



Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT/ MATERIALS MANAGEMENT

An ISO 9001
Company

ENQUIRY	Phone: +91 431 257 76 53 Fax : +91 431 252 00 31 Email : skaruna@bheltry.co.in Web : www.bhel.com
NOTICE INVITING TENDER	

TWO PART BID Tender to be submitted in two parts.	Enquiry Number: 2851400041	Enquiry Date: 18.07.2014	Due date for submission of quotation: 18.08.2014
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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	Qty.	Delivery Required	Delivery Terms
10	CNC Vertical Milling Machine as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or http://tenders.gov.in)	01 No.	6 months from the date of Purchase Order	Indigenous Bidders:- F.O.R, BHEL Stores, PEFP, BHEL, Bhandara District, Maharashtra

Important points to be taken care during submission of offer

1. The rate of EMD for this Tender will be (INR) : 1,50,000/-
2. All the technical documents are to be provided in duplicate.
3. The Compliance Form for Commercial Terms & Conditions to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
4. 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 (refer MM/CE/GENL/001-EMD) 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 above Enquiry reference.

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

Saranya
Sr. Engineer / MM Capital Equipment

C. SARANYA
Senior Engineer
MM / Capital Equipment
BHEL / Tiruchirappalli - 620 014.

PART A
CNC Vertical Milling Machine

SECTION – I: QUALIFYING CRITERIA

The BIDDER has to compulsorily meet the Qualifying criteria indicated in SECTION –I to get qualified. Otherwise the technical offer will not be considered.

S. No.	REQUIREMENTS	Vendor's Response
1	<p>Only those vendors (OEMs), who have manufactured, supplied and commissioned at least one CNC VERTICAL MILLING MACHINE with</p> <p>1. Spindle power of 7.5 KW (continuous rating) or more 2. Table size- 1000mm x 500mm or more</p> <p>EITHER (i) In at least one country other than the country of origin to establish vendor's global business activity. OR (ii) In India; and the referred machines are presently working satisfactorily for more than one year from the date of commissioning (as on the original date of tender opening).</p> <p>The name and contact addresses of the customers to whom the CNC Vertical Milling Machine were supplied to be furnished with details in the past ten years are only eligible to quote.</p> <p>The Vendor should get and submit along with the offer one performance certificate from a customer on the customer's letter head to whom such machine is supplied and which is meeting the above criteria.</p> <p>The performance certificate should be either in the format indicated at SECTION-IV of Part-A of this Tender or Disclose all details prescribed in that format.</p> <p>Those O.E.M manufacturers who do not fulfill the above requirements are requested not to respond to this Tender.</p>	
	The vendor should submit following information where such machine has been supplied for qualification of their offer.	
1.1	Name and postal address of the customer or company where such machine is installed.	
1.2	Name and designation of the contact person where such machine is installed. .	
1.3	Phone No, FAX No and email address of the contact person where such machine is installed.	

1.4	Month and Year of commissioning of such machine.	
1.5	Application for which the machine is supplied	
1.6	BHEL reserves the right to verify the above information provided by vendor. In case the information provided is found to be false/incorrect, the offer shall be rejected.	
1.7	<p>DELIVERY:</p> <p>The bidder shall quote the best possible delivery. However the delivery shall not exceed 6 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 the date of dispatch from the vendor works.</p>	

SECTION – I I

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

S. No.	REQUIREMENTS	Vendor's Response
1.0	The BIDDER to furnish Reference List of Customers, with full address, details of contact person, where CNC VERTICAL MILLING MACHINES have been supplied in the past.	
2.0	Details of CNC VERTICAL MILLING MACHINES supplied to other BHEL units, if any. (Year of commissioning, Spindle power and Table size).	
3.0	Details on SERVICE-AFTER-SALES Set-Up in India including the Address of Agents / Service Centers in India.	
4.0	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
1.0	The BIDDER shall submit the offer in TWO PARTS. 1. Technical offer (PART A & PART B) 2. Commercial offer and Price Bid.	
2.0	The Technical Offer shall contain complete details against all clauses of Technical Specifications given by BHEL.	
3.0	The Technical Offer shall be supported by copies of product Catalogues, Data sheets and technical details of Bought- Out-Items.	
4.0	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

Suggestive Format of Performance Certificate:

The performance certificate should be on **Customer's Letter Head** and submitted along with the offer.

SAMPLE FORMAT OF PERFORMANCE CERTIFICATE

1. Machine Supplied by(Manufacturer's name)		
2. Make & Model Number of the Machine		
3. Month & Year of Commissioning		
4. Application for which the Machine is used		
5	a) Spindle Motor Power (cont. rating) b) Table size c) Spindle Taper d) Spindle speed range(RPM) e) Spindle feed range (meter/min) f) Details of CNC control	
6. Performance of the Equipment (Please tick appropriately)		Not Satisfactory
		Average
		Good
		Satisfactory
7. Service after sales (Please tick appropriately)		Not Satisfactory
		Average
		Good
		Satisfactory
Signature & Seal of the Authority Issuing the Performance Certificate		
Date:		

PART - B: Technical Specification for CNC Vertical Milling Machine

NOTE:-					
1. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.					
2. The offer and all documents enclosed with offer should be in English language only.					
ADDRESS OF THE SUPPLIER :		ADDRESS OF THE INDIAN AGENTS :			
TELEPHONE NOS.:		TELEPHONE NOS.:			
FAX NOS.:		FAX NOS.:			
E-MAIL ADDRESS :		E-MAIL ADDRESS :			
SCOPE: SUPPLY, ERECTION & COMMISSIONING OF CNC VERTICAL MILLING MACHINE: Qty. of Machine- 1 no.					
SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
1.0 PURPOSE & WORKPIECE MATERIAL					
1.1	Purpose: (Operation/Jobs involved) This Vertical Milling Machine is mainly intended for machining of prefabrication components of various products of power plant equipment.	vendor to confirm			
1.2	Work Piece Material: Generally the material will be carbon and alloy steels. The machine shall be capable of machining tougher and hard materials within the capacity of the machine. Heavy and accurate machining of jobs requiring various machining operations like milling, drilling, boring, tapping etc.	vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
2.0	MACHINE SPECIFICATION				
2.1	Machine construction: The construction shall be thermally stable and rigid enough to maintain its geometrical accuracy at all conditions of operation and exterior conditions.	vendor to confirm			
2.2	TABLE :				
2.2.1	Size of work table, min 1000mm x 500mm	Vendor to confirm and specify (C&S)			
2.2.2	Max. weight of work-piece min. 500 Kg. or more	Vendor to confirm and specify			
2.2.3	Details of T-Slots: No / Size / Pitch	Vendor to specify			
2.2.4	Tapped holes: Size / Pitch	Vendor to specify			
2.2.6	Central slot tolerance	Vendor to specify			
2.2.7	Lateral slot size and tolerance	Vendor to specify			
2.2.8	Table top and central slot shall be accurately machined and shall be used as reference surfaces.	Vendor to confirm			
2.3	SPINDLE:				
2.3.1	Spindle orientation shall be vertical	Vendor to confirm			
2.3.2	Spindle diameter	Vendor to specify			
2.3.3	Spindle motor power shall be min. 7.5kW (AC, 100% duty, S1)	Vendor to confirm and specify			
2.3.4	Spindle motor (shall comply with IEC/IS standards), make of motor shall be ABB/CGL/Marathon/Siemens/ Fannuc/ Bharat Bijlee only	Vendor to specify			
2.3.5	Spindle bearing diameters (radial & axial)	Vendor to specify			
2.3.6	Taper in spindle shall be BT-50	Vendor to confirm and specify			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
2.5.1	Rapid Traverse X-Axis shall be min. 10 M/min or more.	Vendor to confirm and specify			
2.5.2	Rapid Traverse Y-Axis shall be 10 M/min or more.	Vendor to confirm and specify			
2.5.3	Rapid Traverse Z-Axis shall be 5 M/min or more.	Vendor to confirm and specify			
2.5.4	Feed Rate in X Axis (Infinitely variable) shall be 1 to 5 M/min or more	Vendor to confirm and specify			
2.5.5	Feed Rate in Y-Axis (Infinitely variable) shall be 1 to 5 M/min or more	Vendor to confirm and specify			
2.5.6	Feed Rate in Z-Axis (Infinitely variable) shall be 1 to 5 M/min or more	Vendor to confirm and specify			
2.5.7	Feed drives/motors shall be digital, AC servo motors of either Siemens/ Fanuc make (detail of model, make, type etc. to be submitted)	Vendor to confirm and specify			
2.5.8	Feed back system for X, Y & Z axes. Heidenhain incremental linear scales (Details to be submitted)	Vendor to confirm and specify			
2.5.9	Details of system to ensure zero backlash for the axes	Vendor to specify			
2.5.10	Mechanism for locking / clamping the axes	Vendor to specify			
2.5.11	Clamping force of each axes to be furnished	Vendor to specify			
2.5.12	Detail of axes feed mechanism (Details shall include diameter of Ball Screws of each axis)	Vendor to specify			
2.5.13	All linear traversing axes shall be provided with steel telescopic covers of rust resistant material with wipers. Joints of telescopic covers shall be sealed to avoid mixing of coolant and other lubricating oil.	Vendor to confirm and specify			
2.6	CONSTRUCTION:				

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
2.6.1	Vendor to furnish material, hardness of guideways & constructional detail, including explanatory drawings, of various components/ assemblies like gear box, guideways/slides, telescopic covers, accessories, table, feed transmission system, hydraulic and lubrication system, feed back system etc. of the machine.	Vendor to specify			
2.6.2	Video images on CD including hard copy explaining the technical features / Literature with photographs, drawings explaining the technical features should be enclosed with the offer	Vendor to specify			
2.7	COOLANT SYSTEM :				
2.7.1	Recirculating Type Flood Coolant System through adjustable trajectory multiple nozzles around the spindle with all accessories shall be provided.	Vendor to confirm			
2.7.2	Coolant collection and recirculation system should be leakproof & perfect to avoid any spillage on shop floor, trenches for cables & foundation pit of the machine etc.	Vendor to confirm			
2.7.3	Coolant Filtration System: Recirculating type coolant system with Vacuum Rotary drum type System/ Cartridge Type Filtration System and magnetic separator.	Vendor to confirm			
2.7.4	Coolant Flow Diagram showing filters, pumps, valves, tanks etc.to be submitted with the offer.	Vendor to submit			
2.7.5	Pressure & rate of flow of coolant should be furnished in the offer. The Pressure should be sufficient for the coolant to reach the tool tip at full pressure.	Vendor to submit			
2.7.6	Coolant Tank Capacity	Vendor to specify			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
2.7.7	Coolant pump and motor. Motor make: Siemens/ABB/CGL/ Bharat Bijlee/Marathon	Vendor to specify			
2.7.8	The coolant tank should be fitted with skimmer for regular cleaning of coolant from contamination with tramp oil.	Vendor to confirm			
2.7.9	Filtration purity	Vendor to specify			
2.8	CHIP CONVEYOR:				
2.8.1	A chip conveyor to carry both short and curly chips efficiently and effectively to the chip bin on the floor shall be provided at the side of the machine. Two chip bins of appropriate size of Indian make, with wheels and handle for movement shall also be supplied.	Vendor to confirm			
2.8.2	Type of chip conveyor	Vendor to specify			
2.8.3	Width of conveyor	Vendor to specify			
2.8.4	Elevation of chip conveyor for chip bin	Vendor to specify			
2.8.5	Material of chip conveyor (to be rust resistant)	Vendor to specify			
2.8.6	Provision for smooth flow of chips to the conveyor.	Vendor to confirm			
2.8.7	Operation of chip conveyor (forward & reverse) through push buttons on operator's panel and at Chip Conveyor	Vendor to confirm			
2.8.8	Layout showing location of chip conveyor should be submitted.	Vendor to submit			
2.9	MACHINE LIGHTS:				
2.9.1	Machine Lights for sufficient illumination of complete working area should be provided for clear visibility.	Vendor to confirm			
2.9.2	A magnetic base portable spot light with sufficiently long cable should also be provided.	Vendor to offer			
2.9.3	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents	Vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
2.9.4	Flashing / rotary type End of Cutting and Program Stop Light.	Vendor to confirm			
2.10	HAND HELD UNIT:				
2.10.1	Hand Held unit with Electronic hand wheels selectable for all axes of Siemens/ Fanuc make alongwith sufficient length of interfacing cable is to be offered with complete details.	Vendor to confirm			
3.0	PNEUMATIC SYSTEM: (Optional)				
3.1	There will be compressed air line of 5-6 bar pressure available in the plant near site. If air pressure requirement for the machine is more than this, the vendor may quote suitable air compressor.	Vendor to offer			
3.2	The vendor may quote suitable air dryer if there is requirement of dry air for the machine.	Vendor to offer			
3.3	Compressed air point with manual ON/OFF valve and flexible pipe of suitable length for work piece cleaning shall be provided on the machine.	Vendor to offer			
4.0	HYDRAULIC SYSTEM : Details shall be submitted by the vendor.				
4.1	System shall be centralised. Hydraulic tank shall be preferably located at floor level	Vendor to confirm			
4.2	Make: Bosch Rexroth / Vickers/Yuken/Hoerbiger	Vendor to specify			
4.3	Filtration System	Vendor to specify			
4.4	Failure indication	Vendor to specify			
4.5	Automatic shut off provision (Details to be submitted)	Vendor to specify			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
4.6	Refrigerated type cooling and electric heating (Electric heating only if required) system of sufficient capacity to maintain complete Hydraulic System, including lubrication oil, hydrostatic oil and gearbox oil, etc. at a temperature not exceeding 40 deg C irrespective of the ambient conditions. Complete details shall be submitted.	Vendor to specify			
4.7	Hydraulic pump capacity (Flow / pressure)	Vendor to specify			
4.8	Each pump shall have an independent motor. Tandem pumps shall not be used	Vendor to confirm			
4.9	First filling of all required oil & grease etc. shall be in the scope of supply of vendor. Indigenous (Indian) source, or Indian Equivalent, and specifications of oils/ greases also shall be provided by the vendor.	Vendor to confirm			
5.0	AIR CONDITIONERS:				
5.1	Air Conditioners with dehumidifiers of suitable/sufficient capacity shall be provided for all electrical / electronic panels / cabinets including Operator's panel considering specified ambient conditions. Detailed specifications of the same to be submitted.	Vendor to specify			
6.0	CNC SYSTEM & FEATURES :				
6.1	Make : Siemens/Fanuc	Vendor to confirm			
6.2	Type : Latest version	Vendor to confirm			
6.3	Model : Sinumerik 828D or higher or equivalent Fanuc ol system. (Latest version, as available at the time of ordering shall be supplied)	Vendor to specify			
6.4	Details of Standard features (List to be Submitted)	Vendor to specify			
6.5	Details of optional features, recommended by vendor. (Including features required for Prove-Out Components)	Vendor to specify			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
6.6	The system shall preferably have Operator's Panel with 15" TFT colour display, 19" machine control panel, full CNC keyboard or equivalent for Fanuc system, RS232C interfaces for I/O devices, USB, 2 channels and expansion slots. The operator panel configuration shall be as per Rittal VIP6000 or equivalent. The CNC system shall also have network ready (LAN) with preinstalled system software & other required softwares etc. (Details to be submitted by vendor)	Vendor to confirm and specify			
6.7	The CNC System shall have following necessarily features: Access locks on the operation panel, Graphic simulation, coordinate system rotation, coordination system transformation, Lock ahead of minimum 70 blocks. Helical Interpolation, Scaling, programmable mirror image machining, Process oriented Canned Cycles for drilling & milling operations, Rigid tapping and tool management. Display of PLC ladder and I/O status on the monitor.	Vendor to confirm and specify			
6.8	Details of standard features. List to be submitted	Vendor to confirm			
6.90	PLC programme/ ladder diagrams & all its symbols must be in English language only.	Vendor to confirm			
6.10	All OEM sub-programs & user programs must be in English language only.	Vendor to confirm			
6.11	All OEM menu must be in English language only.	Vendor to confirm			
6.12	The program transfer shall be simple copy & paste method with USB and ethernet port.	Vendor to confirm			
6.13	All necessary Anti- Virus measures shall be incorporated .	Vendor to confirm			
7.0	MANUAL CONTROL:				

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
7.1	Complete manual control of machine with required switches/ keys shall 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 or MDI mode. Diagrams/ sketches for switches/ keys provided on operator's pendent shall be submitted.	Vendor to confirm. Layout of panel showing requisite switches to be submitted.			
8.0	FAULT DIAGNOSTIC SYSTEM				
8.1	Supplier's own diagnostic system with required Software and Hardware installed on the CNC system which shows detailed cause and remedy for the fault on the CNC system display indicating the element / device causing the fault. Vendor shall also offer a PC note book along with software (licensed copy)/ necessary cables and adaptor (for communication) for diagnostic purpose. The note book PC shall be loaded with complete Electrical Schemes, Mechanical Assembly drawings, Hydraulic Circuit Diagrams, Operation, On-Line display of PLC user should be available on the note book PC.	Vendor to confirm and specify			
8.2	Machine shall have provision to switchover from position feedback system -2 (direct) to position feed back system-1 (Motor encoder) through PLC program(for service personnel only).				
9.0	VOLTAGE STABILIZER (optional)				
9.1	The vendor may offer suitable servo-controlled voltage stabilizer of Indian make (NEEL, Aplab or Auto Electric) and of appropriate ratings; if required for the machine, its drive, controls, PLC etc..	Vendor to confirm and specify			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
9.2	The offer shall be submitted with spare package (including Correcting servomotor- 2 nos, control cards- 2 nos) required for long term maintenance of this stabilizer				
9.3	Model, Rating & Input/Output Voltage etc.	Vendor to specify			
9.4	Spare package for Servo Voltage Stabilizer with item wise break-up are to be recommended and offered by the vendor for 2 years of trouble free operation. Price of unit quantity of each item is to be quoted.	Vendor to specify			
10.0	ULTRA ISOLATION TRANSFORMER				
10.1	Indian make Ultra Isolation Transformer suitable for complete machine, its drives, controls, PLC etc.	Vendor to specify			
10.2	Make shall be NEEI, AplaB or Auto Electric	Vendor to specify			
10.3	Model & Rating	Vendor to specify			
10.4	Catalogue of the Ultra Isolation Transformer shall be submitted with the offer.	Vendor to specify			
11.0	SPARES: (whichever is applicable)				
11.1	Mechanical & Hydraulic Spares : Unit price of each item of spare shall be offered as optional	Vendor to specify			
11.1.1	Pressure switches, flow switches used in Hydraulic / Lubrication / Pneumatic / Coolant Circuit. (1 No. of each type)	Vendor to specify			
11.1.2	All types of regenerative type filter inserts (10 No. of each type)	Vendor to specify			
11.1.3	All types of Disposable type filter inserts (30 nos. of each type)	Vendor to specify			
11.1.4	One set of belts (including timing belt) used in the machine.	Vendor to specify			
11.1.5	One set of seal kits used in different hydraulic & pneumatic cylinders in the machine.	Vendor to specify			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
11.1.6	All types of hydraulic hose pipes, pneumatic pipes and oil & coolant pipes, complete with end connection, as used in the machine (complete one set, as used in machine).	Vendor to specify			
11.1.7	All types of couplings used with different pumps (1 no. of each type) & pressure sleeves used in machine.	Vendor to specify			
11.1.8	All types of shaft seals (2 no. of each type), O-rings & piston rings (5 nos. of each type) used in the machine.	Vendor to specify			
11.1.9	One set of pneumatic filtration / condensate drain system.	Vendor to specify			
11.2	Electrical / Electronic / CNC Spares : Unit price of each item of spare shall be offered as optional	Vendor to specify			
11.2.1	Limit Switches/ Micro Switches (2 Nos each type)	Vendor to specify			
11.2.2	Proximity Switches (2 Nos each type)	Vendor to specify			
11.2.3	Push Buttons (5 Nos each type)	Vendor to specify			
11.2.4	Indicating Lamps (20 Nos each type)	Vendor to specify			
11.2.5	Encoders (1 No each type)	Vendor to specify			
11.2.6	Scanning Heads for Linear Scales (1 No each type)	Vendor to specify			
11.2.7	CNC control with display	Vendor to specify			
11.2.8	Keyboard & Machine Control Panel	Vendor to specify			
11.2.9	Power Modules & Control Cards for Main Drive as well as Feed Drives (1 Nos each type)	Vendor to specify			
11.2.10	DC Power Supply (1 Nos each type)	Vendor to specify			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
11.2.11	All types of spares for total machine and accessories shall be available for at least 10 years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor shall inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure these in advance, if required.	Vendor to confirm			
11.2.12	Vendor to confirm that complete list of spares for machine and accessories, along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the machine.	Vendor to confirm			
	12 TOOLINGS:				
12.1	All types of tool holders, adapters, sleeves, pull studs, Centering Devices etc. required for the machine shall be supplied by the vendor.	Vendor to confirm			
12.2	The Vendor to offer tooling package consisting of all toolings i.e. cutting tools, tool holders for machining of test piece mentioned at sl.24.1. The tooling package shall also contain sufficient number of consumables (inserts, screws, shims etc as well as solid carbide tools) to machine the quantity of 10 such test pieces (for further regular requirement). Item wise price shall be clearly indicated in the price bid. Detailed drawing /catalogue of all the toolings shall be supplied in the event of order (in 2 sets).	Vendor to Confirm and offer. Details to be finalized during technical discussion			
13.0	ELECTRIC SUPPLY:				

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
13.1	415V ± 10%, 50Hz ± 3, 3 Phase AC (3 wire system no neutral) Power Supply Voltage 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 is to be informed by vendor well in advance so that same could be incorporated during construction of foundation.	Vendor to accept & confirm			
13.2	Tropicalisation: All electrical/electronic equipment shall be tropicalized	Vendor to confirm			
13.3	All electrical & electronic control cabinets & panels should be dust and vermin proof	Vendor to confirm			
13.4	All electrical components should be mounted on DIN Rail	Vendor to confirm			
13.5	All electrical/ electronic panels should be provided with adequate door locks. 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			
13.6	Motors shall conform to IEC or Indian Standards. Makes shall be Siemens/ABB/CGL/ Bharat Bijlee/Marathon	Vendor to confirm			
13.7	All cables moving with traversing axes should be installed in caterpillar / Drag chain. Additionally, all the cable trays required for laying of cables should be included in the offer.	Vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
13.8	Vendor should ensure the proper earthing for the machine and its peripherals. Any material requirement for the same should be informed with foundation design/drawings.	Vendor to confirm			
14.0	OPERATING CONDITIONS & THERMAL STABILITY				
14.1	Total machine including CNC system and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Power Supply: 3 phase no neutral, Voltage: 415 V ± 10%: Frequency: 50 Hz ±3%, Ambient Conditions: Temperature = 5 to 45°C Relative Humidity = 95% max. Weather conditions are tropical, Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition. Max. temperature variation is up to 25 deg Celsius in 24 hours.	Vendor to confirm			
14.2	Thermal Stability of the complete machine keeping in view specified Ambient Conditions and accuracy requirements of BHEL components and trouble free operation of the machine should be ensured by vendor.	Vendor to confirm and specify how supplier is meeting the requirements			
15.0	SAFETY ARRANGEMENTS:				
15.1	Following safety features in addition to other standard safety features shall be provided on the machine:	Vendor to confirm			

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
15.2	Machine shall have adequate and reliable safety interlocks / devices to avoid damage to the machine, workpiece and the operator due to the malfunctioning or mistakes. Machine functions shall be continuously monitored and alarm / warning indications through lights/ alarm number with messages (on CNC display and panels) shall be available.	Vendor to confirm			
15.3	A detailed list of all alarms / indications provided on machine shall be submitted by the supplier.	Vendor to confirm			
15.4	All the pipes, cables etc. on the machine shall be well supported and protected. These shall not create any hindrance to machine operator's movement for effective use of machine.	Vendor to confirm			
15.5	All the rotating parts used on machine shall be statically & dynamically balanced to avoid undue vibrations.	Vendor to confirm			
15.6	Emergency Switches at suitable locations as per International Norms are to be provided.	Vendor to confirm			
15.7	Oil & water pipe lines shall not run with electrical cable in the same tray / trench.	Vendor to confirm			
16.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE : The Machine shall conform to following factors related to environment :				
	(a) Maximum noise level shall not cross 80 dB (A) at any condition, 1 M away from the machine with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16. Supplier to demonstrate compliance to noise level, if so required.	Vendor to confirm			

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	(b) There shall not be any emissions from the machine except fumes of cutting fluid during machining.	Vendor to confirm			
	(c) There shall not be any effluent from the machine. In case there are any effluents from the machine, requisite effluent treatment plant or pollution control device shall be built into the machine by the supplier.	Vendor to confirm			
	(d) No hazardous chemicals shall be required to be used in the machine.	Vendor to confirm			
	(e) If any safety / environmental protection enclosure is required it shall be built in the machine by the vendor.	Vendor to confirm			
	(f) Paint of the machine should be oil / coolant resistant and shall not peel off and mix up with coolant.	Vendor to confirm			
	17.0 LEVELING & ANCHORING SYSTEM				
	17.1 Complete set of anchoring system including foundation bolts, nuts, washers, anchoring materials, fixtures, leveling shoes etc for alignment and fixing of the machine on the floor shall be supplied.	Vendor to specify			
	18.0 TOOLS FOR ERECTION, OPERATION & MAINTENANCE :				
	18.1 Special tools and equipment required for erection and necessary tools like torque wrench, spanners, keys, grease guns etc. for operation and maintenance of the machine shall be brought by the vendor. List of such tools should be submitted with offer	Vendor to specify			
	19.0 DOCUMENTATION :				
	4 sets of following documents (Hard copies) in English language shall be supplied along with the machine:				
	19.1 O&M manuals of machine, CNC system & drives				

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19.2	Programming Manuals of CNC system				
19.3	Detailed maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including electrical / pneumatic/ coolant / hydraulic circuit diagrams. All assembly/ sub assembly drawings shall be supplied with the part list also	Vendor to specify			
19.4	Maintenance, Interface & commissioning manuals for CNC system, spindle & feed drives.				
19.5	Manufacturing drawings for all supplied tool holders, coolant connections, adapters, sleeves, fixtures etc.				
19.6	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.				
19.7	Detailed specification of all rubber items and hydraulic/lube fittings				
19.8	Spare parts catalogue of full machine and its all peripherals.				
19.9	PLC program print-outs with comments in English.	Vendor to specify			
19.10	PLC program, NC data & PLC data on CD/USB.	Vendor to specify			
19.11	Complete back-up of CNC control & Drives on CD/USB with clear written instructions for taking back-up and reloading.	Vendor to specify			
19.12	List of parts used in the machine with price list	Vendor to specify			
19.13	One additional set of all the above documentation on CD ROM/ USB , electronic media.	Vendor to specify			
20.0	PRE-DISPATCH INSPECTION AND TRAINING				

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20.1	BHEL Persons shall be trained at supplier's works for mutually agreed period in the area of (a) CNC Part Programming / Technology, Use of all CNC Features, Programming for Measuring Systems & supplied accessories etc. (b) Electrical, Electronic & CNC maintenance for machine & other supplied equipments (c) Mechanical & Hydraulic maintenance of the machine & other supplied equipments (d) Operation of the machine & other supplied equipments.	Vendor to offer			
20.2	Pre-dispatch inspection (refer sl. 21.1) of the machine shall also be carried out by the team during their stay at vendor's works for the training.	Vendor to note			
20.3	Air-fare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor to note			
20.4	Competent, english speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to confirm			
20.5	Vendor to quote for training on man / week basis	Vendor to offer			
21.0	FOUNDATION :				

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21.1	<p>Vendor shall submit the preliminary layout drawing for getting BHEL's approval within one month from the date of Letter of Intent (LOI)/ P.O. Soil condition data shall be furnished by BHEL alongwith the approval. Complete foundation design including details, like Static/ Dynamic load details etc. and final layout drawings shall be submitted by the supplier within 3 months after getting BHEL's approval. The layout shall consist of all requirements pertaining to complete machine and all accessories, including space requirement for Voltage Stabiliser. Isolation Transformer, Air Compressor, Chip Bin & any other accessory. BHEL shall construct complete foundation for the machine under supervision of supplier and at supplier's responsibility. Vendor shall arrange equipment required for the testing of foundation, if required by the vendor. The vendor shall also indicate detailed specifications of grouting compound and grouting procedure etc. for foundation bolts of the machine.</p>	Vendor to accept & offer.			
22.0 ERECTION & COMMISSIONING					
22.1	<p>Supplier to take full responsibility for carrying out the erection, start up, testing of machine, it's control & all types of other supplied equipment/ accessories, machining of test pieces etc. 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. Being green field project other requirements like crane and labour shall also be arranged by supplier in case BHEL cannot provide the same.</p>	Vendor to confirm & offer			
22.2	<p>Erection & Commissioning of Voltage Stabilizer, Isolation Transformer & Air Compressor and other accessories shall also be responsibility of the vendor.</p>	Vendor to confirm & offer			

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22.3	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause 25 (Machine Acceptance) shall form part of the commissioning activity.	Vendor to confirm			
22.4	Test mandrel for checking run-out/laper & alignment should be brought.	Vendor to confirm			
22.5	Tools, tacksels, test mandrels, instruments and other necessary equipment including Laser equipment required to carry out all above activities shall be brought by the supplier.	Vendor to confirm			
22.6	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to confirm			
22.7	All cover plates required for the machine and its peripherals including pits, if any, shall be supplied and installed by the vendor. The plates shall be sourced from India	Vendor to confirm			
22.8	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 colours of paint used.	Vendor to confirm			
22.9	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to submit			
22.10	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to offer			
23.0	ACCURACY TESTS:				
23.1	GEOMETRICAL ACCURACIES :				

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
23.1.1	Submit test chart for all accuracies as per DIN 8609/ ISO 10791 standard or equivalent applicable standard.	Vendor to confirm and submit.			
23.1.2	All the above accuracies shall be demonstrated to BHEL engineers during pre-acceptance at supplier's works and during erection & commissioning at BHEL works.	Vendor to confirm			
23.2	MACHINE POSITIONING ACCURACIES & REPEATABILITY: Shall be measured as per VDI/ DGQ3441/ ISO 230-2 (Latest Revision) using LASER INTERFEROMETER.				
23.2.1	Positioning accuracy (Pa) in all axes shall be max. 15 microns per 1000mm	Vendor to confirm and specify			
23.2.2	Repeatability (Ps) in all axis shall be max. 10 micron.	Vendor to confirm and specify			
23.2.3	Positioning accuracy over entire traverse in all axis (Pa)	vendor to inform			
23.2.4	All the above accuracies shall be demonstrated to BHEL engineers during pre-acceptance at supplier's works and during erection & commissioning at BHEL works.	Vendor to confirm			
24.0	PROVEOUT OF BHEL COMPONENT:				
24.1	Test machining of test piece (approx size- 200mm x 700mm, 100mm thick) including side milling/ face milling/ end milling/ grooving/ drilling/ tapping which shall be discussed & mutually agreed. All tools/ holding device/ fixture, if any for machining of test piece will be supplied by the vendor.	Vendor to accept and specify			

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24.2	Vendor shall be fully responsible for machining of proveout component as per drawing and other requirements specified by BHEL to the full satisfaction of BHEL. Clarifications, if any required by vendor, regarding accuracy requirements of the proveout components, whether specified or not, shall be discussed and cleared by vendor during technical discussions.	Vendor to accept and specify			
25.0	MACHINE ACCEPTANCE: (Tests/Activities should be Performed				
25.1	Tests/Activities should be carried out at supplier's works on the machine before dispatch :				
25.1.1	Geometrical accuracies as per test chart.	Vendor to accept & confirm			
25.1.2	Positioning accuracies as per VDI-DGQ/3441	Vendor to accept & confirm			
25.1.3	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 that time.	Vendor to accept & confirm			
25.1.4	Demonstration of all features of the machine, control system & accessories	Vendor to accept & confirm			
25.1.5	Machining of test piece as per NAS/AFNOR/ISO . Vendor to arrange test piece and tooling for its machining	Vendor to accept & confirm			
25.2	Tests/Activities should be carried out at BHEL works while commissioning the machine :				
25.2.1	Geometrical accuracies as per test chart. Supplier to submit test charts with offer.	vendor to accept & confirm			
25.2.2	Positioning accuracies as per VDI-DGQ/3441 (latest version)	vendor to accept & confirm			

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25.2.3	Full load test to demonstrate the maximum power & cutting capacity of the machine.	vendor to accept & confirm			
25.2.4	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 that time.	vendor to accept & confirm			
25.2.5	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 accept & confirm			
25.2.6	Proveout machining.	vendor to accept & confirm			
25.2.7	Machining test piece as per NAS/AFNOR/ISO. Vendor to arrange Test pieces and tooling for it's machining.	vendor to accept & confirm			
25.2.8	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works	vendor to accept & confirm			
25.2.9	Demonstration by actual use of all supplied attachments and accessories to their full capacity.	vendor to accept & confirm			
26.0	PACKING:				

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
26.1	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 despatched in containers, all small loose items shall be suitably packed in boxes. In case, machine is despatched in container, the container shall be brought upto BHEL, Bhandara. De-stuffing of container shall be carried out at BHEL, Bhandara by the vendor's representative. Any type of material handling equipment required for the de-stuffing of the container shall be brought by the vendor at Bhandara on returnable basis.	Vendor to offer			
27.0	GUARANTEE :				
27.1	Guarantee for complete machine, CNC control, softwares and all supplied accessories/ equipment for 24 months from the date of final acceptance of the machine.	Vendor to confirm & offer			
28.0	GENERAL :				
28.1	Machine Model	Vendor to inform			
28.2	Total connected load (KVA):	Vendor to inform			
28.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to inform			
28.4	Total weight of the machine	Vendor to inform			
28.5	Weight of heaviest part of machine	Vendor to inform			
28.6	Weight of the heaviest assembly / sub-assembly of the Machine	Vendor to inform			
28.7	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to inform			
28.8	Paint of the machine shall be RAL 6011 Apple Green (Polyurethane Paint)	Vendor to confirm			

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28.9	Vendor to submit, along with offer, reference list of customers where similar machines have been supplied mentioning broad specifications of the supplied machine i.e. Model, table size, Spindle power, Load Capacity, Max job Envelope, CNC System etc	Required			
28.10	Detailed catalogues , sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to submit			
28.11	Hydraulic, Pneumatic & oil pipings should be preferably metallic except places where flexible pipings are essential. All the pipes required for the same shall be included in the standard scope of the machine.	Vendor to confirm			