

<p style="text-align: center;">Heavy Power Equipment Plant Bharat Heavy Electricals Limited, Ramachandrapuram - 502032, Andhra Pradesh, INDIA.</p>		Enquiry No. & Dt.:	
		Due Date :	
		Supplier's Ref.:	
		Date :	
Specification cum Compliance Certificate for Blade Tip grinding machine			
Note:-			
<p>1. The Column " VENDOR'S OFFER WITH TECHNICAL DETAILS & REMARKS" 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.</p>			
<p>2. The offer and all documents enclosed with offer should be in English language only.</p>			
Name & Address of the Supplier:		Name & Address of the Indian Agent:	
Telephone No.		Telephone No.	
Fax No.		Fax No.	
e-mail :		e-mail :	
SNO	DESCRIPTION OF BHEL REQUIREMENT	Remarks	
1	PURPOSE & WORK PIECE MATERIAL		
1.1	PURPOSE/ APPLICATION:		
	The machine shall be used for blade tip grinding of the individual compressor wheels and shafts. The machine shall have a rotary table which holds the bladed wheel or shaft and rotate it on the rotary table and belt grinding attachment will grind outer diameter of the blade tips. The grinding process is parallel with the axis of the table for certain wheels and at an angle for certain wheels.	Vendor to note & confirm	
1.2	WORK PIECE MATERIAL:		
	GT Compressor wheels or shafts with blades mounted on its periphery. The blades are made of stainless steel with grade custom 450 or type 403 Cb. It shall have a hardness of 23-38 HRC.	Vendor to note	
2.0	SPECIFICATION:		
2.1	MACHINE CONFIGURATION		
2.1.1	CNC Machine consists of one Rotary table with grinding attachment.	Vendor to confirm	
2.1.2	CAPACITY & SIZE		
	Maximum workpiece diameter	Ø 2600 mm	
	Maximum workpiece height	2800 mm	
	Minimum workpiece height	70 mm	
2.2	ROTARY TABLE :		
2.2.1	Table size (Diameter) - Ø 1500 mm	Vendor to confirm	
2.2.2	Load carrying capacity (Tons) - 12 T or more	Vendor to confirm	

2.2.3	Table Speed : (Infinitely variable)			
2.2.4	Normal - 10 rpm	Vendor to confirm		
2.2.5	Max. RPM	Vendor to submit		
2.2.6	Min. RPM	Vendor to submit		
2.2.7	Center bore at the Ø60 H7 with radial runout of 0.005 mm	Vendor to Confirm		
2.2.8	Chart/Table showing relation of weight and distance of CG from centre of Rotary Table (loading chart of table) to be submitted.	Vendor to submit		
2.2.9	Max Permissible cutting force	Vendor to submit		
2.2.10	Max Permissible Torque	Vendor to submit		
2.2.11	RPM at which Max. Torque available	Vendor to submit		
2.2.12	Radial T-slots suitable for M36 studs as per Annexure 1 sketch	Vendor to confirm		
2.2.13	PCD tapping holes as per Annexure 1	Vendor to confirm		
2.2.14	Maximum radial run out measured at approx. 25mm from table top : 0.01 mm or better.	Vendor to confirm		
2.2.15	Maximum axial runout measured at approximately 25mm above table top (indicator on top of certified master ball) : 0.01 mm or better	Vendor to confirm		
2.2.16	Maximum coning error : 0.01mm/meter or better	Vendor to confirm		
2.2.17	Total connected load (KVA):	Vendor to specify		
2.2.18	Total weight of the table	Vendor to specify		
2.2.19	Weight of the heaviest assembly/ subassembly of Rotary Table	Vendor to specify		
2.2.20	Dimensions of largest part/ subassembly/ assembly of the Rotary Table	Vendor to specify		
2.3	GRINDING ATTACHMENT :			
2.3.1	The grinding should be tangent to the rotary table ie. The grinding belt should grind the blade tips and its centreline should pass through the axis of the rotary table.	Vendor to confirm		
2.3.2	CNC control should be provided to control the feed of the grinding attachment in the steps of 5 µm. Make of CNC/PLC Controller : SIEMENS/FANUC. Type and make of Servomotors/ Steppermotors and Drive : AC Servomotors/ steppermotors of Siemens or Fanuc make.	Vendor to confirm		
2.3.3	Details of motor for grinding belt rotation	Vendor to specify		
2.3.4	There should be provision to tilt the grinding attachment at an angle wrt to axis of the rotary table and it should be locked at a particular angle for grinding certain wheels.	Vendor to confirm		
2.3.5	Max. travel of the grinding attachment ie in a direction radially from rotary table.	Vendor to specify		
2.3.6	Belt (Rough)	60 grit		
2.3.7	Belt (Finish)	160 grit		
2.3.8	Mechanism for locking/ clamping of Table axes	Vendor to specify		
2.4	CONSTRUCTION:			

	Vendor to furnish details of material, hardness & constructional details, including explanatory drawings, of various Components/ Assemblies	Vendor to submit		
2.5	POWER SUPPLY			
	415V \pm 10%, 50HZ \pm 3 Hz, 3 Phase AC (4 wire system) Power Supply 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.	Vendor to confirm		
2.6	AMBIENT CONDITIONS & THERMAL STABILITY			
2.6.1	Total machine should work trouble free and efficiently under following operating conditions . Power Supply: Voltage: 415 V with fluctuation \pm 10%, Frequency: 50 Hz with fluctuation \pm 3Hz No. of phases: 3 with neutral Ambient Conditions: Temperature = 5 to 45°C Relative Humidity = 95% max. (Confirm that machine is suitable for above and details of provisions made in the machine for the same are to be furnished to BHEL)	Vendor to confirm		
2.6.2	Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. Rotary Table shall be kept in the normal shop floor condition. Max. temperature variation is up to 20°C in 24 hours.	Vendor to confirm		
2.7	MANUAL CONTROL :			
	Complete manual control of table with required switches / keys should be provided on operator's panel.	Vendor to confirm. Layout of panel to be submitted.		
2.8	HYDRAULIC (OR) PNEUMATIC SYSTEM:	Vendor to specify		
2.9	ELECTRICAL SYSTEM :			
2.9.1	Tropicalisation: All electrical/ electronic equipment shall be tropicalized.	Vendor to confirm		
2.9.2	Motors shall conform to IEC or Indian Standards	Vendor to confirm		
2.9.3	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to confirm		
3.0	SAFETY ARRANGEMENTS: All the pipes, cables etc. on the machine should be well supported and protected.	Vendor to confirm		
4.0	SPARES			
4.1	MEASUREMENT OF WHEEL OUTSIDE DIAMETER - Probe to measure outer dia. at blade tips of the wheel : Supply, Installation, Commissioning and proveout the probe system with required software and accessories.(Quote separately)	Vendor to confirm		
4.2	Item-wise 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 should be offered .	Vendor to confirm		

4.3	Spare should include - 1) Torque wrench suitable to machine parts, 2) Allen key mm & inch, 3) Spanners set - upto 36, 4) Ratchet spanner set with extension rod 5) One set of each motor used in the machine, 6) Set of pumps used in the machine.	Vendor to confirm		
5.0	MISCELLANEOUS			
5.1	Firm should give breakup prices of all major items and activities.	Vendor to confirm		
5.2	The following drawings and information are to be furnished along with the offer:	Vendor to confirm		
5.2.1	Details and drawing of Rotary table, Grinding attachment and connections	Vendor to confirm		
5.2.2	Details of various controls (Electric/ Mechanical, Instrumentation, safety devices etc.)	Vendor to confirm		
5.2.3	Electrical control and power schematic diagram	Vendor to confirm		
5.2.4	Apart from the details in this specification, if anything else is required for its functioning, the same shall be specifically brought out and indicated.	Vendor to confirm		
6.0	PAINTING			
	The machine shall be painted with suitable enamel paint (colour of your choice) after proper surface treatment. Control panel will be Siemens grey colour powdercoated.	Vendor to confirm		
7.0	INSTALLATION:			
	The Blade tip grinding machine is to be installed on our prepared foundation, details of which will be furnished by manufacturer. Suitable ladders/ platforms should be provided to reach top of the various equipments fitted at height.	Vendor to confirm		
8.0	DOCUMENTATION : THREE SETS OF FOLLOWING DOCUMENTS (HARD COPIES & SOFT COPIES) IN ENGLISH LANGUAGE SHOULD BE SUPPLIED ALONG WITH THE MACHINE	Vendor to supply		
8.1	Operating manuals of the plant.	Vendor to supply		
8.2	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/ parts including Electrical / Hydraulic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list also. Part names on all drgs & circuit diagrams should be written in English only.	Vendor to supply		
8.3	Catalogues, O&M Manuals of all bought out items including drawings, wherever applicable.	Vendor to supply		
8.4	Detailed specification of all rubber items and hydraulic/ lube oil fittings are to be supplied.	Vendor to supply		
8.5	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to submit		
8.6	CNC/PLC/DRIVE/MOTOR : Controller Documentation alongwith PLC Logic printouts/ softcopy backups with comments and cross-references in English	Vendor to supply		
9.0	ACCURACY TESTS:			

9.1	Geometrical Accuracy Tests shall be in accordance with Supplier's applicable standard. Detailed Test Charts for the same, clearly showing the accuracies to be achieved , shall also be submitted with the offer.	Vendor to confirm & submit test charts		
9.2	The above accuracies to be demonstrated to BHEL engineers during pre-acceptance tests at Suppliers works and during Erection & Commissioning at BHEL Works.	Vendor to confirm		
9.3	Demonstration of all features of the SPM and all Accessories during pre-despatch at supplier works.	Vendor to confirm		
11.0	PACKING:	Vendor to confirm		
	Sea worthy & rigid packing for all items of SPM and other supplied items to avoid any damage/loss in transit. When SPM is dispatched in containers, all small loose items shall be suitably packed in boxes. In case SPM is despatched in container, the container shall be brought upto BHEL, Hyderabad. De- stuffing of container shall be carried out at BHEL, Hyderabad by the vendor's representative. Any type of material handling equipment required for the de-stuffing of the container shall be brought by the vendor at Hyderabad on returnable basis.	Vendor to confirm		
12.0	ERECTION & COMMISSIONING			
12.1	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to submit		
12.2	Charges, duration, terms & conditions for E&C should be furnished in detail separately along with offer.	Vendor to offer		
12.3	Tests/ Activities/ Load test to be carried out at BHEL works while commissioning the machine	Vendor to confirm		
12.3.1	Accuracy Tests as per Supplier's test chart as detailed in 9.1	Vendor to confirm		
12.3.2	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the machine. Full load test of the table to its rated load carrying capacity.	Vendor to confirm		
12.3.3	Training of BHEL personal in the area of operation, Safety and maintenance of complete equipment & accessories etc by the supplier's engineers during their stay at BHEL works.	Vendor to confirm		
13.0	QUALIFYING CONDITION :			
	Only those vendors (OEMs), who have supplied and commissioned at least one CNC Rotary Table with table size of Ø1500 mm or more & Weight carrying capacity of 12 Tons or more in the past ten years (on the date of opening of Tender) and referred Rotary Table is presently working satisfactorily for more than one year (on the date of opening of Tender) after commissioning, should quote. The following information should be submitted by the vendor about the companies where referred Rotary Table (s) have been supplied.	Vendor to confirm and provide details		

13.1	Name of the customer/ company where similar equipment is installed. (copy of purchase order to be furnished.)	Vendor to specify		
13.2	Complete postal address of the customer.	Vendor to specify		
13.3	Month & Year of commissioning	Vendor to specify		
13.4	Application for which the machine is supplied with details of accuracies achieved on the job.	Vendor to specify		
13.5	Name and designation of the contact person of the customer	Vendor to specify		
13.6	Phone/ Fax / Email address of the contact person of the customer	Vendor to specify		
13.7	performance certificate from the customer regarding satisfactory performance of the equipment supplied to them	Vendor to specify		
13.8	BHEL reserves the right to verify information submitted by vendor, in case the information is found to be false / incorrect, the offer shall be rejected.	Vendor to specify		
14.0	PACKING (To ensure receipt of items in good condition)	Vendor to specify details		
15.0	GUARANTEE :			
15.1	As per BHEL Terms and Conditions	Vendor to confirm		
15.2	Service beyond guarantee period	Vendor to specify		
15.3	Supplier shall be responsible for service after sales of the equipment.	Vendor to confirm		