

Annexure - C to Tender 2750955E/OT-21: Technical Specification, Revised



**Boiler Auxiliaries Plant,
Bharat Heavy Electricals Limited,
Ranipet - 632406, Tamilnadu, INDIA.**

Enquiry No. & Dt.:
Due Date :
Supplier's Ref.:
Date :

Specification cum Compliance Certificate for Radial Drilling Machine 50 mm Capacity

Note:-

1. The 'Offered' Column and where applicable, the 'Deviations' & 'Remarks' Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous or unsustainable information against any of the clauses of the specifications / requirements shall be treated as non-compliance.

2. The offer and all documents enclosed with offer should be in English language only.

Name & Address of the supplier:	Name & Address of the Indian Agent:
Telephone No.	Telephone No.
Fax No.	Fax No.
e-mail :	e-mail :

Scope: Supply, Installation & Commissioning of Radial Drilling Machine 50 mm Capacity complying with the following specification

S No.	Description - BHEL's Requirement	Specified	Offered
1.0	PURPOSE & WORK PIECE MATERIAL		
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	
2.0	SPECIFICATION:		
2.1	MACHINE CONFIGURATION: 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	MACHINE FRAME : 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	
2.1.2	HEAD STOCK AND DRIVE: 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 motorised / 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	MOVEMENT OF DRILLING HEAD ALONG THE ARM: 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	
2.2	CAPACITY		
2.2.1	Drilling Capacity in Steel of 60 Kg/mm ² Tensile Strength (Min.)	50mm	
2.2.2	Drilling Capacity in Grey Cast Iron (Min.)	60mm	
2.2.3	Tapping Capacity in Steel of 60 Kg/mm ² Tensile Strength (Min.)	M42x3	
2.3	SPINDLE		
2.3.1	Spindle Stroke (Min.)	300mm	
2.3.2	Spindle Taper	Morse Taper 5	
2.3.3	Main Motor Power (Min.) S1/S6	3.4/4.5kW	
2.3.4	Braking system to slows down and stops the main spindle.	Vendor to provide	
2.4	Spindle Speed and Feeds		
2.4.1	Spindle Speeds	50-1600rpm	
2.4.2	Number of Speed steps minimum	12	
2.4.3	Feed range	0.125 - 1.25mm/rev	
2.4.4	Number of feed steps minimum	6	
2.5	Traverses		
2.5.1	Vertical Travel of Arm (Min)	700 mm	
2.5.2	Traverse of Drilling Head along the Arm (Min)	925 mm	
2.5.3	Range of Swing of Arm 0 -180 Deg. / 0 -360 Deg	Vendor to specify	
2.6	Distances		
2.6.1	Max. Distance from the spindle axis to the guide-ways of the column or More	1325 mm	
2.6.2	Min. Distance from the spindle axis to the guide-ways of the column or Less	530 mm	
2.6.3	Max. Distance from the spindle nose to the base plate or More	1300 mm	
2.6.4	Min. Distance from the spindle nose to the base plate or Less	355 mm	

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2.7	BEARINGS		
2.7.1	Make of all bearings shall be SKF/ FAG / UKF only	Vendor to specify the make and confirm.	
2.8	COOLANT FACILITY		
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.	
3.0	OPERATION AND CONTROL SYSTEM:		
3.1	ELECTRICAL EQUIPMENT:		
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	
4.0	HYDRAULIC SYSTEM	Details shall be submitted by vendor	
5.0	First filling of all required Oils & Grease 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 confirm	
6.0	LUBRICATION:		
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	
7.0	ELECTRICAL:		
7.1	415V + 10% / -10%, 50HZ +/-3 HZ, 3 Phase AC (3 wire system with out 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 / Telemecanique / Merlin Gerin / GE/ ABB and shall be accordance with DIN/IEC Standards.	Vendor to confirm	
8.0	SAFETY ARRANGEMENTS: 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.	Vendor to note and reply	
9.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE : The Machine shall conform to following factors related to environment (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	LEVELING & ANCHORING SYSTEM		
10.1	Complete anchoring system including foundation bolts, anchoring materials, leveling shoes etc should be supplied.	Vendor to confirm	
11.0	TOOLS FOR ERECTION, OPERATION & MAINTENANCE :		
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.	Vendor to confirm	


12.0	SPARES:		
12.1	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: (Unit Price of each item of spare should be offered)	Vendor to specify	
12.2	a) Mechanical & Hydraulic Spares: All types of Pumps, Valves, Pressure Switches, Transducers, Flow Switches, Filters, Seals, O-rings, Hydraulic Hoses etc.	Vendor to specify	
12.3	b) Electrical /Electronic : All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power etc.	Vendor to specify	
12.4	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 specify	
12.5	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	
12.6	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	
13.0	DOCUMENTATION: Five sets of following documents (Hard copies) in English language should be supplied along with the machine		
13.1	Operating manuals of Machine		
13.2	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 confirm	
13.3	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.		
13.4	Detailed specification of all rubber items and hydraulic/lube fittings		
13.5	Complete Master List of parts used in the machine shall be submitted by the vendor.		
13.6	One additional set of all the above documentation on CD ROM, wherever possible.		
14.0	FOUNDATION:		
14.1	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. whichever is earlier.	Vendor to submit	
15.0	ERECTION & COMMISSIONING		
15.1	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 note	
15.2	Tools, Tackles, instruments and other necessary equipment required to carry out all above activities should be brought by the supplier.	Vendor to note	
15.3	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to note	
15.4	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	
15.5	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to submit	
15.6	Erection & commissioning Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor to submit	
16.0	GEOMETRICAL ACCURACIES :		
16.1	The machine shall be tested for Geometrical Accuracy as per applicable Standards.	Vendor to specify the standard	
16.2	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	
17.0	MACHINE ACCEPTANCE: (Tests/Activities should be Performed by Vendor)	Should be accepted & confirmed by Vendor	
17.1	Tests/Activities should be carried out at supplier's works on the machine before dispatch :		
17.1.1	The machine shall be tested for Geometrical Accuracy as per applicable Standards.	Vendor to specify the standard	
17.1.2	The vendor shall inform the various standards (testing, measurements, motors, workmanship) applicable for this machine acceptance. Standards shall be of Indian / International.	Vendor to furnish	

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17.1.3	Motors data sheet	Vendor to submit	
17.1.4	Internal routine test report	Vendor to submit	
17.1.5	Quality plan for final factory inspection to BHEL review	Vendor to submit	
17.1.6	The machine should be tested for its full capacity at supplier works as per Purchase Order.	Vendor to accept	
17.1.7	Demonstration of all features of the machine, control system & accessories	Vendor to demonstrate	
17.2	Tests/Activities should be carried out at BHEL works while commissioning the machine		
17.2.1	The machine shall be tested for Geometrical Accuracy as per applicable Standards.	Vendor to specify the standard	
17.2.2	The machine should be tested for its full capacity at BHEL works as per Purchase Order.	Vendor to accept	
17.2.3	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 accept	
17.2.4	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to accept	
18.0	PACKING:		
18.1	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	
19.0	GUARANTEE:		
19.1	24 months from the date of acceptance of the machine at BHEL works..	Vendor to accept	
20.0	GENERAL:		
20.1	Machine Model	Vendor to furnish	
20.2	Total connected load (KVA):	Vendor to furnish	
20.3	Floor area required (Length, Width, Height) for complete machine & accessories	Vendor to furnish	
20.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)	Vendor to note	
20.5	Total weight of the machine	Vendor to furnish	
20.6	Weight of heaviest part of machine	Vendor to furnish	
20.7	Weight of the heaviest assembly / sub-assembly of the Machine	Vendor to furnish	
20.8	Dimensions of largest part/ sub-assembly/ assembly of the machine	Vendor to furnish	
20.9	Vendor to submit, along with offer, reference list of customers where similar machines have been supplied mentioning broad specifications of the supplied machine Model, Capacity etc.	Vendor to furnish	
20.10	Detailed catalogues, sketch/ photographs of the m/c and accessories/ attachments should be submitted with the offer.	Vendor to submit	
20.11	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	
21.0	Qualification requirements		
21.1	Only those vendors (OEMs), who have supplied and commissioned at least One RADIAL DRILLING MACHINE with 1.) Spindle power of 3.4 KW or more, 2.) Drilling capacity of minimum 50 mm on steel and 3.) Drilling radius from column center 925 mm or more in the past TEN years and such machine should be working satisfactorily for a minimum period of One year after commissioning, as on the date of opening of this Tender are eligible to quote. (However, if such machine is already supplied to BHEL, then that machine should be working satisfactorily for a minimum period of six months after commissioning, as on the date of opening of this tender)		
	The vendor should submit following information where similar machine has been supplied for qualification of their offer.		
	1. Name and postal address of the customer or company where similar machine is installed		
	2. Name and designation of the contact person of the customer.		
	3. Phone, FAX no and email address of the contact person of the customer.		
	4. Month and Year of commissioning of the machine.		
	5. Phone no, fax no and email address of the contact person of the customer.		
21.2	6. Parameters of machine supplied, viz. Spindle power, Drilling capacity and the application for which the machine is supplied.		
	7. Performance certificate from the customer regarding satisfactory performance of the machine supplied to them. (Original certificate of through email directly from the customer). Original performance certificate may be returned after verification by BHEL, if required.		
	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.		


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