TRAINING:		
14.1	The Vendor shall train Two BHEL Engineers in Operation and Maintenance (Mechanical, Electrical/ Electronics and CNC System) of the Machine at Vendor's works for a period not exceeding 5 working days.	Vendor to confirm	
14.2	Airfare, boarding & lodging for the BHEL Engineers will be borne by BHEL		
14.3	The Vendor shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance after the commissioning of the Machine at BHEL works for not less than 6 working days	Vendor to confirm	

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14.4	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	Vendor to confirm
14.5	Vendor to quote on the basis of per man per day for training at vendor's works.	Vendor to specify
15.0	FOUNDATION:	
15.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI). Vendor shall submit complete foundation details including static and dynamic loads within three months after getting BHEL's approval. The layout should consist of all requirements pertaining to complete machine including space requirement for Voltage Stabilizer, Isolation Transformer, & any other accessories. BHEL will construct complete foundation for the machine.	Vendor to confirm
15.2	The Vendor shall indicate detailed specifications of grouting compound and Grouting procedure etc. for foundation bolts of the machine.	Vendor to Specify
16.0	ERECTION & COMMISSIONING:	
16.1	<p>1.Supplier to take full responsibility for supervision of the erection. Start up, testing of machine, it's control system & all types of other supplied equipment, machining of test pieces etc. are the responsibility of the supplier.</p> <p>2.Service requirement like power, air & water shall be provided by BHEL at only one point to be indicated by supplier in their foundation/layout drawings.</p> <p>3.Other requirements like crane and helping personnel shall also be provided by BHEL, free of cost.</p>	Vendor to confirm

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16.2	Erection & Commissioning of Voltage stabilizer, Isolation Transformer shall also be responsibility of the vendor.	Vendor to confirm	
16.3	Tools, Tackles, Test Mandrels, instruments and other necessary equipment including Laser equipment required to carry out all above activities should be brought by the supplier.	Vendor to confirm	
16.4	The supplier shall arrange commissioning spares required for commissioning of the machine.	Vendor to confirm	
16.5	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.	Vendor to confirm	
16.6	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm	
16.7	Duration, terms & conditions for E&C should be furnished with this technical offer in detail. Charges for the same shall be submitted with the price bid	Vendor to confirm	
17	ACCURACY TESTS:		
17.1	GEOMETRICAL ACCURACIES:		
17.1.1	Geometrical Accuracy Tests shall be in accordance with ISO 13041 standard or equivalent applicable standard.	Vendor to confirm	
17.1.2	Head Stock Spindle run out (Radial & Axial):	Vendor to specify.	
17.1.3	All other accuracies to confirm to ISO 13041 (Latest Revision) or Suppliers Test chart whichever is finer.	Vendor to confirm	
17.1.4	Tail stock Quill taper run-out:	Vendor to specify.	
17.1.5	Cylindricity of turning:	Vendor to specify.	
17.1.6	True roundness of turning:	Vendor to specify.	

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17.1.7	Facial run-outs:	Vendor to specify.
17.1.8	All the above accuracies should be demonstrated to BHEL engineers during pre-acceptance at Suppliers works and during Erection & Commissioning at BHEL Works.	Vendor to confirm
17.2	MACHINE POSITIONING ACCURACIES & REPEATABILITY: Should be measured as per VDI/DGQ 3441 using LASER INTERFEROMETER.	Vendor to confirm
17.2.1	Positioning accuracy in X axis (Pa) per 1000 mm:	± 0.010 mm
17.2.2	Positioning accuracy in Z axis (Pa) per 1000 mm:	± 0.040 mm
17.2.3	Repeatability in X axis (Ps): per 1000 mm	± 0.005 mm
17.2.4	Repeatability in Z axis (Ps): per 1000 mm	± 0.020 mm
18.0	AMBIENT CONDITIONS & THERMAL STABILITY:	
18.1	Power Supply : AC 415 V ±10% Frequency : 50 Hz ±3HZ Phases : 3 phase 3 wire system Compressed air supply: 60-70 psi Ambient Temperature: max 45 °C Relative Humidity = 85% Vendor to confirm that machine is suitable for above conditions	Vendor to confirm
18.2	Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. Machine will be installed in the normal shop floor condition. Vendor to confirm that machine is suitable for above	Vendor to confirm
18.3	Thermal Stability of the machine shall be good enough to withstand the specified ambient conditions in order to meet the accuracy requirements of BHEL components. Vendor to confirm for trouble-free operation of the machine.	Vendor to confirm
18.4	The Vendor should confirm that the machine and its accessories is suitable for continuous operation at its full capacity for 24 hours a day and 7 days a week through out	Vendor to confirm

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19.0	MACHINE ACCEPTANCE: (Tests/Activities should be Performed by Vendor)		
19.1	Tests/Activities should be carried out at supplier's works on the machine before dispatch:		
19.1.1	Geometrical accuracies as per standard test chart provided by the supplier.	Vendor to confirm	
19.1.2	Machine positioning accuracies & repeatability should be measured as per VDI/DGQ 3441 / ISO 230 – 2 (latest revision) using laser interferometer.	Vendor to confirm	
19.1.3	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from restarting.	Vendor to confirm	
19.1.4	Demonstration of all features of the machine, control system & accessories.	Vendor to confirm	
19.1.5	Machining of test piece as per NAS/AFNOR/ISO. Vendor to supply test piece and tooling for it's machining.	Vendor to confirm	
19.2	Tests/Activities should be carried out at BHEL works while commissioning the machine:		
19.2.1	Geometrical accuracies as per test chart provided by the supplier.	Vendor to confirm	
19.2.2	Machine positioning accuracies & repeatability should be measured as per VDI/DGQ 3441 / ISO 230 – 2 (latest revision) using laser interferometer.	Vendor to confirm	
19.2.3	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor to confirm	
19.2.4	The machine should be tested for continuous running of 48 hrs. If any break down occurs during this test, the test should be repeated for 48 hrs from restarting.	Vendor to confirm	
19.2.5	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine	Vendor to confirm	

Clause No	PARTICULARS AND BHEL SPECIFICATION		BIDDER'S OFFER With Technical Details
19.2.6	Machining test piece as per NAS/AFNOR/ISO. Vendor to arrange Test pieces and tooling for it's machining.	Vendor to confirm	
20.0	PACKING:		
20.1	Sea worthy & rigid packing for all items of complete machine, CNC System, 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.	Vendor to specify	
21.0	GUARANTEE:		
21.1	12 months from the date of acceptance of the machine at BHEL OR 18 months from dispatch, whichever is earlier	Vendor to confirm	
22.0	GENERAL:		
22.1	Machine Model:	Vendor to specify	
22.2	Total connected load (KVA):	Vendor to specify	
22.3	Floor area required (L x W x H) for complete machine & accessories:	Vendor to specify	
22.4	Painting of Machine / Electrical Panels: <ol style="list-style-type: none"> 1. Synthetic enamel glossy finish apple green paint as per IS 5/1994. Shade :(ISC) NO-281. 2. The paint is to be supplied from new batch manufactured on / after December 2009. 3. Recommended Suppliers: ASIAN, SHALIMAR, NEROLAC and BERGER. 	Vendor to confirm	
22.5	Total weight of the machine:	Vendor to specify	
22.6	Weight of heaviest part of machine:	Vendor to specify	
22.7	Weight of the heaviest assembly / sub-assembly of the Machine:	Vendor to specify	
22.8	Dimensions of largest part/ sub-assembly/ assembly of the machine:	Vendor to specify	