

	<b>Transformer Plant,</b> <b>BHARAT HEAVY ELECTRICAL LIMITED,</b> <b>BHEL, JHANSI.</b>	<b>Machine No</b>	MT-3/2/1524	<b>Enquiry No. :</b>	
		<b>Quantity</b>	1 No	<b>Due Date :</b>	
		<b>Spec. No.</b>	6222	<b>Supplier's Ref.:</b>	
				<b>Date :</b>	
<b>Specification cum Compliance Certificate for RADIAL DRILLING MACHINE</b>					
<b>Note:-</b>					
<b>1. Vendor(OEM) must submit complete information against clause no. 23. The offer meeting this clause would only be processed.</b>					
<b>2. The 'Offered' Column and where applicable, the 'Deviations' &amp; '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.</b>					
<b>3. The offer and all documents enclosed with offer should be in English language only.</b>					
<b>Name &amp; Address of the supplier:</b>		<b>Name &amp; Address of the Indian Agent:</b>			
<b>Telephone No.</b>		<b>Telephone No.</b>			
<b>Fax No.</b>		<b>Fax No.</b>			
<b>e-mail :</b>		<b>e-mail :</b>			
<b>Scope: Supply, Erection &amp; Commissioning of RADIAL DRILLING MACHINE complying with specification as below.</b>					
<b>S No.</b>	<b>Description - BHEL's Requirement</b>	<b>Specified</b>	<b>Offered</b>	<b>Deviations</b>	<b>Remarks</b>
<b>1.0</b>	<b>PURPOSE &amp; WORK PIECE MATERIAL</b>				
1.1	Purpose: All Drilling Machine Operations like Drilling, Reaming, Tapping etc.	Vendor to confirm			
1.2	Work Piece Material: Carbon Steel, Alloy Steel, Cast Iron & Stainless Steel. Hardness 20 - 40 HRC	Vendor to confirm			
<b>2.0</b>	<b>SPECIFICATION:</b>				
2.1	<b>MACHINE CONFIGURATION:</b> The Drilling Head shall move horizontally on the arm. The arm shall move vertically up & down on the pillar. The Column shall swivel manually or automatically.	Vendor to confirm			
2.1.1	<b>MACHINE FRAME :</b> The machine frame shall be made from high quality gray cast iron. The base should have a large surface for mounting work pieces, tables or fixtures. All housing and Radial arm guides shall be hardened and ground.	Vendor to confirm			

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2.1.2	<b>HEAD STOCK AND DRIVE:</b> The headstock shall be made from gray cast iron and is equipped with an adjustable quill. The spindle should run in lifetime lubricated precision antifriction bearings. Suitable motorized / hydraulic locking system shall be provided to lock the headstock on the radial arm at desired position. The gear steps, spindle speeds and feeds shall be selected on the control panel by means of the spindle start lever.	Vendor to confirm			
2.1.3	<b>MOVEMENT OF DRILLING HEAD ALONG THE ARM:</b> The movement of drilling head over the arm shall be mechanised. The desired travel direction is selected by means of a direction control lever.	Vendor to confirm and furnish details			
<b>2.2 CAPACITY</b>					
2.2.1	Drilling Capacity in Steel of 60 Kg/mm <sup>2</sup> Tensile Strength	90 mm(min)			
2.2.2	Drilling Capacity in Grey Cast Iron	110 mm			
2.2.3	Tapping Capacity in Steel of 60 Kg/mm <sup>2</sup> Tensile Strength	M 76 x 6			
2.2.4	Tapping Capacity in Grey Cast Iron	M 100 x 6			
<b>2.3 SPINDLE</b>					
2.3.1	Spindle Stroke (Min.)	350 mm			
2.3.2	Spindle Morse Taper	MT5/MT 6			
2.3.3	Main Motor Power (Min.) to be supported by calculation.	15 KW			
2.3.4	Braking system to slows down and stops the main spindle.	Vendor to provide			
2.3.5	Spindle Ovality	0.005 max			
<b>2.4 Spindle Speed and Feeds</b>					
2.4.1	Spindle Speeds (Range)( Approx.)	25 - 1400 RPM			
2.4.2	Number of Speed steps	12 ( min)			
2.4.3	Feed range (Approx.)	0.03 - 2.5 mm/rev			
2.4.4	Number of feed steps	10( min)			
<b>2.5 Traverses</b>					
2.5.1	Vertical Travel of Arm (Min)	800 mm			
2.5.2	Range of Swing of Arm	0 - 360 Deg.			
<b>2.6 Distances</b>					
2.6.1	Distance from the spindle axis to the guide-ways of the column at the farthest position	2350 mm( min)			
2.6.2	Distance from the spindle axis to the guide-ways of the column at the closest position	600 mm( Max.)			

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2.6.3	Distance from the spindle nose to the base plate at the farthest position	1550 mm( min)			
2.6.4	Distance from the spindle nose to the base plate at the closest position	750 mm ( max)			
<b>2.7 BEARINGS</b>					
2.7.1	Make of all bearings shall be SKF/FAG only	Vendor to confirm.			
<b>2.8 COOLANT FACILITY</b>					
2.8.1	Coolant System of minimum 40 lpm with pump & motor shall be offered. Proper collection and retrieval shall be ensured.	Vendor to offer details of motor power, discharge , pressure and coolant tank capacity.			
<b>3.0 OPERATION AND CONTROL SYSTEM:</b>					
<b>3.1 ELECTRICAL EQUIPMENT:</b>					
3.1.1	The clearly laid out operator panel with emergency stop switch and locking device switch shall be mounted on the machine housing.	Vendor to offer			
<b>4.0 HYDRAULIC SYSTEM - Details should be Submitted by the Vendor</b>					
5.0	<u>First filling of all required Oils &amp; Grease etc.</u> 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 confirm			
<b>6.0 LUBRICATION:</b>					
6.1	Lubrication shall be of life time lubricated wherever possible. Other lubrication points shall be of automatic type. Details shall be submitted.	Vendor to confirm			
6.2	Centralized auto lubrication shall be offered with metering cartridges and necessary electrical interlock.	Vendor to confirm			
<b>7.0 ELECTRICAL:</b>					

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7.1	415V + 10% / -10%, 50HZ +/-3 HZ, 3 Phase AC (4 wire system with 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 confirm			
7.2	All electrical & electronic control cabinets & panels should be dust and vermin proof.	Vendor to confirm			
7.3	All electrical components in the cabinets should be mounted on DIN Rail.	Vendor to confirm			
7.4	All electrical and electronic panels including operator's panel should be provided with CFL for sufficient illumination. All adapters/receptacles should have compatibility with Indian equivalents.	Vendor to confirm			
7.5	Motors shall conform to IEC or Indian Standards	Vendor to confirm			
7.6	All cables and cable trays required for the machine should be included in the offer.	Vendor to confirm			
7.7	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm			
7.8	The electrical components used shall be from reputed international makes such as Siemens / Telemechanique / Merlin Gerin / GE/ ABB and shall be in accordance with DIN/IEC Standards.	Vendor to confirm			
8.0	<b>SAFETY ARRANGEMENTS:</b>	Vendor to note and reply			
	Following safety features in addition to other standard safety features should be provided on the machine:				
	1. Machine should have adequate and reliable safety interlocks / devices to avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes.				
	2. A detailed list of safety alarms / indications provided on machine should be submitted by the supplier.				
	3. Emergency Switches at suitable locations as per International Norms should be provided.				
<b>ENVIRONMENTAL PERFORMANCE OF THE MACHINE :</b>					

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
9.0	The Machine shall conform to following factors related to environment	Vendor to confirm			
	(a) Maximum noise level shall be 85 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.				
	(b) If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.				
	(c) Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to confirm			
10.0	<b>LEVELING &amp; ANCHORING SYSTEM</b>				
10.1	Complete anchoring system including foundation bolts, anchoring materials, leveling shoes etc should be supplied.	Vendor to confirm			
11.0	<b>TOOLS FOR ERECTION, OPERATION &amp; MAINTENANCE :</b>				
11.1	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. Test mandrel for checking run-out/taper and alignment should also be supplied.	Vendor to confirm			
12.0	<b>ESSENTIAL ACCESSORIES:</b>				
12.1	<b>Box Table</b>	Vendor to offer with details			
12.1.1	Cast Iron Box Table 1000 mm x 700 mm x 500 mm with M24 T-Slots				
12.2	<b>Tilting Table</b>				
12.2.1	Cast Iron Tilting Table 750 mm x 600 mm with M24 T-Slots	Vendor to offer with details			
12.3	<b>Tools:</b>				
12.3.1	Reduction Sleeves MT6 to MT5 & MT6 to MT4 Each 2 Nos.	Vendor to offer			
12.3.2	Extension Sleeves MT6 to MT5 & MT6 to MT4 Each 2 Nos.	Vendor to offer			
12.3.3	Tapping Attachment with collets- M6 to M24 - 1 Set	Vendor to offer			
12.3.4	Tapping Attachment with collets- M24 to M48 - 1 Set	Vendor to offer			
12.3.5	two set of tools same as required for proving both dia holes in cl.19.3.4				

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13.0	<b>SPARES:</b>				
13.1	Itemized 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 by vendor. The list to include following, in addition to other recommended spares: <b>(Unit Price of each item of spare should be offered in the price bid)</b>	Vendor to furnish			
13.2	<b>Mechanical &amp; Hydraulic Spares:</b> All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc.	Vendor to furnish			
13.3	<b>Electrical /Electronic :</b> All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power etc.	Vendor to furnish			
13.4	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 these in advance, if required	Vendor to furnish			
13.5	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			
13.6	Vendor to supply 2 Sets of Electronic cards or PCBs, Modules of PLCs, Display Boards if any used in the machine as essential spares.	Vendor to offer			
14.0	<b>DOCUMENTATION :</b> Five sets of following documents (Hard copies) in <b>English language</b> should be supplied along with the machine	Vendor to confirm			
14.1	Operating manuals of Machine				
14.2	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.				

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14.3	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.				
14.4	Detailed specification of all rubber items and hydraulic/lube fittings				
14.5	Complete Master List of parts used in the machine shall be submitted by the vendor.				
14.6	One additional set of all the above documentation on CD ROM, wherever possible.				
15.0 TRAINING					
15.1	BHEL Persons should be trained at supplier's Works for mutually agreed period in the area of (a) Electrical and Electronic maintenance for machine & other supplied equipments wherever applicable. (b) Mechanical & Hydraulic maintenance of the machine & other supplied equipments (c) Operation of the machine & other supplied equipments.	Vendor to agree			
15.2	Air-fare, boarding & lodging for the trainees shall be borne by BHEL.	Vendor to note			
15.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel.	Vendor to note and accept			
15.4	Vendor to quote for training on man / day basis	Vendor to note			
16.0 FOUNDATION :					
16.1	Vendor shall submit the preliminary General Layout drawing including control panel for getting BHEL's approval within one month from the date of Letter of Intent (LOI) / P.O. Soil condition data will be furnished by BHEL along with the approval. Complete Foundation Design including details viz. static / dynamic load details etc. and Final Layout drawings shall be submitted by the supplier within two months after getting BHEL's approval. BHEL shall construct complete foundation for the machine under supervision of supplier and at supplier's responsibility. Vendor should arrange equipments 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.	Vendor to submit			
17.0 ERECTION & COMMISSIONING					

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
17.1	Supplier to take full responsibility for carrying out the erection, start up, testing of machine, it's control & all types of other supplied equipment, 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. Other requirements like crane and helping personnel shall also be provided by BHEL subject to availability. Details of these requirements should be informed by vendor in advance.	Vendor to note			
17.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at <b>clause 19</b> (Machine Acceptance) shall form part of the commissioning activity.	Vendor to note			
17.3	Tools, Tackles, instruments and other necessary equipment required to carry out all above activities should be brought by the supplier.	Vendor to note			
17.4	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to note			
17.5	All Cover Plates required for the machine and its peripherals including pits, if any, shall be supplied and installed by the vendor..	Vendor to note			
17.6	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colors of paint used.	Vendor to note			
17.7	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to submit			
17.8	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to submit			
<b>18.0 GEOMETRICAL ACCURACIES :</b>					
18.1	The machine shall be tested for Geometrical Accuracy as per IS 2199 /ISO 2423 latest revision. Supplier shall submit test chart for BHEL approval.	Vendor to confirm and submit			
18.2	All the above accuracies should be demonstrated to BHEL engineers during pre-acceptance at Suppliers works and during Erection & Commissioning at BHEL Works.	Vendor to accept			



S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
19.0	<b>MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)</b>	To be accepted & confirmed by Vendor			
19.1	Quality assurance plan to be submitted for BHEL approval within 4 weeks time after LOI/PO.				
19.2	<b>Tests/Activities to be carried out at supplier's works on the machine before dispatch :</b>				
19.2.1	Motors data sheet	Vendor to submit			
19.2.2	Internal routine test report	Vendor to submit			
19.2.3	The machine should be tested for its full capacity at supplier works . Vendor shall arrange test pieces at their end.	Vendor to accept			
19.2.4	Demonstration of all features of the machine, control system & accessories	Vendor to demonstrate			
19.3	<b>Tests/Activities to be carried out at BHEL works while commissioning the machine :</b>				
19.3.1	The machine should be tested for its full capacity at BHEL works . BHEL will provide test pieces for prove out.	Vendor to accept			
19.3.2	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			
19.3.3	Training of BHEL machine operators for four working days in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to accept			
19.3.4	Job proving : drilling of dia 85 mm and dia 75 mm holes in compensating beam as per drg 06/2/15/68 with accuracy of 0.03(max) and 0.025(max) respectively. The finish of holes has to be 1.6 $\mu$ ( max).				
20.0	<b>PACKING:</b>				
20.1	Sea worthy & rigid packing for all items of complete machine, CNC System, all Accessories and other supplied items to avoid any damage/loss in transit. When machine is despatched in containers, all small loose items shall be suitably packed in boxes.	Vendor to note and accept			
21.0	<b>GUARANTEE :</b>				
21.1.	24 months from the date of acceptance of the machine at BHEL works..	Vendor to accept			
22.0	<b>GENERAL :</b>				
22.1	Machine Model .	Vendor to furnish			
22.2	Total connected load (KVA):	Vendor to furnish			
22.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to furnish			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
22.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)	Vendor to note			
22.5	Total weight of the machine	Vendor to furnish			
22.6	Weight of heaviest part of machine	Vendor to furnish			
22.7	Weight of the heaviest assembly / sub-assembly of the Machine	Vendor to furnish			
22.8	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to furnish			
22.9	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, Capacity etc.	Vendor to furnish			
22.10	Detailed catalogues, sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to submit			
22.11	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 note			
22.12	BHEL reserves the right to verify the information provided by vendor during prequalification and present stage. In case the information provided by vendor is found to be false/incorrect, the offer shall be rejected.				
23.0	<b>COMPANY PROFILE/QUALIFYING CONDITIONS :</b>				
23.1	<b>COMPANY PROFILE</b>				
	The BIDDER has to provide the details pertaining to each clause in the	Vendor to submit			
	Number of years of experience of the BIDDER/ VENDOR in the field	Vendor to submit			
	Details on the Codes/Standards adopted for the machine design and	Vendor to submit			
	Details on Manufacturing facilities available with the VENDER for:	Vendor to submit			
	(a) Sourcing/Building large machine casting or fabricated components	Vendor to submit			
	(b) Heat treatment facilities	Vendor to submit			
	(c ) Machine assembly & testing Rigs	Vendor to submit			
	Capacity of vendor to supply machine within 16 months	Vendor to confirm			
	Capacity of vendor .	Vendor to submit			
23.2	<b>QUALIFYING CONDITIONS :</b>				
	Only those vendors(OEM), who have supplied and commissioned at least one similar machine in the past 10 years (on the date of opening of	Vendor to submit details			
	The following information should be submitted by the vendor about the companies where similar machines have been supplied. This is required from all the vendors for qualification of their offer.	Vendor to submit details			

S No.	Description - BHEL's Requirement	Specified	Offered	Deviations	Remarks
	1. Name of the customer / company where similar machine is installed.	Vendor to submit			
	2. Complete postal address of the customer.	Vendor to submit			
	3. Month & Year of commissioning.	Vendor to submit			
	4.Parameters of machine(s) supplied & application for which the machine is supplied.	Vendor to submit			
	5. Name and designation of the contact person of the customer.	Vendor to submit			
	6. Phone, FAX no. and email address of the contact person of the customer.	Vendor to submit			
	7. Performance certificate from the customers regarding satisfactory performance of machine supplied to them ( original certificate or through E-mail directly from the customer).The original may be returned after verification by BHEL,If required.	Vendor to submit			
	8.BHEL reserves the right to verify the information provided by vendor.In case the information provided by vendor is found to be false/incorrect, the offer shall be rejected.	Vendor to confirm			

Arjun Singh Mgr. (WE&S)	Md. Arshad Mgr. (LMM)
S.J.Chakraborty Sr. DGM (WTFT)	K.D.Manjhi DGM (LMM & LMP)