


	<u>BHARAT HEAVY ELECTRICAL LIMITED</u>		Enquiry No. :	
			Due Date :	
			Supplier Qtn. No.:	
	<u>CONTACT PERSON FROM PURCHASE DEPTT.:</u> <u>NAME:</u> <u>DESIGNATION:</u> <u>PHONE NO.:</u> <u>E-MAIL:</u> <u>FAX NO. :</u>		Date :	
<u>TECHNICAL SPECIFICATIONS CUM COMPLIANCE CERTIFICATION FOR " ELECTRICALLY HEATED SINGLE ENDED BOGIE HEARTH FURNACE"</u>				
	NOTE :-			
	1. Vendor(OEM) must submit complete information against clause at Sl.No.. 22.0 The offer, complying this clause, would only be considered. 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. 3. The offer and all documents enclosed with offer should be in English language only.			
	ADDRESS OF THE SUPPLIER :	ADDRESS OF THE INDIAN AGENTS :		
	TELEPHONE NOS.:	TELEPHONE NOS.:		
	FAX NOS.:	FAX NOS.:		
	E-MAIL ADDRESS :	E-MAIL ADDRESS :		
SCOPE:	SUPPLY, ERECTION & COMMISSIONING OF ELECTRIC BOGIE HEARTH FURNACE COMPLYING WITH SPECIFICATIONS			

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
1.0	PURPOSE & BASIC FEATURES				
1.1	Purpose: Electrically heated single ended Bogie Hearth Furnace must have working dimension of 12000(L) X 8000 (W)X 6500 (H) mm and must be suitable for handling gross charge load of 100 MT and 1050°C operating temperature. It is required for stress relieving / annealing / normalizing etc. of ferrous components as per the preset (adjustable) time-temperature programme.	Vendor to note & accept			
1.2	BASIC FEATURES: The furnace 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 and safety etc.	Vendor to note & accept			
2.0	SPECIFICATIONS:				
2.1	TECHNICAL DATA				
2.1.1	Electrically heated single ended Bogie hearth type furnace	Vendor to offer			
2.2	GENERAL PARAMETERS				
2.2.1	Batch capacity (Gross Load) - 100 Metric Tons	Vendor to offer			
2.2.2	Working dimension available inside furnace chamber				
2.2.2.1	Length -12000 mm	Vendor to offer			
2.2.2.2	Width - 8000 mm	Vendor to offer			
2.2.2.3	Height - 6500 mm	Vendor to offer			
2.2.3	Over all out side dimensions of the furnace (Indicative)				
2.2.3.1	Length (bogie withdrawn out side the furnace chamber minimum 1000 mm)	Vender to specify			
2.2.3.2	Width	Vender to specify			
2.2.3.3	Height (Door in fully open condition)	Vender to specify			
2.2.3.4	Door opening height -6500 mm	Vender to offer			
2.2.2.5	Working height of the Bogie Top : 900 mm (maximum)	Vender to specify			

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2.2.3	Heating rate : 80° C./hr. (max.) for fully loaded and adjustable in the range of 80 - 200 ° c for less load and temperatures..	Vender to specify			
2.2.4	Cooling Rate : min 20 ° C / hr	Vender to specify			
2.2.5	Maximum Temperature : 1050 ° C	Vender to specify			
2.2.6	Furnace to be normally operated for soaking temperatures between 550 ° to 800 ° C. Furnace to be designed to efficiently work in this				
2.2.7	Uniform temperature throughout furnace for stress relieving as	Vendor to Confirm			
2.2.7.1	Difference in temperature < 100 ° c for temp less than 250°c	Vendor to Confirm			
2.2.7.2	Difference in temperature < 75 ° c for temp between 250°c - 500°c	Vendor to Confirm			
2.2.7.3	Difference in temperature < 50 ° c for temp more than 500°c	Vendor to Confirm			
2.2.7.4	Difference in temperature < 20 ° c at soaking temperature.	Vendor to Confirm			
2.2.7.5	Rate of heating and cooling: ± 1%	Vendor to Confirm			
2.2.7	Mode of Temperature control :Proportional through Thyristor / IGBT Power Controller	Vender to specify			
2.2.8	Make of Thyristor Controller / IGBT - Siemens / Eurotherma only	Vender to specify			
2.2.8.1	Model of Thyristor controller	Vender to specify			
2.2.9	No of control zones (6 min.)	Vender to specify with location			
2.2.10	Power rating, MW	Vender to specify with design details			
2.2.11	Furnace outer wall temperature : maximum 40 ° C above ambient.	Vender to specify			
2.2.12	Furnace to have split door at approx. 6 Meter length to operate at part load. (To be quoted as optional feature)	Vendor to offer			
2.3	MECHANICALS				
2.3.1	Casing plate material & thickness: Carbon Steel & 5 mm (minimum) thick.	Vender to specify			
2.3.2	Bogie top plate material & thickness : AISI 310 & 20 mm (minimum) thick	Vender to specify			
2.3.3	Rail size	Vender to specify			

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2.3.4	Bogie Details				
2.3.4.1	Brick retainer casting : HRCI	Vender to specify			
2.3.4.2	Sealing arrangement : Sand sealing	Vender to specify			
2.3.4.3	Door details : Sand sealing at bottom Type of door : Rise & fall, counter balanced Sealing arrangement : Motorised cum manual operated.	Vendor to confirm			
2.3.4.4	Door Up/Down movement : By electric motor. Lifting speed : 2 meters/min (maximum) Motor capacity (HP & RPM) Door up/down movement - free & locking by motorised cam operated	Vender to specify			
2.3.4.5	Bogie Movement: Electric through chain & sprocket / wire rope Speed of bogie movement : 2 meters /min. (maximum) Motor capacity -HP & RPM	Vender to specify			
2.3.4.6	Bogie roller supported with inter-connected chain (roller material-HRCI)	Vender to specify			
2.3.4.7	boggie must of suitable construction to take shock (impact) of loading and unloading 100 Mt by crane.				
2.3.5	Insulation details for Walls, roof, door and Bogie				
2.3.5.1	Walls	Vendor to specify			
2.3.5.1.1	Layer-I : 125 mm vacuum formed borad , density 200 kg/m3, suitable for 1200drg.C in single thickness of -125 mm Make : Kanthal /Kerfa/ Rescal.	Vendor to specify			
2.3.5.1.2	Layer-II : Ceramic Fiber Blanket (CFB)128kg/m3 (HTZ Grade) Make : Murugappa-Morgan /Unifrax.	Vendor to specify			
2.3.5.1.3	Layer-III CFB 128kg/m3(RTZ Grade) in single thickness of 100 mm.	Vendor to specify			

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2.3.5.1.4	Layer-IV CFB 96 kg/m ³ (HTZ Grade) in single thickness of 50 mm.	Vendor to specify			
2.3.5.2	Roof				
2.3.5.2.1	Layer-I : 125 mm vacuum formed borad , density 200 kg/m ³ , suitable for 1200drg.C in single thickness of -90 mm Make : Kanthal /Kerfa/ Rescal.	Vendor to specify			
2.3.5.2.2	Layer-II: CFB 128kg/m ³ (RTZ Grade) in single thickness of 100 mm. Make : Murugappa-Morgan /Unifrax.	Vendor to specify			
2.3.5.2.3	Layer-III : CFB 128kg/m ³ (RTZ Grade) in single thickness of 100 mm.	Vendor to specify			
2.3.5.2.4	Layer-IV : CFB 96 kg/m ³ (HTZ Grade) in single thickness of 50 mm.	Vendor to specify			
2.3.5.3	Door				
2.3.5.3.1	Layer-I :125 mm vacuum formed borad , density 200 kg/m ³ , suitable for 1200drg.C in single thickness of -125 mm Make : Kanthal /Kerfa/ Rescal	Vender to specify			
2.3.5.3.2	Layer-II CFB 128kg/m ³ (RTZ Grade) in single thickness of 100 mm.	Vender to specify			
2.3.5.3.3	Layer-III CFB 96 kg/m ³ (HTZ Grade) in single thickness of 50 mm.	Vender to specify			
2.3.5.3.4	Layer-IV 64 kg/m ³ (HTZ Grade) in single thickness of 100 mm.	Vender to specify			
2.3.5.4	Bogie				
2.3.5.4.1	Layer-I : 115 mm 55-60% Al ₂ O ₃ shape bricks of Fe content < 1% CCS(Cold crushing Strength) greater than 450 and sintering Tempemrature >1300 drg.C	Vender to specify			

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2.3.5.4.2	Layer-II 115 mm IS8 + 75 mm Hot Face Insulation type Bricks.	Vender to specify			
2.3.5.4.3	Layer-III : 115 mm Cold Face Insulation type Bricks.	Vender to specify			
2.3.5.4.4	Layer-IV : 40 mm Hysil Block.	Vender to specify			
2.3.6	Heating Elements				
2.3.6.1	Type:	s			
2.3.6.2	Size :	Vender to specify			
2.3.6.3	Make :Sandvik / Rescal-France /VDM-Germany/Kerfa-Germany	Vender to specify			
2.3.6.4	Material : Fe-Al-Cr with liner temperature co-efficient suitable for 1200drg.C.	Vender to specify			
2.3.6.5	Locations : Side walls, Roof, Back wall, Door & Hearth	Vender to specify the distributed load			
2.3.6.6	Holding Arrangement : Non conducting pin of Fe-Al-Cr,suitable to carry the weight of elements.	vender to specify			
3.0	Instrumentation:				
3.1	Heating /Cooling Controller (Master):	Vender to offer			
3.1.1	Type : P.I.D.programmable, universal input.	Vender to offer			
3.1.2	Make : Eurotherm/Chino	Vender to specify			
3.1.3	Range : 0-1200 °C	Vender to specify			
3.1.4	Input signal : Universal.	Vender to offer			
3.1.5	Display : Dual Display ,4 digits.	Vender to specify			
3.1.6	Input Power : 220V AC through Isolation Trandormer.	Vender to offer			
3.1.7	Output signal : 4-20 mA DC.	Vender to offer			
3.1.8	Accuracy : ±0.3% FSD.	Vender to specify			
3.1.9	Control Accuracy : ±1drg.C.	Vender to specify			
3.1.10	Temperatur Repeatability : ±0.5drg.C.	Vender to specify			
3.1.11	Size :	Vender to specify			
3.1.12	Alarm setting : 02.	Vender to specify			

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3.1.13	Memory : EEPROM.	Vender to offer			
3.1.14	Tuning : Auto Tuning.	Vender to offer			
3.1.15	Manual Setting of Temperature - in case of failure of auto tuning	Vender to offer			
3.1.16	Other features : Display of Heating /cooling curve & actual furnace temperature graphically. 50 user programs.	Vender to specify			
3.1.17	Quantity	Vender to specify			
3.2	Heating /Cooling Controller (Slave):	Vender to offer			
3.2.1	Type : P.I.D.programmable, universal input.	Vender to offer			
3.2.2	Make : Eurotherm 2704 / Chino	Vender to specify			
3.2.3	Range : 0-1200 °C	Vender to specify			
3.2.4	Loops : 03	Vender to specify			
3.2.5	Input signal :Universal.	Vender to offer			
3.2.6	Display : Dual Display, 4 digits	Vender to specify			
3.2.7	Input Power : 220V AC through Isolation Transformer.	Vender to offer			
3.2.8	Output signal : 4-20 mA DC.	Vender to offer			
3.2.9	Accuracy : ±0.3% FSD.	Vender to specify			
3.2.10	Control Accuracy : ±1drg.C.	Vender to specify			
3.2.11	Temperatur Repeatability : ±0.5drg.C.	Vender to specify			
3.2.12	Size :	Vender to specify			
3.2.13	Alarm setting : 02.	Vender to specify			
3.2.14	Memory : EEPROM.	Vender to offer			
3.2.15	Tuning : Auto Tuning.	Vender to offer			
3.2.16	Manual Setting of Temperature - in case of failure of auto tuning	Vender to offer			
3.2.17	Quantity:	Vender to specify			
3.3	Over Temperature Controller	Vender to offer			
3.3.1	Type : Digital solid state P.I.D.programmable.	Vender to offer			
3.3.2	Make : Eurotherm / Chino.	Vender to specify			
3.3.3	Range : 0-1200 drg.C	Vender to specify			
3.3.4	Loops : 02	Vender to specify			
3.3.5	Input signal :Universal.	Vender to offer			

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3.3.6	Output signal : On / Off (Replay,5 Amps,230 V AC)	Vender to specify			
3.3.7	Accuracy : $\pm 0.3\%$ FSD.	Vender to specify			
3.3.8	Control Accuracy : ± 1 drg.C.	Vender to specify			
3.3.9	Temperatur Repeatability : ± 0.5 drg.C.	Vender to specify			
3.3.10	Size :	Vender to specify			
3.3.11	Display : Dual Display ,4 digits.	Vender to specify			
3.3.12	Alarm setting : 02	Vender to specify			
3.3.13	Memory : EEPROM.	Vender to offer			
3.3.14	Quantity :	Vender to specify			
3.4	Temperature Recorder:	Vender to offer			
3.4.1	Temperature recorder able to plot the T-T diagram with date and time log and different colours for different thermocouples (Minimum 8 channels).	Vender to offer			
3.4.2	Make : Eurotherm./Chino	Vender to specify			
3.4.3	Range : 0-1200 drg.C	Vender to specify			
3.4.4	Input signal : Universal.field Programmable .	Vender to specify			
3.4.5	Input Power : 220 V AC.	Vender to offer			
3.4.6	Duty: Continuous.	Vender to offer			
3.4.7	Response time : 100 ms	Vender to specify			
3.4.8	No.of Inputs: 06 nos.	Vender to offer			
3.4.9	Data Memory: Compact flash card of minimum 1 GB (Memory card to be supplied by party).	Vender to specify			
3.4.10	Accuracy : $\pm 0.1\%$.	Vender to specify			
3.4.11	LAN Network Capability : Inbuilt.	Vender to specify			
3.4.12	No.of Colour: Eight different for all different inputs.	Vender to specify			
3.4.13	Data Screen: User programmable -Real -Time Trends or Data Screen or Bar graph screen or Dual end screen etc.	Vender to specify			
3.4.14	Display Type : Touch Screen however programming facility with Touch Screen & Key pad.	Vender to offer			
3.4.15	Burn out : Up/down.	Vender to specify			

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3.4.16	Scale & Range : Field selectable .	Vender to specify			
3.4.17	Power Supply : 230 Volt AC.	Vender to specify			
3.4.18	Qty : 2 No..	Vender to specify			
4.0	Electricals	Vender to specify			
4.1	Thyristor /IGBT Power Controller	Vender to offer			
4.1.1	Current : As per zone requirement ,(All the controller shall be exactly similar and rated for zone current for the largest zone.	Vender to specify			
4.1.2	Rated Voltage : 240 V to 690 V line to line (+10%, -15%).	Vender to specify			
4.1.3	Operating Voltage : 100 V to 690 V line to line .	Vender to specify			
4.1.4	Supply frequency : 42Hz to 68Hz with automatic sensing. Unit inhibited outside 40Hz to 70Hz .	Vender to specify			
4.1.5	Auxiliary supply : 240V (+10%, - 15%).	Vender to specify			
4.1.6	Digital communications: a- Physical link: RS422(4 wire)or RS485 (2 or 4 wire) b- Protocol: PROFIBUS c- Baud rate: 9600 or 19200 baud d- Software and cables: All required software and cable for PC/Laptop communication shall be supplied and demonstrated.	Vendor to confirm			
4.1.7	Environment: a- Operating temperature : 0 drg.C to 50 drg.C b- Cooling : Forced cooling with Over-temperature shutdown. c- Humidity: 5% to 95% RH non condensing . d- Enclosure protecrtion : IP20(IEC 529) e- Electrical safety : Compliant with EEC Low Voltage Directive EN61010 installation category 3(voltage transients must not exceed 4.0 KV) f- Electric protection: RC snubber network and varistor . g- Fuses: Built-in high speed fuses for thyristor protection only .Line protection to be provided separately.	Vender to offer			

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4.1.8	Alarms: a- Inhibition Alarms: Loss of one phase of supply ,Under voltage (70% &50% of calibrated operating voltage depending on configuration), Frequency outside 40 to 70 Hz limits,Over current (logic or burst firing), Thyristor short circuit. b. Indicating alarms: Over voltage (indication 20 % above calibrated operating voltage) Partial load failure (PLF),Detection one in four to one in eight parallel indential elements per limb of the three phase load , Load unbalance. c- Alarm indication: Front fascia display,two relays and optional digital communications. d- Alarm acknowledge: External contact to acknowledge alarms and resume normal operation.	Vendor to specify			
4.1.9	Make : Eurotherm/ Siemens	Vendor to offer			
4.1.10	Qty : 14 nos	Vendor to offer			
4.2	Cooling System:	Vendor to offer			
4.2.1	Cooling Rate : 20 ° C to 80 ° C / hrs,adjustable.	Vendor to confirm			
4.2.2	Type: Cold air purging system.	Vendor to confirm			
4.2.3	Method: Through Master temperature controller ID Fan suitable for 1050°C with suitable three phase ,400V±10% AC motor (VFD duty) of Siemens /ABB make and adequately rated VFD drive of Siemens make .	Vendor to provide all details of AC motor and drive			
4.2.4	No.of cooling zones: 04.	Vendor to confirm			
4.2.5	Actuator operated modulation valve i) Input signal: 4-20 mA from master controller ii)Make: Krom Shrodde/ Eclipse/ Honeywell. iii)Quantity: 4 nos.	Vendor to specify			
4.2.6	MS pipeline and ducting for cold air side for completion of the job: 1 set	Vendor to offer			

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4.2.7	AISI-304 SS pipeline and ducting for cold air side for completion of the job: 1 set	Vender to offer			
4.3	Thermocouple:	Vender to offer			
4.3.1	Type: K type triplex with ceramic protective sheet	Vender to specify			
4.3.2	Thermocouples for measuring Job temperature: Six nos of Duplex Type Thermocouples equi-distance distributed along the length of moving furnace bed .	Vender to offer			
4.3.3	Qty.:	Vender to specify.			
4.4	Compensating cables:	Vender to offer			
4.4.1	Type: K type compensation cable.	Vender to offer			
4.4.2	Qty: 1000 Mts or as per actual requirement for each thermocouple .	Vender to specify			
4.4.3	Make: Reputed.	Vender to specify			
4.5	Ammeters : For monitoring line currents for each phase in each zone. Make : Automatic Electric/MECO	Vender to specify			
4.6	Voltmeters : For monitoring line voltages in each zone. Make : Automatic Electric/MECO	Vender to specify			
4.7	Energy Meter : 1 (one) no for input power consumption monitoring	Vender to specify the make			
4.8	Switch Gear Components:	Vender to offer			
4.8.1	Insolation & MCCB : Siemens / L&T / GE	Vender to specify			
4.8.2	Power Contactor and Auxiliary: Siemens / L&T / GE	Vender to specify			
4.8.3	Contactor : Siemens / L&T / GE	Vender to specify			
4.8.4	Fuses with Base : English Electric /L&T	Vender to specify			
4.8.5	Push Botton : Siemens /L&T, 20mm	Vender to specify			
4.8.6	Indicating Lamps: Siemens / L&T 20mm LED Type	Vender to specify			
4.8.7	Annunciation Window : Micro Annunciators	Vender to specify			
4.9	Other Electric Items:	Vender to offer			
4.9.1	Terminals of suitable rating for connecting heater studs outside the furnace .	Vender to specify			

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4.9.2	Copper cabling of proper rating between furnace and control cabinet,lugs etc.	Vender to specify			
4.9.3	Copper cabling of proper rating between furnace and control cabinet to power supplies system.	Vender to specify			
4.9.4	All limit switches required (SIEMENS /L&T)	Vender to specify			
4.9.5	Any other items not mentioned above but required to complete the work.	Vender to specify			
4.10	Instrument and Power Panel:	Vender to offer			
4.10.1	All the above instruments will be housed in an attractively finished sheet steel fabrication stand alone panel cubicle excepting the thermocouples which will be field mounted . The panel will be fully wired up internally	Vender to offer			
4.10.2	Thickness of stel Used: 2 mm thick.cold rolled steel sheet.	Vender to specify			
4.10.3	Cable Entry: Bottom entry in center of the panel.	Vender to offer			
4.10.4	Bus bar : Aluminum , Incoming power bus bar shall run throughout the length of the power panel.	Vender to offer			
4.10.5	Degree of Protection: IP54	Vender to offer			
4.10.6	Paint Shade: Powder coated Siemens Gray.	Vender to offer			

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4.10.7	<p>Panel will be fitted with the following and completely wired:</p> <p>a -MCCB for each zone, Individual MCB's of proper rating for instruments.</p> <p>b-Semiconductor fuses, Other Fuses ,Indicating lamps etc.</p> <p>c-Incoming MCCB of proper rating and fault level ,Power Contactor.</p> <p>d- Bottom entry for incoming supply via bus bar fitted with MCCB and properly supported in the panel with insulation bush.</p> <p>e -1 No. voltmeter 0-500VAC with selector switch for monitoring line voltage .</p> <p>f -Ammeters and voltmeters for monitoring line currents for each phase in each zone.</p> <p>g -Auxiliary Contactor fuses LED Indicating lamps etc.</p> <p>h- Thyristor power controller as above .Bottom entry for Zone supply cable via bus bar.All the zone shall be terminated in bus bar ends in a separate power connections of the furnace. Isolation cum control transformer for furnace control circuit if required.</p>	Vender to specify			
4.10.8	Instrument and Power Panel shall be in separate panels, each fitted with panel AC of adequate rating for proper cooling of the panel . There shall be no condensation of water during AC operation .Cooling system panelshall be separate also. :	Vender to offer			
5.0	Safety Interlocks:				
5.1	Bogie cannot be moved unless the door is fully open.	Vendor to offer			
5.2	Door cannot be lifted unless heating element is OFF.	Vendor to offer			
5.3	Door can be operated only when the bogie is fully inside	Vendor to offer			

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5.4	The furnace heating operation is interlocked with the Bogie and Door operation so that heaters can not be switched on unless the Bogie is inside completely and the Door are closed .There shall be a lockable miantenance mode switch of checking of the heaters during maintenance.	Vendor to offer			
5.5	The temperature controller shall have broken thermocouple feature so that the controller shall stop functioning and give alarm (Visiable) in case of thermocouple failure .	Vendor to offer			
5.6	Over temperature controller will switch OFF the heating element in case of failure of main controller	Vendor to offer			
5.7	All motors will be provided with thermal overload relays along with single phase preventor	Vendor to offer			
5.8	ALARM ANNUNCIATION : In the event of fault condition viz., broken thermocouple, over temperature or motor failure an audiovisual alarm annunciation system comprising hooter and indicating lamps will activate	Vendor to offer			
6.0.	SPARES	Vendor to accept & offer			
6.1	Itemised breakup of mechanical, pneumatic, 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). estimated life of spares also to be given	Vendor to accept & offer			
6.1.1	Vacuum Formed board : 2 nos.	Vendor to accept & offer			
6.1.2	Heating Elements : 4 nos of each type.				
6.1.3	Contact for Element : 100nos	Vendor to accept & offer			
6.1.4	Thyristor : 10 nos as used in drives.	Vendor to offer			
6.1.5	Semicondctor fuse : 20 nos	Vendor to offer			

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6.1.6	MCCB used in Zone control : 1 no	Vendor to offer			
6.1.7	Contactors & Relays : 1 no. of each type used.	Vendor to offer			
6.1.8	Thyristor Drive spares for two years maintenance : 1 nos	Vendor to offer			
6.1.9	Transformers : 1 no. of each type used.	Vendor to offer			
6.2	All types of spares for total Furnace and accessories should be available for at least ten years after supply of the furnace. 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 offer			
6.3	Vendor to confirm that complete list of spares for Furnace 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 furnace.	Vendor to offer			
7.0	SERVICES PROVIDED BY BHEL	Vendor to confirm			
7.1	Input Power Supply : 415 volt \pm 10 % ; 50 Hz., 3 phase, 3 wire A.C.supply.	Vendor to offer			
7.2	Compressed air at a pressure of 5 kg./cm ² gauge	Vendor to offer			
7.3	Termination of electric power cable to incoming of furnace controls's switch-gear panel from BHEL's terminating point .	Vendor to offer			
8.00	REQUIREMENT FOR ELECTRICAL EQUIPMENT	Vendor to confirm			
8.1	Power Supply will be provided by BHEL at a single point near the furnace, 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 Isolation Transformer & Air Compressor etc. , shall be supplied by the vendor.	Vendor to confirm			
8.2	Tropicalisation: All electrical / electronic equipment shall be tropicalized.	Vendor to confirm			

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8.3	All electrical & electronic control cabinets & panels should be dust and vermin proof.	Vendor to confirm			
8.4	All electrical components in the cabinets should be mounted on DIN Rail.	Vendor to confirm			
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			
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			
9.00	SAFETY ARRANGEMENTS Following safety features in addition to other standard safety features should be provided on the machine:	Vendor to offer			
9.1	Furnace should have adequate and reliable safety interlocks / devices to avoid damage to the furnace, job loaded inside furnace and the operator due to the malfunctioning or mistakes. Furnace 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 furnace system should be submitted by the supplier.	Vendor to offer			
9.3	All the rotating parts used on furnace should be statically & dynamically balanced to avoid undue vibrations & noise.	Vendor to offer			

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
9.4	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to offer			
9.5	Oil & water (if any) pipe lines should not run with electrical cable in the same trench.	Vendor to offer			
10.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE : The Furnace system should conform to following factors related to environment :	Vender to confirm			
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 offer			
10.2	There shall not be any hazardous emissions from the furnace during operation.	Vendor to confirm			
10.3	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to accept & confirm			
10.4	Paint of the machine should be oil / coolant resistant and should not get peeled off and mixed up with coolant.	Vendor to confirm			
11.0	DOCUMENTATION : Five sets of following documents (Hard copies) in English language should be supplied along with the machine	Vendor to accept & offer			
11.1	Operating manuals of Heat Treatment furnace.	For vendor's information.			
11.2	Detailed Maintenance manual of the furnace with all mechanical assembly drawings of assemblies/sub-assemblies/parts, electrical circuit diagram, Instrumentation schematics, details of heating elements, Pneumatic circuit diagrams.	Vendor to offer			
11.3	Catalogues, Operation & Maintenance Manuals of all bought out items (including drawings, wherever applicable) like Drives, Thyristor Power Controller, Heating/cooling Controller etc.	Vendor to offer			

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11.4	Detailed specification of all rubber items and pneumatic fittings	Vendor to offer			
11.5	Complete list of parts/items(Bill of materials) used in the furnace in English language.	Vendor to accept			
11.6	Vendor to confirm that complete list of spares for Furnace 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 furnace.	Vendor to accept			
11.7	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to submit			
12.0	PROVE-OUT HEAT TREATMENT OF BHEL COMPONENT	Vendor to submit			
12.1	Vendor shall be fully responsible for heat treatment of proveout component as per heat treatment cycle to the full satisfaction of BHEL.	Vendor to offer			
12.2	Vendor shall be responsible for any deviation/rejection in proveout component due to malfunctioning of the furnace during proveout heat treatment. The cost of such component shall be refunded by the vendor to BHEL in case of rejection of the component.	Vendor to offer			
13.00	TRAINING OF BHEL PERSONAL	Vendor to accept & confirm			
13.1	Training of BHEL furnace operators in operation of complete system & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to accept & confirm			
13.2	Training of BHEL Mechanical maintenance personal in maintenance of complete furnace & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to accept & confirm			
13.3	Training of BHEL Electrical / Instrumentation maintenance personal in maintenance of complete furnace Instrumentation, drives & other accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to accept			

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14.0	<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 furnace system 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 offer & confirm			
16.0	ERECTION & COMMISSIONING	Vendor to accept & confirm			
16.1	Erection & Commissioning of the complete bogie hearth furnace and other accessories/attachments with all electrical & mechanical connections shall also be responsibility of the vendor.	Vendor to accept & confirm			
16.2	Successful proving of BHEL components by the supplier shall be considered as part of commissioning of the furnace . All features and functions, as mentioned at Sl. No.18.0 (Furnace Acceptance) shall also be part of the commissioning activity.	Vendor to accept & confirm			
16.3	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 & confirm			

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
16.4	Commissioning spares, required for commissioning of the complete furnace within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to accept & confirm			
16.5	Schedule of Erection and Commissioning shall be submitted with the offer.				
16.6	Terms & conditions for Erection & Commissioning should be furnished in detail separately by vendor along with offer.				
16.7	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 & confirm			
17.0	AMBIENT CONDITIONS & THERMAL STABILITY				
17.1	Total system 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. 17.4.	Vendor to offer			
17.2	Power Supply (AC): Voltage = 415V \pm 10% of fluctuations , Frequency= 50Hz \pm 3 , No. of phases = 3 phasel.	Vendor to offer			
17.3	Compressed Air Supply : available at Pressure 5 Kg /cm ² gauge.	Vendor to offer			

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17.4	Ambient Operating Conditions: 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 offer			
17.5	Thermal Stability: Thermal Stability of the complete furnace 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			
17.6	The complete furnace 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			
18.0	FURNACE ACCEPTANCE (Tests/Activities to be performed & demonstrated by Vendor at BHEL works while commissioning the furnace)	Vendor to inform			
18.1	Demonstration of all features of the furnace, control system & accessories to the satisfaction of BHEL for efficient and effective use of the furnace.	Vendor to inform			
18.2	Job Proving: The complete furnace should be tested (for the performance of the furnace and all sub systems) by continuously running for 96 hrs to its full capacity (with respect to load and maximum temperature etc.). If any break down occurs during this test, the test should be repeated for 96 hrs from that time.	Vendor to inform			
18.3	Two weeks of supervision by Vendor of independent operation of the furnace by BHEL after job proveout.	Vendor to submit			

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
18.4	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 submit			
18.5	Training of BHEL maintenance personal in maintenance of complete furnace & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to confirm			
19.0	PACKING: Sea worthy & rigid packing for all items of furnace, 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			
20.0	GUARANTEE: Guarantee for complete Furnace and all supplied accessories/attachments/equipments/items for 24 months from the date of acceptance of the machine.	Vendor to comply & submit with the offer			
21.0	GENERAL	Vendor to inform			
21.1	Furnace / Machine Model No.	Vendor to inform			
21.2	Total connected load (KVA)	Vendor to inform			
21.3	Total Space required (Length, Width, Height) for complete furnace and accessories/attachments.	Vendor to inform			
21.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)	Vendor to inform			
21.5	Total weight of the Furnace after erecting at BHEL, Haridwar.	Vendor to submit			
21.6	Weight of the heaviest assembly of the Furnace system.	Vendor to accept & confirm			
21.7	Dimensions of largest part of the Furnace System.	Vendor to submit			

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
21.8	Vendor to submit reference list of customers where similar furnaces have been supplied mentioning broad specifications of the supplied furnace i.e. Model, chamber size, pay load, maximum temperature, year of supply and customer feed back, if any, etc.	Vendor to submit			
21.9	Detailed catalogues, sketches /drawings / photographs pertaining to the offered furnace system and accessories/attachments/items should be submitted with the offer.	Vendor to submit			
21.10	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			
21.11	All Cables and Hoses etc. should be well supported & protected in trays / brackets / drag chains etc.	Vendor to confirm			
22.0	QUALIFYING CONDITIONS				
22.1	Only those vendors, who have supplied and commissioned at least one Big size Electrical Bogie Hearth Furnace of same or higher size for similar applications of stress relieving of fabricated component / casings in the past and such furnace is presently working satisfactorily should quote. The following information should be submitted by the vendor about the companies where similar furnaces have been supplied.However the bidder should be in bussiness of electrically heated furnaces of similar type at present. This is required from all the vendors for qualification of their offer.	Vender to comply and submit with offer			
22.1.1	Name of the customer / company where similar furnace is installed.	Vender to inform			
22.1.2	Complete postal address of the customer.	Vender to inform			
22.1.3	Month & Year of commissioning.	Vender to inform			
22.1.4	Broad specification of the furnace(s) supplied (Chamber Size LxWxH, Max. Payload, Maximum temperature) and application for which the furnace is supplied.	Vender to inform			
22.1.5	Name and designation of the contact person of the customer.	Vender to inform			

SL. NO.	DESCRIPTION OF BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATION	REMARKS
22.1.6	Phone, FAX no. and e-mail address of the contact person of the customer.	Vender to inform			
22.2	Performance certificate from the customers regarding satisfactory performance of furnace 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.	Vender to arrange			
22.3	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.	Vender to accept			0