भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान मोहाली

शिक्षा मंत्रालय, भारत सरकार द्वारा स्थापित

सैक्टर 81,नॉलेज सिटी,प. ओ. मनोली, एस. ए. एस. नगर, मोहाली, पंजाब 140306

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH MOHALI

(Established by Ministry of Education, Govt. of India)

Sector-81, Knowledge city, PO-Manauli, SAS Nagar Mohali-140306, Punjab

PAN No. - AAAAI1781K GSTIN – 03AAAAI1781K2ZS

• **Phone : +91-172- 2240121** • **Fax : +91-172-2240124** • **http://www.iisermohali.ac.in** • **Email:** tenders@iisermohali.ac.in

CPPP/Institute Website

IISERM(1717) 26/27-Pur. Dated: 05th May 2026

ई - निविदा आमंत्रण सूचना

NOTICE INVITING E-TENDER

ग्रीनहाउस और वॉक-इन प्लांट चैंबर सहित प्लांट ग्रोथ फैसिलिटी के डिजाइन, निर्माण, स्थापना, परीक्षण और कमीशनिंग के लिए दो बोली प्रणाली में निदेशक, आईआईएसईआर मोहाली की ओर से ऑनलाइन निविदाएं आमंत्रित की जाती हैं। तकनीकी विनिर्देश और नीचे दिए गए विवरण के अनुसार और सीपीपीपी पर मूल निर्माता/आपूर्तिकर्ता से बीओक्यू सूची अर्थात https://eprocure.gov.in/eprocure/app निविदा दस्तावेज ई-प्रोक्योरमेंट पोर्टल की वेबसाइट https://eprocure.gov.in/eprocure/app और संस्थान की वेबसाइट www.iisermohali.ac.in से डाउनलोड किए जा सकते हैं।

Online tenders are invited on behalf of the Director, IISER Mohali in **TWO BID SYSTEM** for the **Design, Manufacture, Erection, Testing and Commissioning of Plant Growth Facility including Greenhouse & Walk-in Plant Chamber,** as per detailed specification and BOQ list from the original manufacturer/supplier at CPPP i.e. **https://eprocure.gov.in/eprocure/app**. Tender documents may please be downloaded from the E-procurement portal website **https://eprocure.gov.in/eprocure/app** & Institute website **www.iisermohali.ac.in.**

Sd/-
सहायक कुलसचिव (क्रय तथा भंडार)
Assistant Registrar (Stores & Purchase)

NOTE: **This is a domestic Tender according to the DPIIT Order dated 15/07/2017, 04.06.2020 and subsequent amendments to the order for Public Procurement Preference & PROVISION FOR LOCAL SUPPLIERS TOWARDS PREFERENCE TO MAKE IN INDIA. The bidder required to declare on the letter head the percentage of Local content for the quoted instrument and submit with the Technical Bid. Bidder should also give details of the location(s) at which the local value addition is made.**

भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान मोहाली

शिक्षा मंत्रालय, भारत सरकार द्वारा स्थापित

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ई - निविदा आमंत्रण सूचना / E-TENDER NOTICE

Tender Ref.- IISERM(1717) 26/27-Pur.	Dated : 05th May 2026

Critical Date Sections

Sr.	Description	Date	Time
1.	Tender Publishing Date and time	05th May 2026	6:00pm
2.	Tender Document download start Date & Time	05th May 2026	6:00pm
3.	Bid Submission start Date &Time	05th May 2026	6:00pm
4.	Bid Submission End date and Time	25th May 2026	Upto 2:30pm
5.	Tender opening Date and Time	26th May 2026	At 3:30pm

Online tenders are invited on behalf of the Director, IISER Mohali in **TWO BID SYSTEM** for following item(s) from the original manufacturer/supplier at CPPP i.e. **https://eprocure.gov.in/eprocure/app**. Tender documents may please be downloaded from the E-procurement portal website **https://eprocure.gov.in/eprocure/app** & Institute website **www.iisermohali.ac.in.**

2. Online Tender fee of Rs 590/- (Non-refundable) should be submitted by bidder favoring Registrar, IISER Mohali through NEFT/RTGS as per account details given below. UTR copy to be uploaded along with the technical bid.

3. EARNEST MONEY DEPOSIT (EMD): Tenderer must submit EMD of Rs. 80,000/- (Rupees Eighty Thousand Only) in the format of e-payment / BG **OR Insurance Surety Bonds (ISB) such as, Bid and Performance Bonds issued by the insurance companies in terms of MoF D.O. Letter No. eR-13011/02/2019-Ins.II(Part1) dated 19.12.2024, irrespective of the items quoted i.e. schedule wise EMD amount as mentioned in the document will not be considered.** Without EMD, the tender will be summarily rejected.

A Bank Guarantee of equivalent amount from any Indian Nationalized bank/Scheduled Commercial Banks in a prescribed format **(Format enclosed below in Annexure - I)** favoring Registrar, IISER Mohali. BG should be valid for a period of 6 months. BG is also extendable depending on requirement. Original Scanned copy of Bank Guarantee needs to be uploaded along with tender which will be verified at the time of tender opening. **Original BG copy needs to be send by Post/Courier immediately to Assistant Registrar (S&P), Sector-81, Knowledge city, PO-Manauli, SAS Nagar Mohali-140306, Punjab & it needs to be received within 15 days from the date of tender opening. (OR)**

Online E-Payment shall be made through RTGS as per the details given below. However, online payment details i.e. UTR no and proof of current money transaction details are to be enclosed with our technical bid/tender:

Name: IISER Mohali
Account Number 4790101001912
Canara Bank, IISER Mohali Branch
IFSC : CNRB0004790

a) Payment of Earnest Money by cheque, T.D.R and F.D.R. will not be accepted.

b) Request for adjustment of dues from the Corporation towards EMD will not be entertained.

c) **Refund of EMD :-** The EMD of the bidders whose bids are not qualified/not acceptable will be refunded after finalization of tender in the form of e-payment to those bidders who deposited EMD in the form of e payment, without any interest, upon receipt of a written request by the bidder after deducting bank charges, if any. Those who submitted EMD in the form of BGs, the same will be returned duly to the unsuccessful bidders. For successful bidders, EMD will be returned after submission of Security Deposit / PBG (if applicable).

d) **MSMEs in India registered with appropriate authority as per latest notification shall be exempted from EMD payment provided they are registered for the item being quoted. Micro & MSME/NSIC and Firms registered and the firms registered with concerned Ministries/ Departments, the bidders are exempted from payment of Tender Fee/EMD as per GOI notifications/GFR (2017) and Ministry of Finance OM No. F.9/4/2020-PPD dated 12 November 2020 and No. DPE/7(4)/2017-Fin.(Part-I) dated 19.11.2020, are required to furnish Annexure II.**

e) IISER Mohali will not be responsible for any delayed receipt of Original EMD/BG etc. caused by postal authorities/courier services and loss in transit or delay.

ITEM WISE DETAILS

Sr. No.	Description	Qty. (in units)
1.	**Design, Manufacture, Erection, testing and commissioning of Plant Growth Facility including Greenhouse & Walk-in Plant Chamber Specifications: - As per Annexure-IV**	01

A) IMPORTANT NOTES:-

I. **This is a domestic Tender according to the DPIIT Order dated 15/07/2017, 04.06.2020 and subsequent amendements to the order for Public Procurement Preference & PROVISION FOR LOCAL SUPPLIERS TOWARDS PREFERENCE TO MAKE IN INDIA. Bidders should also give details of Localtions(s) ;at which the local value addition is made. Bidders are requested to furnish the declaration regarding local content/locations in Annexure II through CPPP portal.**

II. **Restriction under Rule 144 (xi) of the General Financial Rules (GFRs), 2017 under sub clause 3, in terms of DOE, MoF No. F.18/37/2020-PPD dated: 8th February, 2021:**

(i) A bidder is permitted to procure raw material, components, sub-assemblies etc. from the vendors from countries which shares a land border with India. Such vendors will not be required to be registered with the Competent Authority, as it is not regarded as "sub-contracting".

(ii) However, in case a bidder has proposed to supply finished goods procured directly/indirectly form the vendors from the countries sharing land border with India, such vendor will be required to be registered with the Competent Authority. Kindly submit the declaration in Annexure-III.

III. The online updated Price BOQ is in INR format. Bids are invited in INR only against domestic tender.

IV. The Online bids should be submitted directly by the original manufacturer/supplier/OEM, the OEM is required to furnish certificate to this effect. If quotation is submitted/filled by any representative/ agent/dealer then they must upload a authorization authority certificate from the principal company/OEM.

V. All MSME/NSIC/Startup Units shall be considered as per provisions/rules prescribed by Govt of India.

VI. Auto-extension of last date for E-Tenders has been activated by CPP Portal which has participation 2 bids or less.

VII. Tenders shall be accompanied with Earnest Money of Rs. 80,000/- by way of receipt of NEFT/RTGS/BG/FDR of a scheduled bank having validity of 3 months or more from last date of receipt of tender.

VIII. The successful bidder will be required to furnish performance guarantee of FIVE percent of the tendered amount. This shall be submitted in the form of NEFT/RTGS/BG/FDR only.

IX. Technical Eligibility Criteria:

Eligibility Criteria for Work Experience. To become eligible for participating in the bid process, the bidders shall satisfy the following Work Experience Criteria

● The Bidders should have satisfactorily completed similar works executed in CFTIs or Government Scientific Research Institutes only, during the last five years ending previous day of last date of submission of tenders as below. For this purpose, cost of work shall mean gross value of the completed work including cost of material supplied by Government/Client but excluding those supplied free of cost. This should be certified by an officer not below the rank of Executive Engineer/Project Manager or equivalent.

- Three similar completed works each costing not less than Rs. 15 lakhs OR
- Two similar completed works each costing not less than Rs. 25 lakhs.
- One similar completed work costing not less than Rs. 35 lakhs.

X. PAYMENT OF BILLS: - All payments to be made to the Contractor, under this contract shall be by NEFT or RTGS within a reasonable time, after the certification of bills by the execution department, as per the payment terms mentioned below and elsewhere in the document, after handing over the site to the institute and submission of 5% PBG of the total value.

B) <u>SUBMISSION OF TENDER</u>

I. All bid/ tender documents are to be uploaded online at Central Public Procurement portal i.e. **https://eprocure.gov.in/eprocure/app** only and in the designated cover/ part on the website against tender ID. Tenders/ bids shall be accepted only through online mode and no manual submission of the same shall be entertained except tender fee. Late tenders will not be accepted.

II. The online bids shall be opened at the office of the Assistant Registrar (S&P), IISER Mohali, on above given date and time. If the tender opening date happens to be on a holiday or non-working day due to any other valid reason, the tender opening process will be attended on the next working day at same time and place. IISER Mohali will not be responsible for any error like missing of schedule data while downloading by the Bidder.

III. <u>The bidder shall upload the tender documents/NIT duly filled in and stamped by the authorized signatory on each and every page along with all necessary Annexures as per NIT.</u> Tender not submitted/uploaded in the prescribed form and as per the tender terms and conditions shall be liable for rejection.

<u>Check List of Documents (signed & stamped) to be provided and uploaded by the bidder:</u>

S. No.	Particulars of Documents	Yes/No	Page No. (As per technical bid)
1.	**Tender Notice Document Copy of NIT** **(duly signed and stamped)**		
2.	**EMD as per Annexure-I OR EMD remittance details (UTR/NEFT/RTGS)** **(issued by nationalized / schedule commercial bank in prescribed format)**		
3.	**Documentary proof of work orders, completion certificates etc.**		
4.	Declaration of Local content/MII, with complete information (if applicable) – **Annexure-II** **(on letter head duly signed and stamped)**		
5.	**Land border sharing declaration in Annexure-III**		
6.	**Technical Compliance Sheet** **(on letter head duly signed and stamped)**		
7.	**Authorization/MAF Certificate** from OEM (principle)/ Manufacturer certificate, if applicable **(signed copy)**		
8.	**Tender Fee**, if applicable or Exemption Certificate (NSIC/MSME Certificate) **(duly signed and stamped)**		
9.	**Attached copy of PAN Card**		
10.	**Attached copy of GST**		

11.	**Proof of Financial turnover certified by the Chartered Accountant**		
12.	**Non-blacklisting declaration, solvency certificates**		

**** If checklist is not provided by the bidder along with ABOVE DOCUMENTS the bid shall be summarily rejected.***

IV. The bidder shall upload scanned copy of the PAN Card, GST number duly signed and stamped. **Also bidders applying against "MSME/NSIC Certificate" issued by appropriate Authority, should ensure that the certificate attached is relevant to the area of service/supply. For example, If the tender is for "supply & installation of Desktop"** ***the certificate should be issued for activity/area of "Computer supply and services activities etc" otherwise bid will be REJECTED without notice.***

V. E-procurement system ensures locking on the scheduled date and time. The system will not accept any bid after the scheduled date and time of submission of bid.

C) INSTRUCTIONS TO BIDDERS

1. The Online bids should be submitted directly by the original manufacturer/supplier, If quotation is submitted/filled by any representative/agent/dealer then they must upload a authority certificate from the principal company for quoting the price otherwise such quotation will be rejected.
2. **The firms should be registered with Sales Tax Authorities. A valid PAN /GST Number of the tenderer/bidder has to be provided/enclosed/upload with a copy of proof with self attested. PAN and GST Number are required for both as below:**

   i) Principle Company and
   ii) Authorized dealer/distributor/channel partner.

3. The quantity mentioned in this inquiry is and shall be deemed to be only approximate and will not in any manner be binding on the Institute. Before the deadline for submission of the online bid, IISER Mohali reserves the right to modify the tender document terms and conditions. Such amendment/modification will be notified on website against said tender ID. If the rates quoted by the bidders and L-1 is more than one, the contract will be shared between the two or more bidders.
4. The rates offered should be FOR Chandigarh/Mohali in case of firms situated outside Chandigarh/Mohali, and free delivery at the Institute premises in case of local firms. Conditional tenders will be summarily rejected.
5. In case of Ex-godown terms the amount of packaging forwarding freight etc. should clearly be indicated by percentage or lump sum amount. Institute has policy not to make any advance payments towards any purchase, Letter of credit can be opened if required.
6. The items, so supplied will have to be of high quality and grade and in the inspection/test if these are found to be of inferior quality, the same are to be replaced by supplier at their cost within the stipulated period, failing which the EMD of the firm will be forfeit. Delayed supply/non-compliance of complete order may also lead to cancellation of order, if technically found suitable and L-1.
7. Custom Duty, applicable as per GOI Norms.
8. GST, applicable as per GOI Norms.
9. Bidder/s quoting in currency other than Indian Rupee (INR) should explicitly mention the currency in which tender quoted wherever applicable in Technical Bid along the tender documents.
10. The delivery period should be specifically stated. Earlier delivery will be preferred.
11. The firms are requested to provide/**upload detailed description and specifications together with the detailed drawings, printed leaflets & literature of the article quoted** and also should enclose **Technical Compliance Sheet.** The name of the manufactures and country of manufacture should also invariably be stated. In the absence of these particulars and documents, the quotation is liable for rejection. Tenders not accompanied by detailed information as required, are liable to

be rejected.

12. If any information furnished by the bidder is, at any stage found to be incorrect, false or fabricated, the Institute/purchaser shall have the absolute right to forfeit the security deposits, in addition to cancellation of contract, forfeiting the warranty/performance Guarantees and other action in accordance with law, such as black-listing, risk & cost etc.

13. The work shall be carried out as per the specifications asked, drawings provided and as per the instructions of the Institute Authorities.

14. Validity of offer: Quoted rates shall remain valid for 90 days from the date of tender opening for the release of work order.

15. Bidders are advised to visit the site and get themselves familiar with the site conditions before applying.

16. There might be some minor changes in the design and specifications of the work. Rates quoted shall be inclusive of all such contingencies.

17. The contractor shall deploy sufficient number of resources to complete the work within timeline mentioned.

18. The contractor shall abide by all the safety protocols of the labor deployed by him. All labor laws and safety protocols should be adhered to.

19. The labor shall not be allowed to stay in the campus in nights. Contractor may decide accordingly.

20. Defect Liability period/maintenance period shall be (thirty-six) MONTHS, starting from the completion of work as defined in scope of the work, certified by the constituted committee, IISER Mohali in the completion certificate. The defect liability period shall start from the date of final handover of the Plant-Growth facility to the Institute, certified by the constituted committee, IISER Mohali in the work completion certificate.

21. In case the contractor deviates from any of its obligations under the contract, the Institute shall be at liberty to terminate the contract at any time.

22. The contractor has to clear and remove all contractors' equipment, surplus material, debris, waste material before issuance of completion certificate.

23. Non-responsive/Incomplete bids in any aspect shall become liable for rejection.

24. Timeline for completion of Work: 60-75 Days or as early as possible.

25. The detailed price breakup may be asked from the bidder.

26. Liquidated Damages: Being an Educational Institute, time is the essence of the order. The date of final handover of the facility to the Institute should be strictly adhered to, otherwise the Institute reserves the right to impose liquidated damages @0.5% per week subject to a maximum of 10% of the value of the order.

27. The decision of the Director IISER Mohali in case of any dispute, shall be final and binding on the contractor.

28. The warranty (if applicable) period after satisfactory installation should be mentioned and firm should replace all manufacturing defect parts/ whole item under warranty without any extra cost including clearance, freight, taxes. Security deposit/Performance Bank Guarantee @ 5% to 10% of the value of supply order as per norms may be sought from the firms, in terms of Ministry of Education, GOI, OM No. F. No. 29-1/2019-IFD dated 06th April, 2023 for compliance of Ministry of Finance, DoE, GOI, OM No.F.1/2/2023-PPD dated 03.04.2023.

29. The right to reject all or any of the quotation and to split up the requirements for itemized L-1 or relax any or all the above conditions without assigning any reason is reserved by the IISER Mohali. For any corrigendum and addendum please be checked the website https://eprocure.gov.in/eprocure/app and http:/www.iisermohali.ac.in

30. For any queries kindly email: tenders@iisermohali.ac.in.

31. Disputes, if any, shall be subject to jurisdiction in the court of Mohali only.

-Sd/-
सहायक कुलसचिव (क्रय तथा भंडार)
Assistant Registrar (Stores & Purchase)

ANNEXURE-I

PROFORMA FOR BANK GUARANTEE TOWARDS EMD
(TO BE USED BY ALL NATIONALISED BANKS/ SCHEDULED COMMERCIAL BANKS)

Ref. Bank Guarantee No.
Date:

To
The Registrar
Indian Institute of Science Education and Research Mohali
Sector – 81, Knowledge City,
PO – Manauli, SAS Nagar,
Mohali – 140 306, Punjab.

Dear Sir,

WHEREAS M/s. _____ having its registered office at _____ (hereinafter called "the supplier") has undertaken in pursuance of Contract No. _____ Dated _____ against Supply of _____ (hereinafter called "the order")

AND WHEREAS it has been stipulated by you in the said order that the Supplier shall furnish you with a bank Guarantee by a recognized bank for the sum specified therein as security for compliance with the supplier's performance obligations in accordance with the order.

AND WHEREAS We, _____ Bank a body Corporate constituted under _____ having its Head Office at _____, having amongst others a branch office at _____ (hereinafter referred to as the "The Bank" which expression shall unless repugnant to the context or meaning thereof, include all its successors, administrators, executors and assignees) have agreed to give the Supplier a Guarantee at the request of the supplier.

THEREFORE WE _____ Bank hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of Rs. _____ [Rupees _____ Only] and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract and without cavil or argument, any sum or sums within the limits of _____ [Rupees _____Only] as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until _____.

Notwithstanding anything contained hereinabove.

i) Our liability under this Bank Guarantee shall not exceed Rs. _____ [Rupees _____only]
ii) This Bank Guarantee shall be valid upto _____.
iii) We are liable to pay the guaranteed amount or any part hereby under this bank guarantee only and only if you serve upon us a written claim or demand on or before _____.

Dated the _____ day of _____ 2026
.

ANNEXURE-II

SELF DECLARATION
[For Local Content of Products, Services or Works]

File/Tender No. ……..
Tender ID: …….. Dated: ……

To,

The Director
Indian Institute of Science Education and Research
(Established by Ministry of Education, Govt. of India)
Sector-81, Knowledge city, PO-Manauli,
SAS Nagar Mohali-140306, Punjab

1. With reference to Order no P.-45021/2/2017 PP (BE-II) dated 04.06.2020 and No. P-45021/2/2017-PP(BE-II) dated 16-09-2020 of DPIIT, Ministry of Commerce and Industry, Govt. of India, we fall under the following category of supplier (please tick the correct category) for the items for which this tender has been floated and being bided.

   - ☐ Class I local supplier – has local content equal to more than 50%. Local contents added at _____ (name of location).
   - ☐ Class II local supplier – has local content more than 20% but less than 50%. Local contents added at _____ (name of location).
   - ☐ Non-local supplier – has local content less than or equal to 20%. Local contents added at _____ (name of location).

2. We are solely responsible for the abovementioned declaration in respect of category of supplier. False declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which we may can be debarred for up to 2 years as per Rule 151(iii) of the General Financial Rules along with such other actions as may be permissible under law.

Signature & seal of the company

Name and address of the organization
…….
…….
…….

Date: ……

Note: In cases of procurement for a value in excess of Rs. 10 crores, the 'Class-I local supplier' / 'Class-II local supplier' shall be required to provide a certificate from the statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content.

ANNEXURE-III

(To be submitted on the letterhead of the company/firm)

CERTIFICATE BY THE BIDDER (FOR TENDERS)

I have read the clause regarding restrictions on procurement from bidder of as country which shares a land border with India.

a) I certify that this bidder is not form such a company

or

b) if from such a country, has been registered with the Competent Authority (copy of Registration Certificate enclosed).

I hereby certify that the bidder fulfills all requirements in this regard and is eligible to be considered. This is in terms of Restriction under Rule 144 (xi) of the General Financial Rules (GFRs) 2017 under sub clause 3, in terms of DOE, MoF No. F.18/37/2020-PPD dated: 8th February, 2021.

Date: Name of the company/firm/organization

Place: Signature with Date and stamp of the bidder

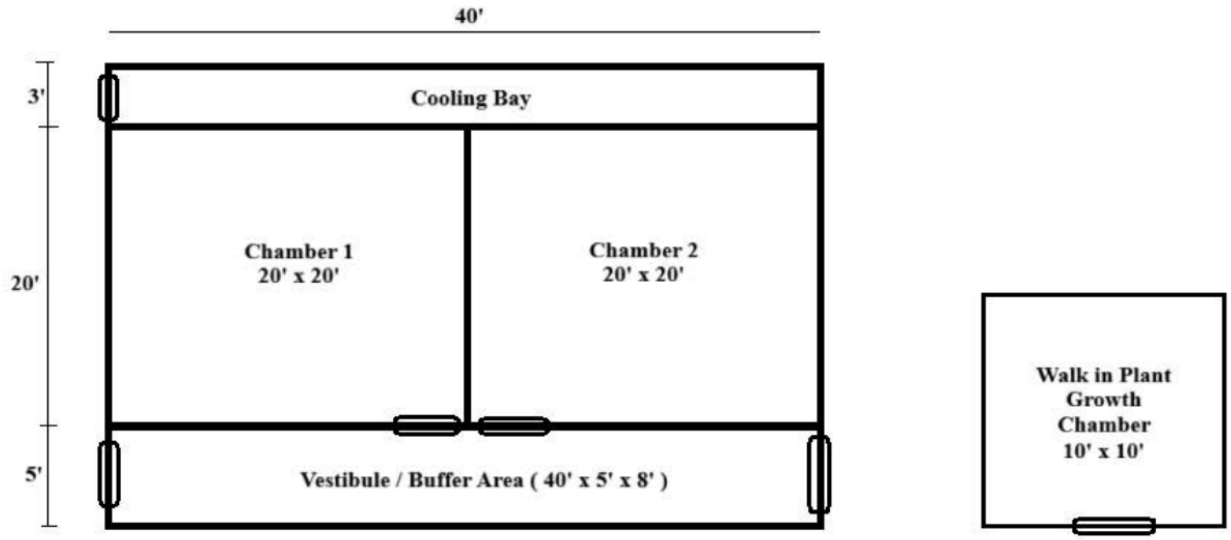
ANNEXURE-IV

GREENHOUSE FACILITY

1. Outer Super structure for plant growth facility

Outer dimensions of Hi-Tech Plant Growth Facility: ~ 40’ x 28’ x 18’ (L × W × H) and will include:

1. Size ~ 400 sq. ft. Quantity 2 Nos Cooling mode: AC-cooled.
2. Size ~ 400 sq. ft. Quantity 1 Utility/Storage area.
3. Size ~ 320 sq. ft. Buffer Area and Cooling Bay.



Layout Plan High Tech Containment Facility and Plant Growth Chamber
(IISER M)

- The Hi-Tech Plant Growth Facility shall be a Conventional Steel Building (CSB) and shall comply with the reference standards mentioned. The roof and side walls of the Hi-Tech Plant Growth Facility shall be made of polycarbonate sheets, while the walk-in chamber shall be constructed with PUF panels.
- All outer structures, rafters, purlins, and trusses shall be hot dip galvanized. Outer structure shall be designed to withstand wind loads of 140-180 km/h. The structure shall be strong enough to withstand all dead load, live load, wind load prevailing at the site, and the size and thickness of all the structural steel members, and its spacing and location shall be designed accordingly.
- All the structural steel frames and elements used must be powder coated with primer and enamel paint.
- Walls: Brick work ~ 2’ with proper finish with plaster and paint. Above wall all sides & roof covering of complete facility must be the completely leak proof with polycarbonate panel 10mm (four-layer) with the following specifications

a. Glazing and Polycarbonate Sheet Specifications:

i. Glazing Requirements:

- Plant growth facility glazing shall be constructed from high-quality, unbreakable, and chemically resistant plastic material.
- The glazing shall be designed and installed to provide an effective barrier for transgenic and sensitive research materials.
- The glazing system shall comply with international biosafety and containment standards (equivalent to BL4-P requirements).

ii. Polycarbonate Sheets:

- Multiwall polycarbonate sheets shall be used for all growth chambers and related areas.
- Minimum thickness: 10 mm (multiwall, four-layer) for chamber walls and roofing.
- Minimum thickness: 6 mm (multiwall, double layer) for false ceilings.
- Sheets shall be UV-stabilized on both sides and capable of withstanding temperatures from −40° C to +120° C.
- Thermal conductivity shall not exceed DIN52612W/2°C - 0.21
- Sound insulation capacity shall be a minimum of 18 dB.
- Light transmission shall be in the range of ~ 65%-84%, with high thermal insulation performance.
- Sheets shall be impact-resistant (minimum 200 times stronger than glass), lightweight, and energy-efficient.

iii. Roof Rainwater Collection and Drainage System:

- 6” Roof Gutters fabricated from galvanized iron sheet (minimum 1.2 mm thick) / PVC with proper alignment and slope to ensure free flow of water to outlets. All joints sealed with suitable weatherproof sealant and supported at 1.0 m intervals. Rainwater Downpipes (PVC / GI pipes) of approved make and diameter (minimum 110 mm) fixed to walls using clamps at 2.0 m spacing. All joints shall be watertight and smoothly finished. Downpipes shall discharge to the ground-level stormwater drain or collection sump. Provide suitable drain inlets with strainers at the base of downpipes to prevent debris entry. Include inspection chambers where specified.

iv. Fixing and Installation:

- Polycarbonate sheets shall be fixed using anodized aluminium profiles, strengthened and sealed to ensure water/ air leak-proof installation for maintenance of temperature and humidity.
- All profiles, fasteners, and screws shall be of corrosion-resistant materials (e.g., stainless steel or galvanized iron).

- All joints shall be sealed with an EPDM gasket and silicon sealant or equivalent thermal-protective material to ensure durability and airtightness.

2. Double door buffer entry with air curtains

- The buffer entry shall consist of a double door system with air curtains to maintain controlled airflow and contamination control. All structural and finishing elements shall be durable, and corrosion resistant.

a. Structure and Covering:

- Door Dimensions (2 Nos.): Double door ~ 3’ wide, lockable to ensure restricted access.
- Covering: Entire buffer entry covered with Multiwall UV-stabilised Polycarbonate Sheet.
- Front Wall: Provided with 40 mesh screens, firmly fixed using suitable profiles for strength and stability.
- Installation: Includes top & bottom tracks, jambs, flashings, and all necessary hardware for secure installation. Installation shall ensure airtight sealing, smooth operation, and long-term functionality of both doors and air curtains.

b. Air Curtain Specifications:

- Type: Electronically balanced air curtain with double blower system.
- Blowers: Made of high-quality aluminium sheets, driven by a 0.5 HP motor, with auto ON/OFF operation synchronized with door opening and closing.
- Cabinet: Heavy-duty cold-rolled Mild Steel Sheet, powder-coated finish.
- Operation: Atomized ON/OFF control with door opening to ensure effective airflow at the entrance of the buffer area.
- Width: 3’ wide, suitable for the double door entry.

3. Shading System

- The shading system shall provide effective external shading to the entire area.
- The system shall be durable, weather-resistant, and capable of withstanding routine operational use.
- ~75% agro shading net, green color. Coverage: Entire designated area as per approved layout.
- Rolling Mechanism: Easy manual rolling arrangement for smooth operation and adjustment of shading coverage.

4. Civil Construction

- Civil construction works shall include all necessary activities to provide a durable, safe, and functional facility in accordance with the approved design. Works shall comply with relevant building codes and standards, ensuring quality, safety, and

longevity as per CPWD specifications. The civil works shall include, but not be limited to:

a. Excavation and Foundations:

- Excavation as per design requirements.
- Digging size: 2'× 1'6''.
- CC (Cement Concrete) foundation in a ratio 1:3:6, with anti-termite treatment.
- PCC base: 3" thick.
- Width: 18"
- First base line: 13"
- Second base line: 9"
- Frame base block: 2' × 9" × 9"
- Curtain wall: 2' height above ground and 2' below actual ground level as a 9" wide kickboard.
- Plinth protection: 2.5' wide all around the greenhouse.

b. Brickwork and Plastering:

- External brick walls plastered with ~15mm plaster.
- Internal walls plastered with ~12mm plaster.
- Cement plaster ratio: 1:6.
- Walls finished with anti-fungal emulsion paint.

c. Flooring:

- Chemical-resistant hard cement flooring, 3" thick, made up of crushed bricks and 20mm graded stone in a 1:3:6 ratio, flushed with cement slurry.
- Floor PCC (Plain Cement Concrete) as per design.
- Anti-skid vitrified tiles (600mm × 600mm) installed without gaps or leaks.
- Flooring laid with proper slope for complete water drainage for minimization of skidding risks.
- Damp Proof Course (DPC): 50mm thick with waterproofing compound.
- Post Construction Anti-termite treatment as per CPWD specification 2019.

d. Ramps, Steps, and Plumbing:

- Plain Cement Concrete Ramps and steps to provide safe access to all sections.
- Plumbing connections from the RO storage tank (for watering plants) as well as from regular water connection (for cleaning and other use) with separate taps (with

markings) and flexible expandable polymer hose (length to cover the entire growth area in each section), including fittings, with arrangements for proper drainage.

e. Internal Finishes:

- Internal walls, ceilings, and floors shall be resistant to liquids and chemicals.
- Finished floor to false ceiling height: ~12'.
- Apex ceiling height: ~14-17'.
- 4 Nos. 6/16 Amp electrical sockets and 16 Amp one-way switches in each section for easy connections of experimental instruments.

f. Drainage System:

- Proper drainage arrangements with anti-clog fittings in each section.
- Connections shall be integrated with the main drainage system available at IISER, Mohali.

g. 4.7 Wash Basin (3 Nos.):

- Stainless Steel 204 grade Wash Basin of size ~ 26"x18"x10" with all necessary plumbing connections from the regular water supply. Water connection to be tapped from the nearest water point as per at the IISER, Mohali site.

5. Lighting system for growing areas (In plant growth facility area and walk-in chambers)

- Photosynthetically Active Radiation (PAR) lamps shall be provided in all growing areas. The lighting system shall be designed to uniformly illuminate the entire growth room area and provide the required light levels in such a way that the complete area shall be utilized, both with and without the use of growing benches/trolleys. The system shall supplement natural daylight to achieve an intensity of up to 800-1000 µmoles/m²/s. All lighting components shall be durable, energy-efficient, and compliant with relevant electrical and safety standards. Installation shall ensure even illumination, safe operation, and ease of maintenance. Installation shall also allow for future upgrade to speed breeding lighting systems.

a. Lamp Specifications for plant growing area:

- Type: High efficiency ~ 250 W LED PAR grow lights.
- Features:
    - Splash-proof coated PCB.
    - Versatile spectrum: ~ 3500K + ~ 660 nm Red, including UV and IR components.
    - High-quality IP67 driver with 10%-100% dimming capability.
- Arrangement and Adjustability:

- Lights shall be arranged within each growth area to allow division into two to four equal sections.
- Each divided internal section shall include a provision for independent height adjustment of the lamps to ensure optimal light distribution in these two to four equal sections according to the growth cycle of the plants.

b. Emergency or working lights shall be installed in:

- Each growth section.
- Working/ soil preparation areas.
- Buffer areas and corridors.
- Entry points of the plant growth facility.

6. Cooling System for plant growth facility

- Air-conditioning (AC) or air-cooled cooling arrangements with complete backup and ECS cooling system to maintain the temperature in the range of 18°C to 40°C with relative humidity of 30-85%.
- Commercial heavy-duty inverter-type air-conditioning units with a BEE 5-star rating (approved by IISER, Mohali), four in number, equipped with timers for automatic switching between units, having a total cooling capacity of approximately 70,000–72,000 BTU/hr in each chamber of the greenhouse, shall be provided. The air-conditioning units shall be installed with all necessary accessories, including copper pipes, insulation sleeves, communication cables, drain pumps (if necessary), drainpipes, etc., as per site conditions. With force type and dual cooling arrangements for easier relative humidity and temperature maintenance. Units shall be designed on a single-phase / three-phase supply for trouble-free operations with HP/LP cut-off devices. Also, necessary accessories like copper pipes, insulation sleeves, communication cables, drainpipes etc, as per site condition. Necessary items/ materials shall be considered for the successful commissioning of the AC system and dehumidifier system to meet the requirements.

7. Heating System (No. of Heater : 2 Nos. in each room)

- A radiant heating system shall be provided in each section of the plant growth facility to maintain uniform heat distribution. The system shall operate on Far Infrared Ray (FIR) radiation, supplemented with commercial heating backup arrangements. All electrical terminations shall be IP65 rated with an overheating prevention device. The heating system shall be durable, energy-efficient, and compliant with standard plant growth facility safety requirements.
- Installation shall guarantee reliable operation, protection against overheating, and minimization of plant stress due to heating. Heaters shall be installed to ensure uniform temperature distribution and plant safety throughout the growth area.

a. Specifications:

- Type: Passive Radiant heating system will be provided inside both the sections of Green House with uniform heat along the wall side.
- Radiation Intensity: 3.49 × 10² W/m².
- Anion Radiation: More than 500 ions/cc.
- Passive Radiant heating system supplemented with Heavy-duty paralytic technique heaters suitable for plant growth facility applications.

b. Features:

- Inbuilt auto thermal cut-off device.
- Biotech-grade, 2.5 KW heating capacity.
- ISI standards make heating elements.
- ISI standard 900 rpm fan to prevent SO_2 injury to plants caused by improper combustion in conventional heaters.

c. Electrical Specifications:

- Input: 200-240 VAC, 50 Hz, three-phase
- Operating ambient: ~5°C to 50°C
- Relative humidity: 30- 90%

8. Humidification System (In plant growth facility and walk-in chambers)

- Ultrasonic vapour humidifiers shall be provided in each section of the plant growth facility to maintain simulated natural humidity up to ~85% RH. The system shall operate without disturbing the internal temperature, as the vapour is discharged in the growth room. The humidifier shall be durable, corrosion-resistant, and suitable for continuous operation in controlled growth environments.

a. Specifications:

- Relative Humidity Range: Up to 85%.
- Mist Generation Rate: Greater than 1.5 L/hr.
- Ultrasonic Frequency: 1700 ± 40 KHz.
- Ceramic Disc: Φ 20 mm, titanium-coated for durability and long life.
- Filter: Fitted with a fiber filter to ensure clean mist output.
- Water Efficiency: Optimum utilization of water to minimize wastage.
- Instant Vaporization: Starts immediately with no thermal losses.
- Automatic Water Selection System: Ensures proper operation with the selected water source.

- Auto-Off Protection: Shuts down automatically in case of non-availability of water.
- Electrical Consumption: Designed for low power consumption.

9. Dehumidifier (in plant growth facility and walk-in chambers)

- A dehumidifier system shall be provided with the necessary ducting and accessories to maintain relative humidity (RH) up to ~85% within each section of the plant growth facility. The system shall operate continuously to adsorb moisture from the growth environment and reactivate the desiccant simultaneously, ensuring consistent humidity control. Positive sealing between the adsorption and reactivation chambers shall prevent mixing of the process and reactivation air streams. Moisture shall be adsorbed in the dehumidification sector using an Eco-dry fluted, metal silicate desiccant synthesized rotor. The desiccant rotor shall be reactivated in the reactivation sector by a stream of hot air in counter flow. Following reactivation, the adsorption sector shall be ready to adsorb moisture again, allowing continuous simultaneous operation of moisture adsorption and rotor reactivation. Necessary ducting (22G) and accessories for the dehumidifier system shall be considered for the successful commissioning of the system to meet the required CFM for the facility.

a. Specifications:

- Unit Type: Totally self-contained.
- Construction: Powder-coated steel fabricated unit.
- Rotor Media: High-performance metal silicates synthesized in situ.
- Rotor Structure: Robust internal structure with steel perimeter flange for industrial quality, durability, and ease of serviceability.
- Rotor Features: Perimeter flange extends media and seal life. Edge hard-face coating ensures long life and good sealing of media and seals. Rotor is non-flammable with organics < 2%.
- Fans and Motors: Process and regeneration fans and motors included.
- Filtration: Micro-filter (5 micron) on both process and regeneration sides.

10. Microprocessor control Panel for plant growth facility (CE Certified)

- The system shall consist of individual microprocessor control panels for each section of the plant growth facility. Microprocessor Photosynthesis Control Panel: User-friendly interface for controlling Temperature, Humidity, and Light.
- Panels must comply with rigid safety standards and allow auto operation with data storage capability; programmable features to link multiple programs; with Wi-Fi connectivity for remote operation and monitoring through mobile and web applications.

a. Temperature Control System Technical Features:

- Temperature range: 0.1°C to 59.9°C

- Accuracy: ±1°C
- Hysteresis: 0.4°C with Pt-100 sensor, cord length 15 meters (minimum 2 sensors per room)
- Set point lock to prevent unauthorized changes
- Set point arrangement for different day and night temperature
- Level lock to allow read-only access to parameters
- Sensor failure indication
- Selection of units: °C / °F
- Display resolution: 0.1°C
- Automatic hysteresis control
- Input voltage: 200-240 VAC, three phase
- Ambient Conditions: 5°C to 50°C, RH up to 85%.

b. Humidity Control System Technical Features:

- RH Range: 30% to 85%
- Accuracy: ±4% (Real RH: ±2% ±1 digit at 45%)
- Set point lock to prevent unauthorized changes
- Level lock to allow read-only access to parameters
- Input Voltage: 220 VAC, three-phase
- Ambient Conditions: 5°C to 50°C, RH up to 85%
- Cyclic/Plitz Timer: 0-999 Min/Sec ON, 0-999 Min/Sec OFF; automatic cycling with quartz accuracy.

c. Programmable Photoperiodic Timer Technical Features:

- Clock accuracy: ±2.5 sec/day @ 20°C
- Channels: 1
- Weekly program functionality
- 16 memory locations adjustable to the minute
- Automatic summer and winter time change
- Backup reserve: 1500 Hrs
- Input voltage: 200-240 VAC, three phase
- Operating ambient: 5°C to 50°C, RH up to 85%

11. Work Benches for the plant growth facility

a. Bench with irrigation tray: (In three sections)

- Both sections of the plant growth facility shall have movable benches with irrigation tray arrangements against the walls (all sides of growth area) (as per the design of each section) of size 4 feet width and 1’8’’ to 4’ adjustable height, suitable for the growth of bottle gourd, ivy gourd, sponge gourd, ridge gourd, melon, cucumber, tomato, rice, chickpea, wheat, sorghum, tobacco, and brassica. Benches shall be supplied, installed, and commissioned inside each chamber. The design shall ensure durability, rust resistance, and suitability for heavy-duty applications coated with steel primer & enamel paint.

12. RO Water System with Storage Tank

- A Reverse Osmosis (RO) water purification system with a minimum output capacity of 250 liters per hour (LPH) shall be provided. The system shall be designed for continuous operation and capable of maintaining consistent treated water quality conforming to IS: 10500 standards for drinking (potable) water. The system shall be complete and functional in all respects and shall include the following components RO Feed Pump (capacity: 250 LPH); Cartridge Filter Housing with 5 Micron Cartridge Filter; RO High-Pressure Pump (capacity: 200 LPH); RO Membrane Housing; RO Membrane (Make: Polymax / Suez / LG / Equivalent); RO Skid Compact design for ease of maintenance, integrated with storage tank, reject water tank, and raw water tank. The storage tank shall be equipped with level indicators and an automatic cut-off/auto-start arrangement to ensure continuous and automatic operation of the pumps. The system shall include non-return valves, safety valves, and flushing arrangements for the RO membranes. All tanks (storage, reject water, and raw water) shall be noncorrosive, highly durable, and have a capacity of approximately 3000 liters. The tanks shall be installed on a high-rise, stable steel or concrete structure with a proper foundation to ensure durability. Each tank shall be provided with a closed, lockable lid to prevent ingress of dust or contamination. The RO system shall be interlocked with the raw water pump and storage tank level sensors for fully automatic operation. A piping network shall be provided from the storage tank to the individual sections of the facility. All distribution lines shall be made of PVC / CPVC / HDPE (ISI-marked) material, pressure rated, and sized as per system requirements. Proper slope and support shall be ensured in the piping layout to avoid stagnation.

WALK-IN-PLANT GROWTH CHAMBER

1. Specifications for walk-in chamber

- Dimensions of WALK-IN-PLANT GROWTH CHAMBER: ~ 10’ x 10’ x 8’ (L × W × H) and will include a single 100 sq. ft. room.
- The walk-in chamber structure shall be fabricated using anti-corrosive, humidity-resistant powder-coated galvanized sheets. All panels and structural elements shall provide thermal insulation, leak-proof performance, and durability suitable for plant growth. The chamber shall be modular, allowing dismantling, relocation, and re-erection at a different site if required.

a. Structure Frame:

- Material: Powder-coated galvanized sheets (PCGI/PPGI) for both inner and outer surfaces.
- Panel Thickness: 60 mm PUF (Polyurethane Foam) with density 42 kg/m³, CFC-free.
- Panel Joints: Cam lock system for leak-proof insulation.
- Joint Sealing: Silicon sealant used at all panel connections.
- Floor, Wall, Ceiling Connections: Wall-to-wall, wall-to-ceiling, wall-to-floor with holes plugged using vinyl caps. Other joinery is not allowed.

b. Panels:

- Floor Panels: 60 mm PUF insulation, 19 mm marine-grade plywood; Covered with 1.2 mm chequered aluminium sheet; Corners covered with 50 mm covings for a dust-free environment and easier temperature maintenance; Corner Panels: 6” × 6” L-shape panels for leak-proof corners and covered with Polyvinyl sheet.
- Door: Swing type, size 1 m × 2 m, fitted with imported Hinges and door closer; Insulated glass hatch window (30 cm × 30 cm) with defogger heater and auto cut-off; Defogger heaters provided on doors to avoid condensation; Door lock with internal safety release mechanism to prevent accidental locking. Panel Joints: Wall-to-wall, wall-to-floor, wall-to-ceiling, and ceiling-to-ceiling using Cam locks made of Godrej.
- Technical Specifications of PUF Insulated Panels
    - Tensile Strength 4.0 Kg/cm²
    - Thermal Conductivity 0.02 W/mK
    - Compressive Strength 2.1 Kg/cm²
    - Adhesion Strength (Foam to Steel) 3.0 Kg/cm²
    - Fire Resistance As per BS 4735 - Max 100 mm extent to burn
    - Water Absorption 0.2% at max 98% RH
    - Vapour Permeability 5.5 ng/Pa·s·m (IS 11239 Part)

2. Cooling and Heating System

- Temperature Range : 2°C to 45°C±0.2°C Controlling Accuracy (Lights OFF)

  10°C to 45°C±0.2°C Controlling Accuracy (Lights ON **)**
- The cooling and heating system with standby additive cooling system shall ensure precise temperature control, energy efficiency, and reliability.
- Type: Air-cooled Direct Expansion condensing unit (Approved make specified in the technical specifications).
- Components Included: Drier, LP/HP valves, Suction and discharge valves, first charge of CFC-free refrigerant.
- Evaporator Unit: Specially designed for precise temperature control by alternately cycling condenser and evaporator.
- Construction: Condenser and evaporator made from inner-grooved copper tubes for superior heat transfer.
- Airflow: Fresh air inlets and outlets shall be adjustable to maintain uniform temperature.
- Redundancy: Two independent complete units working parallelly and sequentially to ensure uninterrupted operation. Necessary items/ materials shall be considered for the successful commissioning of the AC system and dehumidifier system to meet the requirements.

3. Lighting System for growing Areas

- As specified above in point 5 of the Hi-Tech Plant growth facility.

4. Humidification System (2 Nos. One for each chamber)

- Relative Humidity : Upto 35% to 85% ± 5%.
- As specified above in point 8 of the HiTech Plant Growth Facility.

5. Dehumidifier (2 Nos. One for each chamber (Capacity in litres))

- Relative Humidity : Upto 35% to 85% ± 5%.
- As specified above in point 9 of the Hi-Tech Plant Growth Facility.

6. Microprocessor Control Panel for Walk-in-Plant Growth Chamber

- Individual microprocessor-based control panels shall be provided for each section of the plant growth chamber.
- The panels shall be CE certified and user-friendly, controlling Temperature, Humidity, Light, and CO_2, and suitable for continuous operation in controlled growth environments.
- Panels shall be PLC/PID-based with data storage capability and programmable features to link multiple programs; with Wi-Fi connectivity for remote operation and monitoring through mobile and web applications.

- Panels shall have day and night separate controls, audio/visual alarms, and a locking facility with two keys.
- Panels shall be equipped with surge arresters, IP22 protection, and a Touch Screen HMI for realtime display of Temperature, Humidity, Light, and CO_2 readings from all probes.
- All electrical components shall conform to rigid safety standards, with ISI-approved fittings, copper multi-strand twisted FR grade wires, and proper conducting.
- Solenoid valves, CO_2 provision, pressure gauges, galvanized ducts, a heavy-duty suction fan, and complete electrical fittings shall be included.
- Input power: Regulated three-phase with neutral.
- Panels shall be CE-certified, durable,
- The system shall ensure reliable, precise, and safe operation of the plant growth chamber environment.
- All components shall comply with standard industrial and safety practices.

a. Temperature Control System Technical Features:

- Temperature Range: 0.1 to 59.9°C
- Accuracy: ±1°C
- Hysteresis: 0.4°C with Pt-100 sensor probe, cord length 15 m
- Set Point Lock: Protects settings; parameters can be read but not changed
- Set point arrangement for different day and night temperatures.
- Sensor Failure Indication
- Unit Selection: °C or °F
- Display Resolution: 0.1°C
- Automatic Hysteresis Control
- Input Voltage: 200-240 VAC, single-phase
- Ambient Conditions: 5°C to 50°C, RH up to 85%.

b. Humidity Control System Technical Features:

- RH Range: 30% to 85%
- Accuracy: ±4% (Real RH: ±2% ±1 digit at 45%)
- Set Point Lock: Protects settings; readable but not changeable
- Input Voltage: 220 VAC, single-phase /three-phase
- Ambient Conditions: 5°C to 50°C, RH up to 85%

- Cyclic/Plitz Timer: 0-999 Min/Sec ON, 0-999 Min/Sec OFF; automatic cycling with quartz accuracy

c. Programmable Photoperiodic Timer Technical Features:

- Clock Accuracy: ± 2.5 sec/day at 20°C
- Channels: 1
- Weekly Program: 16 memory locations adjustable to minutes
- Automatic Summer/Wintertime Adjustment
- Running Reserve: 1500 hours
- Input Voltage: 200-240 VAC, single-phase
- Ambient Conditions: 5°C to 50°C, RH up to 85%

d. PLC-Based Control System:

- Controls Temperature, Humidity, Light, and CO_2 with precise PLC/PID regulation.
- Data Storage: Onboard PLC memory; no data loss; email notifications can be sent directly.
- HMI Touch Screen: Displays real-time values of all parameters.
- Audio/Visual Alarms: Activates when any parameter exceeds or falls below set values.
- Locking Facility: Full panel lock with two keys.
- Integration: Solenoid valves, CO_2 cylinder provisions, pressure gauges, heavy-duty suction fan, and connecting galvanized ducts.

7. Work Benches for walk-in-Plant Growth Chamber

- Bench: Plant Growth Chamber shall have movable bench with 2 Illuminating shelves with light arrangements (As specified above in point 5 of the Hi-Tech Plant growth facility) against the walls (all sides of growth area) (as per the design of each section) of size 4 feet width with 3 feet height in between the shelves suitable for the growth of bottle gourd, ivy gourd, sponge gourd, ridge gourd, melon, cucumber, tomato, rice, chickpea, wheat, sorghum, tobacco, and brassica. Benches shall be supplied, installed, and commissioned inside each chamber. The design shall ensure durability, rust resistance, and suitability for heavy-duty applications coated with steel primer & enamel paint.
- Growth trolley with shelves: Plant Growth Chamber (1 no).
- Plant Growth Chamber (1 no) shall have growth rack having light arrangements (as specified above in point 6.2 of the Hi-Tech Plant growth facility) with castors (4 Nos.) & break arrangements for the growth of Arabidopsis/ Tobacco as follows: Length 4’2”, Height 7’8”, width 24”- 10 nos; total Shelves 6, Shelf to shelf distance 16” with height adjustments arrangements. Illuminated Shelves 5. Shelf Hylem (Bakelite) sheet.

- Low flow Fertilizer Injector: A compact, fertilizer injection with injection range of 0.2 - 2 %; Water flow range 10 l/h to 3 m³/h; Operating water pressure 0.3 - 6 bar that doses liquid concentrate into the greenhouse irrigation main with digital dosing control. Compatible with tap or polymer hose irrigation system, for crops like bottle gourd, ivy gourd, sponge gourd, ridge gourd, melon, cucumber, tomato, rice, chickpea, wheat, sorghum, tobacco, and brassica. Accurate dosing of concentrated liquid fertilizer across low-to-moderate irrigation flows. Robust materials compatible with common NPK and micro-nutrient liquid concentrates.
- Electrification from the nearest electric supply of the institute based on the total connected load: High-quality ISI-approved fittings with copper multi-strand twisted Fire-Resistant Grade (ISI make) wires standards of safety with a proper MCB duly fitted in the control panel and a necessary kVA voltage Stabilizer with appropriate electrical points of necessary IP ratings 6/16 amps, combined switch & socket completed as required. Supply and laying of one (A2XFY) PVC insulated and PVC sheathed/XLPE power cable (copper) of 1.1kV grade of suitable size armored cable directly in the wall/ground, including excavation, sand cushioning, protective covering, and refilling of trenches, etc., from greenhouse control panel to existing nearby power supply panel at the site (IISER, Mohali) with all necessary fittings & fixtures all complete as required. Dedicated earthing for the system, if required as per IS3043 to be done by contractor including necessary earth pits with earth enhancing mineral and connecting earth conductor from panel to pit. Fabrication of outdoor panel with suitable incomer/ outgoing switch gear, bus bar, necessary IP ratings, necessary control wiring termination including all cabling etc. also included in contractor scope.
- Water connection from the nearest water supply of the institute: Laying of water line directly in the ground, including excavation, sand cushioning, protective covering, and refilling of trenches, etc., from the plant growth facility to the existing nearby water supply point at the site (IISER, Mohali), with all necessary fittings & fixtures all complete.

List of Approved Makes:

Item/Material	**Approved Makes**
Reinforcement Steel & Structural steel	TATA/JSW/Vizag Steel
GI ducting	TATA/JSW/Vizag Steel
Cement	Ultra tech/Ambuja/ACC
Polyurethane Foam panels	Beardsell/Cosmic/Lloyd

Polycarbonate sheet	Sabic Lexan/Palram/ Bayer/Acewell
Water Tank	Sintex / Vectus & Polycon / Supreme
PVC pipes	Supreme/Astral/Finolex
Tiles	Rak Ceramics/ Kajaria/ Somany
Paint	Asian/Berger/Dulux
Aluminium	Jindal / Hindalco/ Indalco
Cellulose pads	Hutek
Hinges	Ebco
Locks	Godrej
Working Lights	Wipro / Philiips / Crompton Greaves
Copper/A2XFY Cable/wires	Finolex/Polycab/Havells
MCB (c curve)/Power Point	Schneider Electric/ Legrand/ Siemens
Grow Lights	Osram/ Philips
Ultrasonic vapour humidifier	Garuu/ Mars Hydro / Bhanu
Dehumidifier	Honeywell/ Siemens/ Danfoss
Desiccant Rotor Dehumidifier	Bryair/ Hygro
Precision A/C system	O' General / Toshiba / Daikin / Mitsubishi Electric

Precision A/C system DX condenser unit	Vertiv (Emerson)/Schneider Electric/Daikin/Copeland
Air-conditioning systems	Daikin, Mitsubishi, O General
Split A/C drain pump	Hitachi
Air-curtains	Almonard, Mitsubishi
Electrical Rotary /ON-OFF Switches	L&T, Legrand
Monobloc Pump	Kirloskar/CRI/CG/ Equivalent
Fertilizer Injector	Dosatron/Jain/Kothari

Equivalent makes mentioned in the table can be provided but only after providing a sample and taking prior approval from the IISER (user). If makes are not provided in the table suitable standard make ISI mark shall be used with prior approval from the IISER (user).