

**Office of the Dean Research and Development
Indian Institute of Engineering Science & Technology (IEST), Shibpur
Howrah-711 103**

Project Code: DRC/DST-INSPIRE/CEGESS/SP/008/16-17

**Centre of Excellence for Green Energy & Sensor Systems
Indian Institute of Engineering Science & Technology (IEST), Shibpur
Howrah-711 103**

**Ref.: Tender Advt. No. CGE 1282, published in the "Statesman (All
Edition)", dated 06.09.2017**

Notice Inviting Quotations

Sealed quotations are invited for the supply of

Item 1. HIGH TEMPERATURE TUBULAR FURNACE.

as per the following technical specification. The technical specification can be downloaded from the website. The document can be also obtained from the Centre of Excellence for Green Energy & Sensor Systems (contact: Dr. S. Patra) between 10.30 a.m. and 3.00 p.m. on all working days. The invitation is valid for 14 working days from the date of publication of this notice.

Dean (R & D)

(A. Code DRC-T053/17-18)

SECTION I: TERMS & CONDITIONS

1. The last date of receipt of quotation is valid **for 14 working days** from the date of publication of this notice. Quotations received later will not be entertained under any circumstances.
2. Potential supplier are to submit the quotations in Sealed Cover to the Centre of Excellence for Green Energy & Sensor Systems in the following address:

**Dr. S. Patra
CEGESS
IEST, Shibpur
Howrah-711103, India**

3. Item name must be mentioned on cover
4. The price quoted should be inclusive of all Taxes in INR, duties and levies. Inclusion of Tax/Levy at a latter stage will not be accepted. Freight, Insurance charges should be clearly indicated. If GST is chargeable then price quoted should be inclusive of GST in INR.
5. Vendor should have proven track record of supply in IEST, IIT, NIT, IISc.
6. Commercial Papers duly signed & must be attached.

SECTION II: TECHNICAL SPECIFICATIONS

Item 1.

HIGH TEMPERATURE TUBULAR FURNACE

Name of Equipment:

Electrically heated floor top atmospheric control Horizontal High Temperature Tubular Furnace. Maximum working temperature 1400⁰C with accuracy $\pm 1^0$ C. Using silicon carbide heating element with microprocessor based digital PID temperature programmer controller with Thyristor power drive and cooling fan.

Working Chamber Size:

Both end open 99.99% nonporous Alumina working tube, tube size 50 mm ID X 60 mm OD and 750 mm length. 'Industrial Ceramic' made.

Details of Heating Elements:

Silicon carbide heating elements, solid rod type. Size of element is 14 mm dia 100 mm hot zone and 300 mm total length. 'SILCARB' make Alfa rod.

Temperature controller:

Microprocessor based digital PID temperature programmer controller, Single programs 8 segments. Programming for heating, cooling and holding. 'FUJI' make model no: FXR9.

Thermocouple

'R' type (pt/pt RH 13%) with quick response and slight variations in temperature and should have thermocouple break protection to prevent the failure of thermocouple for 1000⁰C with high alumina refractory shed and connecting holder.

Thyristor Power Drive:

YUDIEN make phase angle control thyristor power drive for long life and safe guard heating element with soft start and limit facility. 230VAC 45 A. Model no: AIJK3

Thermal Insulation:

For best thermal efficiency shell be triple layer insulation by Vacuum Formed Fiber Boards.

Imported vacuum compressed fiber board for 1600⁰C used in hot face. Fibrous ceramic of different grade (Temperature limit of 2nd layer – 1450⁰C, 3rd layer – 1260⁰C) used in back and finally air insulation for double chamber fabrication.

Rate of Temperature Rise:

Pre- determined temperature rising rate are available by the programmer and normal raising rate (0.1 – 20 deg C) are available by the controller.

Temperature Accuracy:

$\pm 1^0$ C at set temperature above 1000⁰C and suitable element placement, System to ENSURE better uniform temperature.

Flanges and accessories:

SS Flanges for gas purging along with special VITRON/SILICON rubber O-Rings and high precision SS ball valve install both end of working tube.

Construction:

MS angle and CRC sheet construction of thick gauge double walled for minimize skin temperature (below 60⁰C). Furnace and control panel place vertically (floor top type). Furnace outer dimensions around 400 mm (W) x400 mm (D) x900mm (H).

Cooling Fan:

¼ HP cooling blower install in control panel for cooling electrical instrument as way as furnace outer cell.

Gas Cylinder:

'ECHO' made gas cylinder with non corrosive UHP gas, capacity 7 CUM/per cylinder.

Rotameter:

Acrylic made rotometer with needle valve, range 0-2.5 lts/min.

Quantity : 1 (Nos.).

Furnace Essential Parts:

- 1) MS Angle and CRC sheet with enamel paint double constriction table top type furnace body.
- 2) Imported vacuum compressed fiber board constriction chamber.
- 3) 'SILCRAB' make silicon carbide heating elements, Solid rod type. 8 pcs.
- 4) Thermocouple 'R' type – 1 no.
- 5) SS gas purging flange.

Control Panel Essential Parts

- 1) Microprocessor based digital PID temperature programmer controller,
- 2) Thyristor power drive. 230 VAC, 45 A
- 4) Electrical equipment for running of furnace LED Indicator Lamp, Safety MCB, On/Off rotary switch, Ammeter, Magnetic contractor, Manual power regulator, Safety fuses.