Carbon dioxide and Temperature Gradient Chamber (CTGC) facility

Establishment of Carbon dioxide and Temperature Gradient Chamber (CTGC) facility consisting of eight 30x6x4m chambers with

1. Two chambers with temperature gradient of 5°C above ambient
2. Two chambers with temperature gradient of 5°C above ambient + uniform concentration of 550ppm CO_2
3. Two chambers with uniform concentration of 550ppm CO_2
4. Two chambers with ambient temperature and CO_2 with all structural fittings of S.No.2

The following issues are mandatory and should be submitted

1. A conceptual design and layout of components of facility.
2. List of material (heaters, sensors, equipments and other accessories) with make, model along with supplementary literature/ information.
3. List of brochures indicating the commissioning of similar facilities by the firm elsewhere
4. The simple reporting of 'complied' on any specification of the facility will be treated as 'not responding' or 'no information'. Hence the firm has to submit information on 1, 2, 3 items mentioned above very clearly.
5. List of experts with their names and details who monitor and supervise the facility during and after commissioning the facility.

S.No.	Item
1	Each chamber should be of 30 meters length, 6 meters width and 4 meters height at the centre. The chambers must be provided with sufficient strength to maintain 30x6x4 meter chamber size. All the chambers should be covered with high quality, light weight, rigid, corrugated polycarbonate sheet of Lexan or its equivalent quality of BIS grade, with excellent impact resistance, superior clarity, versatility, and weather resistance with >90% light diffusion with > 85% PAR transmission. The thickness of the sheet must be at least 4mm. The fabrication drawings should be submitted to the CRIDA for approval before initiating fabrication.
2	Each chamber must be provided with 12 no's of sensors for temperature and relative humidity of Rotranic or equivalent quality appropriately located and controlled by RTD/Thyristers to maintain the temperature gradient of 5 ± 0.5°C with reference to ambient temperature. Temperature sensors should have measuring range 0-100°C, with an accuracy of ±0.2°C and a resolution of 0.02%. The RH must be 0-100% with accuracy of 0.5% and a resolution of 0.02%.

3	The chambers with elevated CO_2 must be provided proper monitoring system and controls to maintain uniform CO_2 concentration vertically and horizontally even in combination with gradient temperature condition. The details of CO_2 supply lines and its pressure bearing limit needs to be included for CO_2 supply. The CO_2 supply line with 12 port manifold and CO2 regulators need to be provided.
4	Control panel consisting of temperature, humidity and CO_2 controller with software PLC and SCADA control system
5	Air circulating unit must be provided for maintaining set humidity and temperature with at least 90% efficiency and aerosol disinfector humidifier to attain a maximum of 80% RH.
6	IRGA along with pump pack considering as a set CO_2 monitoring by microprocessor based CO_2 analyzer with non-dispersive infrared absorption (NDIR) measuring method. The repeatability of the CO_2 analyzer within ± 0.5% of full scale and response time of 1-3 seconds; within ± 1% of linearity; ± 0.5% of noise of full scale; With in-built temperature and relative humidity measurement facility; With auto calibration and Barometric pressure compensation and must have sampler selector. Before air sample enters the analyzer, it should pass from the moisture removal device to safe guard the analyzer from excess humidity. The provision for measuring CO_2 concentration should be made through 6 sampling points in each chamber by a dedicated CO_2 analyzer with pump pack and should be interfaced with SCADA and PLC.
7	Heating system for four chambers (2 only temperature; 2 with both temperature and CO_2): The gradient of 5 ±0.5°C above ambient increase in temperature within each chamber with 1±0.5°C increase at regular interval need to be set with proper control and regulation. The temperature settings should have a cut off for above 50±0.5°C under any circumstances. The provision to program variable temperatures for different durations and an in-built alarm system for different trouble shooting events need to be provided.
8	Data management system for SCADA and PLC DELL Monitor 21.5" LED, TFT with red eye protection; windows 7 professional with licensed key and original CD, Intel coreTM i7 processor with suitable chipset and high processor speed (15M Cache, up to 3.90GHz), 64GB DDR3 ram, 64 bit, 4 DIMM sockets for memory slots, 4 nos bays (2 nos 5.25” for optical media drives and 2 nos, 3.5” for hard disk drives), 500 GB SATA hard disk drive (7200 rpm), Super multi SATA DVD writer, MS office 2007, 6 USB ports of highest version and compatible to all connecting devices, audio ports, head phones and microphone ports in front, standard key board with all provisions, optical two button scroller mouse, network interface integrated 10/100/1000 baseT network interface, 3 year onsite warranty, antivirus: kaspersky with original CD. Multimedia graphic card.

9	Standard signal cable for connecting sensors to the PLC/SCADA system in control room. It should be standard make and ISI certified. There should not be any signal loss in the wires while connecting from source to the SCADA. It should have ferrules and identifiers for easy identification in the field and maintenance.
10	HP Laser color printer high quality proper software: print speed 8ppm on A4, 600 x 600 dpi, in line color laser printing, direct to page printing, duty cycle 35,000 pages, standard memory 16 MB, processor speed 264 MHz, host based standard languages, 2 standard paper trays, 250 sheets, 125 sheets output bin, manual duplex print options, media sizes A4, A5 and B5 sheet fed finished output handling, standard connectivity with USB and Ethernet, compatible to windows 7 professional.
11	UPS (5 KVA) of with two hour back up to support all control and monitoring units.
12	Maintenance: A service engineer may be provided for addressing day-to-day issues relating to maintenance. The whole establishment must be maintained trouble-free with monthly preventive maintenance for the first year and there after quarterly preventive maintenance for subsequent 2 years.
13	The details of technical expertise and man power to set up and maintain the facility. The brochures with technical details of proposed components need to be attached.
14	Proof of experience in establishing the facility or similar facilities if any with satisfactory working report or certificate from the PI/Institute of not less than six months prior to this advertisement.

The decision of the duly constituted technical committee of CRIDA is final in evaluation of technical bids on its suitability/ qualification. This decision cannot be challenged by the bidder and no correspondence will be entertained further.