



# BHARAT HEAVY ELECTRICALS LIMITED

( A Government of India Undertaking )  
HIGH PRESSURE BOILER PLANT  
PURCHASE DEPARTMENT - FOSSIL BOILERS  
THIRUCHIRAPALLI - 620014  
TAMILNADU (INDIA)

PHONE :2577645  
GRAMS : BHARATELEC  
FAX NO: 2520719  
E-mail: srchandran@bheltry.co.in  
Web:

429-002/A

	<b>Enquiry No</b>  2691500017 - 41	<b>Enquiry Date</b>  12.02.2015	<b>Due Date for Quotation</b>  07.03.2015
Please quote Enquiry No, Date and due date in all correspondences. This is only a request for quotation and not an order			

Item	Description	Unit	Quantity	Delivery Quantity	Schedule Date
10	High Temperature 1300 deg C Electric Bogie Hearth Furnace 1.Purpose: Electrically heated single ended Bogie Hearth Furnace having usable dimension of 750(L) X 750 (W) X 750 (H) mm suitable for handling gross charge load of 1 MT and maximum operating temperature 1300°C is required for heating treatment (stress reliving / annealing / tempering etc) of ferrous and non-ferrous components of various grades and sizes as per the pre-set (adjustable) time-temperature programme. 2. GENERAL SPECIFICATION Furnace type: Bogie Type Furnace Working Chamber dimensions Depth : 750 mm Width : 750 mm Height : 750 mm Design Temperature: 1300 Deg C Working Temperature: 1270 Deg C Type of elements: Kanthal Globar SD Silicon Carbide Heating elements. Power rating and energy calculation should be submitted by vendor Withstands weight up to : 1 Tons minimum Maximum rate of rise of temperature : 15 Deg C per minute up to 1000 deg C, then 6 Deg C per minute from 1000 deg C to 1300 Deg C. No of control zones: should be given by vendor Main Temperature Controller: PID Type Microprocessor base 7 Sigmets 4-20mA DC, RS 232C (Make -Eurotherm) Number and Type of thermocouple: Four numbers of R-Type Thermocouple. Type of temperature control: Automatic PID type by means of Thyristor Furnace temperature Uniformity: +/- 5 Deg C at maximum operating temperature at the end of two hours soaking. Furnace excess temperature controller: One number provided as safety to cut off power to heating elements in case of	NO	1.000	1.00	08.04.15

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The offers will be opened at 14.30 hrs on the due date of tender in the presence of tenderers who have submitted their offer and who may like to be present for the tender opening.Late and delayed offers are liable to be rejected.

Yours faithfully,  
For **BHARAT HEAVY ELECTRICALS LIMITED**

*[Signature]*  
D. CHANDRAMOHAN  
Senior Manager / MM / RM MANAGER / PURCHASE  
Purchase / CP & SP (FOSSIL BOILERS)  
BHEL, TIRUCHY - 620 014. Yours faithfully,



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excess temperature condition.  
Safety features Excess temperature protection:  
Thermocouple broken indication Limit switch to cut off heaters while opening door. Earthing terminal to avoid electrical current leakage.  
Power supply: 415 V, +/- 10%, Three phase supply.  
Type of Insulation: Ceramic fiber board of 1400, 1260 & 1000 Grade.  
Forced air insulation: Provided to reduce skin temperature.  
Location of vapour vent Located at the top of the furnace  
Stand Height: 3 feet height suitable to base of the furnace made of 40mm thick 'L' angle  
3. FURNACE CASING:-  
The furnace shall be duly fabricated in two stage pattern. The inner structure will hold all insulation material and the outer casing shall hold the inners structure and the control panel. If required, there shall be forced air circulation between the outer and inner casing to reduce the skin temperature. Door front plate will be made of High temperature steel plates to withstand heat flux during opening and closing.  
4. INSULATION:-  
The hot face insulation shall be fiber ceramic boards of 1400 grade. These shall be backed up by fiber ceramic boards of 1260 and 1000 grades. Boards should have lower thermal mass than bricks and hence help in faster ramping. They also should have good insulation properties leading to lower skin temperature. The supplier shall also provide forced air insulation between the outer and inner casing to bring the skin temperature down to a minimum.  
5. DOOR  
The furnace shall be provided with a vertical opening door having a moving mechanism. The door shall be insulated like side walls to reduce heat loss. Manual screw type clamps shall be provided for proper sealing of door in closed condition. Limit switch shall be provided to ensure switching off the heaters once the door is opened.  
Door details  
Drive type : By electric motor.  
Lifting speed : 4 meters/min (approx)

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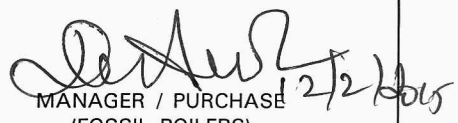
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Motor capacity 1 HP (or above)  
Drive type :  
For Bogie: Electric through rack and pinion.  
Speed of bogie movement : 5 meters /min.  
(approx)  
Motor capacity 3HP (or above)  
For Doors: Chain Sprocket/Rope Pulley (Details of rope shall be provided by vendor. In no case lifting door rested on rope should sag  
6. HEATING ELEMENT :  
The chamber furnace shall be equipped with Kanthal Globar SD Silicon Carbide elements. Manufacture certificate should be submitted in original  
7. THYRISTOR :  
Suitable Thyristor Power controller (Make - Eurotherm) for the above controller  
8. TEMPERATURE CONTROL AND RECORDING SYSTEM  
Furnace shall be provided with single zone automatic Temperature control system consisting of following equipment.  
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 to 1350 Deg. C (or above)  
d) Input signal: Universal  
e) Display: Dual Display, 5 digits  
f) control 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:  $\pm 0.5$  Deg. C  
k) Alarm setting: 02  
l) Memory: EEPROM  
m) Ambient Temperature: 0 - 50 Deg. C  
n) Tuning: Auto Tuning  
o) Other features: Display of Heating/cooling curve & actual furnace temperature graphically, Minimum 10 Ramp/Sock programming and store option should be available.  
p) Cascade or One/two loops control option to be available  
q) Suitable for R-Type Thermocouple Over temperature controller  
Duty: Protection against over temp.  
a) Type: Digital solid state P.I.D. Programmable,  
b) Make: Eurotherm/ Chino/Honeywell/Massibus  
c) Range: 0 - 1500 Deg. C (or above)  
d) Loops: One/two loop  
e) Input signal: Universal.  
f) Output Signal: On / Off (Relay, 5 Amps, 230 V AC)  
g) Accuracy:  $\pm 0.1\%$  FSD

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- g) Control Accuracy:  $\pm 1\%$  FSD  
h) Temp. Repeatability:  $\pm 0.5$  Deg. C  
i) Display: Dual display 5 digit.  
j) Alarm setting: 02  
k) Memory: EEPROM  
l) Ambient Temperature: 0 - 50 Deg. C.  
m) Suitable for R-Type Thermocouple  
Temperature recorder  
Duty: Recording of process temp.  
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)  
b) Range: 0-1350 Deg. C (or above)  
c) Input signal: Universal field Programmable  
d) Input Power: 220V AC  
e) Duty: Continuous  
f) Make: Eurotherm / Chino/ Honeywell  
g) Response time: 100 ms or better  
h) No. of inputs: 06  
i) Data Memory: Compact flash card of minimum 16 GB (Memory card to be supplied by party)  
j) Accuracy:  $\pm 0.1\%$   
k) LAN Network Capability: Inbuilt  
l) No. of Colour: Six different for all different inputs  
m) Data Screen: User Programmable-Real-Time Trends or Data Screen or Bar graph screen or Dual end screen etc  
n) Burn Out: Up/Down  
o) Scale and Range: Field Selectable  
p) Power Supply: 230 Volt AC  
q) Suitable for R-Type Thermocouple Multi Point analysing/Data Acquisition application software must be supplied along with recorder to see/view the data on PC as & when required.  
Thermocouple  
Type: Duplex  
Element: Pt. 13% Rh. /Pt.  
No.of :4(four)nos (1 nos. duplex + 3 nos.simplex).  
All the above instruments will be housed in an attractively finished sheet steel fabrication standalone panel cubicle excepting the thermocouples which will be field mounted. The panel will be fully wired up internally.  
9. SAFETY INTERLOCKS:  
a) Heating element cannot be switched ON unless the bogie is fully inside the furnace and door is closed.  
b) Bogie cannot be moved unless the door is open at least 500mm.  
c) Door cannot be lifted unless heating element

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is OFF.

d) Door can be operated only when the bogie is fully inside

e) All motors will be provided with thermal overload relays along with single phase preventer

f) Over temperature controller will switch OFF the heating element in case of failure of main controller

## 10. ALARM COMMUNICATION:

In the event of fault condition viz., over temperature or motor failure an audio visual alarm communication system comprising hooter and indicating lamps will activate

## 11. ELECTRICAL

The furnace shall be provided with one number Instrument cum Control panel. The panel shall house all the temperature control instruments, ammeter, volt meter, energy meter and on/off switch for supply power to heating elements.

## 12. SPARES:

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)

Electrical /Electronic Spares: Following Spares are to be offered.

a) Vacuum Formed board with heating element - 2 nos. of each type used in the furnace.

b) Heating Elements: 06 nos of each type.

c) Connecting rods for Element: 50nos

d) Thyristor : 01 nos as used in drives.

e) Semiconductor fuse: 06 nos

f) MCCB used in Zone control: 1 no

g) Contactors and Relays: 1 no. of each type used.

h) Transformers: 1 no. of each type used.

i) RTD temperature transmitter (1 No each type)

j) Push Buttons (5 Nos each type)

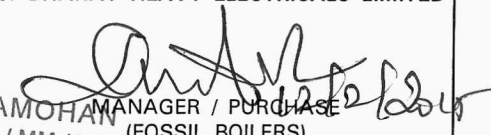
k) Indicating Lamps (10 Nos each type)

## 13. QUALIFYING CONDITIONS:-

Only those vendors, who have supplied and commissioned at least 1000 Deg C or higher temperature Box/bogie furnace for similar applications of heat treatment of fabricated components/casings in the past ten years (on the date of opening of tender) and such

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furnace is presently working satisfactory for more than six months after commissioning (on the date of opening of tender), should quote. The following information should be submitted by the vendor about the companies where similar furnaces have been supplied. This is required from all the vendors for qualification of their offer.

- a),,Name of the customer / company where similar furnace is installed.
- b),,Complete postal address of the customer.
- c),,Month & Year of commissioning.
- d),,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.
- e),,Name and designation of the contact person of the customer.
- f),,Phone, FAX no. and e-mail address of the contact person of the customer.
- g),,Performance certificate from the customer regarding satisfactory performance of furnace supplied to them (Original Certificate or Through E-mail directly from the customer).
- h),,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.

14. MACHINE ACCEPTANCE (Tests/Activities to be performed and demonstrated by Vendor at BHEL works while commissioning the furnace)  
The complete furnace should be tested (for the performance of the furnace and all sub systems) by continuously running for 24 hrs to its full capacity (with respect to 1 Ton and 1250 Deg C temperature). If any break down occurs during this test, the test should be repeated for 24 hrs from that time.

Uniformity of furnace will be tested by positioning external thermocouple at 75 mm from the side wall, roof and top locations of the furnace.

Two weeks of supervision by Vendor of independent operation of the furnace by BHEL after job prove out.

#### 15. FOUNDATION

- a) Vendor shall submit the foundations layout drawings giving load points static/ dynamic loading for BHEL's approval within one month from

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the date of Letter of Intent (LOI) or Purchase Order, whichever is earlier.

b) Foundation of the machine will be designed by BHEL and will be concurred by the supplier.

c) Construction of foundation will be carried out by BHEL under the supervision of supplier/ supplier representative.

#### 16. ERECTION and COMMISSIONING

a) Erection and Commissioning of the complete bogie hearth furnace and other accessories/attachments with all electrical and mechanical connections shall also be responsibility of the vendor.

b) 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 Machine Acceptance shall also be part of the commissioning activity.

c) Tools, Tackles, instruments and other necessary equipment required to carry out all erection and commissioning activities should be arranged and brought by the supplier.

d) Commissioning spares, required for commissioning of the complete furnace within stipulated time, shall be brought by the supplier on returnable basis.

e) Terms and conditions for Erection and Commissioning should be furnished in detail separately by vendor along with offer.

f) 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.

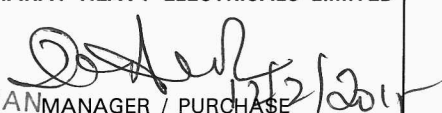
#### 17. TRAINING OF BHEL PERSONNEL:

a) Training of BHEL furnace operators in operation of complete machine & accessories etc by the supplier's experts / engineers during their stay at BHEL works.

b) Training of BHEL maintenance personnel in maintenance of complete furnace and accessories etc by the supplier's experts / engineers during

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their stay at BHEL works.

c) 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.

#### 18. GUARANTEE:

Guarantee for complete Furnace and all supplied accessories/attachments/equipments/items for 18 months from the date of acceptance of the machine.

#### 19. DOCUMENTATION:

- a) Three sets of following documents (Hard copies) in English language should be supplied along with the machine
- b) Operating manuals of Heat Treatment furnace.
- c) 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.
- d) Catalogues, Operation and Maintenance Manuals of all bought out items including drawings, wherever applicable.
- e) Detailed specification of all rubber items and pneumatic fittings
- f) Complete list of parts/items (Bill of materials) used in the furnace in English language.
- g) One additional set of all the above documentation on CD ROM, wherever possible.
- h) Calibration certificate of all controllers is required

High Temperature Furnace

#### General Note:

PL. SUBMIT YOUR OFFER ON F.O.R - BHEL, TRICHY (TAMILNADU) BASIS AND IN TWO PART (TECHNO-COMMERCIAL BID AND PRICE BID) IN A SEPARATE COVER.

IF THE OFFER IS SUBMITTED IN SIGNLE PART AND THE SAME WILL BE LIABLE FOR REJECTION.

ANNEXURE-III ENCLOSED HERewith MUST BE FILLED, SIGNED AND SUBMITTED ALONG WITH YOUR OFFER.

THIS TENDER IS HOSTED IN BHEL WEBSITE VIDE NIT REF. \_\_\_\_\_ DT. \_\_\_\_\_  
AND ANY CORRIGENDUM MAY PL BE VIEWED IN THE BHEL WEBSITE (HTTP://

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ENCLOSURE: ANNEXURE - III

MSME VENDOR GIDE LINES WILL BE FOLLWDED FOR THIS TENDER

**Enclosures:**

"LD clause has to be confirmed without fail."

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# COMMERCIAL TERMS& CONDITIONS

# ANNEXURE-III(m)

Bharat Heavy Electricals Limited, Tiruchirapalli – 620 014, Tamilnadu

MM: CP & SP

(Check List - to be filled and submitted along with Techno-Commercial Bid)

Sl. No.	BHEL Commercial Terms and Conditions for Indigenous Supplies	Vendor's Confirmation / Comments
1	Bid should be submitted in <b>Two Parts</b> . 1. Techno-commercial Bid (Part-I) and 2. Price Bid (Part-II) in a <b>separate sealed cover and both the covers must be placed in a Third Cover and Sealed. Our Enquiry No., Enq. Date &amp; Enq. Due date must be written on all Three covers</b>	
2	Technical confirmation to BHEL's Specification shall be furnished. If needed additional sheets shall be used.	
3	<b>Prices shall be quoted item wise only.</b>	
4	Delivery INCO TERMS- Price quoted <b>-FOR BHEL TRICHY, STORES or ex- WORKS Basis or, FOR WORKS (DESPATCHING STATION)</b> <b>In case of EX works / FOR WORKS basis, indicate the Despatching station.</b>  Prices shall be quoted on <b>"FIRM PRICE"</b> basis only.	
5	<b>Validity of offer</b> shall be for a minimum period of 120 days from the date of Tender opening	
6	<b>Delivery period</b> from the date of Letter of Intent / Purchase order	
7	Liquidated damages shall be 0.5% of the total order value per week or part thereof subject to a maximum of 10% of the total order value. For staggered delivery schedule, LD shall be 0.5% of the undelivered portion per week of the delay or part thereof subject to a maximum of 10% of the total order value. Any deviation from the above LD clause, loading will be applied to the extent to which it is not agreed by the bidder (at offered value).	
8	<b>Payment term for supply portion:</b> Payment term is 100% direct payment after 45 days from the date of receipt and acceptance of materials. <b>Note:</b> Only Direct Payment after goods receipt & acceptance will be accepted .Above payment term acceptance is essential for consideration of your offer  <b>Any deviation in the above payment term will attract loading as mentioned below.</b> <b>"Base rate of SBI (as applicable on the date of bid opening. Techno-commercial bid opening in case of two part bids) + 6% shall be considered for loading for the period of relaxation sought by bidders.</b>  Payment through Bank is not preferred. In case of Payment through Bank is opted by Supplier, BHEL prefers documents submission through bank with copy of LR and door delivery of Goods to Stores with Consignee copy attached. In this case Loading will be 3% on the offered value. Offers of indigenous Suppliers with payment terms as <b><u>LC/Advance Payment are liable for rejection.</u></b> <b>Important Note: BHEL will consider the ranking after the loading is applied as referred vide Sl. No. 7&amp; 8 above wherever deviations are observed.</b>	
9	<b>Following Risk Purchase clause</b> shall be applicable: The purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or dispatch within the time stipulated or if the same were not available, the best and the nearest available substitute therefore. The supplier shall be liable for any loss which the Purchaser may sustain by reason of such risk purchases.	
10	<b>Erection / commissioning: (if applicable only)</b> Erection / commissioning charges if any has been mentioned in the offer or else confirmation that Erection / commissioning shall be done at free of cost is available in the offer.	
11	The equipment shall be guaranteed as per tender condition from the date of receipt & acceptance./(commissioning (commissioning date ,if applicable as per tender condition)  Normally No deviation permitted and the <b><u>deviated offers are liable for rejection.</u></b>	

# COMMERCIAL TERMS& CONDITIONS

# ANNEXURE-III(m)

12	Equipment will be inspected at vendor's works prior to dispatch if applicable. However final inspection and acceptance of equipment will be after installation at BHEL, Trichy, Tamilnadu.	
13	The vendor shall provide necessary drawings, Test Certificates and Operating Maintenance Manuals etc., as called for in the Technical Specification, in the required number of copies at no extra cost.	
14	Any warranty replacement during warranty period shall be supplied free of charge on FOR BHEL, Trichy, Tamilnadu basis.	
15	Performance Bank Guarantee, if applicable as per tender condition. Normally No deviation permitted and the <b><u>deviated offers are liable for rejection.</u></b>	
<b>OTHER DETAILS REQUIRED</b>		
16	% of Excise Duty with cess	
17	% of TAX (VAT) (TNGST with FORM-17)	
18	% of TAX (VAT) without form	
19	% of TAX (CST) (CST with C-FORM)	
20	% of TAX (CST) without form	
21	Packing & Forwarding Charges ( <b>in % only</b> )	
22	Freight& transit insurance charges, if any( <b>in % only</b> ) Freight charges from Dispatching station to BHEL, Tiruchirapalli (Note: If the delivery terms is Ex Works the materials has to be sent through BHEL approved carrier only ,in this case the freight will be borne by BHEL)	
23	Approximate Net weight of the total consignment	
24	Approximate Gross weight of the total consignment	
25	Approximate Dimensions of the Consignment	
26	Name of the contact person	
27	Land Line Number	
28	Fax Number	
29	Mobile Number	
30	E-mail ID	
31	PAN No.	
32	CST No.	TIN No.

**a) It is confirmed that all the terms and conditions stipulated in the Enquiry have been fully understood by us and all clarifications & details have been obtained.**

**b) Applicable % of ED, Sales Tax -CST or VAT, Service Tax), Freight, Insurance and Installation and Commissioning Charges etc., are indicated in offer.**

**Full postal Address:**

**Signature & Office Seal of the vendor**

**Note:-**

**Your specific acceptances to our Payment terms, LD & Risk Purchase (RP) Clause are essential for consideration of your offer. Otherwise your offer is liable for rejection.**

**No row shall be left blank. Please indicate NA, in case the item is "not applicable"**