

Specifications for Walk-in Plant growth chamber

S. no.	Item	Specifications								
1	Name of the equipment	Walk-in Plant growth chamber								
2	Number	One								
3	Body Design and Dimensions	<ul style="list-style-type: none"> The body design should be build as reach in growth chamber. The construction should be made up of galvanized or corrosion resistant stainless steel where inner walls are coated with adequate insulated panel. The property of material or insulated cover should minimize the heat and cold loss or intake from inside to outside and vice versa. The design of these chambers should serve the purpose of growing Rice plants. Interior: Corrosion resistant stainless steel. Atleast 80 mm CFC free PUF Insulated modular cabinet Exterior: Powder coated, Painted, protected steel with a textured finish. The bidder must ensure in the design of chamber itself that shelves steel should withstand the weight of soil, water and plant biomass. Observation Window- Full view see through Glass Window 								
4	Working area	Internal working size- 3m X 3.6m X 3m (LXDXH)								
5.	Shelving	<ul style="list-style-type: none"> The chamber should consists of at least of three working shelves, which are lighted independently in each from top/back panels by appropriate lamps. Shelves should be modular in design where one should be able to take extra shelves out. Specially designed solid stainless steel wire mesh trays ensure even temperature distribution. At least three shelves/racks made of sturdy stainless steel with appropriate thickness to bear the weight of soil and plants. Shelves slide in and out on stainless steel rail assemblies and should be vertically adjustable. The shelves should allow a growing height of atleast 180cm. 								
6	Door	Door while opening should allow full access to the interior of chamber and when closed keeps the door against doorframe tight via magnetic gasket seal so that internal moisture and cool air does not get leaked. Door should be front facing of the chamber.								
7	Temperature	<p>The plant growth chamber must maintain the set temperature regardless of the outside weather condition, time of day and season of a year following temperature regimen.</p> <table border="1"> <tbody> <tr> <td>Temperature Range</td> <td>5° C to 60° C (RH / LIGHTS OFF)</td> </tr> <tr> <td>Temperature Range</td> <td>20° C to 60° C (RH / LIGHTS ON)</td> </tr> <tr> <td>Temperature Range</td> <td>10° C to 60° C (LIGHTS ON)</td> </tr> <tr> <td>Temperature Accuracy</td> <td>± 0.2° C</td> </tr> </tbody> </table> <p>Apart from temperature control a programmable minimum and maximum temperature tracking alarm should trigger automatically. Mandatory audible alarm should be provided.</p>	Temperature Range	5° C to 60° C (RH / LIGHTS OFF)	Temperature Range	20° C to 60° C (RH / LIGHTS ON)	Temperature Range	10° C to 60° C (LIGHTS ON)	Temperature Accuracy	± 0.2° C
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Temperature Accuracy	± 0.2° C									
8	Refrigeration and Humidity	<ul style="list-style-type: none"> Hermetically Sealed CFC Free Emerson Compressor with R- 								

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	control	<p>134a refrigerant having state of art By pass system for continuous run compressor.</p> <ul style="list-style-type: none"> • The refrigeration system should ensure uniform temperature and relative humidity across the shelves within the chamber. The refrigeration system control should have automatic operation and in the event of failure of the control system it should alert user via audible alarm or through GSM based alerts. • Relative humidity should be controllable in the range of 40-95% ($\pm 2\%$) irrespective of outside weather condition and temperature of chamber. Low energy ultrasonic humidity generator and advanced humidity sensors with an alarm are required to control moisture within the chamber. Non condensing type steam injection system with water level arrangement with insulation to save heat energy.
9	Lighting system	Each tier of shelves should be lighted from top by cool fluorescent lamps, supplemented by incandescent lighting lamps if required or better. The light intensity should be programmable from 500 $\mu\text{mol}/\text{m}^2/\text{s}$ to 900 $\mu\text{mol}/\text{m}^2/\text{s}$ for Rice with dawn and dusk simulation or by dimmable option. The programming of light option should allow the user to change the day and night cycle length conveniently.
10	Airflow	The airflow design should discharge uniform flow of air vertically across the shelves. For growing crop plants the flow of air should be bottom to top in the chamber and have no or minimum impact on the rate of transpiration of plants.
11	Plant growth area and height	It should give total shelving area more than 55 (± 1) ft ² for growing plants. The bidder must provide 12 trays.
12	Control System	Programmable Logic Control with Safety controller, auto changeover of Standby systems & other event managements with 7" Color touchscreen and Ethernet connectivity
13	Water Purification system	<p>Water Purification system to produce de-ionised water for the production of humidity in the chamber with any salt deposition in the bath & on the element with the following specifications-</p> <ul style="list-style-type: none"> - Should be from a reputed international brand/company - Microprocessor controlled single integrated system with Type 1 and Type 2 Water producing capability and should dispense water directly from system. - Flow rate: 1 L/min; Operating pressure in bar, min/max: 1 - 6 bar; TOC Value: 1-5 ppb; Bacterial content in CFU/ml: <1; Particle content: < 1 - Internal Tank Capacity: 5-7 liter. - Warranty: 1 year or more - Principal Supplier Should Have Direct Presence in the country along service set up. - Should have a strong RO system to feed the water system with good quality low TDS water for better & longer life of the water purification System
Other specifications		
1	Power	Works on 230/430 V AC single / three phase 50Hz; MCB, Heavy duty latch with lock & key.







S. no.	Item	Specifications
2	Password protection	Authority level access for controls and separate password at user level; Door access system through Biometrics
3	Certifications	ISO 9001: 2015 and ISO 13485 : 2016; CE certified
4	Documentations	IQ, OQ, PQ documents with material Test certificates And calibration reports
5	Mobile alerts	Mobile alert via GSM Technology in case of system failure
6	Additional trays	Additional tray suitable for above equipment
7	Uninterrupted power supply	Online uninterrupted power supply for PLC up to 30 min; Appropriate genset facility/ Preferably Solar power backup facility (minimum10KW capacity or more to run the whole system)
8	Voltage stabilizer	Compatible Servo Controlled Voltage Stabilizer should be provided
9	Civil works required	All types of civil & electrical work wherever required. One Ton Branded Split Air Conditioner for the better efficiency of the growth chamber to work in all weather condition. The AC should be fitted on the wall & fitted with compatible voltage stabilizer.
10	Standby refrigeration system	Ready to use stand by refrigeration system in case of regular system fails. Complete with compressor condenser, evaporator and other accessories with gas charging.
11	Standby humidity system	Ready to use stand by Humidity System in case of regular system fails.

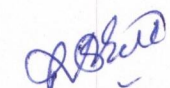
Additional terms and conditions

1. The bidder should take full responsibility of installing chamber and making it functional once it arrives at PAU Ludhiana. The institute will provide a water tap connection along with appropriate power point plugs.
2. The system should be equipped with all accessories for proper & effective functioning (such as power supply cords, stabilizers, water distillation units etc.) Any upgradation of the system accessories and software within two year from the time of installation should be provided free of cost.
3. Price of individual components should clearly be specified in the standard and optional format in the quote.
4. The quotation should justify each specification point by point in their order of requirements. Quotation not done in the proper form may invite technical rejection.
5. Three-years of unconditional warranty for growth chamber and five-year of unconditional warranty on compressors should be provided.
6. An appropriate Servo stabilizer should be included in the final price for each chamber and price must be included in the final quote. After three years of warranty period, price for five years of annual maintenance contract (AMC) must be quoted with terms and conditions clearly.
7. A branded Light meter to check the intensity of light should be provided.
8. A high-performance branded vacuum cleaner (2000 watt capacity) should be given by the supplier to clean the chambers.
9. Justify in the order of requirement each specification and provide catalogue to evaluate the technical bid.
10. Simply Copying and Paste specifications will lead to disqualification of Bidder; Web link to be provided for the Quoted Model to verify the compliance
11. If the bidders are distributors, then must attach the OEM certificate.
12. The Bidders must attach the quality certificate, user list with contact details, order/Performance copies, brochure with compliance in tabular form

13. FOR should be PAU Ludhiana

You are requested to please obtain and convey the approval of CPC. The funds are available in the scheme "Tackling emerging diseases and insect pests problem in rice through innovative genomic approaches" CSS- 82 (PC-6409) under non recurring contingencies". The photocopy of the financial sanction is enclosed herewith.

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