

**SPECIFICATIONS FOR
PRECISION SURFACE GRINDER**

Indent no. - 20141492

	Requirement	Vendor Confirmation / Remarks
1	PURPOSE: The machine must be capable of precision grinding of blade roots & shrouds & fitting pieces to meet requirement of blade assembly & other miscellaneous grinding work in Steam Turbine assemblies.	
2	WORK PIECE MATERIAL: Various alloy steels including high tem. & creep resistant alloy steels of material grade 21Cr Mo V47, 17Cr Mo V511 etc. and forged steels.	
3	BROAD SPECIFICATIONS: The machine offered must be completely independent unit in ready to operate condition & scope of supply should include flood coolant & filtration arrangement with splash guard, lamp for light for easy working, electromagnetic chuck suitable for the table of machine and equipped with all accessories, diamond dresser etc.	
3.1 a	TABLE:	
3.1 a.1	Table area 900mm (or more) X 300mm (or more) . To be confirmed by vendor	
3.1 a.2	Table clamping area should be suitable for clamping Electromagnetic chuck (size 600x300mm) (Refer point no. 3.3.6.1). To be confirmed by vendor.	
3.1 a.3	No. and size of T-slots in table. To be informed by vendor.	
3.1 a.4	Table speed (infinitely variable):- up to 18M/Min or more. To be informed by vendor.	
3.1 b	TABLE TRAVERSES:	
3.1 b. 1	Longitudinal traverse \geq 600mm. To be confirmed & informed by vendor.	
3.1 b. 2	Cross traverse to suit working width of Electromagnetic chuck or more. To be confirmed & informed by vendor.	
3.1 b. 3	Vertical traverse to suit workpiece working height upto 350mm or more. To be confirmed & informed by vendor.	
3.1 b. 4	Max height of spindle centre above table. {350mm or more (refer point no. 3.1 b.3) + Radius of grinding wheel (refer point no. 3.2.1)}. To be informed by vendor.	
3.1 b. 5	Feed for cross traverse. To be informed by vendor.	
3.1 b. 6	Transverse fine feed by hand/graduation. To be informed by vendor.	
3.1 b. 7	Least count of hand wheel for vertical travel. To be informed by vendor.	
3.1 b. 8	Least count of hand wheel for transverse travel. To be informed by vendor.	
3.1 b. 9	Rapid vertical transverse feed. To be informed by vendor.	
3.1 b. 10	Automatic continuous transverse feed(mm/stroke). To be informed by vendor.	
3.2	GRINDING WHEEL HEAD:	
3.2.1	Size of grinding wheel (Dia. x Thickness x Bore)(in mm) & Grade (suitable for work piece material referred in point no.- 2). To be informed by vendor.	
3.2.2	Grinding wheel speed. To be informed by vendor.	
3.2.3	Grinding wheel- 1 No. per machine to be provided. Suitable for creep resistant alloy Steels.	
3.3	MACHINE:	
3.3.1	Grinding wheel head motor Min. 2.0KW.	
3.3.2	Hydraulic pump motor. To be informed by vendor.	
3.3.3	Coolant pump motor. To be informed by vendor.	
3.3.4	Coolant Flow rate. To be informed by vendor.	
3.3.5	Coolant Tank Capacity. To be informed by vendor.	
3.3.6	Following accessories are required with the machine offered.	
3.3.6.1	Electromagnetic chuck with power supply & control unit (size 600x300mm) with suitable clamps.	
3.3.6.2	Electric lamp mounted on machine for illumination of working area.	
3.3.6.3	All electricals equipment should be suitable for 3phase, 415 volts +/-10%, 50+/- 3% Hz AC supply and control voltage 110 V. To be confirmed by vendor	
3.3.6.4	Balancing mandrel for balancing of grinding wheel, to be provided.	

03/03/14
Srinivas Kumar
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03/03/14
Srinivas Kumar
(E3, WEX-BL-3)

03/03/14
P.C. Sriniva
(E3, WEX-BL-3)

03/03/14
Srinivas Kumar
(E3, TUM)

03/03/14
Srinivas Kumar
(E3, TUM)

3.3.6.5	Hydraulic unit system (Reciprocating type)- Machine will be complete with hydraulic equipment i.e. pump & motor with closed loop recycling & cleaning arrangement for coolants (with magnetic dust seperator). Details to be informed by vendor.	
3.3.6.6	Coolent filter ,dust collector and splash guard 1 No each per machine.	
3.3.6.7	Wheel Flange 1 no. per machine.	
3.3.6.8	Wheel Flange Extractor nut & Screw 1 no. per machine.	
3.3.6.9	Diamond Dresser Unit- 1 no. per machine.	
3.3.6.10	One set of standard tools for normal operation like spanners, allen keys etc. List of Tools to be specified (per machine)..	
4	GENERAL FEATURES	
4.1	There should be no leakage of hydraulic / lubrication oil from the machine during operation or idle time.	
4.2	No tandem pump should be used in hydraulic system & elsewhere.	
4.3	Machine must be of rigid construction & vibration free column supporting the wheel spindle must be of robust construction.	
4.4	Overall size of the machine, weight, standard colour and noise level to be indicated. Noise level should be less than equal to 85db.	
4.5	Desired paint colour for machine is Apple Green Colour (ISC. No.- 281 as per IS-5:2007). To be confirmed by vendor.	
4.6	All the electrical control equipment and switchgears should be of Siemens/ABB/L&T/Telemecanique/Schneider make.	
4.7	First fill of M/C oil, lubricating oil and coolent will be done by supplier.The supplied machine should be complete in all respect in ready to operate condition.	
4.8	Electrical wiring length 30 meter along with proper connectors to be provided by the supplier.BHEL will provide power mains only.	
4.9	One 3-phase, 20Amp, MCBDB should be attached to the control panel or base (whichever fixed) having industrial socket and plug.	
5	SPARES:	
5.a	Party must offer following items with price (For Total no. of machines):-	
5.a.1	Grinding Wheel- 10 nos.	
5.a.2	Diamond Dresser Unit- 10 nos.	
5.a.3	One number of each type of pumps used in hydraulic , lubrication and coolant circuit with motor.	
5.a.4	Five number of each type filter elements used in hydraulic , lubrication and coolant circuit.	
5.a.5	3 no of each type of bearing used in machine	
5.a.6	3 set of each type of seal used in the machine.	
5.a.7	5 no. of each type of o-ring used in the machine	
5.a.8	3 no. of each type of hose pipe used in the machine	
5.a.9	8 no. of each type of connectors used in the machine.	
5.a.10	3 set of limit block for to and fro motion of the table.	
5.a.11	2 no. of each type of lead nut used in the machine.	
5.a.12	3 set of belts used in the machine.	
5.a.13	HRC Fuses - 10 No. each type	
5.a.14	3-phase, 20Amp, MCB-DB having industrial socket and plug. - 2 No.	
5.a.15	Push button - 5 Nos. each type	
5.a.16	Selector switch - 5 Nos. each type	
5.a.17	Contactors / Relays - 5 Nos. each type	
5.a.18	MCB/MPCB - 2 Nos. each type	
5.a.19	Machine lamp assembly-01 nos.	
5.a.20	Limit switches-02 nos.each type	
5.a.21	Indicating lamps-05 nos.each type	
5.a.22	Controller for magnetic chuck with remote operator pendent -02 no.	
5.b	Any additional spares as recommended by vendor for 2 years of trouble free operation of machine (For Total no. of machines). List of items with quantity to be offered.	
6	GEOMETRICAL ACCURACY & GRINDING ACCURACY:	
6.1	Geometrical Accuracy as per appliable Indian / International standard. Std. chart showing tests & permissible values to be submitted by vendor.	
6.2	Grinding Accuracy: Flatness values less than equal to . Surface Finish values equal or better than . Vendor to confirm.	
7	PRE DISPATCH INSPECTION:	
7.1	BHEL will carryout pre despatch inspection at supplier works to confirm the compliance with given specification and performance. Machine, its controls and accessories will be tested for Geometrical / Acuracy tests as per agreed norms confirming to International/National standards.	

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8	FOUNDATION:	
8.1	Supplier to furnish details of foundation after 2 weeks of placement of PO. Foundation bolts, nuts, plates, etc will be supplied by the party.	
8.2	Civil works of the machine at site to be done by BHEL Haridwar.	
9	INSTALLATION & COMMISSIONING:	
9.1	Commissioning of the complete equipment supplied will be carried out by the supplier at our works. Machine, its controls and accessories will be again tested for Geometrical / Accuracy tests as per International/National standards.	
9.2	Final acceptance shall be made by B.H.E.L at Haridwar following successful erection & commissioning and achieving the specified accuracy. It shall be the responsibility of the supplier to arrange and provide all required items, tools & tackles as required for the successful commissioning / testing / proving of the equipment. BHEL will provide power supply only. After successful erection & commissioning of machine, it will be used for one day for specified purpose for final acceptance.	
10	TRAINING:	
	Training to be provided to shop & maintenance persons related to operational and maintenance aspects during PDI / commissioning.	
11	WARRANTY:	
11.1	Test Certificate for the complete equipment to be furnished alongwith the supply. Warranty for all supplied equipments for a minimum period of 24 months from the date of commissioning to be offered.	
12	MANUALS:	
12.1	3 sets of operating and maintenance manual which must contain following in additional to their standard manual in English language.	
12.2	Hydraulic, lubrication and coolant circuit diagram with description, specification and make of each element including hose pipes of each circuits.	
12.3	Assembly diagram of each subassemblies of machine with marked parts list with the specification of each componenets.	
12.4	Full documents to be given on CD also.	
12.5	Complete Electrical Circuit Diagram of the machine (3-Sets) . The electrical drawing should have proper Wire Nos & Component Details . Electrical manual should clearly describe the working of components with functioning of interlocks provided.	
13	AMBIENT CONDITIONS:	
	Machine is required to operate at following conditions.	
13.1	Ambient temp. 5 to 50 deg. C	
13.2	Relative humidity up to 95%	
13.3	Power supply 415±10%, 3 phase+Earth (without neutral), 50Hz±3%	

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P. K. K.
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