


	<b><u>BHARAT HEAVY ELECTRICAL LIMITED</u></b>		<b>Enquiry No. :</b>	
	<b><u>UNIT'S ADDRESS:</u></b> HEEP, RANIPUR HARIDWAR - 249403 UTTARANCHAL, INDIA		<b>Due Date :</b>	
			<b>Supplier Qtn. No.:</b>	
	<b><u>CONTACT PERSON FROM PURCHASE DEPTT.:</u></b> <b><u>NAME:</u></b> <b><u>DESIGNATION:</u></b> <b><u>PHONE NO.:</u></b> <b><u>E-MAIL:</u></b> <b><u>FAX NO. :</u></b>		<b>Date :</b>	
<b>TECHNICAL SPECIFICATIONS CUM COMPLIANCE CERTIFICATION FOR " INDUCTION HARDENING FURNACE" (BUDGET CONTROL NO.ZSTT17456010)</b>				
	<b>NOTE :-</b>			
	<p>1. Vendor(OEM) must submit complete information against clause at Sl.No.. 23.0 The offer, complying this clause, would only be considered.</p> <p>2. The vendor(OEM) should fill the "Offered" Column in compliance to specified requirements and also "Deviations" Column, where there is deviation from the requirement. Duly filled specification cum compliance certificate should be 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>3. The offer and all documents enclosed with offer should be in English language only.</p>			
	<b>ADDRESS OF THE SUPPLIER :</b>	<b>ADDRESS OF THE INDIAN AGENTS :</b>		
	<b>TELEPHONE NOS.:</b>	<b>TELEPHONE NOS.:</b>		
	<b>FAX NOS.:</b>	<b>FAX NOS.:</b>		
	<b>E-MAIL ADDRESS :</b>	<b>E-MAIL ADDRESS :</b>		

<b>SCOPE: SUPPLY, ERECTION &amp; COMMISSIONING OF INDUCTION HARDENING FURNACE COMPLYING WITH SPECIFICATIONS AS</b>					
<b>SL. NO.</b>	<b>DESCRIPTION OF BHEL REQUIREMENT</b>	<b>REQUIRED</b>	<b>OFFERED</b>	<b>DEVIATION</b>	<b>REMARKS</b>
<b>1.0</b>	<b>PURPOSE &amp; BASIC FEATURES</b>				
1.1	<b>Purpose:</b> High frequency Induction Hardening Machine capable of progressive heating and quenching shall be used for surface hardening on turbine components( cylindrical/non cylindrical/flats) of carbon and alloy steel to achieve the hardened depth 0.5 mm.to 2.0mm max.and hardness of HRC 50 - 62.	Vendor to note & accept			
1.2	<b>BASIC FEATURES:</b> The equipment design is to be in accordance with up-to date standards and special care is to be taken to ensure ease of operation and maintenance, accuracy of heating, safety etc. The coil should have 3-axis movement.and water cooling arrangement.The job loading / unloading shall be manual.The job is to be supported between centres or with interchangeable work holdersof non magnetic stainless steel.The various types of jobs are : Gears - Ø 40 to 200 mm ; Shafts - Ø 25 to 90 mm , max length 1000mm ,length to be hardened 600mm; Spacers Ø120mm ; Centring Bolts Ø 80 x 225 mm; Fitted keys 120 x 105 mm , 40x243mm. Levers , Cams of non linear curved surfaces. Weight of the jobs varying from 50 gms to 5 kg.	Vendor to note & accept			
<b>2.0</b>	<b>SPECIFICATIONS:</b>				
<b>2.1</b>	<b>TECHNICAL DATA</b>				
2.1.1	<b>Solid state High Frequency Induction Hardening Machine</b>	Vendor to offer			
<b>2.2</b>	<b>. GENERAL PARAMETERS</b>				
2.2.1	Input Power Supply : 415 volt ± 10 % ; 50 Hz+- 3%,. 3 phase, 4wire A.C.supply.	Vendor to accept			
2.2.2	Output Power : 95KW approx , variable type.	Vendor to specify.			
2.2.2.1	Frequency : 100 to 150 Khz , variable type.	Vendor to specify			

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2.2.2.2	Output regulation accuracy : + - 1% with + - 10% AC input line variance under all operating conditions.	Vendor to specify			
2.2.2.3	Output Power Control : (a) Manual : 3 - 100% (b) Automatic : as per set point.The head should operate satisfactorily throughout the above power range.	Vendor to specify			
2.2.3	Heating Control : With built in digital timer and digital display for minutes and seconds. The timer adjustments shall be provided in the operator panel with suitable UP /DOWN Push buttons.Display height shall be 1" or more , LED type. The timer shall auto-reset after each heating cycle or when ' Heating Off ' button is pressed. Provision for automatic temperature control by means of non contact radiation pyrometer shall also be provided.	Vendor to specify			
2.2.3.1	Operator controls : Start/ Stop , Heating On / Off , Emergency Off , Manual /Automatic ,Power and Fequency Control through Potentiometers Or + - Push Buttons , Set Point controls for Automatic control of Power and Frequency, Job Rotation , rotation speed, work coil UP/Down, Quench ON/OFF, Scan , DM Water ON /OFF.	Vendor to specify			
2.2.3.2	Diagnostic Display : LED / Lamp display for Fault / Run / Cooling water/Cycle complete /Cooling water Temperature ( digital with 1"display)	Vendor to specify			
2.2.3.3	Protection : IP 54.	Vendor to specify			
2.2.3.4	Inductor Voltage : within safe working limit.	Vender to confirm			
2.2.4	Remote pendant : A remote pendant with 5 meters extension wire with the following controls shall be supplied : Heating ON /OFF , Emergency OFF , Cycle ON/OFF.	Vendor to specify			
2.2.5	Foot Switch : A foot operated switch for Heating ON / OFF purpose.	Vendor to specify			

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2.2.6	Inhibition and Alarm : Phase Failure , IGBT / Thyristor failure , Cooling water circulation failure, Panel door open , No water , Water temperature high.	Vendor to specify.			
2.2.7	Noise level : Less than 85dB.	Vendor to specify			
<b>2.3</b>	<b>MECHANICALS</b>				
2.3.1	Cooling Medium : DM Water.	Vendor to specify			
2.3.2	Water consumption : less than 70 LPM.	Vendor to specify			
2.3.3	Water Pressure : 4 - 6 Bar.	Vendor to specify			
2.3.4	Water Temperature : 15 - 31 C	Vendor to accept			
2.3.4.1	Flow Rate	Vendor to specify			
2.3.4.2	Sensing : Flow switch , Temperature switch.	Vendor to specify			
2.3.4.3	Heat Exchanger : Suitable Water tanks and heat exchangers with all necessary controls and interlocking with main head shall be provided.	Vendor to specify			
2.3.4.4	Extension of Inductor from Panel : 500mm Max , Suitable support for Inductor shall be provided.Work coil adjustment in X , Z Axis + - 25mm.Working height - approx 1135mm.	Vendor to specify			
2.3.4.5	Feed Rate of work coil : 5 to 30 mm/sec. Job rotation : 50 - 300 RPM.	Vendor to specify			
2.3.4.6	Vertical Scanner : Max length of job - 1000mm , max scanning length 600mm.	Vendor to specify			
2.3.4.7	Air Filter,Regulator,Moisture separator and air dryer ( if compressed air is required on the machine)	Vendor to specify.			
<b>3.0</b>	<b>ELECTRICALS</b>				
3.1	The complete electricals will be designed for 415 V± 10%; 3 phase , 4 wire 50 Hz A.C.	Vendor to confirm			
3.2	<b>SCR Controller</b> : Zero fired thyristor controller with phase angle control to control heater power infinitely	Vendor to specify			
3.3	<b>Ammeter</b> : 2 (two )nos minimum . With selector switch for measuring line current . Make : AEPL /equivalent make.	Vendor to specify			

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3.4	<b>Voltmeter : 2</b> (two) nos. with selector switch . Make AEPL /equivalent make	Vendor to specify			
3.5	<b>Energy meter : 1 ( one) no. for monitoring energy consumption.</b>	Vendor to specify			
3.6	<b>Electrical panel:</b> One no. Mild steel fabrication separate electrical panel will house SCR controllers, Ammeter, Voltmeter, switches, indicating lamps,push buttons etc.	Vendor to confirm			
3.7	<b>Cabling : To</b> provide all the power and control cabling except as stated under clause 7.3.	Vendor to confirm			
3.8	<b>Earthing :</b> Earthing of equipment will be done with GI/MS Flat/Wire and will be connected to existing earthing system.	Vendor to confirm			
4.0	<b>Duty : Intermittent for 30 mins.</b>	Vendor to specify.			
4.1	Load Matching : Built in Load matching capacitor with external Tap changing switch if required.	Vendor to specify			
4.2	Input Power Factor : More than 90%	Vendor to specify			
4.3	Energy Conversion Efficiency : More than 80%	Vendor to specify			
5.0	<b>SAFETY INTERLOCKS :</b>				
5.1	Machine must not switch ON in case of No Water Supply in water Cooling system Also the machine must trip if water pressure is inadequate .	Vendor to confirm			
5.2	All motors will be provided with thermal overload relays along with single phase preventor	Vendor to confirm			
6.0	<b>ALARM COMMUNICATION :</b> In the event of fault condition viz., over temperature or motor failure or no water an audiovisual alarm annunciation system comprising hooter and indicating lamps corresponding to the fault will activate	Vendor to confirm			
7.0	<b>SERVICES PROVIDED BY BHEL</b>				

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7.1	Input Power Supply : 415 volt $\pm$ 10 % ; 50 Hz., 3 phase, 4wire A.C.supply.	Vendor to accept & offer			
7.2	Compressed air at a pressure of 3 - 5 kg./cm2 gauge	Vendor to accept & offer			
7.3	Termination of electric power cable to incoming of machine's controls's switch-gear panel from BHEL's terminating point .	Vendor to accept & offer			
<b>8.00</b>	<b>REQUIREMENT FOR ELECTRICAL EQUIPMENT</b>				
8.1	Power Supply will be provided by BHEL at a single point near the machine, as per layout recommended by Vendor. All types of switches, cables, connections, circuit breakers etc. required for connecting BHEL's power supply point to different parts of the machine/control cabinets including Voltage Stabilizer, Isolation Transformer & Air Compressor etc. , shall be supplied by the vendor.	Vendor to accept & offer			
8.2	<b>Tropicalisation:</b> All electrical / electronic equipment shall be tropicalized.	Vendor to offer			
8.3	All electrical & electronic control cabinets & panels should be dust and vermin proof.	Vendor to offer			
8.4	All electrical components in the cabinets should be mounted on DIN Rail.	Vendor to offer			
8.5	All electrical / electronic panels to be provided with adequate door locks. All electrical & electronic panels including operator's panel should have sufficient illumination and power receptacles/plug points of 220Volts, 5/15 Amp AC with on/off switch. All electrical adapters/receptacles, fittings, consumables etc. should be Indian or should have compatibility with Indian equivalents.	Vendor to offer			
8.6	All motors shall conform to IEC or Indian Standards	Vendor to offer			

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8.7	Vendor should ensure the proper earthing for the machine and its peripherals/accessories. Any material requirement for the same should be informed with foundation design/drawings. The vendor can take earthing connection from the nearest column of the production shop.	Vendor to offer			
8.8	All Electrical modules and PCB's are to be located in a separate cage inside the electrical cabinet so that in case of water leakage from the cooling system it does not damage the same.	Vendor to confirm			
<b>9.00</b>	<b>SAFETY ARRANGEMENTS</b> Following safety features in addition to other standard safety features should be provided on the machine:	Vendor to offer			
9.1	Equipment should have adequate and reliable safety interlocks / devices to avoid damage to the machine, job loaded on the machine and the operator due to the malfunctioning or mistakes. Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm on the control panel should be available.	Vendor to offer			
9.2	A detailed list of all alarms / indications provided on system should be submitted by the supplier.	Vendor to submit			
9.3	All the rotating parts used on machine should be statically & dynamically balanced to avoid undue vibrations & noise.	Vendor to confirm			
9.4	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to offer			
9.5	Oil & water pipe lines should not run with electrical cable in the same trench.	Vendor to offer			
<b>10.0</b>	<b>ENVIRONMENTAL PERFORMANCE OF THE MACHINE :</b> The Induction Hardening equipment system should conform to following factors related to environment :	Vendor to offer			

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10.1	Maximum noise level shall be 85 dB(A) at normal load condition, 1 meter away from the furnace with correction factor for back ground noise, if necessary. This will be measured as per international standards like DIN 45635-16, if required. Supplier to demonstrate compliance to noise level, if so required.	Vendor to confirm			
10.2	There shall not be any hazardous emissions from the machine during operation.	Vendor to confirm			
10.3	No hazardous chemicals shall be required to be used in the equipment.	Vendor to confirm			
10.4	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm			
10.5	Paint of the machine should be oil / coolant/ heat resistant and should not get peeled off and mixed up with coolant.	Vendor to confirm			
<b>11.0</b>	<b>SPARES :</b>				
11.1	Itemised breakup of mechanical, pneumatic, water cooling, electrical and electronic spares used on the machine in sufficient quantity as per recommendation of Vendor for 2 years of trouble free operation on three shifts continuous running basis should be offered by vendor. The list to include following, in addition to other recommended spares: (Unit Price of each item of spare should be offered) : Thyristors /IGBTs - 1 set , Semiconductor Fuse - 2 sets , Hollow conductors - 1 set , Coil Support 1 set, Work coils one no. each type.	Vendor to offer			
11.2	<b>Mechanical &amp; Pneumatic Spares :</b> Following Spares are to be offered.	Vendor to offer			
11.21	All types of filter inserts of disposal type (20 nos. each type)	Vendor to offer			
11.22	All types of pneumatic valves, pressure switches and flow switches (1 no. of each type)	Vendor to offer			

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11.23	All types of O-rings,Oil seals & Pneumatic Hoses (1 set of each type)	Vendor to offer			
11.24	Water Pump( 1 no. each type),Solenoid valves ( 2 nos each type),Flow control valves ( 1 no each type),Flow meter( 2 nos each type).	Vendor to offer			
11.3	<b>Electrical /Electronic Spares :</b> Following Spares are to be offered.	Vendor to offer			
11.3.1	Relays ( 2 Nos each type )	Vendor to offer			
11.3.2	Contactors ( 2 Nos each type )	Vendor to offer			
11.3.3	RTD temperature transmitter ( 1 No each type )	Vendor to offer			
11.3.4	Proximity Switches ( 2 Nos sensor each type ) if any	Vendor to offer			
12.3.5	Push Buttons ( 5 Nos each type )	Vendor to offer			
11.3.6	Indicating Lamps ( 10 Nos each type )	Vendor to offer			
11.3.7	Semiconductor Fuses ( 5 Nos each type )	Vendor to offer			
11.3.8	Special Fuses ( 5 Nos each type )	Vendor to offer			
11.3.9	Circuit Breakers ( 1 No each type )	Vendor to offer			
11.3.10	Main Power Switch ( 1 No each type )	Vendor to offer			
11.3.11	Encoders ( 1 No each type ), if any.	Vendor to offer			
11.3.12	Operator's panel with Display Unit	Vendor to offer			
11.3.13	Power Module & Control Cards for Rotary table and vertical scanner ( 1 Nos each type )	Vendor to offer			
11.3.14	All modules and PCB's including Main control card , SCR firing card etc,-one no. of each type. Power Modules - 5 nos of each type.	Vendor to offer and specify the total no. of cards used in the machine.			
11.4	All types of spares for total Equipment and accessories should be available for at least ten years after supply of the machine. If component or control is likely to become obsolete in this period, the vendor should inform BHEL sufficiently in advance and provide drawings of parts / details of spares & suppliers to enable BHEL to procure these in advance, if required	Vendor to confirm			

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11.5	Vendor to confirm that complete list of spares for equipment and accessories, along with specification / type / model, and name & address of the spare supplier shall be furnished along with documentation to be supplied with the machine.	Vendor to confirm			
<b>12.0</b>	<b>DOCUMENTATION :</b> Three sets of following documents (Hard copies) in English language should be supplied along with the machine	Vendor to offer			
12.1	Operating manuals of HF Induction Hardening Equipment.	Vendor to offer			
12.2	Detailed Maintenance manual of the equipment with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic and water circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list also.	Vendor to offer			
12.3	Catalogues, Operation & Maintenance Manuals of all bought out items including drawings, wherever applicable.	Vendor to offer			
12.4	Detailed specification of all rubber items and pneumatic fittings	Vendor to offer			
12.5	Complete list of parts/items( Bill of materials) used in the machine in English language.	Vendor to offer			
12.6	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to offer			
12.7	Electrical schematic , wiring diagram,junction box details,connector details etc. Maintenance and diagnostic manual of controller.	Vendor to offer.			
<b>13.0</b>	<b>PROVE-OUT OF INDUCTION HARDENING OF BHEL COMPONENT</b>				
13.1	Vendor shall be fully responsible for Induction hardening of proveout component as per the cycle to the full satisfaction of BHEL.	Vendor to accept & confirm			

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13.2	Vendor shall be responsible for any deviation/rejection in proveout component due to malfunctioning of the equipment during proveout of induction hardening The cost of such component shall be refunded by the vendor to BHEL in case of rejection of the component.	Vendor to accept & confirm			
14.00	<b>TRAINING OF BHEL PERSONNEL</b>				
14.1	Training of BHEL furnace operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to confirm			
14.2	Training of BHEL maintenance personal in maintenance of complete equipment & accessories etc by the supplier's experts / engineers at manufacturer's works.	Vendor to confirm			
15.0	<p>Vendor shall submit the preliminary layout drawings for getting BHEL's approval within one month from the date of Letter of Intent (LOI) or Purchase Order, whichever is earlier.</p> <p>Complete Foundation Design including details viz. static / dynamic load details etc. and final layout drawings shall be submitted by the supplier within two months after getting BHEL's approval for Preliminary layout Drgs..</p> <p>The layout should consist of all requirements pertaining to complete machine including space requirement for all accessories/ attachments/ offered items.</p> <p>BHEL shall construct complete foundation for the system ( if required) under supervision of supplier and at vendor's responsibility.</p> <p>Vendor should arrange equipments required for the testing of foundation, if required by the vendor.</p> <p>The vendor shall also indicate detailed specifications/requirement of earthing material, grouting compound and grouting procedure etc. for foundation bolts of the machine.</p>	Vendor to accept & offer			

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16.0	Soil condition at BHEL, Haridwar is mentioned below : (a) Soil strata : Silty sand up to 2.5 meter depth (b) Average density of soil = 1.8 T/cubic m (c) Angle of internal friction = 35° (up to 3.0 m depth) (d) Coefficient of elastic uniform compression “Cu” = 3.0 Kg/cubic cm (at 7m depth for 10sq.m base area and 1.0 Kg/sq.cm confining pressure) (e) Bearing capacity at 1.5 meter depth = 10T/sq.m (f) Water table = 25 meter below ground level	For vendor's information.			
<b>17.0</b>	<b>ERECTION &amp; COMMISSIONING</b>				
17.1	Erection & Commissioning of the complete Induction Hardening machine and other accessories/attachments with all electrical & mechanical connections shall also be responsibility of the vendor.	Vendor to offer			
17.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning for the machine . All features and functions, as mentioned at Sl. No. 20.0 (Machine Acceptance) shall also be part of the commissioning activity.	Vendor to offer			
17.3	Tools, Tackels, instruments and other necessary equipment required to carry out all erection & commissioning activities should be arranged and brought by the supplier.	Vendor to accept			
17.4	Commissioning spares, required for commissioning of the complete equipment within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to accept			
17.5	Schedule of Erection and Commissioning shall be submitted with the offer.	Vendor to submit			
17.6	Terms & conditions for Erection & Commissioning should be furnished in detail separately by vendor along with offer.	Vendor to submit			

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17.7	Portion, if any, of the machine, accessories/attachments and other supplied items where paint got rubbed or peeled off during transit or erection should be repainted and matched with the original adjoining paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colours/shades of paints used. The vendor shall ensure performing touching after commissioning but before final acceptance.	Vendor to offer			
<b>18.0</b>	<b>AMBIENT CONDITIONS &amp; THERMAL STABILITY</b>				
18.1	Total machine including all supplied items should work trouble free and should give specified accuracies under existing power supply and ambient operating conditions, as mentioned below at Sl. Nos. 19.4	Vendor to accept & confirm			
18.2	<b>Power Supply (AC):</b> Voltage = 415V $\pm$ 10% of fluctuations , Frequency= 50Hz $\pm$ 3% , No. of phases = 3 phase with neutral.	Vendor to accept & confirm			
18.3	<b>Compressed Air Supply</b> : available at Pressure 3 - 5 Kg /cm <sup>2</sup> gauge.	Vendor to accept & confirm			
18.4	<b>Ambient Operating Conditions:</b> Temperature = 5 to 45 degree Celsius Relative Humidity = 95% max. Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. Machine shall be kept in the normal shop floor condition without any temperature controlled enclosure/shop. Max. temperature variation is 25 deg Celsius in 24 hours.	Vendor to accept			

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18.5	<b>Thermal Stability:</b> Thermal Stability of the complete machine components and all supplied items including controls for their troublefree operation with specified accuracy in the specified Ambient Conditions should be ensured and confirmed by vendor.	Vendor to offer & confirm			
18.6	The complete system should be suitable for continuous operation to its full capacity for 24 hours a day and 7 days a week throughout year. Vendor to ensure and confirm the same.	Vendor to offer & confirm			
<b>19.0</b>	<b>MACHINE ACCEPTANCE (Tests/Activities to be performed &amp; demonstrated by Vendor at BHEL works while commissioning the furnace)</b>	Vendor to accept & confirm			
19.1	Demonstration of all features of the machine, control system & accessories to the satisfaction of BHEL for efficient and effective use of the equipment.	Vendor to accept & confirm			
19.2	<b>Job Proving:</b> The complete equipment should be tested ( for the performance of the systems and all sub systems) The Hardness and case depth requirements as per clause 1.1 shall have to be achieved.	Vendor to accept & confirm			
19.3	Two weeks of supervision by Vendor of independent operation of the machine by BHEL after job proveout.	Vendor to accept & confirm			
19.4	Training of BHEL furnace operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to accept & confirm			
19.5	Training of BHEL maintenance personnel in maintenance of complete equipment & accessories etc by the supplier's experts / engineers at manufacturer's works.	Vendor to accept and confirm.			
<b>20.0</b>	<b>PACKING</b>				

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20.1	Sea worthy & rigid packing for all items of machine,controls, mechanical movement System, all Accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes. In case machine is despatched in container, the container shall be brought upto BHEL, Haridwar. De- stuffing of container shall be carried out at BHEL, Haridwar 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 Haridwar on returnable basis.	Vendor to offer & confirm			
<b>21.0</b>	<b>GUARANTEE</b>				
21.1	Guarantee for complete equipment and all supplied accessories/attachments/equipments/items for 24 months from the date of acceptance of the machine.	Vendor to offer			
<b>22.0</b>	<b>GENERAL</b>				
22.1	Machine Model No.	Vendor to inform			
22.2	Total connected load (KVA)	Vendor to inform			
22.3	Total Space required (Length, Width, Height) for complete machine and accessories/attachments.	Vendor to inform			
22.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green ( Polyurethane Paint )	Vendor to offer			
22.5	Total weight of the machine after erecting at BHEL, Hardwar.	Vendor to inform			
22.6	Weight of the heaviest assembly of the system.	Vendor to inform			
22.7	Dimensions of largest part of the System.	Vendor to inform			
22.8	Vendor to submit reference list of customers where similar machines have been supplied mentioning broad specifications of the supplied equipment i.e. Model, Size , Power rating , frequency , year of supply and customer feed back, if any, etc.	Vendor to submit			

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22.9	Detailed catalogues, sketches /drawings / photographs pertaining to the offered system and accessories/attachments/items should be submitted with the offer.	Vendor to submit			
22.10	Hydraulic, Pneumatic & Oil pipings should be preferably metallic except places where flexible pipings are essential. All the pipes required for the same shall be supplied by the vendor.	Vendor to confirm			
22.11	All Cables and Hoses etc. should be well supported & protected in trays / brackets / drag chains etc.	Vendor to confirm			
<b>23.0</b>	<b>QUALIFYING CONDITIONS</b>				
23.1	Only those vendors, who have supplied and commissioned at least one Solid state High Frequency Induction Hardening equipment of same or higher rating for similar applications of Induction Hardening in the past ten years (on the date of opening of tender) and such machine is presently working satisfactorily for more than one year after commissioning (on the date of opening of tender) , should quote. However if similar machine(s) has/had been supplied to BHEL ,then the machine should be presently working satisfactorily for more than six months after its commissioning and acceptance (on the date of opening of tender ) should quote. The following information should 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.	Vendor to comply & submit with the offer			
23.1.1	Name of the customer / company where similar equipment is installed.	Vendor to inform			
23.1.2	Complete postal address of the customer.	Vendor to inform			
23.1.3	Month & Year of commissioning.	Vendor to inform			

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23.1.4	Broad specification of the machine(s) supplied (Power ,Frequency,) and application for which the equipment is supplied.	Vendor to inform			
23.1.5	Name and designation of the contact person of the customer.	Vendor to inform			
23.1.6	Phone, FAX no. and e-mail address of the contact person of the customer.	Vendor to inform			
23.2	Performance certificate from the customers regarding satisfactory performance of Induction hardening equipment 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 submit			
23.3	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 accept & confirm			