

Central Glass & Ceramic Research Institute
KOLKATA (WEST BENGAL) INDIA
CORRIGENDUM

REFERENCE NO. :- PS-1/NC/387/RDG/SPO/OT/19-20(RETENDER)

DATE: 26/08/2020

NAME OF EQUIPMENT: BOTTOM LOADING GLASS MELTING FURNACE TEMPERATURE - 1800° C

NOTE: The Bids must be submitted in the Central Public Procurement Portal (URL: <https://etenders.gov.in/eprocure/app>) only. Manual/Offline bids shall not be accepted under any circumstances. Bidders should quote in INR only.

CONSEQUENT TO THE PRE-BID MEETING HELD ON 18/08/2020, THE REVISED SPECIFICATION AND TERMS AND CONDITIONS OF THE TENDER ARE GIVEN BELOW:-

SPECIFICATIONS:-

Annexure-I
Specifications of bottom loading glass melting Furnace
Temperature -1800°C

Introduction:

This Furnace will be utilized for melting of a kind of specialty glass which requires a critical specification as stated below. These will be placed within a process plant along with a annealing Furnace and other equipment within dehumidified, clean and controlled atmosphere. Quotations are invited from the reputed vendors covering all the points categorically as per the following specifications. The offers complying (**Complying statements will be properly justified by the vender.**) with the following specification will only be considered for bidding.

Essential Features:

1. Type : Bottom Loading Furnace for glass melting
2. Useful Heating Zone : 220 mm x 220 mm x 380 mm Height
4. Maximum Temperature- 1800°C (soaking 10 min) under loading condition
5. Working Temperature : 1750°C (continuous soaking for 12 hours) under loading condition
6. Temp. Uniformity : $\pm 3.0^{\circ}\text{C}$ (during soaking), across the heating zone
7. Temp. Control Accuracy : $\pm 1.0^{\circ}\text{C}$.
8. Thermocouple :
 - 1) Type - Pt40Rh/Pt20Rh (40/20) - Duly calibrated, within an alumina (recrystallized) sheath to measure, control & display temperature all around the useful working zone, maximum at 1800 Deg C.
 - 2). (Additional) 'S-type' duly calibrated, within (re-crystallized) alumina sheath to measure, control & display for operation upto 1450 deg C.
 - 3) Make & calibration agency (Govt certified) of thermocouple to be mentioned by vender.
 - 4) 3 nos Thermocouple to be placed in the heating Zone, at three levels (height-wise) for indicating the specified uniformity & accuracy of temperature.
9. Heating Element : Kanthal brand Molybdenum disilicide (MoSi_2) of requisite capacity or substantially equivalent heating element. (For substantially equivalent heating elements necessary test certificate & other documents to be provided during bid submission.)
10. Operational Atmosphere : Ambient air
11. Mode of Heating : Electrical, 400 ($\pm 8\%$) VAC, 3 Ph, 50 Hz ($\pm 3\%$).
12. Power Rating : 12 KW to 25 KW
13. Heat Up Rate : 1°C per minute to 10°C per minute.
14. Heat Up Time : Maximam 220 minute to raise up to 1750°C .

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15. Temperature Control : 1) Programmable 16-segment, 'Eurotherm make 2404- P4' or **substantially equivalent** Controller features having facility to carry on programme automatically from process value on withdrawing of 'Hold' or after remittance of power cut. (For substantially equivalent Temperature controller necessary test certificate & other documents to be provided during bid submission.)

2) The controller must have the features for using both thermocouples of S-type and 40/20-type.

16. Total charge weight : 12 (6+3+3) kg (Glass batch + Crucible + Sagger)

17. Mode of Charging : Dry powder batch materials will be loaded on Furnace Hearth in Silica crucibles ($\varnothing 150 \times 220$ mm height \times 5 mm thick i.e. 2 litre). Refilling may be carried out for 4-5 hours by lowering the hearth, being at working temperature.

18. Stirring system : Provision to be made for install one platinum/Silica stirrer from roof top. Stirrer will be supplied by CGCRI. Stirrer wt. is 4 kg (approx.). system has the following features:

- 1) The system to be driven by a **Siemens make or substantially equivalent servo motor** with an adaptor or a chuck to fix the Stirrer-stem of $\varnothing 12 (\pm 3)$ mm with the driver shaft.
- 2) The servo motor to have the ability to work for continuous operational at varying speeds without appreciable vibration.
- 3) The servo motor have the ability to withstand the radiated temperature from the furnace. So necessary cooling arrangement to be provided for the servomotor.
- 4) The servo motor have microprocessor-based stepless speed control arrangement with rotation counting facility for Stirrer speed, 5 – 100 rpm.
- 5) Manual override provisions are to kept for emergency situations.
- 6) X-Y-Z directional friction-less movement of the stirrer for positioning with respect to the crucible and depending upon the vertical lift and the horizontal travel.
 - Z axis movement of Stirrer : To be carried out by Servomotor. Necessary cooling to

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be provided for the servo motor. Manual override provisions are to kept for emergency situations

- X & Y movment: To be carried out by mechanically or by Servo motor

19. Furnace Lining

: The following type of refractory lining to be needed for maintaining the skin temperature below 50 deg C at maximum operating temperature.

- 1) Hot face (Side wall): **Cumi make (CUMILAG B101) or substantially equivalent Brick.** (For substaintially equivalent Bricks necessary test certificate & other documents to be provided during bid submission.)
- 2) Cold face (Side wall): **MMTCL make or substantially equvallent ceramic fiber board**
- 3) Hot face (Vestibule & Roof): **Cumi make (CUMILAG B101) or substantially equivalent Brick.** (For substaintially equivalent Bricks necessary test certificate & other documents to be provided during bid submission.)
- 4) Cold face (Vestibule & roof): **MMTCL make or substantially equvallent blanket.**
- 5) The roof-top opening for Stirrer insertion is to be lined with good quality non-dust generating refractory block (may be of fused cast AZS) which will be frequently handled for covering and uncovering during operation.
- 6) Total thickness of refractory lining to be designed in such a way that skin Temperature should be within 50 deg c.

20. Hearth movement

: The system has the following features:

- a) Z-axis movement: 600 mm
- b) Y-axis movement (Forward & Backward): 600mm
The motion of the hearth on rail for easy glass batch charging and molten glass collection from furnace hearth.
- c) A positive action safety switch should be provided to isolate power supply to the heating elements during the lowering operation.
- d) Z-axis movement need to be carried out by Geared-Motor (AC/DC) drives of **Siemens make or substantially equvallent motor** having sufficient capacity to run smoothly for continuous operational turns at varying speed and frequency without vibration and slip.

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e) A manual override and motor cooling provisions are also to be kept for emergency situations..

f) Type of refractory in hearth: **Cumi make (CUMILAG B101)or substantially equivalent Brick.** (For substantially equivalent Bricks necessary test certificate & other documents to be provided during bid submission.)

21. Structure

- a) The structure need to be made of rolled-steel section having rigidity to withstand working conditions.
- b) 2 mm thick CRCA/S.S sheets duly perforated where necessary for outer shielding and duly surface treated/coated/painted where necessary.
- c) The charging height of the furnace from the floor need to be 850 (\pm 25) mm .

22. Safety Precaution:

- a) Over-temperature protection Controller of **Eurotherm-make or substantially equivalent controller.** (For substantially equivalent over Temperature controller necessary test certificate & other documents to be provided during bid submission.)
- b) Overload protection relay of **L&T/ABB/Siemns or substantially equivalent make** with harmonic filter
- c) Broken T/C indication .
- d) Soft start/stop facility, suitable for heating elements
- e) One toggle switch to be provided for direct power input.
- f) Gentle and Leak proof sealing of the Hearth with vestibule
- g) Precision alignment of the Hearth and Stirrer.

23. Control Panel

- a) **Components of ABB/L&T/Siemens/Eurotherm or substantially equivalent make** having capacity to withstand working conditions and duly wired up with identifying tag marks
- b) Phase wise digital Voltmeter/Ammeter/Wattmeter
- c) Programmable **Eurotherm** or **substantially equivalent** O/T controllers. (For substantially equivalent over Temperature controller necessary test certificate & other documents to be provided during bid submission.)
- d) Indicating lamps.
- e) On/Off soft press /toggleswitches.
- f) Thyristors of '**Eurotherm**' or **substantially equivalent** make feature having phase-angle triggering circuit board and harmonic filter with safe load handling capacity for continuous operation. (For substantially equivalent thyristor controller

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necessary test certificate & other documents to be provided during bid submission.)

- g) Wires & cables are of requisite capacity and FRLS type
- h) Switch gear items as applicable should be of **L&T or substantially equivalent make.**
- i) Exhaust fan(s) have to be provided to dissipate heat from panel inside to protect panel mounted items
- j) Geared-Motor (for Hearth movement) of **Siemens make or substantially equivalent motor** for continuous operational turns at varying speed and frequency.

K) Servo motor drive of Stirrer.

24. Inspection

a) Pre-dispatch inspection at manufacturer's site is to be arranged by the supplier with at least **one week of prior intimation. The expenditure of the visit will be borne by CSIR-CGCRI.**

b) Necessary instruments are to be kept ready by the vender to carry out measurement of the technical parameters to establish quality of the product.

25. Installation & Commissioning : It is to be ensured that engineers of manufacturer will carry out the installation and commissioning of the furnace at the user's site. The pre-installation requirements at the site for trouble-free and appropriate installation and operation must be clearly indicated in advance.

26. Demonstration & Training : On site training will provided by the manufacturer. They will train the 4 nos CGCRI personnel for operation, trouble-shooting & maintenance during a full production run and performance acceptance test.

27. Documents

: Necessary documents (hardcopy and soft copy) are to be provided in English such as

- a) Operational and maintenance manuals of the furnace
- b) Electrical circuit diagram as per identifying tag marks of the wired up control panel for study and easy maintenance
- c) Literature / specification sheet of all branded bought out items for study and easy maintenance
- d) Run / Test certificates of the complete furnace and individual branded bought out items as quality assurance
- e) Name & address of at least one party to be provided to whom the vender has supplied similar kind of furnace during last 5 yrs.

28. Warranty

: Three (3) years of comprehensive warranty is to be provided from the date of commissioning.

The above amendments shall amount to amendments of the relevant terms of our Bid Document for CGCRI Tender No. **PS-1/NC/387/RDG/SPO/OT/19-20(RETENDER).**

All other Tender terms and conditions remain unchanged.

Bidders should quote only in INR.

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Stores & Purchase Officer

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