

TECHNICAL SPECIFICATION OF VERTICAL MILLING MACHINE					
SCOPE:	SUPPLY, ERECTION & COMMISSIONING OF VERTICAL MILLING MACHINE WITH SPECIFICATIONS AS BELOW :				
SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
1.0	PURPOSE & WORKPIECE MATERIAL				
1.1	Purpose: The machine shall be required for machining of small components of various shape and sizes involving a high level of efficiency and accuracy.	Vendor to confirm			
1.2	Work Piece Material: The machine should be suitable for machining of work piece material of Non-ferrous metals like aluminum alloys, bronze and ferrous materials like carbon steels, alloy steels, tool steels etc.	Vendor to confirm			
2.0	MACHINE SPECIFICATIONS				
2.1	SPINDLE				
2.1.1	Spindle position	Vertical			
2.1.2	Spindle taper	ISO 50			
2.1.3	Spindle motor power 7.5 KW (or more)	Vendor to inform			
2.1.4	Spindle speed range	35 to 1800 r.p.m. (approx.)			
2.2	TABLE				
2.2.1	Table size	2055 mm x 355 mm			
2.2.2	Clamping area	1600 mm X 355mm or more			
2.2.3	Max. permissible load on table	500 kg or more			
2.2.4	The table top should have longitudinal T-slots. The dimension of T-slots is to be specified by supplier.	Vendor to submit			
2.2.5	Longitudinal traverse	1200 mm or more			
2.2.6	Vertical traverse	425 mm or more			
2.2.7	Cross traverse	320 mm or more			
2.3	FEED RATES				
2.3.1	Rapid traverse rate Longitudinal	4000 mm/min or more			
2.3.2	Rapid traverse rate Cross	800 mm/min or more			
2.3.3	Feed rates Longitudinal	16-1600 mm/min (approx.)			
2.3.4	Feed rates Cross	16-1600 mm/min (approx.)			
3.0	GENERAL FEATURES OF MACHINE	Vendor to confirm			

TECHNICAL SPECIFICATION

D10_VERTICAL MILLING MACHINE

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
3.1	The specification of feed drive motors with make, model no., max. & nominal torque should be specified.	Vendor to confirm			
3.3	Preferably the guideways of all axes should have telescopic type protective covers with adequate sealing on joints to prevent seepage of dust & coolant oil inside or wipers. Guide ways should be of hardened steel with hardness HRC60 or more	Vendor to confirm			
3.4	The machine must have rigid streamlined and vibration free construction. All gears must be case hardened and ground and all the slides should be rigid to withstand heavy stock removal. It should have independent main drive and feed drive motors.	Vendor to confirm			
3.5	A suitable, preferably centralised lubricating system for lubrication of all moving / rotating elements should be there preferably with interlock /alarm system in case of it's failure.	Vendor to confirm			
3.6	Each axis should have electrical limit switches interlocked with feed/ rapid drive as well as mechanical stopper.	Vendor to confirm			
4.0	ATTACHMENT & ACCESSORIES				
	The following accessories should be quoted separately giving their individual prices. (Catalogs of all these accessories should be submitted by the supplier along with the offer.	Vendor to offer			
4.1	Machine vices with fixed base, width of jaws 160 mm.				
4.2	Universal swivel vices with fixed base, width of jaw 200 mm.				
4.3	Universal dividing head with tail stock 135 mm height, 3-jaw self-centering chuck, dead centre & draw bolt.				
4.4	Self-centering vice (50-150mm).				
4.5	Manually operated rotary table Dia 300 mm or more. (Accuracies to be specified).				
4.6	REDUCTION MILLING SOCKETS				
4.6.1	TANG TYPE:	ISO 50 / MT 1			
		ISO 50 / MT 2			
		ISO 50 / MT 3			
		ISO 50 / MT 4			
		ISO 50 / MT 5			
4.6.2	DRAW BOLT TYPE:	ISO 50 / MT 1			
		ISO 50 / MT 2			
		ISO 50 / MT 3			
		ISO 50 / MT 4			
		ISO 50 / MT 5			

TECHNICAL SPECIFICATION

D10_VERTICAL MILLING MACHINE

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4.6.3	COLLET ADOPTER				
4.6.3.1	Collet Adopter ISO 50	Vendor to offer			
4.6.3.2	Set of collets (metric) of sizes (4,6,8,10,12,16,20,25 & 32 mm)	Vendor to offer			
4.7	STUB ARBORS WITH KEY	Vendor to confirm			
4.8	Re-circulatory type coolant system.	Vendor to confirm			
4.9	Work piece illumination light.	Vendor to confirm			
4.10.	Splash – guards.	Vendor to confirm			
4.11.	Foundation parts.	Vendor to confirm			
4.12.	Any other standard / optional attachment which will increase the productivity / performance of the machine should be quoted with their individual prices.	Vendor to offer			
5.0	POWER SUPPLY / ENVIRONMENT CONDITION				
	The machine should be suitable for operation in the following conditions: -	Vendor to note & confirm			
5.1	Power supply for the machine: 415V +10% / -15%, 3phase, 50Hz +/-3%				
5.2	For controls:230 V +10 % / -15 %; 50 Hz + / -3 %				
5.3	Temperature:5 to 45 deg C				
5.4	Relative humidity:95 % max.				
5.5	Compressed air: 4 to 6 Kg / sq. cm				
5.6	Other conditions:Similar to tropical country.				
5.7	Water supply industrial:1.5 to 2.0 Kg / sq. cm				
5.8	Dust laden atmosphere during some part of the year				
6.0	SPARES				
6.1	Mechanical & Hydraulic spare list should have followings:				
6.1.1	One number of each type of the following items used in hydraulic, lubrication and coolant circuit	Vendor to offer			
	(a) Pumps				
	(b) Pressure reducing & pressure relief valves				
	(c) Direction control & flow control valves				
	(d) Pressure switches				
	(e) Level switches				
	(f) Flow switches				
	(g) One complete set of Rubber hoses used in the machine				
6.1.2	Two numbers filter elements of regenerative type & ten numbers filter elements of disposable type used in hydraulic, lubrication and coolant circuit.	Vendor to offer			

TECHNICAL SPECIFICATION

D10_VERTICAL MILLING MACHINE

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6.1.3	One set of each type of lead screw – lead nut used for feed drives of table, cross & vertical axis.	Vendor to offer			
6.1.4	One set of wipers used in machine.	Vendor to offer			
6.1.5	One number of each type of worm gears & bushes used in machine and spindle bush bearing	Vendor to offer			
6.2	Electrical spares				
6.2.1	If the control system incorporates PLC, then the spares should have one nos. of each type of I/O board and power supply unit.	Vendor to offer			
6.2.2	All the electrical components should be of reputed make, e.g. Siemens, ABB, etc.	Vendor to confirm			
6.2.3	Spares should have 5 nos. of each type of indicating lamps and push buttons.	Vendor to confirm			
6.2.4	Spares should have 2 nos. of each type of relays and contractors.	Vendor to offer			
6.2.5	Spares should have 2 nos. of each type of limit switches, proximity switches and pressure switches.	Vendor to offer			
6.2.6	If the spindle speed and feed is controlled through a servo drive, then it should be of either Siemens or ABB make.	Vendor to confirm			
6.2.7	Spares should have 2 nos. of each of Electromagnets and electrical coils of directional valves.	Vendor to confirm			
6.2.8	List of fast moving spares should be mentioned.	Vendor to submit			
6.2.9	The machine should have machine lamp of 220V AC supply.	Vendor to confirm			
7.0	MANUALS / DOCUMENTS				
7.1	5 sets of documents for operation, maintenance and servicing manuals for machine and other equipments to be provided in English language only, out of which 1st set to be sent along with offer.	Vendor to confirm			
7.2	Service manual should contain followings in addition to description	Vendor to confirm			
	a. Assembly drawings of each unit with marked list of each component with its specification & make				
	b. Hydraulic, lubrication & coolant diagram with marked list of each component with its specification & make.				
	c. Detail catalogue of bought – out items with its specification & make.				
	d. Manufacturing drawing of ball-screw items made of soft metals like bronze, i. e., worm gear and wedge etc.				
7.3	Each document for operation, maintenance & service manual should be given on CD.	Vendor to confirm			

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D10_VERTICAL MILLING MACHINE

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
8.0	FOUNDATION DRAWING is to be submitted by supplier within 4 weeks of placement of LOI/PO whichever is earlier.	Vendor to confirm			
9.0	QUALIFYING CONDITIONS:-				
9.1	Only those vendors, who have supplied and commissioned at least one same or higher sizes machine in the past ten years (on the date of opening of tender) and such machine is presently working satisfactory for more than twelve months after commissioning (on the date of opening of tender), should quote. The following information should be submitted by the vendor about the company (s) where similar furnaces have been supplied. This is required from all the vendors for qualification of their offer.	Vendor to comply and submit with offer			
9.1.1	Name of the customer / company where similar machine is installed.	Vendor to inform			
9.1.2	Complete postal address of the customer.	Vendor to inform			
9.1.3	Month & Year of commissioning.	Vendor to inform			
9.1.4	Board specification of the machine (S).	Vendor to inform			
9.1.5	Name and designation of the contact person of the customer.	Vendor to inform			
9.1.6	Phone, FAX no. and e-mail address of the contact person of the customer.	Vendor to inform			
9.1.7	Performance certificate from the customer regarding satisfactory performance of machine supplied to them (Original Certificate or Through E-mail directly from the customer). The original performance certificate may be returned after verification by BHEL, if required.	Vendor to arrange			
9.1.8	BHEL reserves the right to vary information submitted by vendor. In case the information is found to be false / incorrect, the offer shall be rejected.	Vendor to accept			
10.0	GENERAL				
10.1	Total power requirement of the machine to be specified by the supplier.	Vendor to submit			
10.2	Overall space required for installation of the machine to be specified by the supplier.	Vendor to submit			
10.3	Pre-dispatch inspection may be carried out by BHEL representative at Party's works. However it is at the discretion of BHEL and final acceptance will be done at BHEL, Jagdishpur after carrying out all the required accuracy tests etc.	Vendor to note & confirm			
10.4	Training of machine operation, mechanical & electrical & electronic maintenance should be provided at BHEL works during Installation and Commissioning of machine by the vendor.	Vendor to confirm			

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D10_VERTICAL MILLING MACHINE

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10.5	The supplier shall take the full responsibility for carry-out the erection, start-up, testing of machine its control system and all types of other supplied equipment, machining of test pieces etc. at BHEL works. Service requirement like power, air & water shall be provided by BHEL at one point to be indicated by supplier in their foundation / layout drawings.	Vendor to confirm			
10.6	Color of the machine should be apple green as per ISO.	Vendor to confirm			
10.7	PACKING The complete machine and its all other supplied equipment shall be suitably packed in rigid packing to avoid damage during handling, transportation and storage, to prevent ingress of dust /dirt and entering of foreign material.				
10.8	GUARANTEE Supplier shall provided full and complete guarantee for trouble free performance for 18 months from date of dispatch or for 15 months from commissioning.				
10.9	The supplier is to submit a clause wise deviation statement against each clause of this technical specification along with the offer.	Vendor to confirm			