

	<b><u>BHARAT HEAVY ELECTRICAL LIMITED</u></b> <b><u>UNIT'S ADDRESS</u></b> <b><u>UNIT'S PHONE NOS.</u></b> <b><u>CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL</u></b> <b><u>(FROM PURCHASE DEPTT.)</u></b>			Enquiry No. :
				Due Date :
				Supplier Qtn. No.:
				Date :
<b><u>SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR</u></b> <b><u>"RADIAL ARM DRILLING MACHINE"</u></b>				
<b>NOTE:-</b> <b>1. Vendor must submit complete information against clause no. 20.0 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>ADDRESS OF THE SUPPLIER :</b>				
<b>TELEPHONE NOS.:</b>				
<b>FAX NOS.:</b>				
<b>E-MAIL ADDRESS :</b>				

<b>SCOPE: SUPPLY, ERECTION &amp; COMMISSIONING OF " RADIAL ARM DRILLING MACHINE" COMPLYING WITH SPECIFICATION AS</b>							
<b>SNO</b>	<b>DESCRIPTION FOR BHEL REQUIREMENT</b>	<b>SPECIFIED / TO BE CONFIRMED BY</b>	<b>OFFERED</b>	<b>DEVIATIONS</b>	<b>REMARKS</b>		
<b>1.0 PURPOSE &amp; WORKPIECE MATERIAL</b>							
1.1	<b>Purpose:</b> A Radial arm drilling machine is required for drilling,reaming,tapping,spot facing,counter boring,back spot facing etc. on various component of Traction Motor.	Vendor to conform					
1.2	<b>Work Piece Material:</b>						
	(1)Manganese steel forgings, Normalised, complying generally to IS 4367 - 1991 & UTS upto 640 N/mm2, Hardness 200 BHN.						
	(2) Carbon Steel Forgings, Normalised class 4 (45C8) complying to IS 2004-1981,UTS 530N/mm2 & 200 BHN.	Vendor to conform					
	(3) Alloy Steel Forging, hardened and tempered , with UTS upto 740N/mm2.						
<b>2.0 SPECIFICATION:</b>							
<b>2.1 MACHINE CONGIGURATION:</b>	The machine should be consist of a drilling unit which can perform drilling,reaming,tapping. The arm should rotate and also move in forward /reverse, up/down dirrections. The machine should have longitudinal movement over a bed. Various control levers for changing speed and feed, and hand wheels for traverses should be provided. All gears should be hardened and ground.						
<b>2.2 CAPACITY :</b>							
2.2.1	Drilling Capacity in CI ( 250N/mm2) with 0.3mm per revolution feed rate	60					
2.2.2	Drilling Capacity in Steel of 60 kg/mm2 with 0.3mm per revolution feed	50					
2.2.3	Threading Capacity in Steel of 60 kg/mm2	M56					
<b>2.3 DRILL HEAD</b>							
2.3.1	Spindle Motor power	Vendor to specify					
2.3.2	Spindle Motor range ( Vendor to furnish number of steps )	40 to 1800 rpm					
2.3.3	Spindle feed range	0.125 to 1.25 mm per rev.					

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2.3.4	Max. Troque	Vendor to specify			
2.3.5	Max. Drilling Thrust	Vendor to specify			
2.3.6	Spindle diameter	Vendor to specify			
2.3.7	Spindle Nose	Vendor to specify			
2.3.8	Internal Taper	MT5			
2.3.9	Spindle Axial Travel	Vendor to specify			
	<b>2.4 COLUMN :</b>				
2.4.1	Column Sleeve dia.	400 mm			
2.4.2	Column drilling radius	2350 mm			
2.4.3	Quill Traverse	325 mm			
2.4.4	KW Rating of column traverse motor	Vendor to specify			
2.4.5	Drill head Traverse	1800 mm			
	<b>2.5 ARM</b>				
2.5.1	Vertical Travel of arm	940 mm			
2.5.2	Width of arm guide	250 mm			
2.5.3	Mini. And Max. distance between spindle nose and floor	Vendor to specify			
2.5.4	Mini. And Max. distance between spindle axis and column axis	Vendor to specify			
2.5.5	Vertical rapid traverse	Vendor to specify			
2.5.6	KW Rating of vertical traverse motor	Vendor to specify			
<b>3.0</b>	<b>CONSTRUCTION:</b>				

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3.1	Details of material, hardness & construction, including explanatory drawings of various component / assemblies like column, bed, spindle unit, etc. should be given . Levers and other operator controls are to be clearly indicated in the offer	Vendor to specify			
4.0	<b>MANUAL CONTROL :</b>				
2.11.3.1	Complete manual control of machine with required switches / keys should be provided on operator's panel for selection of spindle rpm, feed, direction of spindle Rotation,i.e. CW/CCW, cutting feed and spindle rpm on/off etc.	Vendor to specify			
5.0	<b>COOLANT SYSTEM :</b>				
5.1	Coolant System with all accessories should be provided	Vendor to conform			
5.2	Pressure & rate of flow of coolant should be furnish in the offer.	Vendor to conform			
5.3	Coolant Tank capacity	Vendor to specify			
5.4	Coolant pump & motor details	Vendor to specify			
6.0	<b>ELECTRICAL :</b>				
6.1	415V(fluctuation + 10% / -10% ), 50HZ (fluctuation +/-3 Hz ), 3 Phase AC (3 wire system with out neutral) Power Supply will be provided by BHEL	Vendor to conform			
6.2	<b>Tropicalisation:</b> All electrical / electronic equipment shall be tropicalized	Vendor to conform			
6.3	All electrical & electronic control cabinets & panels should be dust and vermin proof	Vendor to conform			
6.4	Motors shall conform to IEC or Indian Standards	Vendor to conform			
6.5	All cables moving with traversing axes should be installed in caterpillar / Drag chain. / suitable device	Vendor to conform			
7.0	<b>SAFETY ARRANGEMENTS:</b>				

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7.1	Following safety features in addition to other standard safety features should be provided on the machine:				
7.2	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.	Vendor to conform			
7.3	All the pipes, cables etc. on the machine should be well supported and protected.	Vendor to conform			
7.4	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations.	Vendor to conform			
7.5	Emergency switches at suitable locations are to be provided.	Vendor to conform			
8.0	<b>ENVIRONMENTAL PERFORMANCE OF THE MACHINE :</b>				
8.1	The Machine should conform to following factors related to environment :				
8.2	Maximum noise level shall be 85 dB(A) at normal load condition, 1meter 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 asked for.	Vendor to conform			
8.3	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to conform			
8.4	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to conform			
9.0	<b>SPARES:</b>				
9.1	Itemwise breakup of mechanical, electrical 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)</b>	Vendor to specify			

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9.2	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 conform			
10.0	<b>DOCUMENTATION :</b> Five sets of following documents (Hard copies) in English language should be supplied along with the machine				
10.1	Operating manuals of Machine .	Vendor to conform			
10.2	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.	Vendor to conform			
10.3	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to conform			
10.4	Detailed specification of all rubber items and hydraulic/lube fittings	Vendor to conform			
10.5	Operating Manuals, Maintenance Manuals & Catalogues for supplied Automatic Tool Offset & Job Measuring Systems, Voltage Stabilizer, Isolation Transformer, Air-Compressor and all supplied Accessories.	Vendor to conform			
10.6	Complete Master List of parts used in the machine shall be submitted by the vendor.	Vendor to conform			
10.7	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to conform			
11.0	<b>TRAINING</b>				
11.1	Vendor to impart training to BHEL personnel in operation & maintenance at BHEL works for a period of days after commissioning and proving of jobs.	Vendor			
12.0	<b>ERECTION &amp; COMMISSIONING</b>				

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12.1	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. Details of these requirements should be informed by vendor in advance.	Vendor to conform			
12.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at <b>clause 16</b> (Machine Acceptance) shall form part of the commissioning activity.	Vendor to conform			
12.3	Tools, Tackels, Test Mandrels, instruments and other necessary equipment including Laser equipment required to carry out all above activities should be brought by the supplier.	Vendor to conform			
12.4	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to conform			
12.5	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colours of paint used.	Vendor to conform			
12.6	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to conform			
12.7	Charges, duration, terms & conditions for E&C should be furnished in detail	Vendor to conform			
13.0	<b>ACCURACY TESTS:</b>				
13.1	<b>GEOMETRICAL ACCURACIES :</b>				

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13.2	Geometrical Accuracy Tests shall be in accordance with relevant ISO/DIN standard or equivalent applicable standard. Relevant standards and 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 conform			
13.3	All the above accuracies should be demonstrated to BHEL engineers during pre-acceptance test at vendor's works and during Erection & Commissioning at BHEL Works.	Vendor to conform			
14.0	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY :</b>				
14.1	Total machine and all supplied items should work trouble free and efficiently under following operating conditions and should give specified accuracies. Supply: Voltage: 415 V - 10%, +10% Frequency: 50 Hz +1.5%, - 3% No. of phases = 3 (3 wire no neutral) Ambient Conditions: Temperature = 0 5 to 50 degree celsius Relative Humidity = 95% max.	Vendor to conform			
14.2	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. Max. temperature variation is up to 25 deg Celsius in 24 hours.	Vendor to conform			
14.3	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.	Vendor to conform			
14.4	The machine, including attachments and accessories, 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 conform			
15.0	<b>PROVEOUT OF BHEL COMPONENTS :</b>				



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15.1	Vendor shall carryout drilling & tapping in one component to prove the performance to full satisfaction of BHEL .	Vendor to conform			
16.0	<b>MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)</b>				
16.1	<b>Tests/Activities to be carried out at supplier's works on the machine before dispatch :</b>				
61.1.1	Geometrical accuracies as per test chart of relevant DIN/ISO standards .	Vendor to conform			
61.1.2	Demonstration of all features of the machine, control system & accessories	Vendor to conform			
61.1.3	Drilling and tapping on a mock job ( to be arranged by vendor at their works) to demonstrate the capacity. Required drills and taps also to be arranged by the vendor .	Vendor to conform			
16.2	<b>Tests/Activities to be carried out at BHEL works while commissioning the machine :</b>	Vendor to conform			
16.2.1	Geometrical Accuracy Tests shall be in accordance with relevant ISO/DIN standard	Vendor to conform			
16.2.2	Full load test to demonstrate the maximum power & cutting capacity of the machine.	Vendor to conform			
16.2.3	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 conform			
16.2.4	Drilling and tapping on BHEL actual jobs.	Vendor to conform			
16.2.5	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 conform			
17.0	<b>PACKING:</b>				
22.1	Rigid packing for all items of complete machine, and all accessories and other supplied items to be provided to avoid any damage/loss in transit. When machines is despatched in containers,all small loose items shall be suitably packed in boxes.	Vendor to conform			

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	<b>18.0 GUARANTEE :</b>				
	18.1 24 months from the date of acceptance of the machine.	Vendor to conform			
	<b>19.0 GENERAL :</b>				
	19.1 Machine Model No.	Vendor to specify			
	19.2 Total connected load (KVA):	Vendor to specify			
	19.3 Overall size of the machine (Length, Width, Height)	Vendor to specify			
	19.4 Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)	Vendor to specify			
	19.5 Total weight of the machine	Vendor to specify			
	19.6 Vendor to submit , along with offer, reference list of customers where similar machines have been supplied mentioning the customer machine model, major specifications of the supplied machine, year of supply etc.	Vendor to specify			
	19.7 Detailed catalogues , sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to conform			
	19.8 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 conform			
	<b>20.0 QUALIFYING CONDITIONS :</b>				

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20.1	Only those vendors (OEM), who have supplied and commissioned at least one CNC LATHE of same (SOC, Load Carrying Capacity, At least half of the Admit Between Centers specified) or higher sizes for similar applications in the past ten years(on the date of opening of Tender) and such machine is presently working satisfactorily for more than one year after commissioning(on the date of opening of Tender) , should quote.However if such machine(s) has/had been supplied to BHEL, then such machine should be presently working satisfactorily for more than six months after its commissioning and acceptance(on the date of opening of Tender) in BHEL should quote. 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 conform			
20.2	Name of the customer / company where similar machine is installed.	Vendor to conform			
20.3	Complete postal address of the customer.	Vendor to specify			
20.4	Month & Year of commissioning .	Vendor to specify			
20.5	Application for which the machine is supplied with details of accuracies achieved on the job.	Vendor to specify			
20.6	Name and designation of the contact person of the customer.	Vendor to specify			
20.7	Phone, FAX no. and email address of the contact person of the customer.	Vendor to specify			
20.8	Performance certificate from the customers regarding satisfactory performance of machine supplied to them	Vendor to specify			