

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

CORRIGENDUM

REFERENCE NO. :- P/NC/91/SD/DB/OTE/22-23

DATE: 09/11/2023

**NAME OF ITEM: SUPPLY, INSTALLATION, COMMISSIONING,
DEMONSTRATION AND TRAINING OF MODIFIED CHEMICAL VAPOUR
DEPOSITION (MCVD) SETUP ETC.**

CONSEQUENT TO THE PRE-BID MEETING HELD ON 30/10/2023 AGAINST OUR TENDER ENQUIRY No. P/NC/91/SD/DB/OTE/22-23, the revised technical specifications are given below:-

MCVD SET-UP WITH ULTRADRY VAPOUR DELIVERY SYSTEM

1	Horizontal Lathe System	1 set
2	Bubbler cabinet with Gas Control system	1 set

Detailed description

System components	Fabrication guide	
		<ul style="list-style-type: none">• Tube length: Up to 1000 mm• Inlet tube diameter: OD 20 ± 2 mm• Collector tube diameter: OD 28-45 mm• Headstock and tailstock chuck with the proper gripping arrangement.
1.	MCVD Lathe	<p>MCVD Lathe consists of the following components:</p> <ul style="list-style-type: none">◆ Maximum distance between chuck protection plates: 1400-1900 mm.◆ PLC control burner with carriage speed of minimum 1-5 mm/min and maximum 3000 mm/min with increment of 1.0 mm/min.◆ Stainless steel heat shield at two ends to protect from heat with adjustable tube.◆ Spindle rotational speed: 0-100 RPM.◆ The main burner: Hydrogen/Oxygen burner suitable for uniform heating of tube dimension 14-22 mm with N₂ gas curtains.◆ Oxy-hydrogen Hand burner for glass processing.◆ Two additional burner front/rear and associated gas control systems.

		<ul style="list-style-type: none">♦ Infrared Pyrometer operating in the temperature zone of 700° to 2500°C with cooling system to measure the temperature of substrate tubes with an accuracy ±10°C during processing.♦ Automatic tube diameter control system with camera.♦ Automatic soot removal and preform internal pressure control system.♦ The lathe will support deposition in both upstream and downstream directions.♦ Rotary joint will be capable to handle the input tube of 20±2 mm outer diameter.♦ Provision for attachment of Chelate delivery system should be made separately to the rotary seal of the MCVD set-up which will be required in the near future.						
2.	Gas Control System	<p>Main bubbler cabinet:</p> <ul style="list-style-type: none">♦ At least 3 (three) bubblers with suitable protecting cover along with the facility of continuous purging with nitrogen gas.♦ Oil/Water bath arrangement to heat the bubbler for precise control of the internal temperature within a range of 20° to 50°C. <p>Bubblers:</p> <ul style="list-style-type: none">♦ Material of construction: Glass/metal or a combination of both.♦ Suitable refilling facility (manifold, valves, pipework, etc.) to top-up liquid halide precursor materials from time to time with proper safety arrangement.♦ Digital temperature display for water/oil bath with an accuracy of ±0.10°C or better.♦ Digital display of individual bubbler temperature or in computerized programme software. <p>Bubbler capacity (Litre):</p> <table><tr><td>SiCl₄</td><td>5 – 10</td></tr><tr><td>GeCl₄</td><td>1– 5</td></tr><tr><td>POCl₃</td><td>1– 5</td></tr></table> <p>Bubbler heating system:</p> <p><u>Reagent lines:</u></p> <ul style="list-style-type: none">♦ Separate VENT and RUN mixing manifolds within the evaporator cabinet to switch over the reagent supply to the respective channels.	SiCl ₄	5 – 10	GeCl ₄	1– 5	POCl ₃	1– 5
SiCl ₄	5 – 10							
GeCl ₄	1– 5							
POCl ₃	1– 5							

- ♦ Suitable heating system to keep the run manifold lines to avoid clogging and moisture-free.
- ♦ Gas system pipework/valves will be SS-316.
- ♦ Pipelines carrying halide precursor must be of high quality non-reacting/non-corrosive Teflon or SS-316.
- ♦ Suitable filter must be present in gas lines to avoid dust/other contaminants before MFC.
- ♦ N₂ to be purged for the rotary seal, pressure transducer, vent manifolds and lathe line.

MFC cabinet:

- ♦ Two sets of gas dryers to be provided for the main Oxygen (used as carrier) and Nitrogen (used for pressure compensation) gas lines. The dryers should be replaceable in nature or option of regeneration from time to time to keep moisture level in ppb range.
- ♦ Digital display to be attached for continuous display of the moisture level.
- ♦ Arrangement to be made for continuous sweeping of all the gas lines with dry nitrogen from a common supply.
- ♦ All MFCs will be Digital MFCs for precise flow with PID control.

Flow rate (sccm) of MFC (Accuracy $\pm 3\%$)

Mentioned only minimum flow required for each MFC			
Carrier Oxygen		High	Low
	SiCl ₄	0 – 500	0 – 200
	GeCl ₄	0 – 500	0 – 100
	POCl ₃	0 – 1000	0 – 100
Process gas	O ₂	0 – 1000 or more	
	N ₂	0 – 1000 or more	
	He	0 – 500 or more	
	Cl ₂	0 – 200 or more	
	SF ₆	0 – 100 or more	
	SiF ₄	0 – 200 or more	

Control System:

- ◆ Overall control should be provided through PLC and relation databases to be run under Microsoft Windows 10 or higher.
- ◆ The operator interface should work via the PC with machine control via the PLC which allows the process to continue even if the PC crashes.
- ◆ The databases will be created with configuration software.
- ◆ All the fabrication parameters are to be saved in the recipe database and production data is to be logged to a production history database.
- ◆ The control system has to be operated under both Recipe Control Mode and Manual Control Mode.
- ◆ Two suitable flat panel colour monitor is to be provided. One for the overall control system. A second monitor will serve as a dedicated display for the tube-diameter camera system.

Installation and Commissioning: Supervision of all kinds of installation and commissioning to be done by the supplier onsite (CSIR-CGCRI).

At least two preform-making runs: one for standard single-mode fiber and a second for a step-index multimode fiber having a core diameter of 25 – 30 μm with NA of 0.20 ± 0.02 based on the suitable selected recipe.

Training: At least 2 (two) Scientists and 2 (two) Technical staff should be trained to run the machine individually. Training is to be conducted at CSIR-CGCRI premises during installation and commissioning.

Warranty: 12 (twelve) months from the date of completion of successful installation and commissioning.

The above amendments shall amount to amendments of the relevant terms of our Bid Document for CGCRI Tender No. **P/NC/91/SD/DB/OTE/22-23**.

All the other Tender terms remain unchanged.


(Anjani Kr. Pandey)

Stores & Purchase Officer

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