

**CSIR-CENTRAL GLASS AND CERAMIC RESEARCH INSTITUTE****[COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH, CSIR]**

196, Raja S. C. Mullick Road, Jadavpur, Kolkata – 700032 (W.B.) India

FAX: + 91 33, 2473-0957 EPABX: +91 33 2473 3469 Ext.3478/3453/3479

website: <http://www.cgcri.res.in> E-mail: purchase@cgcri.res.in**PURCHASE ORDER**

M/s. Steadfast International, 61A, R. K. Chatterjee Road, Kolkata – 700042, Phone: 9433369918 Email: starcemintl@yahoo.com	P.O. No.	P//NC/483/RC/DB/OLT/19-20
	Date	05/05/2021
	Subject	Purchase Order

Reference:

1. Our Bid Document No. P//NC/483/RC/DB/OLT/19-20
2. Your Quotation Ref. SI/CGCRI/PURCHASE/TCF/01/2020-21 dt. 11/10/2020
3. Our letter dt. 03/12/2020
4. Your email dt. 13/12/2020
5. Our letter dt. 11/01/2021
6. Your email dt. 15/01/2021
7. Your email dt. 27/02/2021
8. Your email dt. 03/04/2021.

Dear Sir,

I am directed to request you to kindly supply the following material as per the enclosed terms & conditions.

Sl. No	Description	Qty	Unit price in INR	Total Price in INR
01.	Twin Chamber Furnace 1. Type : Twin Chamber Furnace 2. Capacity : 2 x 120 litre (approx.) within single structure 3. Useful Heating Zone : 400 mm (H) x 500 mm (W) x 600 mm (D) [Door Size:350mm(H)x450 mm(W)] 4. Working Temperature : 1100°C (continuous soaking for 12 hours) 1000°C (continuous soaking for 6 days) 5. Temp. Control Accuracy : $\pm 1.0^{\circ}\text{C}$ 6. Temp. Uniformity : $\pm 3.0^{\circ}\text{C}$ (within 10 minute of soaking) 7. Thermocouple : Calibrated 'K - type' within recrystallined alumina sheath at least, 04Nos. for each Chamber on roof and side walls to indicate, affirm and control of temperature uniformity all around the useful working zone. : One T/C for Control + One T/C for Safety + Two T/C on two side walls for additional Indication = Total 4 Nos. T/C are to be supplied. (make : Rajput Engineering Company) 8. Heating Element : 'Kanthal brand APM wire' in the form of coil on tube, of requisite capacity to take up heat load. 9. Operational Atmosphere : Stationary Ambient air with Nitrogen purging system (inlet / outlet) Outlet is to be controled with suitable purge rotameter. 10. Mode of Heating : Electrical, 400 ($\pm 8\%$) VAC, 3 Ph, 50 Hz ($\pm 5\%$). Connecting power cable of requisite size up to 5 mtr. from the mains has to be supplied with the Furnace. (Max. Input current per Phase per chamber: 44Amps.approx.) 11. Power Rating : 25 kW approx. x 2 (Two) 12. Heat Up Rate : 1°C TO 10°C per minute 13. Heat Up Time : 100 minute (approx.) to raise up to 1000°C. 14. Temperature Controller : Programmable 16-segment, 'Eurotherm make 2404-P4' Controller having facility to carry on programme automatically from process value on withdrawing of 'Hold' or after recovery of power cut. 15. Kiln Furniture : Silicon carbide base plate having smooth working surface 16. Total charge weight : 60 (± 5) kg (approx.), for two chambers 17. Mode of Charging : Cast iron mould is to be placed on Hearth for	01 (One) No.	10,23,000.00	10,23,000.00

Ray
15/5/21

<p>heating Peak to Ambient temperature following a suitable temperature profile</p> <p>18. Safety Precaution : The following safety precaution should be provided:</p> <p>a) Over temperature protection Controller of 'Eurotherm' make Over load protection relay of reputed make with harmonic filter</p> <p>b) Broken T/C indication with automatic trapping</p> <p>c) Soft start/stop facility, suitable for heating elements</p> <p>d) One toggle switch should be provided for direct power input</p> <p>e) Gentle and Leak proof sealing of the Door with vesttblue</p> <p>19. Control Panel : The control panel should be provided with the following facilities to achieve continuous long-run life cycle and inbuilt with the Furnace at the base separately for each Chamber:</p> <p>a) Components of reputed make having capacity to withstand working conditions and duly wired up with identifying tag marks</p> <p>b) Phase wise Voltmeter/Ammeter/Wattmeter</p> <p>c) Programmable, O/T controllers and other Indicators</p> <p>d) Indicating lamps</p> <p>e) On/Off soft press /toggles witches</p> <p>f) Thyristors of 'Eurotherm' make having phase angle triggering circuit board and harmonic filter with safe load handling capacity for continuous operational turns</p> <p>g) Wires & cables are of requisite capacity and FRLS type</p> <p>h) Switch gear items as applicable should be of reputed make</p> <p>i) Continuous duty exhaust fan(s) have to be provided to dissipate heat from panel inside to protect panel mounted items</p> <p>j) Make and Model of Components: Schinder</p> <p>20. Furnace Lining : A combination of low thermal mass refractory insulation (Brick for hot face / Ceramic Board for cold face) of M/s Curborundum Universal Limited (CUMI) / Murugappa Morgan Thermal Ceramics Limited (MMTCL) make or of equivalent features, to use all around to minimize storage heat as well as heat loss to maintain skin temperature <math>< 50^{\circ}\text{C}</math> at maximum temperature. Dense and hard refractory bricks are to be used around the doorway and the floor, to withstand abrasion and spillage and to ensure long life. Make, brand, model and thickness of refractory materials in layers of hearth, door, roof and walls: Hotface : CUMI Intermediate Coldfaces: Murugappa Morgan Thermal Ceramics Limited (MMTCL) Last cold face: HYSIL (HIL Limited) Hotface thickness: 50mm brick Coldface thickness: 20 / 40 / 50 mm Total insulation thickness: 125 to 150mm approx.</p> <p>21. Door movement : Manually operated, vertical / horizontal / swing-aside door for easy access to the chamber. Gentle, leak proof closure of door would be ensured. A positive action safety switch would be provided to isolate power supply to the heating elements during door operation. Door handling would be opposite for two chambers</p> <p>22. Structure : Floor standing would be on wheels; made of rolled steel sections having rigidity to withstand working conditions with a combination of ≥ 2 mm thick CRCA sheets for outer shielding and duly surface treated / coated / painted. The door and front side would be made of S.S sheet. The Charging height of the furnace will be finalised during manufacturing to suit site conditions (approx. 900 ± 25 from ground). The overall size of the furnace would be 1900mm(H) x 2000mm(W) x 1500(D) approx..</p> <p>23. Pre-dispatch Inspection: Inspection at manufacturer' s site would be arranged by the supplier with at least one week prior intimation, when total performance of the Furnace in respect of itemwise specification and operational features are to be demonstrated. Necessary instruments are to be kept ready to carry out measurement of the technical parameters to establish quality of the product.</p> <p>24. After-dispatch Inspection : Unloading of the Furnace on Store/Shop floor would be arranged & unloading at & unloading at store Store by the supplier. After-dispatch Inspection is to carry out at CSIR-CGCRI site for ensuring good health of the delivered items</p> <p>25. Installation. & Commissioning : Factory trained engineers would</p>			
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