ANNEXURE-1

TECHNICAL SPECIFICATIONS-CUM-COMPLIANCE TABLE FOR CARBONATION CHAMBER

NOTE: For each specification, please enter "Yes" or "No" in the third column of this table. If a cell in the third column is left blank, then it will be assumed that the quotation does not comply with the respective specification/requirement. Provide catalogues, data sheets and/or other documentation to support the compliance of your equipment to the given specifications.

S. No.	Specifications	Yes / No	Remarks
	General		
1	Size of storage area - minimum 200 litres		
2	Chamber interior - made of stainless steel, 18 SWG		
3	Chamber exterior - fabricated using 18 SWG MS powder coated material		
4	Two detachable and height adjustable type loading tray (wire shelving) each with at least 50 kg load bearing capacity within the chamber		
5	Heavy duty castors for easy handling and transportation		
6	Non-flammable rock wool with at least 100 mm thickness and at least 90 kg/m^3 density, on walls and door		
7	Appropriate drain from within the chamber		
	Temperature Control		
8	Programmable temperature range: 5°C to 50°C with measurement accuracy of at least ±0.1°C		
9	Control accuracy: within ±1°C after stabilization		
10	Inconel sheathed type heaters to prevent bursting under long-term usage		
11	Single stage (one compressor) air-cooled refrigeration system and a non-CFC based refrigeration gas for temperature and humidity control		
	Relative Humidity (RH) Control		
12	Programmable RH range: 40 to 95% with RH accuracy of ±1.5%		
13	Air atomizers for humidification process along with water vapour generator (with auto-refill facility)		
14	Storage tank for distilled water and a water level indicator on the control panel		
15	Air compressor to produce dry air with at least @ 3-4 bar pressure and for de-humidification		
	Carbon-di-oxide (CO_2) Control		
16	Programmable CO_2 range of 0 to 5% with accuracy of the CO_2 Sensor of at least 1% of measuring range or 5% of the measured value		
17	Valve assembly (with both manual and automatic control) for purging CO_2 into the chamber and remove the excess CO_2 from the chamber		

18	Air compressor to purge dry air into the chamber and remove the excess CO_2 from the chamber		
19	CO_2 transmitter with a sensor preferably using NDIR technology with automatic base line correction to measure CO_2. Response time of the CO_2 sensor should be less than 2 minutes		
20	Transmitter should provide appropriate output with respect to 0-5% CO_2 concentration in the air and control the opening and closing of purging valve to maintain the set concentration level		
	Display and Control Panel		
21	A separate panel for controlling and displaying the current values and set values of the Temperature, RH, and CO_2 concentration (in °C, %RH and %), on the control panel attached to the chamber. All these values should be displayed at all time		
	Door Assembly and Viewing Window		
22	Door system with full front opening (180 degrees), with heavy duty and long-lasting hinges with suitable locking mechanism		
23	Door with a glazed viewing window		
24	Door equipped with an interlock protection system (automatic switching off/on of the chamber)		
	Air-Circulation System		
25	Air circulation with fans (preferably with SS304 blades) for the uniform control of environment inside the chamber		
26	Motor to be kept outside the chamber		
	Controller System		
27	High performance PID Profile Controller with advanced control algorithm for stable straight-line control having percentage output control for controlling the temperature and humidity		
28	Provision of real-time clock		
29	5-digit display for temperature, humidity, and CO_2 process values and set points		
	Safety		
30	Over-heat safety system (with a maximum temperature = 50°C) and an over-cool safety system (with a minimum temperature = 5°C)		
31	Thermal overload relay for the fans and compressor		
32	Safety alarm for chamber malfunction		
33	Separate switch/button for switching off the main power supply		
34	“Caution Notices”, based on international standards, on printed metallic plates, affixed onto the door		
35	Wiring for electrically grounding the entire chamber		
36	Noise Level of the chamber to be within 65 dBA, measured at 1 m distance (as per TNPCB norms)		

37	All the electrical items should meet the Standard Ingress Protection 55 (IP 55) grade suitable for humidity chambers		
38	All the Switchgears and Metal Circuit Breakers used should be of proven, very high quality reputed brands (matching the quality standards of Telemechanic/Merlin Gerin etc.)		
	Power Supply Requirements		
39	415 V ± 10%, 3 Phase, 50 Hz AC		
	Calibration Certificate		
40	Calibration certificate, which has traceability to NABL for the complete system should be provided at the time of supply. Original calibration certificate of the Sensors used, which has international traceability, should also be supplied along with the system		
	Vendor Qualification, Experience, Installation & Training		
41	The original equipment manufacturer (OEM) should have least 5 years of experience in the field of supplying environment - controlled chamber systems		
42	Similar equipment should have been supplied and commissioned satisfactorily. Provide a list of IITs/government agencies, where similar equipment was supplied with their email and phone contact details such that the details can be verified. Provide the relevant purchase orders also		
43	Free installation and commissioning of the Carbonation chamber at the location specified in the purchase order		
44	Free hands-on training on the installation, operation, testing, data acquisition, maintenance and emergency management of the equipment for minimum two users, for a period of at least one full working day at delivery location as specified in the purchase order		
45	Technical support to clarify queries on subsequent usage of the system Specify all what can be demonstrated in the Remarks cell		