

Technical Specification for 8 Ton Slotting Machine

PRM/19-20/OL, Dated 15/3/19

SL. NO.	Description for BHEL Requirement	Specified/to be Confirmed By Bidder	Offered	Deviations	Remarks
1.01	Slotting Machine is required for manufacturing of circular stator and rotor sheets. The machine should be equipped with pneumatically operated friction clutch & brake unit, variable speed AC Drive, Cam, Indexing Unit and Centralized oil Lubrication System with stripping device.	Vendor has to Confirm			
SL. NO.	Description for BHEL Requirement				
2.01	The slotting machine should be of latest design comprising all the features, which guarantee reliable service, most convenient and safe operating conditions and best quality production with least maintenance.	Vendor has to Confirm			
2.02	The position of slots to fixing notch should be by turnover setting device	Vendor has to Specify			
2.03	The Slide Guide ways should be play-free and provided with pre loaded roller gibs.	Vendor has to Confirm			
2.04	The machine should have Electro-pneumatically controlled single disk clutch and brake system for quick start stop without overlapping.	Vendor has to Confirm			
2.05	The main eccentric shaft should be driven by AC motor with variable speed drive and gearbox.	Vendor has to Confirm			
2.06	The Machine should have mass balancing of the entire slide drive including the upper part of the tool.	Vendor has to Specify			
2.07	The Machine Loading and unloading of tool should be made without changing the pre-set slotting diameter. Clamping of tool shall be manual.	Vendor has to Specify			
2.08	Slide adjustment shall be manual.	Vendor has to Specify			
2.09	The Machine stroking shall be engaged by portable pedal switch/hand Operated Switch.	Vendor has to Specify			
2.1	The oil Lubrication system should be automatic re-circulating type with pump & filtration system with electronic monitoring, with lubricant at all rotating points, sliding points and other moving parts.	Vendor has to Specify			

3.00	Performance					
3.01	The Machine should be able to give the guaranteed performance as specified in Clause No. 4	Vendor has to Confirm				
3.02	Accuracy test chart of the slotting machine offered should be furnished with the offer.	Vendor has to Confirm				
3.03	The test & Calibration of Machine should be confirmed to relevant standard.	Vendor has to Confirm				
3.04	The slotting accuracy should achieve within ± 0.05 mm per 500mm diameter of sheets.	Vendor has to Confirm				
4.00	Specification:					
4.1	Capacity	80KN	Vendor has to Confirm & Specify			
4.2	Maximum sheet Thickness	0.35 MM to 1.5 MM				
4.3	Minimum Depth of Throat	350 MM				
4.4	Maximum sheet Diameter	1200 MM				
4.5	Stroke of Slide	10 MM to 12 MM				
4.6	Minimum Slide Adjustment	25 MM				
4.7	Slide Area LR x FB	Min (180 x 140 MM) - Max (225 x 175 MM)				
4.8	Minimum Slide Lift	20 MM				
4.9	Spigot Diameter	32H7(or 32H6) x 40MM				
4.10	Minimum Shut Height over bolster(SDAU)	220 MM				
4.11	Bolster Area (LRx FB) (fixed)	Min (400 x 220 MM) - Max(440x300 MM)				
4.12	Minimum Bolster Opening: (LRx FB)	100x140 MM				
4.13	Bolster Thickness	Vendor to specify				
4.14	Distance Between Slide Center to spindle center	Cover a distance of 100 MM (or less) to 450 MM (or more)				
4.15	Distance from Top of Bolster to Top of Blank Locator	70 MM - 85 MM				
4.16	Minimum Height From Floor to Top of Bolster	950 MM				
4.17	Minimum Number of Slots / Circle	10 Slot or less				
4.18	Maximum Number of Slots / Circle	150 slots or more				
4.19	Maximum Stator Slot Size	30x140 MM				
4.20	Maximum Rotor Slot Size	30x140 MM				
4.21	Stroking speed must cover a range of	200 - 600 SPM				
4.22	Available Air Pressure	4.5 - 5.5 kg/ sq. cm				

5.00	Maintenance					
5.01	All the parts of the slotting machine should have easy accessibility for maintenance work, lubrication inspection and repair work without need for excessive dismantling.	Vendor has to Specify				
5.02	Any special tools required for maintenance and repair of the slotting machine should be indicated and quoted separately with item wise price details.	Vendor has to Specify				
5.03	List of auxiliaries with specification including all auxiliaries required for servicing and maintenance for a time of approx. 2 years should be quoted.	Vendor has to Specify				
5.04	Necessary guard and protection cover should be provided to protect against dirt and dust.	Vendor has to Specify				
5.06	Safety guard electronic / mechanical for safety of operator to be provided.	Vendor has to Specify				
6.00	Training					
6.01	Training facilities for Mechanical, Electronic maintenance and Operating personnel to be provided at manufacturer works.	Vendor has to Confirm				
7.00	TROPICALISATION: All electrics should be suitably tropicalised to relevant Indian Standards to work under the ambient temperature varying from 5°C to 40°C and relative humidity between 30% to 95%. The digital read out unit should be properly ventilated. The cooling requirements of digital read out unit should be indicated.	Vendor has to Confirm				
8.00	Electrical Supply & Controls					
8.01	The slotting machine is to be suitable for operation on 415 volts $\pm 10\%$, 3-phase, 3 wire 50 HZ $\pm 3\%$ AC supply. The necessary transformer for stepping down to lower voltage for controls etc. fuses: terminals, bars, contactor, indicators pilot lamps and other auxiliaries are to be included. Controls should also included provision for operating each unit through push buttons, schematic and other technical details for these are to be forwarded with the quotation.	Vendor has to Confirm				
8.03	The connections should be made through Terminal board, Supply to be complete with all inter-connecting, piping and wiring Only the main cable for giving 415 volt $\pm 10\%$, 3-phase, 3 wire 50 HZ $\pm 3\%$ AC supply upto the main supply terminals in the slotting machine offered will provided by us. The size of the cable and the total power requirement are to be details in the offer.	Vendor has to Confirm				

Not to be used for anything else

	All controls and elements electrical and electronic circuits are to be grouped together and located in the control panel. The control cabinet housing all the electrical controls and other components should be provided with a key lock to obviate the risk on unauthorized tampering.	Vendor has to Confirm				
8.04	Control panel wiring to be made by standard copper conductor PVC pipe with ferrule. The slotting machine lighting should be suitable for 220 volts supply. Die light and panel inside light with interlock to be provided.	Vendor has to Confirm				
8.05	The motors should be of reputed make such as Siemens / ABB/Indramat.	Vendor has to Confirm				
8.06	The motors should have the requisites control gear and protection like overload protection and under-voltage protection, single phase prevention device etc. All control gears and switch gears should be of reputed make.	Vendor has to Confirm				
8.07		Confirm				
9.00	Safety					
	Suitable electrical and mechanical interlocks, limit switches, overload protection, etc. should be incorporated in the slotting machine wherever necessary to prevent the slotting machine from damage and for the safety of operator in case of inadvertent operation / malfunctioning of the slotting machine.	Vendor has to Confirm				
9.01	Suitable safety device should be provided for longitudinal vertical and transverse movements to prevent engagement of any of them if the respective side has been locked.	Vendor has to Confirm				
9.02	All the motor starters should be provided, with single-phase prevention device of reputable make in addition to normal voltage and over load protection. Double earthing of machine must be provided.	Vendor has to Confirm				
9.03						
10.00	Technical Documentation					
	Following details in English should be included in the offer. (4 copies each)					
10.01	General Arrangement drawing of the slotting machine showing the following details:	Vendor have to Specify				
10.02	Construction features, dimensional details and capacities of the items, details of accuracy / alignment etc. Accuracy test chart of slotting machine offered should be furnished.	Vendor have to Specify				
10.03	Foundation drawings showing all details of slotting machine foundation as well as loading data.	Vendor have to Specify				
10.04	Operators manual consist of technical specifications, transportation and installation, Safety instruction, Operating instructions and Maintenance instruction with recommended spares and make.	Vendor have to Specify				

at section furnished only.

10.05	Details and type of lubrication and hydraulic circuit diagram. Make of hydraulic valve etc.	Vendor have to Specify				
10.06	Details of pneumatic circuit diagram.	Vendor have to Specify				
10.07	List of wear and spare parts with make if bought out.	Vendor have to Specify				
10.08	Drawings for component related accessories.	Vendor have to Specify				
10.09	Electrical Circuit Diagram.	Vendor have to Specify				
10.10	Catalogue for bought out items with details, specifications and maintenance manual should be provided.	Vendor have to Specify				
10.11	List of electrical units and cam development.	Vendor have to Specify				
10.12	Safety interlocks provided.	Vendor have to Specify				
11.00	MISCELLANEOUS					
11.01	The entire slotting machine is to be completely tested and inspected and four copies of test and inspection guarantee certificates are to be provided. BHEL Engineers may witness the test and inspection of the machine before supply of the machine.	Vendor has to Confirm & Specify				
11.02	The slotting machine is to be guaranteed in respect of design material construction, operation and against any manufacturing defects for a period of 18 months from date of shipment / supply or 12 months from date of commissioning whichever is later. Free after sales service (with free replacement of faulty component, if required) is to be provided during the guarantee period.	Vendor has to Confirm & Specify				
11.03	Four copies of descriptive leaflets technical literature drawings electrical wiring diagram. Hydraulic circuit diagrams and spare parts manuals, drawings details for erection and commissioning of the slotting machine and for sub-assemblies of the machine should be supplied. Two copies of each of these are to be forwarded within four weeks of placing of Purchase Order.	Vendor have to Specify				
11.04	Fault indicator & remedial action guide manual should be supplied.	Vendor have to Specify				
11.05	The slotting machine should be free from frequent problem of play in ram slide assembly.					
12	QUALIFYING CONDITION:					

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for electrical supervision only

Only those vendors, who have supplied and commissioned at least one slotting / notching machine of same or higher capacity in the past ten years and such machine is presently working satisfactorily for more than one year after commissioning, should quote. The following information is to 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.

1. Name of the customer / company where similar machine is installed.
2. Complete postal address of the customer.
3. Month & Year of commissioning.
4. Application for which the machine is supplied with details to be furnished.
5. Name and designation of contact person of the customer.
6. Phone, FAX no. and email address of the contact person of the customer.
7. Performance certificate from the customers regarding satisfactory performance of machine supplied to them

13.00 SCOPE OF SUPPLY

13.01	The equipment should consist of the following : (Here all items & consumables required for satisfactory commissioning could be mentioned including standards, accessories etc.)	Vendor have to Specify				
13.02	Machine meeting all above spec. para 2 to 12.	Vendor have to Specify				
13.03	Installation, Commissioned, Drawing & Proving.	Vendor have to Specify				
13.04	Set of operation & Maintenance Manuals with Circuit Diagrams.	Vendor have to Specify				
13.05	Accessories & Training	Vendor have to Specify				
13.06	Training of Customer Personnel at Manufacturing Works.	Vendor have to Specify				
14.00	Evaluation Criteria					
14.01	Equipment should meet all our above specification para 2 to 14 and bidders must furnish point-to-point replies against all the points of our above specification enclosed failing which their offer may not be considered.	Vendor have to Specify				

Vendor has to Confirm & Specify

for exception of specification only

for erection & commissioning order 20/3/2019

15.00	FOUNDATION:					
15.01	Vendor shall submit the preliminary layout drawing 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 three months after getting BHEL's approval. The layout should consist of all requirements pertaining to complete machine including space requirement for Voltage Stabilizer, Isolation Transformer, Air compressor, Chip Bin & any other accessories. 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 have to Specify				
16.00	ERECTION & COMMISSIONING					
16.01	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. EOT Crane shall also be provided by BHEL. Details of these requirements should be informed by vendor in advance.	Vendor have to Specify				
16.02	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause 17 (Machine Acceptance) shall form part of the commissioning activity.	Vendor have to Specify				
16.03	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 have to Specify				
16.04	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	Vendor have to Specify				
16.05	All Cover Plates required for the machine and its peripherals including pits, if any, shall be supplied and installed by the vendor.	Vendor have to Specify				
16.06	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 have to Specify				
16.07	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor have to Specify				
16.08	Charges, duration, terms & conditions for E&C should be furnished in detail separately by vendor along with offer.	Vendor have to Specify				

17.00	MACHINE ACCEPTANCE: (Tests/Activities to be Performed by Vendor)	Should be accepted & confirmed by Vendor				
	Tests/Activities to be carried out at supplier's works on the machine before dispatch :					
17.01	Geometrical accuracies as per test chart.					
17.02	Demonstration of all features of the machine, control system & accessories					
	Tests/Activities to be carried out at BHEL works while commissioning the machine :					
17.03	Geometrical accuracies as per test chart.					
17.04	Full load test to demonstrate the maximum power & cutting capacity of the machine.					
17.05	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine					
17.06	Demonstration by actual use of all supplied attachments and accessories to their full capacity.					
17.07	One week supervision of independent operation of machine by BHEL after job proveout					
17.08	Training of BHEL machine operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works					