

<b>DETAIL</b>	<b>INFORMATION</b>
Contact Person and Address	M.NALLATHAMBI SENIOR MANAGER / CCDP PURCHASE DEPARTMENT/R&D and CR UNIT – HPBP BHEL, TIRUCHY, INDIA PIN : 620 014
Email	mnthambi@bheltry.co.in
Telephone	0091-431-257 7558, 257 7152
Fax	0091-431-2520696, 2520193
Notification (Reference) No.	2821500016 – CR Dt. 07/07/2015
Tender Title	SUPPLY OF QUARTZ TUBE REACTOR (250X500)
Tender Type	BUY – Two Part
Brief Description	Supply of Quartz Tube Reactor (250x500) as per the specification, qualifying criteria, commercial terms and conditions enclosed
Published in Newspaper	NO
Published On	--
Tender Value in Rs	--
EMD Value - Rs	NIL
Document Cost- Rs	NIL
Date of Issue of Notification -DD/MM/YY	
Date for Closure of Sale of Forms - DD/MM/YY	Not Applicable
<b>Completed Forms to be submitted by - DD/MM/YY</b>	<b>11/08/2015 : 14.00 Hrs IST</b>
<b>Date of Opening for Technical Bids - DD/MM/YY</b>	<b>11/08/2015 : 14.30 Hrs IST</b>

**Note:**

*If the due date of tender opening happens to be a holiday, the tenders will be opened on the next working day.*

*All clarification may be sought at least seven days prior to tender due date from the undersigned with due written request.*

*Corrigendum if any, with respect to this tender will be hosted only in the website <http://www.bhel.com> (or) <http://tenders.gov.in>. You are requested to visit the website regularly for updates.*

*The offer should reach this office on or before the due date & we are not responsible for any postal delay. Late tender will not be considered.*



429-002/A

**BHARAT HEAVY ELECTRICALS LIMITED**

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

2577152

PHONE ~~2577222~~  
GRAMS : BHARATELEC  
FAX NO: 2520696  
E-mail: ssraj@bheltry.co.in  
Web:

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	<b>Enquiry No</b>	<b>Enquiry Date</b>	<b>Due Date for Quotation</b>
	2821500016 - CR	07.07.2015	11.08.2015
<p>Please quote Enquiry No, Date and due date in all correspondences. This is only a request for quotation and not an order. <b><i>Bid should be submitted in two parts. 1.Techno-commercial bid (Part-I) and 2.Price bid(Part-II) in a separate sealed cover and both 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.</i></b></p>			

Item	Description	Unit	Quantity	Delivery Quantity	Schedule Date
10	QUARTZ TUBE REACTOR (250X500) as per the enclosed specification	NO	1.000	1.00	26.10.15

**General Note:**


## NOTE :

- 1) Offer will be invited in TWO PART BID only  
(Technical bid and Price bid - Two separate covers- "TECHNICAL BID" Cover and "PRICE BID" Cover).
- 2) If regretted make mention on the top of the reply cover as "REGRETTED".
- 3) LD Clause for delivery has to be confirmed without fail. Otherwise we would assume that you have accepted our LD Clause.
- 4) BHEL preferred payment term is "100% direct Payment after 45 days from the date of receipt and acceptance of the material". This payment term acceptance is essential for consideration of your offer. Offer with advance payment or proforma invoice will not be considered.
- 5) Transport and Delivery at BHEL - shall be Vendor's scope.
- 6) Tender details are also hosted in BHEL Web : [www.bhel.com](http://www.bhel.com).
- 7) No Revision of prices will be entertained after the tenders are opened.
- 8) Offer validity should be minimum 60 days from the date of opening, otherwise we are not in a position to consider your offer.
- 9) Kindly submit point wise compliance to our Terms & Condition. Otherwise it will be presumed that you are accepting BHEL's terms and conditions.
- 10) Test certificate and Guarantee certificate is required.

The offers should reach us 30 minutes before the time of opening of tenders. 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**

**S. SUBBURAJ**  
Senior Manager  
Purchase / R&D and CR

  
MANAGER / PURCHASE  
(FOSSIL BOILERS)  
Yours faithfully,

Bharat Heavy Electricals Limited  
Tiruchirappalli - 620 014.



# BHARAT HEAVY ELECTRICALS LIMITED

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

2577152

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Web:

Page  
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2821500016 / 07.07.2015

23505

11) Technical specification enclosed. Copy of filled and signed technical specification confirmations to be submitted. Without this offer will not be considered.

12) Qualifying criteria format is enclosed. Copy of filled and signed Qualifying criteria format is to be submitted. Without this offer will not be considered.

**Enclosures:**


"LD clause has to be confirmed without fail."

**OFFER IS TO BE SENT TO THE  
FOLLOWING ADDRESS**

**AGM / CCDP & MM  
Purchase / R&D and CR  
CCDP, BHEL  
TIRUCHIRAPALLI - 620 014  
TAMIL NADU, INDIA**

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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

  
**S. SUBBURAJ** MANAGER / PURCHASE  
Senior Manager (FOSSIL BOILERS)  
Purchase / R&D and CR Yours faithfully,  
Bharat Heavy Electricals Limited  
Tiruchirappalli - 620 014.

**Bharat Heavy Electricals Limited – Tiruchirapalli**  
**COAL RESEARCH CENTRE**

**Technical Specifications For Electrically Heated Quartz Reactor**

Ref : BHE: CRC:CLC04

Dt: 01-07-2015

**Application:** The quartz reactor is used for controlled combustion of coal where the flue gas composition is analyzed using flue gas analyzer. The solid pulverized coal particles will be placed on the support plate. The solid particles are very fine, it should not fall through the holes of support plate. The detailed drawing of the experimental set-up and quartz reactor is given in Annexure-I

Sl.No	Description	BHEL's Specification/requirement	Vendor Comments
1	Item	250 mm horizontal/vertical quart heating tube and 500 mm vertical quartz tube reactor with heating provision (independent heating required for each 250 mm length). Both horizontal and vertical quartz reactor must have heating provision. Each zone temperature should be controlled independently	
2	Desired design features	Gas first enter Horizontal/Vertical Quartz Tube (H/VQT) and then to the Vertical Quartz Tube (VQT) at the bottom and exit at the top. The solid material will be placed on a small support quartz plate at the bottom of VQT. The operation of reactor is a batch process. After every experiment VQT will be accessed to change the material	
3	Electrical furnace	It should be made of stainless steel and the furnace should be splittable for easy access of the Quartz reactor	
4	Total operating length of horizontal/vertical quart tube	250 mm	
5	Total operating length of vertical quart tube	500 mm	
6	No. of zones in the vertical quart tube	2 (250 mm length for each zone)	
	Zone-I	0 – 250 mm	
	Zone-II	250 – 500 mm	

**Bharat Heavy Electricals Limited – Tiruchirapalli**  
**COAL RESEARCH CENTRE**

**Technical Specifications For Electrically Heated Quartz Reactor**

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Dt: 01-07-2015

	Note: VQT was termed as Zone-I & Zone-II for referring the heating of section of quartz tube. However, the VQT can be a single piece. Control over heating (temperature) is required for zone-I and zone-II independently		
7	Normal operating range	600-1100 °C	
	Horizontal/vertical quart tube	50-800 °C	
	vertical quart tube (zone-I)	50-1100 °C	
	vertical quart tube (zone-II)	50-1100 °C	
8	Support Plate at the bottom of VQT	To keep the solid material in the VQT, a support plate is provided, which is 48 mm diameter and it has 125 numbers of 1mm holes. Plate is support with rods for placing at the bottom of VQT	
9	Thermocouples ports	<b>2 numbers</b> in the zone-1 one at 100 mm from bottom and the other one through the top of VQT	
10	Pressure transmitter ports	<b>2 numbers</b> , one at 20 mm from bottom and the other one at 223 mm from the bottom	
11	Effective H/VQT heating length	250 mm	
12	Effective VQT heating length	500 mm (250 mm zone -I and 250 mm zone-II)	
13	Inside Reactor Tube diameter	50 mm	
14	Outside Reactor Tube diameter	~60 mm (specify)	
15	Heating	Heated uniformly 360 °	
16	Heating element	Molybdenum disilicide (MOSi <sub>2</sub> ) based or equivalent heating element with high resistance to oxidation	

**Bharat Heavy Electricals Limited – Tiruchirapalli**  
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17	Heat duty	To be specified by vendor	
18	Heating rate	Greater than 5 °C / min	
19	Permissible variation in temperature along the length of the tube	+/- 10 °C	
20	View Ports	25 mm circular sealed Safire/ Ceramic view port with shutter, water cooled housing and gas ports for clear vision. This view port needs to be located in the VQT, 100 mm from the bottom of the furnace.	
21	Shell temperature	When operated at the maximum furnace temperature, the shell temperature should not be more than 50C. Must be properly insulated.	
22	Furnace temperature control system	<ul style="list-style-type: none"> <li>☞ Digital programmable controller with PID control</li> <li>☞ RS 485 communication ports</li> <li>☞ Selectable Measurement Units</li> <li>☞ LED Display</li> <li>☞ Emergency Switch</li> <li>☞ Alarm At 2 Levels</li> <li>☞ Hour-Meter</li> <li>☞ Auto power shutdown when temperature exceeds maximum set temperature</li> <li>☞ Power output, working voltage and current displays</li> <li>☞ Multilevel Safety Interlocks</li> <li>☞ All completely wired and packaged in an attractive self supported panel/cabinet</li> </ul>	
23	Temperature Control accuracy	+/- 3 ° C	
24	End Connections	Suitable SS flange connections should be provided for terminal points	

**Bharat Heavy Electricals Limited – Tiruchirapalli**  
**COAL RESEARCH CENTRE**

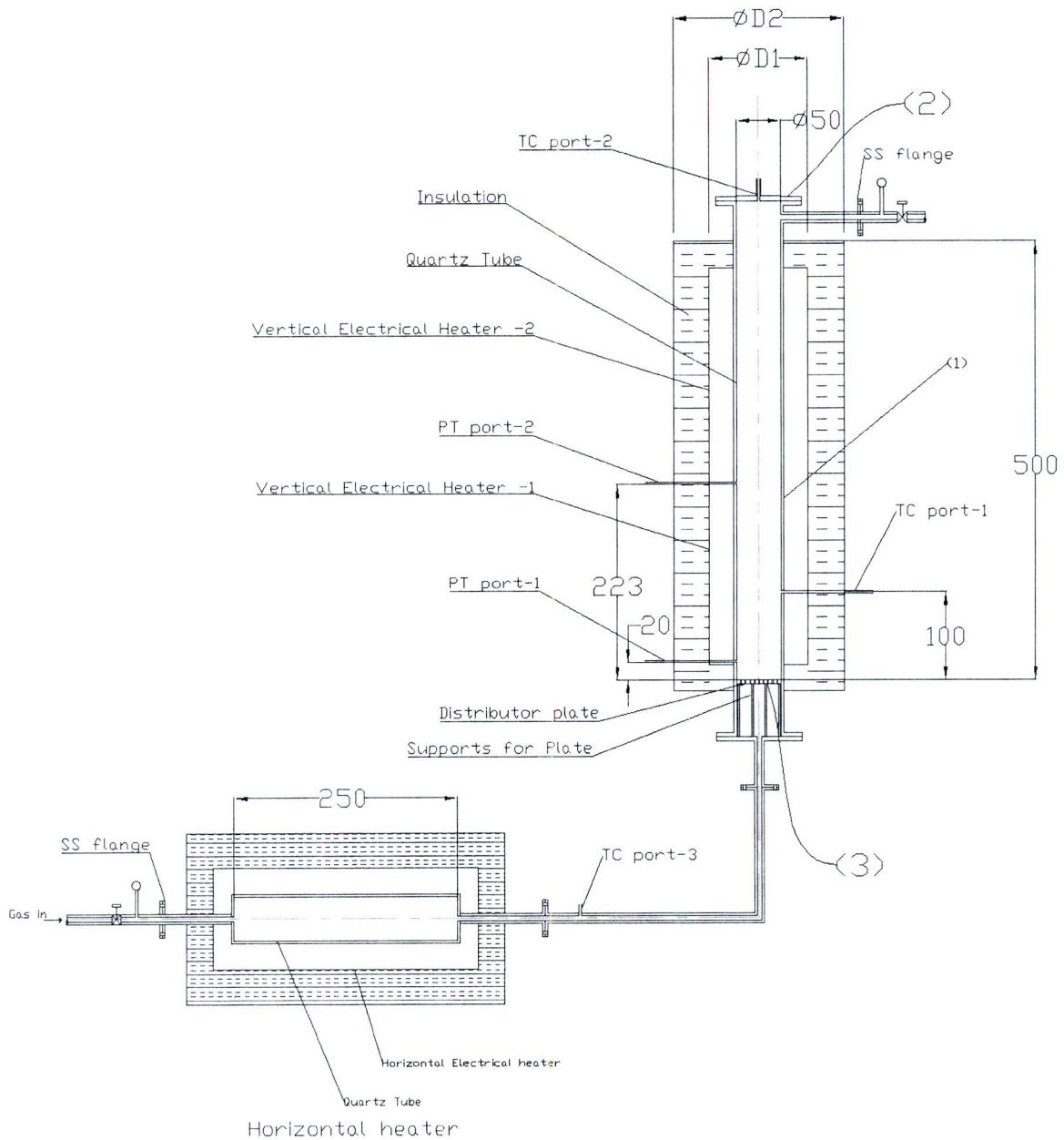
**Technical Specifications For Electrically Heated Quartz Reactor**

Ref : BHE: CRC:CLC04

Dt: 01-07-2015

25	Connections	The leak proof connections between H/VQT and VQT must be supplied	
26	Accessories	All essential accessories including cables (up to 15 meters) and adaptors required for supplying input power to heating control panel of quartz reactor must be supplied by the vendor.	
27	Installation	Free installation at BHEL works by the supplier. In case the installation is chargeable, the cost for the same may be clearly indicated in the price bid.	
28	Performance prove-out at BHEL	Supplier to <b>demonstrate the performance as per the specification</b> at BHEL's works.	
29	Manuals	Complete set of installation and O&M manuals in English language	
30	Documents to be furnished to BHEL along with the offer.	Scope of supply – 2 signed copies	
		Catalogs of models quoted	
		Dimensional drawing	
31	Onsite performance guarantee	The supplied items are to be guaranteed for its performance for a minimum period of 1 year from the date of performance acceptance at BHEL works.	
The total cost should be inclusive of the quartz tube reactor, heating element, connection arrangements of quartz tube, control interfaces and all essential accessories.			

### ELECTRICALLY HEATED QUARTZ FURNACE



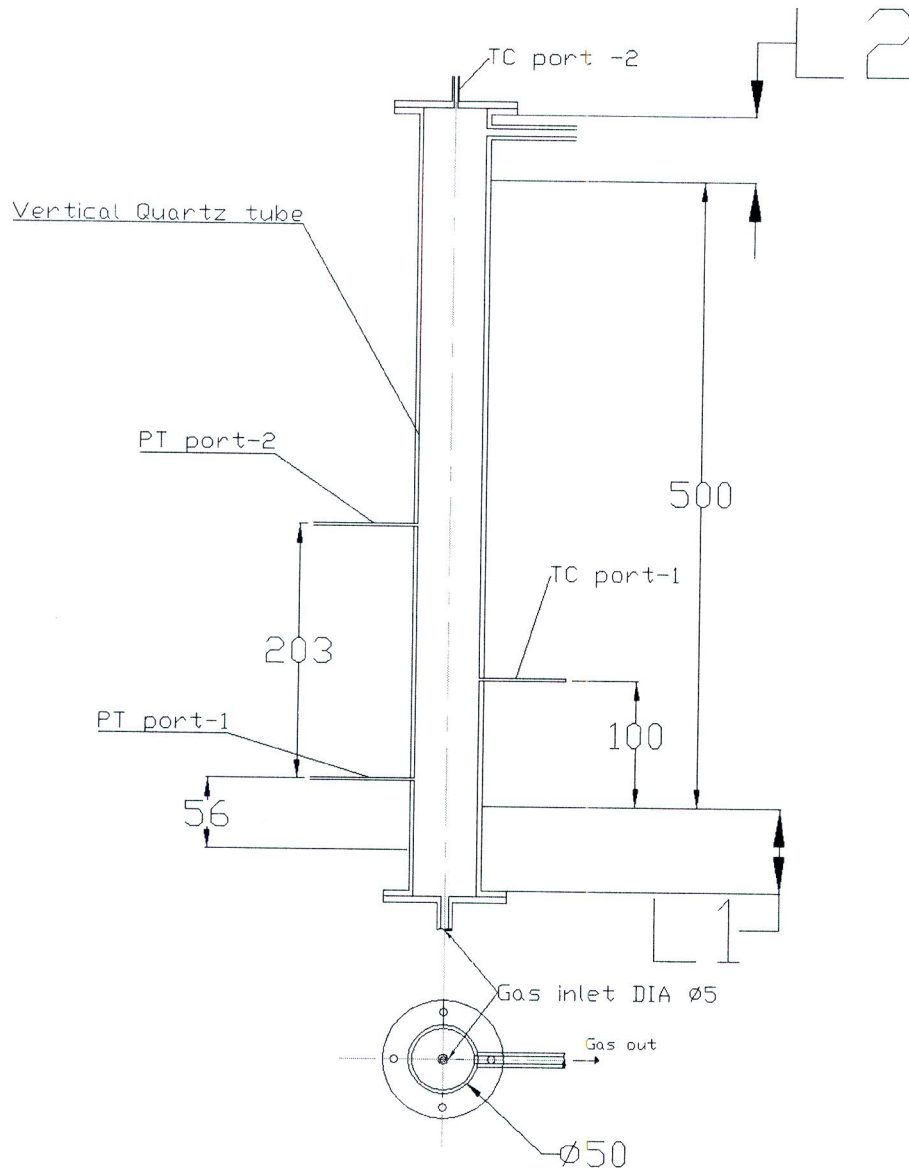
Note: Drawn not to scale. This drawing is for understanding only

TC: thermocouple; PC: pressure transmitter

Note: All Figures not drawn on scale

Figure: Schematic drawing of electrical heating furnace (horizontal and vertical split furnace)

1. Vertical electrical heater
2. End connection
3. Stand for placing material

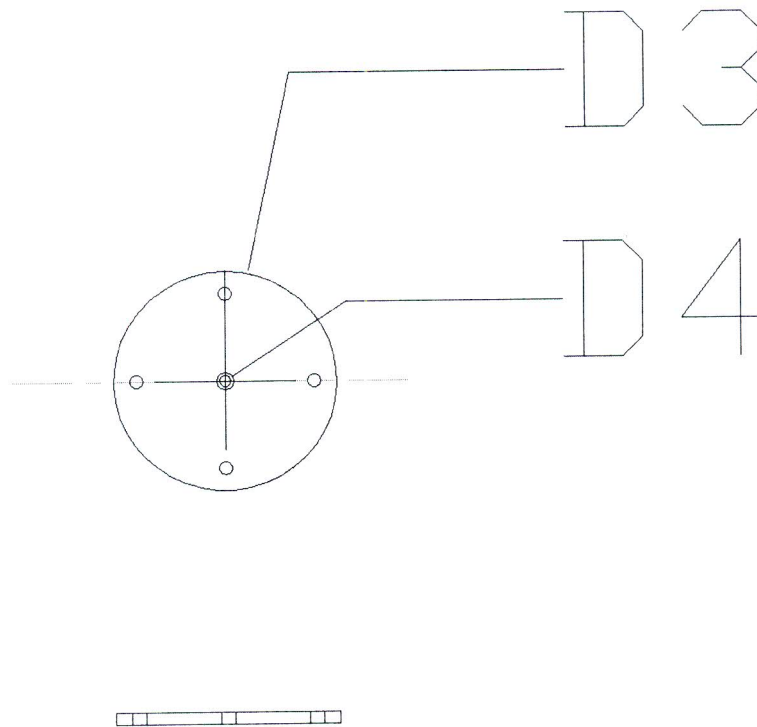


(1): Quartz tube

Figure: Schematic drawing of quartz tube bottom portion in the vertical heating arrangement

Note 1: The TC and PT ports can be placed anywhere radially at given distance from bottom/top.

Note 2: L1 and L2 are the lengths of quartz tube before and after 500 mm length VQT, which can be suitably decided by the vendor

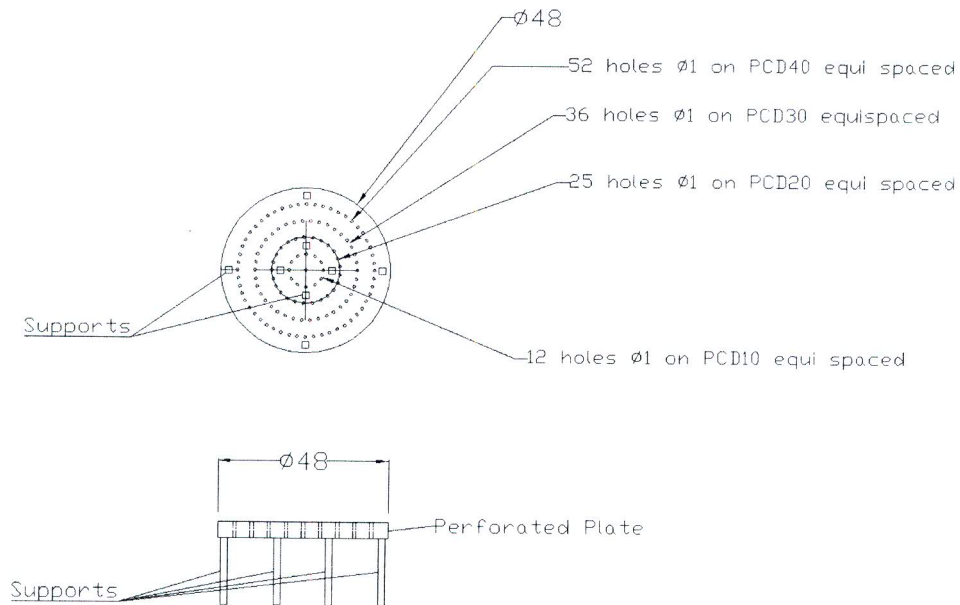


(2): Quartz tube flange for top & bottom

Figure: Schematic drawing of flange for top & bottom portion of Quartz Tube

Note: D3 is the diameter of quartz flange at the bottom and top of the VQT reactor, which can be suitably decided by the vendor

and D4 is the TC hole diameter at the top VQT flange at least 3 mm



(3): Quartz sieve plate at the bottom

Figure: Schematic drawing of the perforated support stand at the bottom of the quartz tube with hole diameter of 1 mm. This stand will be used to keep the solid material in the quartz tube and holes will help gas to pass through the solid material.

**Bharat Heavy Electricals Limited – Tiruchirapalli  
COAL RESEARCH CENTRE**

**Qualifying criteria for supply of Electrically Heated Quartz Reactor**

Ref : BHE: CRC:CLC:05

Dt : 01-07-2015

**QUALIFYING CRITERIA**

The BIDDER / VENDOR have to necessarily provide the following details, for making an assessment of the firm's capability and competency.

The bid consists of 2 parts namely Technical and Price bid. Vendor shall submit Technical and Price bid separately. BHEL will study both the Qualifying Criteria and Response for Technical Specifications. The Price bid can be studied only if both the Qualifying Criteria and Response for Technical Specifications are found acceptable.

[The BIDDER is expected to give complete details against each clause in the table given below and wherever necessary an additional sheet may be attached giving clear reference number to cover the required details]

**Name of the product:** Electrically Heated Quartz Reactor

Please refer Technical Specification for further details.

<b>S. No.</b>	<b>PARTICULARS</b>	<b>VENDOR's RESPONSE</b>
<b>1.0</b>	The BIDDER / VENDOR or their Principal shall have a minimum of <b>FIVE</b> Years of Continuous Experience in the Design, Manufacture & Supply of <b>Vertical Split Quartz Reactors</b> . Please indicate the actual experience.	
<b>2.0</b>	Number of " <b>Vertical Split Tube Quartz Reactors</b> " supplied, installed and commissioned till date in India. Please furnish contact person name, address, phone number, fax number and mail id.	
<b>3.0</b>	Number of " <b>Vertical Split Quartz Reactors</b> " supplied, installed and commissioned till date outside India. Please furnish contact person name, address, phone number, fax number and mail id.	
<b>4.0</b>	Please enclose Performance Certificate from atleast <b>one</b> Indian or Foreign customer for this type of furnace.	
<b>5.0</b>	Details of Technical Back-Up assured from the PRINCIPAL Equipment Maker.	
<b>6.0</b>	The BIDDER / VENDOR shall assure a continuous support for SPARES and SERVICE for Five Years, from the date of commissioning of the equipment at BHEL Works.	



An ISO 9001 Company

**Bharat Heavy Electricals Limited**  
Purchase Dept /R&D and CR  
Tiruchirappalli-620014, Tamil Nadu, India

## **COMMERCIAL TERMS AND CONDITIONS FOR SUBMISSION OF OFFER**

### **1.0 QUOTATIONS**

Bidders shall submit the offer in **TWO INNER ENVELOPES** as indicated below which shall be sealed in one outer envelope.

**Envelope I** This sealed envelope should contain all the copies of technical bid together with un-priced commercial bid. This envelope should be clearly marked "**Part I - Technical and commercial bid**", indicating Enquiry No., Due Date and Address & Reference of the Bidder.

**Envelope II** This sealed envelope should contain **price details**. This envelope should be clearly marked "**Part II - Price bid**", indicating Enquiry No., Due Date and Address & Reference of the Bidder.

Both the envelopes (Part I & II) shall be put in one cover, duly sealed, superscribing as Part I and Part II of Enquiry No., due date of opening and the address and reference of the Bidder.

The above offer should reach this office on or before the due date by 14.00 Hrs (IST). Late offers will not be considered. We suggest you to send the offer by SPEED POST.

Tender should not be addressed to any Individual's name but only by designation to:

**AGM / CCDP & MM**  
**Purchase Department / R&D and CR**  
**BHARAT HEAVY ELECTRICALS LIMITED**  
**TIRUCHIRAPALLI - 620 014**  
**TAMIL NADU, INDIA**

Tenders should be free from **CORRECTION AND ERASURES**, Corrections if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.

Offers should be in **ENGLISH** and accompanied by detailed technical literature, catalogue and details of process facility in **ENGLISH**.

**2.0 PART I (TECHNICAL & UNPRICED COMMERCIAL BID)**

**2.1 Technical**

This part shall include / indicate the following:

Offer should contain complete scope of supply with all technical details, specifications, delivery and other commercial terms and conditions.

**2.2 Commercial**

This part shall include / indicate the following:

- 2.2.1. Port of shipment / Station of despatch
- 2.2.2. Terms of payment
- 2.2.3. Taxes & duties applicable.
- 2.2.4. Delivery Schedule
- 2.2.5. Offer validity
- 2.2.6. Country of origin
- 2.2.7. A copy of "Un-Priced Part II" i.e., a copy of the Price Bid **without the price details** to be enclosed.  
(Incomplete offers shall be liable for rejection).

**3.0 PART II (PRICE- BID)**

This part should contain the schedule of price particulars and to be co-related to the technical details provided in Part I. Wherever required / possible break up price details are to be furnished. (Bidders shall quote only fixed rate / price only and not subject to any escalation whatsoever during the period of bid validity and execution of purchase order. Any bid with adjustable or price variation clause shall be treated as "non responsive" and liable for rejection).

**4.0 OPENING OF TENDERS**

The Part I - Technical & commercial bid alone would be opened on the Tender opening date at the pre-fixed time. In presence of responded tenderers / authorised representative, who may like to be present for tender opening.

The Part II - Price bid of Technically suitable Bidders alone would be opened. The Technically suitable Bidders would be informed about the tender opening date. Clarifications if any required by BHEL for Technical evaluation would be sought from Bidders before opening of Part II - price bid.

**5.0 GENERAL**

5.1. Incomplete offers will not be considered.

5.2. **Terms of Delivery:** Bidders are required to quote their best delivery period. Delivery shall be counted from the date of Letter of Intent.

## **Bharat Heavy Electricals Limited TIRUCHIRAPPALLI**

**5.3. Taxes and Duties :** All Taxes and Duties if any payable extra over and above the quoted price should be specifically indicated in the un-priced bid along with CST & TIN No etc., failing which the purchaser will not be liable for payment of such Taxes and Duties (the quoted rates shall be considered as "all inclusive").

**Note :** *We are not eligible to issue C Form.*

**5.4. Validity of Offer :** Offer shall be kept valid for acceptance for a period of 60 days (sixty days) from the date of opening of the price bid.

**5.5. Payment terms :** Payment term is 100% direct payment after 45 days from the date of receipt and acceptance of materials. (Any deviation in the above payment term will attract loading as mentioned below.

"Base rate of SBI (as applicable on the date of Techno-commercial bid opening) + 6% will be loaded for the period of relaxation sought by bidders.

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.

**5.6. Liquidated damages :** It is clearly understood among the parties to the contract the " **Time is the essence of the contract** ". Therefore, the delivery of the goods specified in the purchase order should be made within the time prescribed. Failure to dispatch the materials in the time as per the delivery quoted in our Purchase Order would make the supplier liable to an un-conditional penalty as below

a. Liquidated damages shall be 0.5% of the total order value per week or part there of subject to a maximum of 10% of the total order value.

b. For staggered delivery schedule, LD shall be 0.5% of the undelivered portion per week of the delay or part there of subject to a maximum of 10% of the total order value.

c. 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).

**5.7. Risk purchase :** Alternatively 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 despatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefor. The supplier shall be liable for any loss, which the Purchaser may sustain by reason of such risk purchases.

**5.8. Test certificates:** The Bidders shall clearly mention in their offer that Test Certificates as called for in the Technical Specification, in the required number of copies will be provided at no extra cost.

**5.9.** Evaluation of the offers shall be on the basis of "To-Door Cost at BHEL, Trichy (Net Cash outflow to BHEL). BHEL will consider the ranking after the loading is applied as referred above wherever deviations are observed.



**BHARAT HEAVY ELECTRICALS LIMITED**  
**TIRUCHIRAPALLI – 620014**

**PURCHASE / R&D and CR**

**ANNEXURE TO PURCHASE ENQUIRY**

1. PRICE : Ex-Works / Ex-Godown (or) F.O.R- DESTINATION
2. DISCOUNT : ..... % (or) Lumpsum amount Rs .....
3. PACKING & FORWARDING : ..... % (or) Lumpsum amount Rs .....
4. TAX : VAT.....% / CST ..... %  
(CST Without C FORM)
5. SURCHARE : .....%
6. DUTIES : .....%
7. FREIGHT & INSURANCE :
8. DELIVERY PLACE :
9. DELIVERY PERIOD :
10. LD / PENALTY FOR DELAY IN DELIVERY : @ 0.5% PER WEEK SUBJECT TO A MAXIMUM OF 10% IS APPLICABLE. ACCEPTED
11. OFFER VALIDTY :
12. PAYMENT TERM : 100% direct Payment after 45 Days from the date of Receipt and Acceptance of the Material.
13. GUARANTEE / TEST CERTIFICATE :

SIGNATURE OF SUPPLIER WITH SEAL

**NOTE :** Please do not Quote as EXTRA. Quote the rate in % or the amount as lumpsum. (Rates of applicable Taxes & Duties, whether inclusive or exclusive should also be mentioned).