

	<b>BHARAT HEAVY ELECTRICAL LIMITED</b>			<b>Enquiry No. :</b>	
	<b>PIPLANI, BHOPAL, INDIA</b>			<b>Due Date :</b>	
	<b>UNIT'S PHONE NO.:</b>			<b>Supplier Qtn. No.:</b>	
	CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPT.)			<b>Specification No.:</b>	
				<b>Date:</b>	

**SPECIFICATION FOR DEEP HOLE DRILLING MACHINE**

**NOTE:-**

1. Vendor (only OEMs) must submit complete clausewise information.
2. 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.
3. The offer and all documents enclosed with offer should be in English language only.
4. All dimensions are in mm unless otherwise stated.

<b>ADDRESS OF THE SUPPLIER :</b>	<b>ADDRESS OF THE INDIAN AGENTS :</b>
<b>TELEPHONE NOS.:</b>	<b>TELEPHONE NOS.:</b>
<b>FAX NOS.:</b>	<b>FAX NOS.:</b>
<b>E-MAIL ADDRESS :</b>	<b>E-MAIL ADDRESS :</b>

**SCOPE: SUPPLY, ERECTION & COMMISSIONING OF 2-SPINDLE DEEP HOLE CNC DRILLING MACHINE**

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
1	<b>REQUIREMENT:</b>  Two independent spindle full CNC deep hole drilling machine to drill jobs of size 3000 x 3000, drill depth upto 1000mm, drill dia(BTA) from 12.7 to 32 mm or more using BTA/Gun drilling system of job weighing upto 20 metric tons.	Vendor to confirm			
2	<b>SCOPE OF SUPPLY</b>				
2.1	CNC Deep Hole column type drilling machine is required for drilling tube sheets for Heat Exchangers. It shall have easy loading & unloading of the job. Machine shall be suitable for drilling of holes on tube layout pitch varying from 1.20 to or more than 1.35 times of outer tube diameter .	Vendor to confirm			
2.2	Work piece material: Carbon steel, Alloy steel, stainless steel, Dual metal (cladding of SS on Carbon steel) etc., Hardness of Material upto 500 BHN Max.	Vendor to confirm			
2.3	Machine shall have two independent spindles suitable for variable center distance between the two spindles. The drilling carriage shall have BTA (STS), Gun drill system configuration .	Vendor to confirm			
2.4	Bed: Machine Bed shall be cast iron or thermally stabilized fabricated steel . The guide way shall have fixed rack for column longitudinal movement The bed guide ways are protected by metal telescopic cover.	Vendor to confirm			
2.5	Column base: Column base shall be of cast iron or fabricated steel structure thermally stabilized. Its shall slide on the two preloaded hydrostatic way of the bed. It shall slide on the bed by a double pinion gear box with backlash compensation system.	Vendor to confirm			
2.6	Column: Column shall be cast iron or fabricated steel thermally stabilized with two vertical and ground guideways on which the spindle carriage slides. Between the guide ways it shall have recirculating ball screw with preloaded double nut for the vertical movement of the spindle carriage.	Vendor to confirm			
2.7	Vertical slide: Vertical slide shall be of cast iron or fabricated steel structure, thermally stabilized slide on vertical on the way of the column (Y-axis ) on antifriction pads with automatic lubrication system. Optical sensor shall be provided to monitor the position of the pitch. The vertical slide guideways shall be protected by long life bellows cover on the top	Vendor to confirm			

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2.8	Two Drilling Spindle Carriages: Two drilling spindle carriage shall be steel fabricated and thermally stabilized sliding on the horizontal ways of the vertical slide.	Vendor to confirm			
2.9	Y-axis balancing system : Y-axis balancing system shall consist of a hydro cylinder to permit the balancing and locking of the vertical moves during the Y-axis movement to ensure perfect positioning accuracy.	Vendor to confirm			
2.10	Geometrical auto compensation of drilling slide carriage: Geometrical auto compensation of drilling slide shall be hydraulic system to compensate the possible dropping down of the carriage which holds the drilling spindle slides and ensure best accuracy during drilling operation. Mechanical counterweight required to balance carriage load.	Vendor to confirm			
2.11	Weight of Job : 20 Ton or more	Vendor to confirm			
2.12	Initial following tools (To be quoted separately ) is to be supplied along with the machine the details are as follows: 1. Tool holder with pull stud as per DIN 2079 ISO 50: 6 Nos. each 2. BTA Drill head size 16.12 mm effective drilling depth 320 mm : 25 Nos. 3. BTA Drill head size 16.18 mm effective drilling depth 150 mm : 25 Nos. 4. BTA Drill head size 25.65 mm effective drilling depth 260 mm : 25 Nos. Note: The sizes mentioned are tentative ,However final sizes will be decided at the time of placement of order , the change sizes shall be in line and nearest.	Vendor to confirm			
2.13	First filling of all required oils & grease etc. for the machine, voltage stabilizer, isolation transformer etc. to be supplied by vendor. Indigenous (Indian) source or Indian equivalent and specifications of oils/ greases are also to be provided by the vendor.	Vendor to note & confirm			
3	<b>BASIC MACHINE: (Minimum Requirements)</b>				
3.1	<i>Required technical specification for the machine:</i>				
3.1.1	<b>AXIS STROKE</b>				
3.1.1.1	(X-axis) Travel : Effective drill hole range : 3000 mm or more	Vendor to confirm			
3.1.1.2	BTA(STS)Gun drill drilling effective vertical carriage stroke (Y-axis) :3000 mm or more	Vendor to confirm			
3.1.1.3	BTA(STS)Gun drill horizontal travel (Z1& Z2 ) : 1750 mm or more	Vendor to confirm			
3.1.1.4	Axis resolution all axis: 1 Micron	Vendor to confirm			
3.1.1.5	Drilling column on X-axis. shall be parked away from the work table for clear,easy , safe loading & unloading of Jobs.	Vendor to confirm			
3.1.1.6	Additional X -axis travel of 1000 mm shall be provided for mock- up testing .	Vendor to confirm			

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<b>3.1.2 STS(BTA)/ GUN DRILLING UNIT</b>					
3.1.2.1	No of drilling spindles : 2 nos. independent	Vendor to confirm			
3.1.2.2	Spindle orientation :Horizontal	Vendor to confirm			
3.1.2.3	Total spindle drive motors :2 nos.	Vendor to confirm			
3.1.2.4	Total feed motor motors( for Z1, Z2 axes) :2 nos	Vendor to confirm			
3.1.2.5	Power of each spindle drive motor: 22 kW or more	Vendor to specify			
3.1.2.6	Torque of each spindle drive motor: 520 NM or more	Vendor to specify			
3.1.2.7	Cutting force each spindle :15 kN or more	Vendor to specify			
3.1.2.8	Spindle nose taper :	Vendor to specify			
3.1.2.9	Spindle RPM (Infinitely variable) : 6 to 3000 or more / batter	Vendor to specify			
3.1.2.10	BTA(STS) hole drilling range diameter :12.7 to 32mm or more	Vendor to specify			
3.1.2.11	Gun drill hole drilling range diameter:12 to >32 or more	Vendor to specify			
3.1.2.12	Deep hole effective drilling length : 1000 mm or more	Vendor to specify			
3.1.2.13	Range of centre distance between 2 spindles	Vendor to specify			
3.1.2.14	Hole pitch adjustment: Motorised with dimension read out on control panel :Infinitely variable	Vendor to confirm			
3.1.2.15	Pump pressure delivery ( for each spindle): 75 Bars or more	Vendor to specify			
3.1.2.16	Pump delivery in LPM for each spindle: minimum 80LPM to 250 or more	Vendor to specify			
<b>3.1.3 FEED RATES</b>					
3.1.3.1	X-axis :Infinitely variable: 1-5000 mm/min or more	Vendor to specify			
3.1.3.2	Y-axis :Infinitely variable :1-5000 mm/min or more	Vendor to specify			
3.1.3.3	Z1, Z2 -axes :Infinitely variable:1-3000 mm/min or more	Vendor to specify			
<b>3.1.4 AXIS RAPID STROKE</b>					
3.1.4.1	Rapid traverse of X-axis :10000 mm/min or more	Vendor to specify			
3.1.4.2	Rapid traverse of Y Axis:10000 mm/min or more	Vendor to specify			
3.1.4.3	Rapid traverse of Z1 & Z2 Axis:6000 mm/min or more	Vendor to specify			
<b>3.1.5 DRILLING ACCURACY</b>					
3.1.5.1	Error between the spindles (Pitch accuracy between holes) :max. ± 0.05 mm	Vendor to specify			
3.1.5.2	Roundness of drilled holes:max. 0.02mm	Vendor to specify			
3.1.5.3	Hole diameter quality:.. IT7-IT9	Vendor to specify			
3.1.5.4	Drill surface finish with BTA system : Ra 1.6µm or better	Vendor to specify			
3.1.5.5	Hole deviation (measured from starting drill face):max.0.015/100mm depth; max.0.12/500mm depth	Vendor to specify			
3.1.5.6	Tolerance of the distance between the two holes next to each other : max. ± 0.12/500 mm	Vendor to specify			

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4.0	<b>WORK TABLE:( Optional : To be quoted seperately )</b>				
4.0.1	Work Table (Bed Plate/ Floor Plate) along with normal offer also to be quoted separately	L=6000, W=4000 or more			
4.0.2	Max capacity of Floor plate	Vendor to specify			
4.0.3	Size of T-slot (X axis parallel):28 H 8 according to DIN 650 H12	Vendor to confirm			
5.0	<b>JOB HOLDING FIXTURES ( Optional : To be quoted seperately )</b>				
5.0.1	Square Angle Plate : 2 nos. min. 4500 mm x 1500 mm size job supporting square angle plates with 28 H8 T slots according to DIN 650 H12 shall be supplied with the machine. Ample no. of job holding studs, T nuts shall be supplied with the angle plates for holding the job ( To be quoted seperately )	Vendor to confirm			
5.0.2	'V' Shape work piece support: 1No. Capacity: 20 Ton (Min.). All clamping items like T Nuts, studs, bolts etc. to clamp the work piece to floor plate shall be supplied in sufficient quantity :: Universal size to hold jobs of dia 800 to 3000mm (To be quoted seperately )	Vendor to confirm			
6.0	<b>COOLANT SYSTEM</b>				
6.1	Oil tank capacity : 7000 L or more	Vendor to specify			
6.2	Degree of filtration : < 20 microns or less	Vendor to specify			
6.3	Filtering capacity :700 LPM or more	Vendor to specify			
6.4	Discharge shall be infinitely variable & controled at operator panel	Vendor to confirm			
6.5	Tanks shall have Min & Max oil level indication	Vendor to confirm			
6.6	Coolant specification (Preferably Indian equivalent shall also be specified	Vendor to confirm			
6.7	Inter locks shall be provided to protect over flow of the coolant oil from tanks	Vendor to confirm			
6.8	In case of filter failure over flow connection back to the tank shall be provided	Vendor to confirm			
6.9	Collection of cutting oil from the machine to mud tank to be specifec	Vendor to confirm			
6.10	Coolant collection and recirculation system should be leak proof & perfect to avoid any spillage on shop floor, trenches for cables & foundation pit of the machine etc. In case, any leakage is found, it shall be corrected by vendor. Additionally, suitable equipment should be provided at deepest point of foundation pit to pump out collected oil/coolant up to shop floor.In no case the coolant oil mix up with hydraulic/Lubrication oil.	Vendor to confirm			
6.11	All types of coolant variants should be switchable through program as well as manually by push buttons provided on the Operator's control panel.	Vendor to confirm			
6.12	Coolant Flow Diagram showing filters, pumps, valves, tanks etc	Vendor to confirm			
6.13	Coolant pumps & motor details etc. for all types of coolant variants	Vendor to confirm			
6.14	Pressure & rate of flow of coolant for different coolant variants for drilling operations should be furnished in the offer. The coolant should be able to reach tool tip at full pressure.	Vendor to confirm			
6.15	Magnetic filter shall be provided to arrest the chips to the mudtank	Vendor to confirm			

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<b>7.0</b>	<b>CHIP CONVEYOR:</b>				
7.1	A suitable chip conveyor system with the machine for chip removal up to the chip bin during operation as well as after drilling of workpiece shall be provided. The chip bin is to be located on the floor at the side of one end of the machine. Two chip bins of appropriate size, with wheels and handle for movement, should also be supplied. The offer of chip bin to be submitted separately (with option of Indian make)	Vendor to confirm			
7.2	Type of chip conveyor	Vendor to confirm			
7.3	Length and Width of conveyor	Vendor to confirm			
7.4	Speed of conveyor	Vendor to confirm			
7.5	Elevation of chip conveyor for chip bin	Vendor to confirm			
7.6	Material of chip conveyor to be rust resistant	Vendor to confirm			
7.7	Provision for smooth flow of chips to the conveyor.	Vendor to confirm			
7.8	Operation of chip conveyor (forward & reverse) through push buttons on operator's panel and at Chip Conveyor	Vendor to confirm			
<b>8.0</b>	<b>LUBRICATION SYSTEM</b>				
8.1	Centralised automatic lubrication unit for all axes slides, ball screw nuts, linear way bearings and other elements with metering units (flow control valve)	Vendor to confirm			
8.2	Grade of Lubricating oil and its Indian equivalent.	Vendor to confirm			
<b>9.0</b>	<b>HYDRAULIC SYSTEM:</b>				
9.1	Hydraulic system should be centralised. Hydraulic Tank shall preferably be located at floor level	Vendor to confirm			
9.2	All Hydraulic pumps and controls etc shall be from world fame manufacturers only like Yuken, Rexroth, Vickers etc.	Vendor to confirm			
9.3	Technical specification and make of all the hydraulic components like pumps, valves, hydraulic cylinders, pressure switches, flow switches, pressure relief valves, hose pipe etc.	Vendor to confirm			
9.4	Air cooling/refrigerated type cooling system of sufficient capacity to maintain cooling of Hydraulic oil at machine required temperature.	Vendor to confirm			
9.5	Each pump should have an independent motor.	Vendor to confirm			
9.6	Grade of hydraulic oil and its Indian equivalent.	Vendor to confirm			
9.7	First filling of all required oil & grease etc. should be supplied by vendor along with the specifications of oils/ greases .	Vendor to confirm			

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9.7.1	<b>OPERATION AND CONTROL SYSTEM:</b>				
9.7.2	<b>OPERATOR'S PANEL:</b>				
9.7.3	Swivelling type <b>air conditioned</b> operator's pendant of <b>Rittal/Schneider</b> make with complete CNC operator panel (OP) and machine control panel (MCP) of required configuration shall be provided on the operator's side for safe, convenient and efficient operation All switches should be within reach of operator of average height (170 cms) for easy operation. All displays/indications should also be conveniently placed accordingly. Layout showing complete details should be submitted.	Vendor to confirm & submit Photographs & Layout.			
<b>10.0</b>	<b>CNC SYSTEM AND FEATURES</b>				
10.1	Make: <b>FANUC / SIEMENS</b>	Vendor to specify			
10.2	Details of Standard features	Vendor to specify			
10.3	The system should have full alphanumeric keyboard, TFT colour display (10.4" or larger), Machine Control Panel (MCP), RS232C serial interface, USB port for data input/output, network ready, graphic simulation and on-screen PLC Ladder display. All PLC input/output modules should be of FANUC/SIEMENS make. <b>(Latest hardware &amp; software versions, as available at the time of delivery, should be supplied).</b>	Vendor to confirm			
10.4	Details of other CNC features:	Vendor to confirm			
10.4.1	Axes Interpolation: Linear, Circular & Helical.	Vendor to confirm			
10.4.2	Max Number of simultaneous interpolation: 3	Vendor to confirm			
10.4.3	Part Program Storage: 2 MB or more	Vendor to confirm			
10.4.4	Technology Cycles: Geometry Calculation, standard Drilling, Tapping, Milling cycles.	Vendor to confirm			
10.4.5	Graphics simulation (Static and dynamic) of Part Programs and Machining process.	Vendor to confirm			

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10.4.6	Co-ordinate Transformation: Datum shift, rotation, mirror image, scaling factor.	Vendor to confirm			
10.4.7	Pitch Error compensation (As applicable)	Vendor to confirm			
10.4.8	Backlash error compensation (As applicable)	Vendor to confirm			
10.4.9	Zero Offset for all axes	Vendor to confirm			
10.4.10	Feed override switch 0-120% for all axis	Vendor to confirm			
10.4.11	Spindle speed override switch 70-120%	Vendor to confirm			
10.4.12	Provision for automatic safe shut down of CNC control in case of power failure	Vendor to confirm			
10.5	Details of optional features, recommended by vendor. (Including features required for Prove-Out Components)	Vendor to specify			
10.6	During the drilling, display of spindle speed, feed rate, and current of the spindle and feed motors are displayed on the panel.	Vendor to confirm			
10.7	Complete manual control of machine with required control elements that include spindle override switch for spindle speed variation, feed override switch feed variation, potentiometers for coolant regulation, Mode selector switch, Axes selector switch, Jog keys for axes and spindles, Push buttons for Boza slide forward and backward, Push button for chip conveyor on and off, Emergency stop switch, Push button with lamp for coolant on and off. Diagram/ Sketches for switches/ keys provided on operators pendant to be submitted.	Vendor to confirm			
10.8	Hand Held unit, alongwith sufficient length of interfacing cable is to be offered for handwheel (MPG) operation of individual axis in jog & increment mode and provision for spindle inch in c.w & c.c.w directions	Vendor to confirm			
10.9	A suitable PC based software for generating part program from for condenser tube layouts (with maximum utilisation of both spindles) drawing file is to be supplied. Two copies of the software on CD ROM with extra hardware locks (dongle) are to be supplied as back up. Details of installation of software on the PC and its use is to be provided in the hard copy. (Software shall have the capability of calculations and illustrations of collision free movements, simulation of movements, automatic generation of NC-programs. Programming language-English, Measuring system-Metric, PC system- windows XP. CNC program generated by the system shall be used directly on the machine control panel. Software should be capable of handling input data in DXF/IGES and other universal formats). Software shall have the library of all possible drills to ease selection, material/job library which include size and mechanical properties, programmes etc in list form with graphical representation in 2D and in 3D forms.	Vendor to confirm			



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10.10	Supplier should specify the required Hardware configuration of PC/Workstation for installation of software	Vendor to confirm			
10.11	The software should be guaranteed for three years for free updates after commissioning	Vendor to confirm			
10.12	The supplier should also quote for the Annual Maintenance Contract (AMC) for the software after the guarantee period is over.	Vendor to confirm			
10.13	Note Book PC (Internationally reputed make and latest model) with Windows operating system is to be supplied for bi-directional transfer of program and data between the offered unit and supplied CNC system. The notebook must contain all application softwares (Licensed) for the supplied CNC, PLC and Drives systems along with required interfaces and cables.	Vendor to confirm			
10.14	In case of PC based CNC systems, UPS for 15 minutes with inbuilt cooling and charge status display (Battery charging /discharging time should be specified by vendor)	Vendor to note			
10.15	Fixed/swivelling type air conditioned operator's pendant of <b>Rittal</b> make with complete CNC operator panel (OP) and machine control panel (MCP) of required configuration shall be provided for safe, convenient and efficient operation. All switches should be within reach of operator of average height (170 cms) for easy operation. All displays/indications should also be conveniently placed accordingly. Layout showing complete details should be submitted.	Vendor to confirm			
11.0	<b>DIAGNOSTIC SYSTEM:</b>				
11.1	<b>FAULT DIAGNOSTIC SYSTEM:</b>				
11.1.1	All alarms and messages should be displayed on the CNC monitor with device ID numbers. Additionally, softcopy and hardcopy of all alarms and messages with cause and remedial measures must be supplied.	Vendor to confirm			
11.2.2	Help guide should be provided to use both diagnostic systems shall be provided.	Vendor to confirm			
11.0	<b>SPINDLE MOTOR AND DRIVE SYSTEM</b>				
11.0.1	Spindle Motor & Drive Make: <b>FANUC ai</b> or <b>SIEMENS 1PH</b> series spindle motors with matching spindle drives	Vendor to specify			
11.0.2	Spindle Encoder: <b>FANUC/SIEMENS/HEIDENHAIN</b> rotary encoders for actual spindle rpm	Vendor to specify			
12.0	<b>FEED MOTOR AND DRIVE SYSTEM FOR X,Y,Z and Z2</b>				
12.0.1	Feed motors & drives: <b>FANUC ai</b> or <b>SIEMENS 1FT/1FK</b> series AC servo motors with matching AC servo drives.	Vendor to specify			
13.0	<b>FEED BACK SYSTEM</b>				
13.0.1	Feed back system for X & Y axes: <b>Heidenhain</b> sealed linear scales (Details to be submitted by the vendor)	Vendor to confirm			
13.0.2	Feed back system for Z1 and Z2 axes: <b>Fanuc/Siemens/Heidenhain</b> Rotary Encoders (Details to be submitted by the vendor)	Vendor to confirm			

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<b>14.0</b>	<b>COOLANT DRIVE &amp; MOTOR: (In case of variable speed coolant system)</b>				
14.0.1	In case of variable speed coolant system the coolant motors should be offFanuc/Siemens make with matching drives of the same make and adequate capacity.	Vendor to specify			
<b>15.0</b>	<b>OPERATOR'S PLATFORM:</b>				
15.1	Operator platform with perimeter safety railing shall be provided. Adequate protection from coolant and chips should be ensured during actual machining operation.	Vendor to note & confirm			
<b>16.0</b>	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY :</b>				
16.1	Total machine should work trouble free and efficiently under following operating conditions. Power Supply: Voltage: 415 V +10% / -15% Frequency:50Hz ± 3% No. of phases = 3 Ambient Conditions: Temperature = 5 to +48 degrees Celsius Relative Humidity = 95% max. (Confirm that machine is suitable for above and details of provisions on the machine for the same should be furnished)	Vendor to note & confirm			
16.2	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. <b>Max. temperature variation is up to 25 deg Celsius in 24 hours.</b> (Vendor to confirm that the machine is suitable for above and details of provisions on the machine for the same are to be furnished by Vendor)	Vendor to note & confirm			
16.3	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. (Confirm that machine is suitable for above and details of provisions on the machine for the same should be furnished)	Vendor to note & confirm			
16.4	The machine, including Attachments and Accessories etc., should be suitable for 24 hrs. continuous operation to its full capacity for 24 hour a day and 7 days a week throughout. Vendor to ensure and confirm the same.	Vendor to note & confirm			
<b>17.0</b>	<b>AIR CONDITIONERS / REFRIGERATION UNITS</b>				
17.1	Door mounted Air Conditioners with Dehumidifiers of reputed international make who have after-sales spares support in India or of Indian make like Advance/ Werner Finley/ Rittal for all Electrical/ Electronic Panels/ Cabinets including Operator's Panel (One no.of sufficient capacity for each cabinet/ panel considering continuous operation at ambient temperature of 50°C). The blow of cool air from the air conditioners shall not fall directly on the electronic circuits/ modules. ACs must be incorporated with electrical/ refrigeration interlocks.	Vendor to offer & confirm			

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17.2	ACs unit must be mounted on the movable pendent with well-supported universal-head bolt. Two sets of cut-out labels are mandatory to be supplied with the units. The electrical connection of the AC unit must be with male-female connector, easily disconnected from the AC unit side. There has to be a MCCB to isolate the AC unit from the electrical panel.	Vendor to offer & confirm			
17.3	For precise air/ oil temperature with energy-efficient operation, latest state-of-the-art technology features like constant pressure control, variable speed control of fan-motor, hot-gas bypass control, etc. needs to be incorporated in the above Unit (s).	Vendor to offer & confirm			
17.4	Unit (s) must be designed to work in extremely harsh industrial environment and needs protection from heat, dust, fumes, corrosive or oily vapours, moisture, etc. The condenser coil must resist dust accumulation & must transfer heat efficiently.	Vendor to offer & confirm			
17.5	Vendor to supply the following information about Air Conditioners and Chiller Unit (s) used in the machine: - Type of Air Conditioning/ Chiller Unit. - Capacity of the Unit. - Type of Compressor with complete specifications. - Type of Thermostatic Expansion Valve with complete specifications. - Fan size and flow in CFM (cubic feet meter) of the Condenser unit. - Specifications of the Evaporator Unit. - Functional requirement of temperature of cool air/ oil to be maintained between range +15°C to +40°C. - Type of Microprocessor-based Controller with LCD Display with complete functional details. Detailed specifications of all the components fitted in the Unit (s) are to be submitted with BOM, make, etc. in Technical bid. Vendor have to provide leaflet/ catalogue of all the brought-out items, refrigeration accessories and provide schematic layout of the system	Vendor to specify			
17.6	Compressor, Refrigeration Spares Items, PHE (Plate-type Heat Exchanger), Gear Pump, etc. must be available in India and if possible can be repaired, locally. Vendor have to give training to operate, maintain & repair all the individual items and the Chiller/ AC Unit (s) as a whole. Exhaustive training is to be given for electrically integration of the Unit (s) with the CNC machines	Vendor to confirm			
<b>18.0</b>	<b>ELECTRICAL SYSTEM :</b>				
18.1	415V +/- 10%, 50HZ +/- 3 %, 3 Phase AC (3 wire system without 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.	Vendor to confirm & specify			

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18.2	Tropicalisation: All electrical / electronic equipment shall be tropicalized	Vendor to confirm			
18.3	Electrical cabinets should be of Rittal/Schneider make properly air conditioned and sealed from ingress of liquids and encroachment of rodents	Vendor to confirm			
18.4	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220Volts, 5 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents	Vendor to confirm			
18.5	Motors shall conform to IEC or Indian Standards	Vendor to confirm			
18.6	All cables outside the electrical cabinets and operator pendant must be routed through flexible conduits capable of withstanding stress, chip hazard and ingress of oil/coolant. Additionally, all cables moving with traversing axes should be of trailing type and installed in caterpillar / cable drag chain.	Vendor to confirm			
18.7	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm			
18.8	The drives for the motors, their setting and control systems, all protection and error diagnostic shall be placed in electric cabinet	Vendor to confirm			
18.9	All the electrical component shall be preferably of Siemens make. The electric system shall be in accordance with IEC or equivalent standard.	Vendor to confirm			
18.10	The electric cabinets have air conditioner with protection class IP54	Vendor to confirm			
18.11	In-cycle hour counter with reset facility.	Vendor to offer			
<b>19.0 MACHINE LIGHTS:</b>					
19.1	Machine Lights for sufficient illumination of complete working area on both sides of operator's platform should be provided for clear visibility.	Vendor to offer & specify details			
19.2	A magnetic base portable spot light with sufficiently long cable should also be provided.	Vendor to offer & specify details			
19.3	Any lights required in the foundation/ pit area shall also be foreseen and supplied by the vendor.	Vendor to confirm			
19.4	Flashing / rotary type End of Cutting and Program Stop Light	Vendor to confirm			
<b>20.0 ULTRA ISOLATION TRANSFORMER WITH SAFETY ENCLOSURE</b>					
20.1	Indian make Ultra Isolation Transformer suitable for complete machine, its drives, controls, PLC etc. shall be supplied	Vendor to offer			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
20.2	Make: NEEL/Alpha/Auto Electric/Servomax or of internationally reputed make	Vendor to specify			
20.3	Model and Rating	Vendor to specify			
20.4	Spares Package for the Ultra Isolation Transformer for 2 years working should also be offered.	Vendor to offer			
20.5	Catalogue of the Ultra Isolation Transformer shall be submitted with the offer	Vendor to submit			
<b>21.0 SAFETY ARRANGEMENTS:</b>					
21.1	Following safety features in addition to other standard safety features should be provided on the machine:				
21.2	Machine should 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 should be continuously monitored and alarm / warning indications through lights/ alarm and messages (with device identification) on CNC display and panels should be available.	Vendor to confirm			
21.3	A detailed list of all alarms / indications provided on machine along with cause and remedy should be submitted by the supplier.	Vendor to submit			
21.4	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 for effective use of machine.	Vendor to confirm			
21.5	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations.	Vendor to confirm			
21.6	Emergency Switches at suitable locations as per International Norms should be provided	Vendor to provide			
21.7	Oil & water pipe lines should not run with electrical cable in the same trench.	Vendor to confirm			
21.8	Safety lights on moving column (preferably Flashing during X- travel	Vendor to confirm			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
22.0	<b>ENVIRONMENTAL PERFORMANCE OF THE MACHINE :</b>				
22.1	The Machine shall conform to following factors related to environment	Vendor to confirm			
22.2	Maximum noise level shall be 75 dB(A) at normal load condition, 1 meter 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			
22.3	There shall not be any emissions from the machine except fumes of cutting fluid during machining.	Vendor to confirm			
22.4	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			
22.5	No hazardous chemicals shall be required to be used in the machine.	Vendor to confirm			
22.6	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm			
22.7	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to confirm			
22.8	Suitable arrangement for recovery of oil mist as per ISO 14001 and OHSAS 18001	Vendor to confirm			
23.0	<b>LEVELING &amp; ANCHORING SYSTEM</b>				
23.1	Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc should be supplied	Vendor to offer & submit details			
24.0	<b>TOOLS FOR ERECTION, OPERATION &amp; MAINTENANCE :</b>				
24.1	Special tools and equipment required for erection of the machine shall be brought by the vendor. 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			
24.2	Test mandrel for checking run-out/taper & alignment should be supplied	Vendor to confirm			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
<b>25.0</b>	<b>SPARES(Optional : To be quoted separately )</b>				
25.1	Itemwise breakup of mechanical, hydraulic, electrical and electronic spares used on the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis should be offered with proper identification number by Vendor. The list to include following, in addition to other recommended spares: <b>(Unit Price of each spare item should be offered)</b>	Vendor to offer			
<b>26.0</b>	<b>Mechanical &amp; Hydraulic Spares: The following spares are to be included. (Optional : To be quoted separately )</b>				
26.1	Pressure control valves, Pressure reducing valves, Flow control valves & Direction control valves used in Hyd / Lub / Pneumatic/ coolant circuit. (1 no. of each type)	Vendor to offer			
26.2	Pressure switches, flow switches used in Hyd / Lub / Pneumatic/ coolant circuit. (1 No. of each type)	Vendor to offer			
26.3	All types of regenerative type filter inserts (6 No. of each type in hydraulic, pneumatic & coolant circuit)	Vendor to offer			
26.4	All types of Disposable type filter inserts (10 nos. of each type)	Vendor to offer			
26.5	All types of Accumulator bladders (1 no. of each type) with charging kit	Vendor to offer			
26.6	One set of seal kits used in different hydraulic & pneumatic cylinders in the machine.	Vendor to offer			
26.7	<b>Electrical /Electronic / CNC Spares:</b> Following Spares are to be offered:	Vendor to offer			
26.7.1	Limit Switches/ Micro Switches (2 Nos each type )	Vendor to offer			
26.7.2	Relays ( 2 Nos each type )	Vendor to offer			
26.7.3	Contactors ( 2 Nos each type )	Vendor to offer			
26.7.4	RTD temperature transmitter ( 1 No each type )if used..	Vendor to offer			
26.7.5	Proximity Switches ( 2 Nos each type )	Vendor to offer			
26.7.6	Push Buttons ( 5 Nos each type )	Vendor to offer			
26.7.7	Indicating Lamps ( 10 Nos each type )	Vendor to offer			
26.7.8	Semiconductor Fuses ( 3 Nos each type )	Vendor to offer			
26.7.9	Circuit Breakers ( 1 No each type )	Vendor to offer			
26.7.10	Main Power Switch ( 1 No each type )	Vendor to offer			
26.7.11	Encoders ( 1 No each type )	Vendor to offer			
26.7.12	Scanning Heads for Linear Scales ( 1 No each type )	Vendor to offer			
26.7.13	PCBs for CNC Controller (1 No each type)	Vendor to offer			
26.7.14	I/O Cards for PLC (1 No each type )	Vendor to offer			
26.7.15	Control & Power modules for Spindle & Feed Drives (1 No each type)	Vendor to offer			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
26.8	All types of spares for total machine and accessories should be available for at least ten years after supply of the machine. If machine or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure them in advance, if required	Vendor to offer			
26.9	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 offer			
26.10	Vendor to submit the complete list of spares for machine and accessories along with specification / type/model, part identification number and name & address of the supplier of all bought out items shall be furnished along with documentation to be supplied with the machine.	Vendor to offer			
26.11	Vendor to submit list of necessary accessories required	Vendor to offer			
26.12	Commissioning Spares	Vendor to offer			
27.0	<b>DOCUMENTATION</b> : Three sets of Hard Copies (Print form) and three sets of soft copies (on CD/DVD) of the following documents in English language should be supplied along with the machine	Vendor to offer			
27.1	Operating manuals of Machine & CNC system	Vendor to offer			
27.2	Programming manuals of machine & CNC system	Vendor to offer			
27.3	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 part list also	Vendor to offer			
27.4	Detailed specification of all rubber items and hydraulic/lube fittings	Vendor to offer			
27.5	Maintenance, Interface & commissioning manuals for CNC system, spindle & feed drives and position feedback system.	Vendor to offer			
27.7	Operating Manuals, Maintenance Manuals & Catalogues for all the bought out items that include Voltage Stabilizer, Isolation Transformer, Air-Compressor and all supplied Accessories.	Vendor to offer			
27.8	Electrical Schematics of the machine with comments in English.	Vendor to offer			
27.9	PLC program with symbols & comments in English.	Vendor to offer			
27.10	Soft copy of complete machine data and PLC project with symbols and comments in English	Vendor to offer			
27.11	Complete software back-up (Ghost) of hard disk (only in case of PC based CNC system) on DVD	Vendor to offer			
27.12	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to offer			
27.13	Complete list of parts/items( Bill of materials) used in the machine in English language.	Vendor to offer			



SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
<b>28</b>	<b>ERECTION &amp; COMMISSIONING</b>				
28.1	Commissioning : Complete commissioning of equipment & demonstration of all its features, control system & accessories at BHEL works is the sole responsibility of Vendor.	Vendor to confirm			
28.2	Supplier to take full responsibility for carrying out the erection, start up, testing of machine, it's control & all types of other supplied equipment. 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. Other requirements like crane and helping personnel shall also be provided by BHEL. Details of these requirements should be informed by vendor in advance.	Vendor to confirm			
28.3	Erection & Commissioning of Voltage stabilizer, Isolation Transformer & Air Compressor shall also be responsibility of the vendor.	Vendor to confirm			
28.4	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause 31 (Machine Acceptance) shall form part of the commissioning activity	Vendor to confirm			
28.5	Tools, Tackles, Test mandrels, instruments and other necessary equipment required to carry out all above activities should be brought by the supplier.	Vendor to confirm			
28.6	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to confirm			
28.7	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to confirm			
28.8	Special tools and equipment required for erection of the machine shall be brought by the vendor. 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			
28.9	Test mandrel for checking spindle run-out & alignment should be supplied	Vendor to confirm			
28.10	Schedule, Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to confirm			
<b>29</b>	<b>ACCURACY TESTS:</b>				
29.1	<b>GEOMETRICAL ACCURACIES :</b>				
29.1.1	Geometrical Accuracy Tests shall be in accordance with applicable standard. Detailed Test Charts for the same, clearly showing the accuracies to be achieved on the machine, shall also be submitted with the offer.	Vendor to confirm			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
30	<b>MACHINE POSITIONING &amp; REPEATABILITY ACCURACIES : SHOULD BE MEASURED AS PER VDI/DGQ 3441 (LATEST REVISION) USING LASER INTERFEROMETER.</b>				
30.1	Positioning accuracy in X / Y axis (Pa) per 1000 mm	0.015mm			
30.2	Positioning accuracy in (Z1 & Z2) axis (Pa) per 1000 mm	0.015mm			
30.3	Repeatability in X / Y axis (Ps) per 1000 mm	0.010mm			
30.4	Repeatability in (Z1 & Z2) axis (Ps) per 1000 mm	0.010mm			
30.5	Backlash on reversal in X / Y Axis (U)	0.005mm			
30.6	Backlash on reversal in (Z1 & Z2) Axis (U)	0.005mm			
30.7	Positioning uncertainty X / Y - axis (P) per 1000 mm	0.015mm			
30.8	Positioning uncertainty (Z1 & Z2) Axis (P) per 1000 mm	0.015mm			
30.9	Vendor to confirm that it will be possible to machine prove-out components to specified drawing accuracies with above mentioned machine accuracies.	Vendor to confirm			
30.10	All the above accuracies to be demonstrated to BHEL engineers during pre-acceptance at Suppliers works and during Erection & Commissioning at BHEL Works	Vendor to confirm			
30.12	LC of scale should be taken to achieve above	Vendor to note			
31.0	<b>MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)</b>	Vendor to note			
31.1	<b>Tests/Activities should be carried out at supplier's works on the machine before dispatch :</b>	Vendor to note			
31.1.1	Geometrical accuracies as per test chart. As per clause no 29.1.1	Vendor to note			
31.1.2	Positioning accuracies as per VDI-DGQ/3441 as per Clause 30.0	Vendor to note			
31.1.3	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 note			
31.1.4	Demonstration of all features of the machine, control system & accessories	Vendor to note			
31.1.5	To check out the max. drilling capacity, finish, performance & other cutting parameter etc. Machine shall be tested out by using max size of the BTA/STS drill of 32.0 mm	Vendor to note			
31.2	<b>Tests/Activities should be carried out at BHEL works while commissioning the machine :</b>	Vendor to note			
31.2.1	Geometrical accuracies as per test chart. As per clause no 29.1.1	Vendor to note			
31.2.2	Positioning accuracies as per VDI-DGQ/3441 as per Clause 30.0	Vendor to note			
31.2.3	Full load test to demonstrate the maximum power & cutting capacity of the machine	Vendor to note			
31.2.4	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 note			
31.2.5	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 note			
31.2.6	Drilling of test piece: - Vendor to arrange Test pieces and tooling for it's drilling	Vendor to note			
31.2.7	Proveout drilling of BHEL component as per <b>Sl. No.-33.1</b>	Vendor to note			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
31.2.8	Three weeks supervision of independent operation of machine by BHEL after job proveout	Vendor to note			
31.2.9	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 note			
31.2.10	Demonstration by actual use of all supplied attachments and accessories to their full capacity.	Vendor to note			
<b>32</b>	<b>PRE-DESPATCH INSPECTION:</b>	Vendor to note			
32.1	Pre-despatch inspection at vendor's works by BHEL personnel	Vendor to note			
32.2	Pre-despatch inspection will be carried out as mentioned at clause <b>31.1 &amp; 34</b>	Vendor to note			
<b>33</b>	<b>PROVEOUT OF BHEL COMPONENTS :</b>	Vendor to note			
33.1	Drg No. 21750540439 will be likely proveout component. Job setting plan, drilling process plan & requirement of Tools etc. for drilling of proveout components shall be discussed and mutually agreed with vendor (Final proveout component drawing no. may change, however, the drilling features of the changed components shall be in line with the original component drawing). Complete drilling of prove out components shall be done by Vendor at BHEL works to the specified design accuracy and surface finish, using BTA/STS drills . CNC programs to be provided by the vendor to prove the machine after complete erection, tests etc. Material for the proveout components shall be provided by BHEL. Vendor shall submit final job setting plan, drilling process plan, tool layout & list with complete description, time study etc. for the proveout machining within two months of placement of order. Vendor shall submit CNC programs prior to start of erection of Machine at BHEL works.	Vendor to offer & confirm			
33.2	Vendor shall be fully responsible for drilling of proveout components 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, should be discussed and cleared by vendor during initial technical discussions.	Vendor to confirm			
33.3	During proveout, all tools should be preset by using supplied Tool offset Measuring System and measurement of machined dimensions of the job shall be done by supplied Job Measuring System. Vendor shall be responsible, financially or otherwise, for any deviation/ rejection in proveout component to the extent of cost of Casting/Forging, due to wrong drilling or malfunctioning of the machine during proveout drilling and also for the delay in drilling due to improper recommended tooling etc.. The cost of such deviation / rejection, if any, shall be refunded by the vendor to BHEL.	Vendor to confirm			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
34	<b>TOOLING FOR FINAL ACCEPTANCE &amp; PROVE OUT</b> : Following complete tooling of various sizes to check out the performance , maximum drilling capacity , surface finish, tolerance etc shall be provided for final acceptance. Minimum 10 drilling heads for BTA system in the range of 12.7- 32 mm of diameter .	Vendor to confirm			
34.1	Cutting speed, Feed rate, Achievable surface finish & Tolerances and Tool life are to be specified by supplier .	Vendor to note			
35	<b>TRAINING</b>				
35.1	Four BHEL Persons should be trained at vendor's works for each machine for the area & period given below: (a) CNC Part Programming for the machine, application of all CNC Features, CNC programme generation softwareProgramming for Measuring Systems & supplied accessories etc. (Period 2 Weeks) (b) Electronic & CNC maintenance for machine & other supplied equipments ( Period 2 weeks ) (c) Mechanical, Electrical & Hydraulic maintenance of the machine & other supplied equipments ( Period 2 weeks ) (d) Operation of the machine & other supplied equipments ( Period 2 weeks ) Pre-dispatch inspection (ref. SI.No. 31.1 of the machine shall also be carried out by the team during their stay at vendor's works for the training. Vendor may specify days required for pre-dispatch inspection. BHEL reserves the right to choose no. of persons, field & period of training, out of above, while deputing their engineers for training.	Vendor to confirm			
35.2	Air-fare, boarding & lodging for the trainees shall be borne by BHEL for training at supplier's work.	Vendor to confirm			
35.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	Vendor to confirm			
35.4	Vendor to quote for training per person per week basis	Vendor to confirm			
35.5	Vendor should commit to organize and quote for training of Electronics Engineer and Programmer at the CNC System Manufacturer's works for advanced features and specialised training if so required by BHEL..	Vendor to confirm			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
<b>36 FOUNDATION:</b>					
36.1	Vendor shall submit the preliminary layout drawing for getting BHEL's approval within two month from the date of Letter of Intent (LOI) P.O., whichever is earlier. Soil condition data will 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 three months after getting BHEL's approval. The Layout should 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 should 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 grouting of foundation bolts of the machine.	Vendor to confirm			
<b>37 AFTER SALES SERVICE:</b>					
37.1	Vendor should provide prompt after sales service to ensure smooth trouble free working of the machine and spares availability during and after guarantee period.	Vendor to confirm			
<b>38 PACKING:</b>					
38.1	Sea worthy & rigid packing for all items of complete machine, all accessories and other supplied items to avoid any damage/loss in transit.	Vendor to confirm			
<b>39 GUARANTEE :</b>					
39.1	24 months from the date of acceptance of the machine.	Vendor to confirm			
39.2	Vendor shall provide free servicing of the machine once in 6 months during guarantee period	Vendor to confirm			
<b>40 GENERAL :</b>					
40.1	Machine Model	Vendor to specify			
40.2	Total connected load (KVA):	Vendor to specify			
40.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to specify			
40.4	Painting of machine/electrical panels: RAL 6011 apple Green ( Polyurethane paint)	Vendor to specify			
40.5	Total weight of the machine	Vendor to specify			
40.6	Manufacturer (OEM) can not source the machine from other countries.	Vendor to confirm			
40.7	Machine should be officially certified for its specification, parameter & performance.	Vendor to confirm			
<b>41 TOUCH-UP PAINTS:</b>	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			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
<b>42</b>	<b>REFERENCE LIST / QUALIFYING CONDITIONS :</b>				
42.1	Only those vendors (OEMs), who have supplied and commissioned at least one single column CNC Deep Hole drilling machine of same ( Two spindle, X- axis 3000 mm , Y axis 3000 mm , Drilling capacity in BTA drills 12.7 mm to 32 mm, total horizontal Z -axis 1100 mm minimum ) or higher sizes in the past 10 years ( on the date of opening of Tender ) should quote. The following information should be submitted by the vendor about the companies where referred machine (s) have been supplied. This is required from all the vendors for qualification of their offer.	Vendor to accept & confirm			
42.2	Name of the customer / company where referred machine is installed.	Vendor to inform			
42.3	Complete postal address of the customer.	Vendor to inform			
42.4	Month & Year of commissioning.	Vendor to inform			
42.5	Parameters of machine(s) supplied ( Nos of spindle, X & Y travel , drilling system drilling capacity etc.Centre distance between two spindle . ) and application for which the machine is supplied.	Vendor to inform			
42.6	Name and designation of the contact person of the customer.	Vendor to inform			
42.7	Phone, FAX no. and e-mail address of the contact person of the customer.	Vendor to inform			
42.8	Performance certificate from at least one customer & issued with in one year of tender opening regarding satisfactory performance of machine supplied to them. The referred machine should presently be working satisfactorily for more than one year (on the date of opening of Tender ) after its commissioning.	Vendor to inform			
42.9	BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false/incorrect, the offer shall be rejected.	Vendor to note			
42.10	Technical evaluation of only those offers will be made who qualify as per the above qualifying conditions. Other offers shall not be considered.	Vendor to note			
<b>43</b>	<b>OTHER FEATURES:</b>				
43.1	<b>NETWORKING:</b>				
43.2	Machine control should have necessary hardware and software for interfacing with gigabit Ethernet Local Area Network with 100 MB/sec through UTP cables for NC program and other related data transfer. This network to be connected to wide area network/Internet. The networking should have following capabilities.	Vendor to confirm			
43.3	The machine shall appear as a node in the Entire Network. (Network Neighborhood)	Vendor to confirm			
43.4	The program transfer shall be by simple copy and paste method provided sharing access is allowed between any PC and the machine across the network.	Vendor to confirm			
43.5	The program transfer between CNC system and network should also be possible in CNC Mode.	Vendor to confirm			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
<b>44</b>	<b>MACHINE MONITORING SYSTEM (MMS) SIGNALS</b>				
44.1	Following MMS signals would be made available on a specifically earmarked terminal strip. These MMS signals should be sourced from a PLC output card separately	Vendor to confirm			
44.2	Control ON	Vendor to confirm			
44.3	Cycle ON	Vendor to confirm			
44.4	Spindle Running	Vendor to confirm			
44.5	Feed Active (Any of the axes moving)	Vendor to confirm			
44.6	M30 (Program Stop)	Vendor to confirm			
44.7	Alarm Active	Vendor to confirm			
<b>45</b>	<b>POINTWISE CONFIRMATION:</b>				
45.1	Vendor should confirm/clarify pointwise (all the points) as per specification and provide original technical leaflet, technical details, photographs, scope of supply etc. at the first instance.	Vendor to note			