

**Government of India  
Bhabha Atomic Research Centre  
Chemistry Division**

Ref. No.: ChD/2019/ 156406

16.08.2019

**Subject: Invitation of quotation for design, fabrication and installation of two high temperature furnaces: (1) High temperature furnace with maximum temperature of 1050<sup>0</sup>C; (2) High temperature furnace with maximum temperature of 1400<sup>0</sup>C**

Dear Sir/ Madam

1. Quotations are invited for minor fabrication job, as per the enclosed specifications (Annexure A), from eligible contractors having adequate experience in similar works.

2. The quotations must reach Head, Chemistry Division by 11<sup>th</sup> September 2019 and must be sent in a sealed envelope super scribed with the above reference number and due date of submission given. The envelope with quotations must be sent only through Registered Post/Speed Post of Indian Postal Service. The quotations should be addressed to

**Head, Chemistry Division,  
Bhabha Atomic Research Centre,  
Modular Labs, Mumbai 400 085.  
Attention: Dr. Vinita G. Gupta**

3. The fabrication work shall be subjected to inspection by our engineer. The finished components shall only be dispatched after approval and inspection by our engineer, at bidder's site.

4. The offer should remain valid for 90 days and should not change during the duration of execution of order.

5. The bidder shall deliver the finished components after approval by our engineers, within **thirty days** from the date of work order issued. The finished components shall be delivered to **"Room No 2-199-H, Chemistry Division, Mod Labs, Bhabha Atomic Research Centre, Trombay, Mumbai 400 085."**

6. The furnaces should have a guarantee of **one year** after installation.

7. The contractor and the workers should possess PVC (police verification certificate) with validity till the completion of the work.

8. The scrap material after the completion of the work at purchaser's site should be removed immediately to the scrap point indicated by the purchaser.

9. The bidder should be able to give references towards previous work done in BARC or other research institutes of repute. If there is a need the bidder should be able to make arrangement to visit a site where his previous work of similar nature has been completed recently.

10. If any mishap happens to the workers of the vendor at BARC due to unsafe practice, the liability would be on the vendor.

11. The Head, Chemistry Division, reserves the right to accept/reject any or all quotations without any reason.

12. The quotations should bear the GST no. and the PAN no. of the firm.

**Encl: Specifications of Minor Fabrication Job  
(Annexure 1)**

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**(Dr. A. K. Tyagi)**  
**Head, Chemistry Division, BARC**  
अध्यक्ष, रसायनिक प्रभाग  
Head, Chemistry Division  
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Trombay, Mumbai-400085.

## Specifications

### *Design, fabrication and installation of high temperature furnaces*

#### A. Material Specification

##### (1) Furnace with maximum temperature of 1400°C

- **Front Loading furnace** table top model, having attached control panel at the bottom of the furnace.
- **Outer Chamber:** Constructed out of thick gauge MS outer shell reinforced with angle and channel iron framework to make the equipment mechanically rigid
- **Insulation:** Thermal Insulation of high quality ceramic fibre vacuum formed board to ensure minimum heat loss.

- **Technical Specification :**

<b>Electricals</b>	230 V AC, single phase power supply
<b>Power consumption</b>	6 KW
<b>No. oh heating zones</b>	1
<b>Heating Zone</b>	8" H X 8" W X 12" D
<b>Heating elements</b>	Silicon carbide
<b>Heating system</b>	Resistance heating system
<b>Thermocouple</b>	"R" Type (2: 1 for T controller, 1 for safety controller)
<b>Max. Temperature</b>	1400 °C
<b>Max. continue temperature</b>	1350 °C

- The temperature of the furnace will be uniform throughout the heating zone. Heating element design should be such that easy replacement is possible.
- **Control Panel :**  
Separate Control panel with at least 5 meter extension cable and should consist of the following:
  1. Temperature Controller: PID temperature controller with dual display
  2. No. of Programs : 2 X 8 Segments
  3. Soft Start Thyristor Card
  4. Communication : RS485 Modbus
  5. Heating Rate : min 1°C/min
  6. Heat On indicator
  7. Power On Indicator
  8. Analogue ampere meter Indicator
  9. Safety controller
  10. Rotary ON/OFF Main switch
  11. Over Temperature Protection Buzzer/cut off

**(2) Furnace with maximum temperature of 1050°C**

- **Front Loading furnace** table top model, having attached control panel at the bottom of the furnace.
- **Outer Chamber:** Constructed out of thick gauge MS outer shell reinforced with angle and channel iron framework to make the equipment mechanically rigid
- **Insulation:** Thermal Insulation of high quality ceramic fibre vacuum formed board to ensure minimum heat loss.

- **Technical Specification :**

<b>Electricals</b>	230 V AC, single phase power supply
<b>Power consumption</b>	5 KW
<b>No. of heating zones</b>	1
<b>Heating Zone</b>	6" H X 6" W X 9" D
<b>Heating elements</b>	Kanthal APM
<b>Heating system</b>	Medium wave IR Resistance heating system
<b>Thermocouple</b>	"K" Type (2: 1 for T controller, 1 for safety controller)
<b>Max. Temperature</b>	1050 °C
<b>Max. continue temperature</b>	1000 °C

- The temperature of the furnace will be uniform throughout the heating zone. Heating element design should be such that easy replacement is possible.
- Control Panel :
- Separate Control panel with at least 5 meter extension cable and should consist of the following:
  1. Temperature Controller : Microprocessor based auto tune PID Temp Controller with dual display (Present Value & Set Value)
  2. No. Of Programs : 2 X 8 Segments
  3. Communication : RS485 Modbus
  4. Soft Start Thyristor Card
  5. Heating Rate : min 1°C/min
  6. Heat On indicator
  7. Power On Indicator
  8. Analogue ampere meter Indicator
  9. Safety controller
  10. Rotary ON/OFF Main switch
  11. Over Temperature Protection Buzzer/cut off
  12. Double skinned construction allows convection air flow to cool the outer case
  13. Exhaust hole at the back side / top of the furnace