Department of Optoelectronics, University of Kerala, Kariavattom, Thiruvananthapuram, Kerala- 695581. Ph: 2308167

Quotation Notice

OPTO/P-17/2012-13

Quotations are invited for the following items:

Item No. 1:

Programmable High Temperature Tubular Horizontal Vacuum Furnace capable of operating between 100 to 1400^{0}C within an accuracy better than $\pm$ 5^{0}C. The furnace should be supplied with an attachable control panel cum stand and with separately packed silicon carbide heating elements & thermocouples. The system should have the digital display indicating PID type programmable temperature controller of EUROTHERM 2404 with Eurotherm 7100A thyristor power control device (control accuracy $\pm$ 1°C under controlled rate of heating, soaking and cooling higher ranges). A vacuum pump of 250 Ltrs/ Hr capacity should also be supplied.

TECHNICAL SPECIFICATIONS

Type of Furnace	:	Horizontal Tubular type with provision to operate under vacuum or inert atmosphere.
Furnace Tube size	:	75 mm ID x 85 mm OD x 1000 mm Length (High quality re-crystallized High Alumina tube)
Temperature Controller	:	PID type programmable temperature controller of EUROTHERM 2404 with Eurotherm 7100A thyristor power control device.
Working Atmosphere	:	Vacuum, Argon, Nitrogen, Air or Oxygen.
Desirable Power Rating	:	3 to 4 KW on 230V AC supply
Heating elements	:	Silicon Carbide spirally grooved
Insulation	:	High quality Ceramic fibre blankets & formed boards
Vacuum level	:	0.001m bar @ room temp. 0.1 m bar at 1400^0 C
Vacuum Gauge	:	Dial type mechanical vacuum gauge of 150 mm dia.
Provision for calibration	:	There should be a provision to insert a standard thermocouple.
Water cooling	:	Efficient water cooling provision is required
Safety control	:	Safety controllers (2 Nos.) should be provided with separate thermocouples to sense the external temperature of furnace tube.
Furnace shell	:	MS sheet make – thickness atleast with 1.5mm.
Lining	:	Furnace should be lined with light weight ceramic fiber blankets

to withstand temperature up to 1600°C. The Skin temperature of the furnace should not exceed 60°C when working at 1400°C.

Heating Elements	:	Spirally grooved silicon carbide heating elements.
Gas Supply System	:	Gas supply through manual shut off valve and flow meter with suitable connecting copper /PVC hose.

Warranty	:	2 Years from the date of installation

Item 2:

HIGH TEMPERATURE MUFFLE FURNACE

HIGH TEMPERATURE MUFFLE FURNACE with Programmable auto tuning PID temperature controller of EUROTHERM model 2404 as specified earlier, in place of the ordinary PID controller

Technical Specifications

Useful chamber size	- 150W x 150 H x 300 D (mm)
Temp. Range @ Accuracy	- 1350°C +/- 2°C
Rate of heating / soaking (this is quoted as optional item)	- 1 to 10°C / Minute variable with the help of programmer Controller
Rating	- 4.5 KW on 440/3/50 cycles AC supply (with the use of Thyristor and PID controller)
Heating Elements	- Silicon carbide.
Temperature Accuracy	- +/- 2°C

Furnace Shell : Furnace shell will be made of heavy gauge MS sheet reinforced with angle iron frame work.

Furnace Lining

Furnace will be lined with different grades of ceramic fibre blankets and vacuum formed boards, which can withstand for temperature up to 1250, 1450 and 1600°C

Door

Door of the furnace will be lined with different grades of ceramic fibre blankets and boards.

Heating Elements

The heating elements used for the furnace will be of silicon carbide elements.

Inlet & Outlest

We will be providing a ceramic tube of ½" dia with metallic collar to let in air into the furnace chamber through the bottom of the door.

Peep Hole

A peep hole of around ½" dia will be provided on the cerntre of the door with a shutter

Limit Switch

A limit switch will be provided at the side of the furnace shell with required acting levers such that the supply to the element will be cut off when the door is opened.

Control Panel

A separate control panel cum-stand will be fitted with digital temperature controller, ammeters, control switches, pilot lamps, thyristors etc. and will be wired using cable marking ferrules for easy identification.

Item 3

A platinum crucible (Size 50 ml, 28 Gauge) and alumina crucible suitable for the tube furnace dimension should also be quoted separately.

The firms who wish to supply the item are requested to submit the quotation in sealed cover to the undersigned on or before 18.03.2013.

Kariavattom,

06.03.2013

DEPARTMENT OF OPTOELECTRONICS * UNIVERSITY OF KERALA * KARIYAVATTOM, THIRUVANANTHAPURAM.

Professor & Head

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