

**Government of India  
Bhabha Atomic Research Centre  
Laser & Plasma Technology Division**

Trombay  
Mumbai - 400 085  
Date: 29/08/2017

REF: LPTD/WORKS/BJ/2017/151822

To  
All Parties

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**Sub: Invitation of Quotations for "Fabrication and installation of high temperature front loading table top furnace as per intender's technical specifications."**

**DUE DATE: 12/09/2017**

Dear Sirs,

1. Quotations are invited on the letter head with official seal (rubber stamp) for the above mentioned job.
2. The letter head should indicate PAN, VAT/TIN and GST numbers of the vendor.
3. Packaging and delivery charges if any, taxes, surcharges and excise duties shall be quoted separately. Form AF, excise exemption certificate etc shall be provided if necessary.
4. The quotations must reach. **Head, Laser & Plasma Technology Division by Regd/ Speed Post** on and before the due date and must be sent in a sealed envelope superscribed with the above reference number.
5. The address on the envelope should read  
(Kind Attn. Dr. B. Jana)  
To  
The Head,  
Laser & Plasma Technology Division, BARC, Mumbai - 400 085.
6. The bidder shall have to take an insurance policy against any material issued to him by the purchaser.
7. The fabrication work shall be subjected to inspection by our engineer at various stages of fabrication and testing. Necessary inspection facilities should be provided to our engineers during fabrication. The finished components shall not be dispatched prior to approval by our engineer at bidder's works.
8. The bidder shall deliver the finished components after approval by our engineer within the delivery period stipulated in the work order issued to the bidder. The finished components and the scrap from the free issue material, if any, shall be delivered by the bidder at **L&PTD, Trombay, Mumbai-400085** or at any other designated site suggested by us at BARC, Trombay.
9. The bidder shall engage a qualified technician familiar with the safety norms of all the technical work associated with the fabrication job. Our engineers will supervise the fabrication job. However, neither BARC nor its employees will be liable to pay any compensation to the bidder's technician in the event of an accident during the fabrication job.
10. Head, Laser & Plasma Technology Division, BARC reserves the right to accept or reject any or all quotations without assigning any reason.
11. For any further clarification B Jana, L&PTD (Extn:-22984) may be contacted.

Yours faithfully,

*Biswajit Jana*  
for Head, LPTD

Encl: Detailed Technical Specification for fabrication work

- CC: 1 Head, SIRD (for uploading to BARC website)**  
**2. BARC Notice Board**  
**3. VSB Notice Board**

**General Specifications**

### **1.0 Free issue materials**

- 1.1 The free issue supply material issued by the purchaser to the fabricator shall be covered by insurance policy taken by the fabricator at his own cost for its full value.
- 1.2 The insurance policy shall cover losses of damages to the purchaser's materials due to fire, riot strikes, theft, civil commotion etc. or any other cause.
- 1.3 The insurance policy shall be valid only till the date of actual delivery of the components to the purchaser.
- 1.4 The purchaser shall be named as the beneficiary.
- 1.5 The fabricator shall retain the balance material such as scraps, outputs, etc. after the fabrication to the purchaser.
- 1.6 Free issue material is not issued, and shall be issued to fabricator

### **2.0 Quality surveillance, inspection report**

- 2.1 All work covered by the specification shall be subject to quality surveillance by the purchaser or his authorized representative for which purpose the fabricator shall allow access at all reasonable time during manufacture to
  - 2.1.1 The premises in which the work is being carried out.
  - 2.1.2 The drawing and/or tooling involved.
  - 2.1.3 Gauge instruments, etc. required for inspecting the work.
- 2.2 Inspection and tests shall be carried out by the fabricator as per the requirements detailed in the drawings and these specifications.
- 2.3 The fabricator shall submit three copies of inspection report to the purchaser for approval.
- 2.4 Components found unsatisfactory as to workmanship or material shall be removed by fabricator and replaced by components, which are satisfactory.
- 2.5 Fabricator shall use materials as specified by the purchaser and submit to the purchaser, the material test certificate for his approval.
- 2.6 The finished components shall not be dispatched prior to approval by our engineer at bidder's works.
- 2.7 All the drawings and technical details in hard copies should be returned to the use department after completion of the work without keeping any copy in any form (soft/hard).

### **3.0 Delivery**

- 3.1 The bidder shall deliver the finished components within 6 weeks after approval of fabrication drawings by our engineer.

### **4.0 Subcontract**

- 4.1 The fabricator shall not sub-contract any or all the work without written consent from the purchaser. The Fabricator shall be responsible to the purchaser for all work of the sub-contractor of the fabricator, if allowed by the purchaser.

### **5.0 Tax**

- 5.1 H form will be issued if necessary. Income Tax @ 2% surcharge on IT, @ 15% will be deducted from your bill for an amount > Rs. 20,000/. Guarantee certificate/warranty certificate may be obtained from the party and forwarded along with the bills.
- 5.2 Sales Tax should be less than 5.4%

- 6.0 **Payment:** Payment shall be made only on satisfactory completion of work and on production of bill, advance stamped receipt and guarantee / warranty certificate.

### **7.0 Confidentiality Clause**

#### **7.1 Confidentiality**

No party shall disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as "Proprietary" in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of the original disclosing party. This clause shall apply to the sub-contractors, consultants, advisers or the employees engaged by a party with equal force.

#### **7.2 "Restricted information" categories under Section 18 of the Atomic Energy Act, 1962 and "Official Secrets" under Section 5 of the Official Secrets Act, 1923:-**

Any Contravention of the above-mentioned provision by any contractor, sub-contractor, consultant, advisor or the employees of a contractor will invite penal consequences under the aforesaid legislation.

#### **7.3 Prohibition against use of BARC's Name without permission for publicity purpose:-**

The contractor or sub-contractor, consultant, adviser or the employees engaged by the contractor shall not use BARC's name for any publicity purpose through any public media like press, Radio, T.V. or Internet without the prior written approval of BARC.

## Scope of work and technical specifications

	Features	Technical specifications
1.	Scope of supply	<ul style="list-style-type: none"> <li>• Supply and installation of <b>high temperature front loading table top furnace</b> capable of operating up to <b>1450°C</b> in <b>Air</b> and long time operation (more than 12 hours) at 1400°C.</li> </ul>
2.	Dimension and other features.	<ul style="list-style-type: none"> <li>• The hot zone of furnace (i.e. the effective working area) should be more than or equal to 300 mm (H) x 300 mm (W) x 300 mm (D).</li> <li>• The door opening size should be more or equal 300 mm (H) x 250 mm (W).</li> <li>• The outer dimension of table top furnace including all (furnace body + controller + programmer and other accessories if any) should not be more than 850 mm (H) x 650 mm (W) x 675 mm (D).</li> <li>• A suitable stand of 600 mm (H) with wheels and locking arrangements should be provided by the vendor to take the load of the furnace</li> <li>• The weight of the furnace including all accessories should not exceed 150 kg.</li> <li>• Maximum continuous operating temperature: <b>1400°C</b>.</li> <li>• Outer body temperature should not be more than 20<sup>0</sup>C above ambient temperature.</li> <li>• Heating element shall be made of <b>Silicon Carbide</b>.</li> <li>• Suitable '<b>R</b>' <b>Type</b> thermocouple should be used for measuring the temperature. The thermocouple shall be duplex type where one will be connected to PID controller and other will be used for safety controller.</li> <li>• It is essential that the temperature controlling of the furnace should be automatic which means the furnace should run automatically based on the input temperature programming. <b><i>Offer with manual or semiautomatic furnace control will not be considered for evaluation.</i></b></li> <li>• The control panel should have programmable PID temperature controller of Eurotherm make which is suitable for controlling the rate of heating, rate of cooling and soaking time.</li> <li>• The control panel should have suitable thyristor for controlling the power to the heating elements.</li> <li>• Light weight low density ceramic fiber board insulation should be used.</li> <li>• Door design should be such that there should be no damage to the front insulation during opening and closing of the furnace.</li> <li>• There should be no water connection and the furnace will be operated by air cooling.</li> <li>• There should be an arrangement for continuous flow of gas like Ar/ O<sub>2</sub> during operation along with its exhaust system.</li> </ul>
3.	Control system	<ul style="list-style-type: none"> <li>• Microprocessor based automatic digital PID programmable temperature controller should be provided for the furnace operation. Since different heating/cooling rates and holding time will be employed during one run, the programmer should be capable of carrying out a minimum of 8 segments during one operation. An example of a heating/cooling schedule (one operation) is given below: Room temperature to 150°C at a rate of 2°C/min followed by 5°C/min up to 1000°C, where a hold for 1 hour will be provided, this will be followed by a heating up to 1400°C with a heating rate of 5°C/min. At 1400°C, a hold time of 8 hours will</li> </ul>

		<p>be given followed by cooling to 700°C with a cooling rate of 5°C/min. Subsequently the sample will be cool to room temperature with a rate 10°C/min. The whole sequence should be covered in one programme /operation. Also there should be provision to go to the manual mode during operation itself and programme can be altered at that stage. <b><i>If the programmer does not match the given specification, the offer will not be considered for evaluation.</i></b></p> <ul style="list-style-type: none"> <li>• The programme controller shall have indications for process temperature, set temperature, and other necessary indications and <b>make of Eurotherm.</b></li> </ul>
4.	Safety Features:	<ul style="list-style-type: none"> <li>• Over temperature protection should be a part of the system. It is preferable to have a separate thermocouple for the same.</li> </ul>
5.	Installation	The supplier shall erect commission and demonstrate the satisfactory performance of the furnace at specified maximum operating temperature.
6.	Operation manual	<p>Two sets of operation/instruction manual containing the following shall be supplied along with the machine:</p> <ul style="list-style-type: none"> <li>• Furnace detail</li> <li>• English manual for the programmer controller should be provided.</li> </ul>
7.	Training	On-site training is required for operation and maintenance. The supplier should submit the test certificate of furnace over the long time operation of more than 12 hours @ 1400 °C temperature carried out at vendor's site.
8.	Power supply	<ul style="list-style-type: none"> <li>• The system shall be suitable for operation with the following type of power supply available at the user's end: 32 Amp, 415 V ± 10% A.C., 50 Hz, Three Phase.</li> </ul>
9.	Spares and accessories:	The vendor should supply one set of heating element and one no R type duplex type thermocouple as a spare component.
10.	Quantity	<p>(a). Heating furnace : 1 no.  (b). Suitable stand for the furnace : 1 no.  ©. Spare heating elements : 1 set.  (d). Spare R type thermocouple : 1 no.</p>