

	<u>BHARAT HEAVY ELECTRICAL LIMITED</u>			Enquiry No. :	
	<u>UNIT'S ADDRESS:</u>			Due Date :	
	UNIT'S PHONE NO.:			Supplier Qtn. No.:	
	<u>CONTACT PERSON'S NAME/DESGN./PHONE NO./E-MAIL</u> <u>(FROM PURCHASE DEPT.)</u>				
SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR ELECTRIC BOGIE HEARTH FURNACE					
	NOTE:-				
	1. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column 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.				
	2. The offer and all documents enclosed with offer should be in English language only.				
	3. All dimensions are in mm unless otherwise stated.				
ADDRESS OF		ADDRESS OF THE INDIAN AGENTS :			
TELEPHONE		TELEPHONE NOS.:			
FAX NOS.		FAX NOS.:			
E-MAIL ADDRESS		E-MAIL ADDRESS :			

SUPPLY, ERECTION & COMMISSIONING OF ELECTRIC BOGIE HEARTH FURNACE COMPLYING WITH SPECIFICATIONS AS BELOW.					
SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
1.0	PURPOSE & WORKPIECE				
1.1	Purpose: Electrically heated single ended Bogie Hearth Furnace having usable dimension of 2000(L) X 1500 (W)X 1500 (H)mm suitable for handling gross charge load of 8000 kg and 1000°C maximum operating temperature is required for pre-heating stress relieving / annealing / tempering etc. of ferrous components of various grades and sizes as per the preset (adjustable) time-temperature programme.	Vendor to offer			
2.0	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, safety etc. The Furnace should have two nos. circulating Fan for temperature uniformity in the chamber.				
3.0	SPECIFICATIONS:				
3.1	TECHNICAL DATA				
3.1.1	Electrically heated single ended Bogie hearth type furnace				
3.2	GENERAL PARAMETERS				
3.2.1	Batch capacity (Gross Load)	8000 kg (min.)			
3.2.2	Inside chamber dimensions- Length x Width x Height	2000 mm x 1500 mm x 1500 mm			
3.3	Over all dimensions (Indicative) -Length (bogie withdrawn) x Width x Height	Vendor to submit			

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3.3.4	Door opening height	Vendor to submit			
3.3.5	Working height of the Bogie Top : 900 mm (approx.)	Vendor to offer			
3.3.6	Heating rate :200° C./hr. in full load (max.).	Vendor to offer			
3.3.7	Cooling Rate : max. 50 ° C / hr	Vendor to offer			
3.3.8	Maximum Temperature :1000 ° C	Vendor to offer			
3.3.9	Temperature Uniformity in the zone +/- 5 degree C of the set value	Vendor to offer			
3.3.10	Mode of Temperature control :Proportional through Thyristor controls	Vendor to offer			
3.3.11	Make of Thyristor Controller Siemens / Eurotherm				
3.3.12	Model of Thyristor controller	Vendor to submit			
3.3.13	No of control zones - '2 minimum	Vendor to confirm & submit			
3.3.14	Power rating	Vendor to specify			
3.3.15	Furnace outer wall temperature : 25 ° C above ambient temperature (approx.)	Vendor to confirm			
3.4	MECHANICALS				
3.4.1	Casing plate material & thickness : 5 mm (minimum)	Vendor to confirm & submit			
3.4.2	Bogie top plate material & thickness : AISI 310 , 10 mm (min)	Vendor to confirm & submit			
3.4.3	Rail size : 60 lbs/yard (min).	Vendor to confirm & submit			
3.4.4	Bogie Details	Vendor to offer			

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3.4.5	Brick retainer casting : HRCI with 1.2% Cr.	Vendor to offer			
3.4.5	Sealing arrangement : sand sealing	Vendor to offer			
3.4.6	Door details				
3.4.6.1	Drive type : By electric motor. Lifting speed : 4 meters/min (approx) Motor capacity 1 HP (min)	Vendor to offer & confirm			
3.4.6.2	Drive type : Electric through rack & pinion. Speed of bogie movement : 5 meters /min. (approx) Motor capacity 3HP (min)	Vendor to offer & confirm			
3.5	Insulation details for Walls, Roof, Door and Bogie				
3.5.1	Walls, Roof and Door				
3.5.2	Layer-I : 125 mm vacuum formed board , density 200 kg/m3, suitable for 1000drg.C in single thickness of -125 mm Make : Kanthal /Kerfa/ Rescal.	Vendor to offer & confirm			
3.5.6	Layer-II : Ceramic Fiber Blanket (CFB) 128kg/m3 (HTZ Grade) 100 mm thickness Make : Murugappa-Morgan /Unifrax/Llyods	Vendor to offer & confirm			
3.5.7	Layer-III CFB 96 kg/m3(RTZ Grade) 100 mm thickness.	Vendor to offer & confirm			
3.6	Bogie				
3.6.1	Layer-I : 115 mm 50-60% Al2O3 shape bricks of Fe content < 1% CCS(Cold crushing Strength) greater than 450 and sintering Tempemrature >1300 drg.C	Vendor to offer & confirm			

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3.6.2	Layer-II 115 mm IS8 + 75 mm Hot Face Insulation type Bricks.	Vendor to offer & confirm			
3.6.3	Layer-III : 115 mm Cold Face Insulation type Bricks.	Vendor to offer & confirm			
3.6.4	Layer-IV : 40 mm Hysil Block.	Vendor to offer & confirm			
3.7.	Heating Elements	Vendor to offer and submit			
3.7.1	Type: Rod Over Bend ,Non-embedded type.	Vendor to offer and submit			
3.7.2	Size : As per vendors choice	Vendor to offer and submit			
3.7.3	Make : Sandvik / Rescal-France /VDM-Germany/Kerfa-Germany	Vendor to offer and submit			
3.7.4	Material : Fe-Al-Cr with liner temperature co-efficient suitable for 1000drg.C.	Vendor to offer and submit			
3.7.5	Locations : Side walls, Roof, Back wall.	Vendor to offer and submit			
3.7.6	Holding Arrangement : Non conducting pin of 8-10 mm diameter of Fe-Al-Cr,suitable to carry the weight of elements.	Vendor to offer and submit			

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4.0.	INSTRUMENTATION				
4.1.	Programmable temp. controller (Master) Duty : Temp.control of furnace . a) Type : P.I.D. Programmable, universal input b) Make : Eurotherm/Chino/Honeywell/Massibus c) Range : 0 – 1200 Deg. C d) Input signal : Universal e) Display : Dual Display, 5 digits f) Input Power : 220 V AC through Isolation Transformer. g) Output Signal : 4 – 20 mA DC h) Accuracy : $\pm 0.1\%$ FSD i) Control Accuracy : $\pm 1\%$ FSD j) Temp. Repeatability : ± 0.5 Deg. C k) Size : 96 X 96 mm l) Alarm setting : 02 m) Memory : EEPROM n) Ambient Temperature : 0 - 50 Deg. C o) Tuning : Auto Tuning p) Other features : Display of Heating/cooling curve & actual furnace temperature graphically, Minimum 10 Ramp/Sock programming and store option should be available. q) Cascade or 2 loops control option to be available	Vendor to offer & confirm			
	r) Sensor break protection must be provide (upscale or downscale) s) Ethernet or RS 485 communication to be provided. t) Qty : 01 Nos.				

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4.20	<p>Over temperature controller Duty :Protection against over temp.</p> <p>a) Type : Digital solid state P.I.D. Programmable, b) Make : Eurotherm/ Chino/Honeywell/Massibus c) Range : 0 – 1200 Deg. C d) Loops : 02 d) Input signal : Universal. e) Output Signal : On / Off (Relay, 5 Amps, 230 V AC) f) Accuracy : $\pm 0.1\%$ FSD g) Control Accuracy : $\pm 1\%$ FSD h) Temp. Repeatability : ± 0.5 Deg. C i) Size : 96 X 96 X 200 mm j) Display : Dual display 5 digit. k) Alarm setting : 02 l) Memory : EEPROM m) Ambient Temperature : 0 - 50 Deg. C. n) Qty : 01Nos.</p>	Vendor to offer & confirm			

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4.3.	<p>Temperature recorder</p> <p>Duty : Recording of process temp.</p> <p>a) Type : 6 Point Graphic Recorder (Paperless recorder Which produces real time display, stores data on a flash memory card and sends data via ethernet to a remote PC for real time monitoring and display)</p> <p>b) Range : 0-1200 Deg. C</p> <p>c) Input signal : Universal field Programmable</p> <p>d) Input Power : 220V AC</p> <p>e) Duty : Continuous</p> <p>f) Make : Eurotherm / Chino/ Honeywell</p> <p>g) Response time : 100 ms</p> <p>h) No. of inputs : 06</p> <p>i) Data Memory : Compact flash card of minimum 1 GB (Memory card to be supplied by party)</p> <p>j) Accuracy : $\pm 0.1\%$</p> <p>k) LAN Network Capability : Inbuilt</p> <p>l) No. of Colour : Six different for all different inputs</p> <p>m) Data Screen : User Programmable-Real-Time Trends or Data Screen or Bar graph screen or Dual end screen etc</p> <p>n) Burn Out : Up/Down</p> <p>o) Scale & Range : Field Selectable</p> <p>p) Power Supply : 230 Volt AC</p> <p>Qty : 01 Nos</p>	Vendor to offer & confirm			
	Multi Point analyzing/Data Acquisition application software must be supplied along with recorder to see/view the data on PC as & when required.				

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4.4.	Thermocouple Type :Duplex Element : Chromel /Alumel. No.off :8(eight)nos (2 nos. duplex + 6 nos.simplex). Make : Rajput /equivalant make. Compensating cable : 30 meters per T.C. element.	Vendor to offer & confirm			
4.5.	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	Vendor to offer & confirm			
5.0	ELECTRICALS				
5.1	The complete electricals will be designed for 415 V± 10%; 3 phase , 4 wire 50 Hz A.C.	Vendor note & accept			
5.2	Ammeter : 3 nos/zone for measuring line current . Make : AEPL /MECO make.	Vendor to offer & confirm			
5.3	Energy Meter: 1 (one) Digital Energy meter to monitor power consumption- AEPL/MEKO make.	Vendor to offer & confirm			
5.4	Voltmeter : 1 (one) no. with selector switch . Make AEPL /MEKO.	Vendor to offer & confirm			
5.5	Motors for bogie drive :TEFC, squirred cage induction motor, SI duty , class 'F' insulation with single phase preventor.	Vendor to offer & confirm			
5.6	Electrical panel: One no. Mild steel fabrication separate electrical panel will house SCR controllers, Ammeter, Voltmeter, switches, inducting lamps,push buttoms etc.	Vendor to offer & confirm			

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5.7	Cabling: To provide all the power and control cabling except as stated under clause 7.3.	Vendor to offer & confirm			
5.8	Earthing : Earthing of equipment will be done with GI/MS Flat/Wire and will be connected to existing earthing system.	Vendor to offer & confirm			
6.0	Switch Gear Components:				
6.1	Insolation & MCCB : Siemens / L&T / GE	Vendor to offer & confirm			
6.2	Power Contactor and Auxiliary: Siemens / L&T / GE	Vendor to offer & confirm			
6.3	Contactor : Siemens / L&T / GE	Vendor to offer & confirm			
6.4	Fuses with Base : English Electric /L&T	Vendor to offer & confirm			
6.5	Push Button : Siemens /L&T, 20mm	Vendor to offer & confirm			
6.6	Indicating Lamps: Siemens / L&T 20mm LED Type	Vendor to offer & confirm			
6.7	Annunciation Window : Micro Annunciators	Vendor to offer & confirm			
7.0.	Other Electric Items:				
7.1	Terminals of suitable rating for connecting heater studs outside the furnace .	Vendor to offer & submit			
7.2	Copper cabling of proper rating between furnace and control cabinet,lugs etc.	Vendor to offer & submit			

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7.3	Copper cabling of proper rating between furnace and control cabinet to power supplies system.	Vendor to offer & submit			
7.4	All limit switches required (SIEMENS /L&T)	Vendor to offer & submit			
7.5	Any other items not mentioned above but required to complete the work.	Vendor to offer & submit			
8.0.	Instrument and Power Panel:				
8.1.	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	Vendor to offer & submit			
8.2.	Thickness of steel Used: 2 mm thick.cold rolled steel sheet.	Vendor to offer & submit			
8.3	Cable Entry: Bottom entry in center of the panel.	Vendor to offer & submit			
8.4	Bus bar : Aluminum , Incoming power bus bar shall run throughout the length of the power panel.	Vendor to offer & submit			
8.5.	Degree of Protection: IP54	Vendor to confirm			
8.6.	Paint Shade: Powder coated Siemens Gray.	Vendor to confirm			

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9.0	Panel will be fitted with the following and completely wired: a -MCCB for each zone, Individual MCB's of proper rating for instruments. b -Semiconductor fuses, Other Fuses ,Indicating lamps etc. c -Incoming MCCB of proper rating and fault level ,Power Contactor. d - Bottom entry for incoming supply via bus bar fitted with MCCB and properly supported in the panel with insulation bush. e -1 No. voltmeter 0-500VAC with selector switch for monitoring line voltage . f -Ammeters and voltmeters for monitoring line currents for each phase in each zone. g -Auxiliary Contactor fuses LED Indicating lamps etc.	Vendor to offer & confirm			
	h- Vendor power controller as above .Bottom entry for Zone supply cable via bus Vendor 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.				
9.1	Instrument and Power Panel shall be in separate panels, each fitted with cooling fans of adequate rating for proper cooling of the panel .	Vendor to offer & confirm			
10.0	SAFETY INTERLOCKS :				
10.2	Heating element cannot be switched ON unless the bogie is fully inside the furnace and door is closed.	Vendor to confirm			
10.3	Bogie cannot be moved unless the door is open at least 500mm.	Vendor to confirm			
10.4.	Door cannot be lifted unless heating element is OFF.	Vendor to confirm			

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10.5.	Door can be operated only when the bogie is fully inside	Vendor to confirm			
10.6.	All motors will be provided with thermal overload relays along with single phase preventor	Vendor to confirm			
10.7.	Over temperature controller will switch OFF the heating element in case of failure of main controller	Vendor to confirm			
11.0.	ALARM COMMUNICATION : In the event of fault condition viz., over temperature or motor failure an audiovisual alarm communication system comprising hooter and indicating lamps will activate	Vendor to confirm			
12.0.	SERVICES PROVIDED BY BHEL				
12.1.	Input Power Supply : 415 volt \pm 10 % ; 50 Hz., 3 phase, 4wire A.C.supply.	Vendor to note & accept			
12.2.	Compressed air at a pressure of 5 - 6 kg./cm ² gauge	Vendor to note & accept			
12.3.	Termination of electric power cable to incoming of furnace controls's switch-gear panel from BHEL's terminating point .	Vendor to note & accept			

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13.0.	REQUIREMENT FOR ELECTRICAL EQUIPMENT				
13.1.	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 Voltage Stabilizer & Isolation Transformer etc. , shall be supplied by the vendor.	Vendor to note & confirm			
13.2.	Tropicalisation: All electrical / electronic equipment shall be tropicalized.	Vendor to confirm			
13.3.	All electrical & electronic control cabinets & panels should be dust and vermin proof.	Vendor to confirm			
13.4.	All electrical components in the cabinets should be mounted on DIN Rail and should be of standard make such as L&T , Siemens etc.	Vendor to confirm			
13.5.	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 confirm			
13.6.	All motors shall conform to IEC or Indian Standards	Vendor to confirm			

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13.7.	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 confirm			
14.0.	SAFETY ARRANGEMENTS Following safety features in addition to other standard safety features should be provided on the machine:	Vendor to confirm			
14.1	A detailed list of all alarms / indications provided on furnace system should be submitted by the supplier.	Vendor to confirm			
14.2	All the rotating parts used on furnace should be statically & dynamically balanced to avoid undue vibrations & noise.	Vendor to confirm			
14.3	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to confirm			
14.4	Oil & water pipe lines should not run with electrical cable in the same trench.	Vendor to confirm			
15.0	ENVIRONMENTAL PERFORMANCE OF THE MACHINE : The Furnace system should conform to following factors related to environment :	Vendor to confirm			
15.1	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			

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15.2	There shall not be any hazardous emissions from the furnace during operation.	Vendor to confirm			
15.3	No hazardous chemicals shall be required to be used in the furnace.	Vendor to confirm			
15.4	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to confirm			
15.5	Paint of the furnace should be oil / heat resistant and should not get peeled off and mixed up with oil.	Vendor to confirm			
16.0	SPARES :				
16.1	Itemised breakup of mechanical, pneumatic, electrical and electronic spares and heating elements used on the furnace 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)	Vendor to offer & confirm			
16.2	Electrical /Electronic Spares : Following Spares are to be offered.	Vendor to offer & confirm			
16.3	Vacuum Formed board with heating element - 2 nos.of each type used in the furnace.	Vendor to offer & confirm			
16.4.	Heating Elements : 06 nos of each type.	Vendor to offer & confirm			

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16.5.	Connecting rods for Element : 50nos	Vendor to offer			
16.6.	Thyristor : 06 nos as used in drives.	Vendor to offer			
16.7.	Semiconductor fuse : 06 nos	Vendor to offer			
16.8.	MCCB used in Zone control : 1 no	Vendor to offer			
16.9.	Contactors & Relays : 1 no. of each type used.	Vendor to offer			
16.10.	Thyristor Drive spares for two years maintenance : 1 nos	Vendor to offer			
16.11	Transformers : 1 no. of each type used.	Vendor to offer			
16.12.	RTD temperature transmitter (1 No each type)	Vendor to offer			
16.13	Push Buttons (5 Nos each type)	Vendor to offer			
16.14.	Indicating Lamps (10 Nos each type)	Vendor to offer			
16.15.	Semiconductor Fuses (5 Nos each type)	Vendor to offer			
16.16.	Main Power Switch (1 No each type)	Vendor to offer			
17.0	Complete drive controller.	Vendor to offer			
17.1	Thermocouple (2 nos each type)	Vendor to offer			
17.2	Programmable temperature controller (1 no. each type)	Vendor to offer			

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17.3	Mechanical & Pneumatic Spares : Following Spares are to be offered.	Vendor to offer			
17.3.1	All types of filter inserts of disposal type (20 nos. each type)	Vendor to offer			
17.3.2	All types of pneumatic valves, pressure switches and flow switches (1 no. of each type)	Vendor to offer			
17.3.3	All types of O-rings & Pneumatic Hoses (1 set of each type)	Vendor to offer			
17.4	All types of spares for total Furnace 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 offer			
17.5	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			
17.6	DOCUMENTATION : Three sets of following documents (Hard copies) in English language should be supplied along with the machine	Vendor to offer			
18.0	Operating manuals of Heat Treatment furnace.	Vendor to offer			

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18.1	Detailed Maintenance manual of the furnace with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic circuit diagrams. All Assembly/ Sub Assembly Drawings shall be supplied with the part list also.All Electrical schematic , wiring diagram ,cable layout and junction box diagram, circuit diagram and interface diagram of Electronic PCB's used in the Furnace.	Vendor to offer			
19.0	Catalogues, Operation & Maintenance Manuals of all bought out items including drawings, wherever applicable.	Vendor to offer			
19.1	Detailed specification of all rubber items and pneumatic fittings	Vendor to offer			
20.0.	Complete list of parts/items(Bill of materials) used in the furnace in English language.	Vendor to offer			
20.1	One additional set of all the above documentation on CD ROM, wherever possible.	Vendor to offer			
20.2.	Calibration certificate of all controllers is required.	Vendor to offer			
21.0	PROVE-OUT HEAT TREATMENT OF BHEL COMPONENT	Vendor to offer			
21.1	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			
21.2	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			

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22.0	TRAINING OF BHEL PERSONNEL				
22.1	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 offer & confirm			
22.2	Training of BHEL maintenance personnel in maintenance of complete furnace & accessories etc by the supplier's experts / engineers during their stay at BHEL works.	Vendor to offer & confirm			
22.3	Training of BHEL Instrumentation personnel in programming and maintenance of controller in detail to be provided at company's specialised training center or at BHEL works by suppliers experts/engineers.	Vendor to offer & confirm			
23.0	FOUNDATION				
23.1	Vendor shall submit the foundations layout drawings giving load points,static/ dynamic loading for BHEL's approval within one month from the date of Letter of Intent (LOI) or Purchase Order, whichever is earlier.	Vendor to confirm			
23.2	Foundation of the machine will be designed by BHEL and will be concurred by the supplier.	Vendor to confirm			
23.3	Construction of foundation will be carried out by BHEL under the supervision of supplier/ supplier representative.	Vendor to confirm			
24.0	ERECTION & COMMISSIONING				
24.1	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 confirm			

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24.2	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 (Machine Acceptance) shall also be part of the commissioning activity.	Vendor to note & accept			
24.3	Tools, Tackles, instruments and other necessary equipment required to carry out all erection & commissioning activities should be arranged and brought by the supplier.	Vendor to confirm			
24.4	Commissioning spares, required for commissioning of the complete furnace within stipulated time, shall be brought by the supplier on returnable basis.	Vendor to confirm			
24.5	Terms & conditions for Erection & Commissioning should be furnished in detail separately by vendor along with offer.	Vendor to confirm			
24.6	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 confirm			
25.0	AMBIENT CONDITIONS & THERMAL STABILITY				
24.1	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 confirm			
24.2	Power Supply (AC): Voltage = 415V \pm 10% of fluctuations , Frequency= 50Hz \pm 3% , No. of phases = 3 phase with neutral.	Vendor to note & accept			

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24.3	Compressed Air Supply : available at Pressure 3 - 6 Kg /cm ² gauge.	Vendor to note & accept			
25.0	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 note & accept			
25.1	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 confirm			
25.2	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 confirm			
26.0	MACHINE ACCEPTANCE (Tests/Activities to be performed & demonstrated by Vendor at BHEL works while commissioning the furnace)	Vendor to confirm			
26.1	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 confirm			
26.2	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 confirm			

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
26.3	Two weeks of supervision by Vendor of independent operation of the furnace by BHEL after job proveout.	Vendor to confirm			
26.4	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 confirm			
26.5	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			
27.0	PACKING				
27.1	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 confirm			
28.0	GUARANTEE				
28.1	Guarantee for complete Furnace and all supplied accessories/attachments/equipments/items for 24 months from the date of acceptance of the machine.				

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
29.0	QUALIFYING CONDITIONS:-				
29.1	Only those vendors, who have supplied and commissioned at least one furnace of same or higher sizes for similar applications of stress relieving of fabricated components / casings in the past and such furnace is presently working satisfactory 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 business of electrically heated furnaces of similar type at present. This is required from all the vendors for qualification of their offer.	Vendor to comply and submit with offer			
29.1.1	Name of the customer / company where similar furnace is installed.	Vendor to inform			
29.1.2	Complete postal address of the customer.	Vendor to inform			
29.1.3	Month & Year of commissioning.	Vendor to inform			
29.1.4	Board specification of the furnace (s) supplied (Chamber size L x W x H, Max. Payload , Maximum temperature) and application for which the furnace is supplied.	Vendor to inform			
29.1.5	Name and designation of the contact person of the customer.	Vendor to inform			
29.1.6	Phone, FAX no. and e-mail address of the contact person of the customer.	Vendor to inform			
29.1.7	Performance certificate from the customer 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.	Vendor to arrange			
29.1.8	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 accept			
30.0	GENERAL				

SL.NO.	DESCRIPTION FOR BHEL REQUIREMENT	REQUIRED	OFFERED	DEVIATIONS	REMARKS
30.1	Furnace / Machine Model No.				
30.2	Total connected load (KVA)				
30.3	Total Space required (Length, Width, Height) for complete furnace and accessories/attachments.				
30.4	Painting of Machine / Electrical Panels : RAL 6011 Apple Green (Polyurethane Paint)				
30.5	Total weight of the Furnace after erecting at BHEL, Hardwar.				
30.6	Weight of the heaviest assembly of the Furnace system.				
30.7	Dimensions of largest part of the Furnace System.				
30.8	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.				
30.9	Detailed catalogues, sketches /drawings / photographs pertaining to the offered furnace system and accessories/attachments/items should be submitted with the offer.				
30.10.	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.				
30.11.	All Cables and Hoses etc. should be well supported & protected in trays / brackets / drag chains etc.All the power / control cables used in the furnace should be of copper of reputed make.				