

## TECHNICAL SPECIFICATION OF CNC INDUCTION HARDENING MACHINE FOR EOI

SL NO.		
1	<b>INTRODUCTION :</b>	
	Induction hardening (IH) is a special process used for the surface hardening of steel and other alloy steel components. The parts to be heat treated are placed inside a copper coil and then heated above their transformation temperature by applying an alternating current to the coil. The alternating current in the coil induces an alternating magnetic field within the work piece which causes the outer surface of the part to heat to a temperature within or above the transformation range followed by immediate quenching. It is an electromagnetic process using a copper inductor coil, which is fed a current at a specific frequency and power level.	Vendor to Note
2	<b>BHEL Requirement:</b>	
	In our product, many components of alloy steel of cylindrical and non cylindrical or irregular shapes are required to undergo induction hardening on certain face or edges to reduce wear and tear during operation at high speed. The value of hardness is specified on drawing and is usually controlled to 45-62 HRC with case depth of 0.5-3 mm depending on component and material used (Alloy Steel like C40, 35NiCrMo15, 38NiCrMo4, 42CrMo4 etc.) . Approximately 200 components of the product are having induction hardening requirement with some components having induction hardening at more than one place. A CNC Controlled Induction Hardening Machine is required for this purpose.	Vendor to confirm
3	<b>BASIC PARAMETER:</b>	
3.1	Type of Machine : CNC controlled auto scanning, single station with rotary table	Vendor to confirm
3.2	Admit between centres - 600 mm	Vendor to confirm
3.3	Case Depth - 0.5 to 3 mm	Vendor to confirm
3.4	Case Hardness - 45 to 62 Hrc	Vendor to confirm
3.5	Max.Job Size (LXWXH) - 600 x 400 x 350 mm	Vendor to confirm
3.6	Max.Weight of the Job - 100 Kg	Vendor to confirm
3.7	Input power - 415 Volts $\pm 10\%$ , 50 Hz $\pm 3\%$ and 3 - phase	Vendor to confirm
3.8	Output Power	Vendor to inform
3.9	Output Frequency	Vendor to inform
4	<b>SPECIFIC CHARACTERISTICS:</b>	
4.1	Design, Supply, installation, testing, commissioning and proving of solid state (IGBT Based) CNC Induction Hardening Machine with rotary table of suitable capacity covers the following:	Vendor to confirm
4.2	The machine shall be used mainly for Induction Hardening and tempering of components.	Vendor to confirm
4.3	The induction hardening components should pass MPT (as per standard) for surface crack detection	Vendor to confirm
4.4	The machine shall be capable of functioning in Automatic and Manual mode.	Vendor to confirm
4.5	The machine shall be capable/designed to induction harden using scanning and sigle shot method	Vendor to confirm
4.6	The Machine shall be equipped with latest version of CNC Control System, prferably SIEMENS/ FANUC or equivalent.	Vendor to confirm
4.7	The scanning shall be done by moving the coil in 3-axis plane/2-axis plane with table rotation/suitable method to scan the complete harden surface of components. The movement for scanning can either be provided in the coil or on the job or combination of both coil and job rotation.	Vendor to confirm
4.8	The machine shall incorporate safety devices to provide protection to the operator and machine against all possible operational and machinery failures. Details of the safety features including various interlocking between sub-systems of the Induction hardening machine provided.	Vendor to confirm
5	<b>ATMOSPHERIC CONDITIONS :</b>	
5.1	The ambient temperature at the site at which the machine will be installed may vary from -4°C to +50°C over the year. The relative humidity may be as high as 98%. The atmosphere is expected to be dusty. The machines offered shall be suitably tropicalised to work under these atmospheric conditions without any adverse effect on their performance.	Vendor to confirm
6	<b>SPARES :</b>	
6.1	Vendor has to provide list of recommended spares required for 2 years (3-shifts) trouble free operation.	Vendor to offer
7	<b>CONSUMABLES &amp; ACCESSORIES :</b>	
7.1	Vendor has to provide list of consumables and accessories used in machine.	Vendor to offer
8	<b>TRAINING :</b>	
8.1	BHEL Persons should be trained by vendor for CNC Programming for the machine, Electrical, Electronic & CNC maintenance for machine & other supplied equipments, Mechanical & Hydraulic maintenance of the machine, Operation of the machine & other supplied equipments	Vendor to confirm
9	<b>PRE-ACCEPTANCE AT VENDOR'S WORKS :</b>	
9.1	BHEL persons deputed for pre-acceptance at vendor's works and give dispatch clearance after satisfaction from all angles. During pre-acceptance, Demonstration of all features of the machine, control system & accessories to be check by the BHEL team.	Vendor to confirm

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10	<b>ERRECTION &amp; COMMISSIONING ;</b>	
10.1	Vendor to take full responsibility for carrying out the erection, start up, testing of machine, it's control & all types of other supplied equipment/accessories. Successful proving of BHEL components by the supplier shall be considered as part of commissioning.	Vendor to confirm
11	<b>PROVE OUT OF BHEL COMPONENTS</b>	
11.1	Vendor to prove out 10-15% of total no. of components on offered machine at BHEL works during commissioning. Images of some components are attached in Annexure 1 for vendor ref. However Coils, fixtures & program for all 200 components are in vendor scope of supply.	Vendor to confirm
12	<b>FINAL MACHINE ACCEPTANCE :</b>	
12.1	Final acceptance shall be made by BHEL Hardwar after completion of following activities & successful commissioning : Demonstration of all features of the machine, Prove out of BHEL components, Training of BHEL machine operators & executives in operation of complete machine, software & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to confirm
13	<b>GENERAL INFORMATION</b>	
13.1	All the information and drawings attached with tender document are exclusive property of BHEL Hardwar. Under no circumstances these should be passed to any third party without prior permission of BHEL and must not be used directly or indirectly detrimental to the interest of BHEL.	Vendor to accept & confirm.
14	<b>PRE-QUALIFYING REQUIREMENTS (PQR) :</b>	
14.1	Original Equipment Manufacturer (OEM) or their authorized dealers in India along with an authorization letter from OEM can submit offers. An authorized representative/Dealer in India, cannot quote for the same equipment from more than one OEM.	Vendor to accept & confirm/inform
14.2	The vendor should have supplied & commissioned at least one CNC Induction Hardening Machine (IHM) of same or higher configuration in the past ten years (From the date of opening of Tender) and the supplied machine must be operating satisfactorily for at least one year from the date of commissioning.	
14.3	Foreign OEM may directly provide after sales service and support. If foreign OEM recommends an Indian agent for after sale service and support, an authorization letter from OEM for the dealer/representative shall be provided with confirmation that after sale service support shall be provided by them.	
14.4	The OEM or their authorized service representatives shall have trained engineers for commissioning & service for the offered equipment and shall be in a position to provide prompt after sales service and spares support for our installations.	
14.5	The following information should be submitted by the vendor about the companies where same or higher configuration 'IHM' has been supplied. This is required from all the vendors for qualification of their offer.	
14.5.1	Name of the customer / company where referred 'IHM' is installed.	Vendor to inform.
14.5.2	Complete postal address of the customer.	Vendor to inform.
14.5.3	Month & Year of commissioning	Vendor to inform.
14.5.4	Parameters of 'IHM' supplied and application for which it is supplied.	Vendor to inform.
14.5.5	Name and designation of the contact person of the customer.	Vendor to inform.
14.5.6	Phone, Fax No. and email address of the contact person of the customer.	Vendor to inform.
14.5.7	Performance certificate/un priced Copy of purchase order or Commissioning report with supporting acceptance papers or a direct Email from the customer where 'IHM' has been supplied (If Possible).	Vendor to submit.

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*S. Kumar*  
(Sujat Kumar  
Dy Mgr/MTE)

Four spares, maintainability  
& PDI  
*Shudhy*  
(Rohit Chaudhary)  
(E2/WEX/BL2 & DAB4)

only for spares, maintainability  
& PDI  
*Anurag*  
(Anurag Kumar)  
(E2/WEX-cnc/PB4  
DAB4)

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(Dy. Manager/DAB4-Prod)

*Rajiv Chaurasia*  
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