INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

E -Tender Notice

Ref: IISER-T/2016/34/2025-26 **Date: 28/11/2025**

Online tenders are hereby invited in **two cover system** from Indian Nationals for the **Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech plant growth facility including walk-in chamber and tissue culture facility at IISER Campus, Thiruvananthapuram.** Bidders can download complete set of bidding documents from e-procurement Platform https://eprocure.gov.in/eprocure/app from 29/11/2025 onwards. Bidders need to submit the bids online by uploading all the required documents through https://eprocure.gov.in/eprocure/app

Last Date/ Time for receipt of bids through e-procurement is: 12/12/2025 up to 16:00 hrs
Late bids shall not be accepted. For further details regarding Tender Notification & Specifications please visit website: https://eprocure.gov.in/eprocure/app and www.iisertvm.ac.in

CRITICAL DATE SHEET

Online Publication Date	**28/11/2025**
Document Download Date & Time	**29/11/2025, 9:00 Hrs**
Bid Submission Start Date & Time	**29/11/2025, 9:00 Hrs**
Pre-Bid Meeting Date & Time	**04/12/2025, 11:00 Hrs**
Bid Submission End Date & Time	**12/12/2025, 16:00 Hrs**
Technical Bid Opening Date & Time	**13/12/2025, 16:00 Hrs**
Price Bid Opening Date & Time	Will be announced after technical evaluation through CPP portal

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

E-Tender-Notice

Name of Work	**Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech plant growth facility including walk-in chamber and tissue culture facility at IISER Campus, Thiruvananthapuram.**
Tender Notification No	**IISER-T/2016/34/2025-26**
Date	**28/11/2025**
Estimated Cost	**Rs 89, 96,768.00**
EMD Amount	**Rs. 1,79,935/-**
Last Date & Time of submission of Tender	**12/12/2025 up to 16:00 Hrs**
Address for communication	**Project Engineer Cum Estate Officer (I/C), IISER TVM, Maruthamala P.O, Vithura, Thiruvananthapuram-695551 Email: pe@iisertvm.ac.in**
Date & Time of opening of technical bid	**13/12/2025 @ 16:00 Hrs**

Bidding Procedures

Section I: Instructions for Online Bid Submission

Instructions to the Bidders to submit the bids online through the Central Public Procurement Portal for e-Procurement at https://eprocure.gov.in/eprocure/app.

1. Possession of valid Digital Signature Certificate (DSC) and enrolment / registration of the contractors / bidders on the e-Procurement/e-tender portal are prerequisite for e- tendering.
2. Bidder should register for the enrolment in the e-Procurement site using the "Online Bidder Enrolment" option available on the home page. Portal enrolment is generally free of charge. During registration, the bidders should provide only valid and true information including valid E-mail id. All the correspondence shall be made directly with the contractors/bidders through E-mail id as registered.
3. Bidder need to login to the site through their user ID / password chosen during enrolment / registration.
4. Then the Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by SIFY / TCS / nCode / eMudra or any other Certifying Authority recognized by Controller of Certifying Authorities (CCA) India on e- Token / Smartcard, should be registered.
5. The registered DSC only should be used by the bidder in the transactions and should ensure safety of the same.
6. Contractor / Bidder may go through the tenders published on the site and download the tender documents/schedules for the tenders.
7. After downloading / getting the tender document/schedules, the Bidder should go through them carefully and then submit the documents as required, otherwise bid will be rejected.
8. Any clarifications may be sought online through the tender site, through the contact details or during pre-bid meeting if any. Bidder should consider the corrigendum if any published before submitting the bids online. The Bidder is requested to submit their questions/ queries/ clarifications by email to reach the IISER Thiruvananthapuram before the meeting. Bidders can send Pre-bid queries on their letter head referring tender number on e-mail address pe@iisertvm.ac.in on or before 03/12/2025 up to 17:00 Hours. Pre-bid meeting will be held on 04/12/2025 at 11:00 hours at the Office of Project Engineer Cum Estate Officer (I/C), IISER TVM, Vithura, Thiruvananthapuram.
9. Bidder may log in to the site through the secured login by the user id / password chosen during enrolment / registration and then by submitting the password of the eToken / Smartcard to access DSC.
10. Bidder may select the tender in which he / she is interested in by using the search option and then move it to the 'my tenders' folder.
11. From my tender folder, he / she may select the tender to view all the details uploaded there.
12. It shall be deemed that the bidder has read and understood all the terms and conditions before submitting the offer. Bidder should go through the tender schedules carefully and upload the documents as asked; otherwise, the incomplete bid shall stand rejected.
13. Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and ordinarily it shall be in PDF /xls / rar / jpg / dwf formats. If there is more than one document, all may be clubbed together and provided in the requested format. Bidders Bid documents may be scanned with 100 dpi with black and white option. It is advisable that each document to be uploaded through online for the tenders should be less than 2 MB. If any document is more than 2MB, it can be reduced through zip / rar and the same if permitted may be uploaded. The file size being less than 1 MB the transaction uploading time will be very fast.
14. The bidders can update well in advance, the documents such as certificates, annual report details etc., under "My Space option" and these can be selected as per tender requirements and then send along with bid documents during bid submission. This will facilitate the bid submission process faster by reducing upload time of bids.
15. Bidder should submit the Tender Fee as specified in the tender. The hard copy should be posted / couriered / given in person to the Tender Inviting Authority, within bid submission due date and time as indicated in the tender. Scanned copy of the instrument should be uploaded as part of the offer.
16. **EMD:**

a. **Bid Security/ Earnest Money Deposit (EMD)**: All other bidders should submit an EMD of **Rs. 1,79,935/-** in the form of DD/ FD/Bank Guarantee/SBI collect. EMD shall be taken in favour of IISER TVM payable at Thiruvananthapuram.
b. No interest will be paid on the EMD/Performance Security deposited/ remitted.
c. The bidders will have to upload scanned copy of payment details towards EMD and the same will be accepted only on verification and confirmation by the Institute. Any delay in credit will not be entertained by the Institute. Original EMD in the form of DD/FD/Bank Gaurantee shall be submitted to the office of

Project Engineer Cum Estate Officer (I/C), IISER TVM, Maruthamala P.O, Vithura, Thiruvananthapuram, Pin: 695551 on or before last date of submission of Bid. IISER TVM will not be responsible for any delay/loss during postal transit.

17. The financial bid (price bid) i.e. bill of quantity (BOQ) of only technically qualified bidders will be opened online by a committee of members and the result will be displayed on the www.eprocure.gov.in which can be seen by all bidders who participated in the tender.
18. **Time of completion**: **75 days.**
19. **Defect Liability/Maintenance Period**: As defined in the scope of the work elsewhere in the document.
20. **Contractors are advised to inspect and examine the site of work and its surroundings before submitting the tenders for better understanding of the site conditions.**
21. Tenders shall submit copy of their registration.
22. The contractor shall not sub-contract the work to sub-contractors or to any single sub-contractor.
23. The successful contractor shall provide a performance guarantee valid for 2 months beyond the completion of work, for his proper performance of the contract within 7 (seven) days from the date of receipt of letter of award. The performance Security shall be in the form of DD/FD/Bank Guarantee/SBI collect in favour of the **INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM**. In case the Performance Security is in the form of Bank Guarantee the same is to be sent to the **Project Engineer Cum Estate Officer (I/C)** in sealed envelope directly by the issuing Bank along with the forwarding letter indicating BG No. purposed of the BG, etc. The amount of the security shall be **5%** of the contract price. The performance security shall be valid until the contractor has executed and completed the works and remedied any defects and maintained the work therein in accordance with the contract. The Performance guarantee shall be returned to the contractor within 14 days from the date of successful completion of work plus maintenance period. If the contractor fails to perform the work as per terms and conditions of the contract, the performance security shall be forfeited.
24. If during the execution of the work the contractor encounters physical obstructions or physical conditions other than climatic conditions on the site, which obstructions or conditions were in his reasonable opinion not foreseeable by the contractor, the contractor shall forth with give notice thereof to the Project Engineer Cum Estate Officer (I/C), IISER TVM. On receipt of such notice, in his opinion feel that such obstructions/conditions could not have been reasonably foreseen by the contractor, after due consultation with the contractor determine any extension of time with no financial bearing to which the contractor is entitled.
25. **During execution, an employee with Min Qualification of B.E (Civil /Mech /Elec) or Equivalent to be deployed for ensuring quality of work.**
26. During the execution of the works, the contractor shall keep the site reasonably free from all unnecessary obstructions and shall store or depose of any contractor's equipment and surplus materials and clear from the site any wreckage, debris, waste or temporary works in consultation with the Institute.
27. The labour **shall not be allowed to stay or put up labour sheds with in the campus**. Contractor has to decide accordingly.
28. Before issue of any completion certificate, the contractor shall clear away and remove from that part of the site to which the completion certificate relates all contractors' equipment, surplus material, debris, waste material and temporary works of every kind.
29. The contractor while employing labour should ensure that all the statutory labour laws and regulations are adhered to; In the event of:
    a. The amount or nature of extra or additional work
    b. Exceptionally adverse climatic conditions
    c. Other special circumstances which may occur other than through a default or breach of contract by the contractor or for which he is responsible.
30. Being such as fairly to entitle the contractor to extension of time for completion of the works or any section or part thereof, the Institute shall after due consultation with the contractor, determine the amount of such extension with no financial bearing and shall notify the contractor accordingly.
31. If the contractor fails to complete the execution and completion of the works as specified in the work order, the contractor shall be bound to pay as liquidated damages a sum of 1% (percent) per week of delay for such default subject to a maximum of 10% of the contract price.
32. When whole of the works has been substantially completed, the contractor shall give a notice to the Project Engineer Cum Estate Officer (I/C), IISER, accompanied by a written undertaking to finish with due expedition any outstanding work during the defect liability period. Such notice and undertaking shall be deemed to be a request by the contractor to the Project Engineer Cum Estate Officer (I/C), IISER, to issue a taking over certificate.
33. Defect liability period shall be calculated from the completion of the work, certified by the Project

Engineer Cum Estate Officer (I/C), IISER in the completion certificate.

34. If the contractor fails to fulfil any of the obligations under this contract, the Institute shall be at liberty to terminate the contract thereby avoiding the contract and will be at liberty to allot the whole work or balance works to any other party at the risk and cost of the first party.
35. All works are to be carried out as per current specification prevailing in the BIS/ CPWD and directed by the Institute.
36. Parties to submit PAN Card.
37. Parties to submit GST Registration.
38. Any deviation of quantity in the scheduled items during execution shall be intimated to the Institute before taking up the work.
39. **Rates once accepted will not be enhanced due to variation in the rate of materials, labour and government taxes. Nothing extra payable.**
40. No tools, plants or manpower will be supplied by the Institute for any purpose.
41. No materials will be supplied by the Institute.
42. Any dispute arising out of the contract shall be settled by the Project Engineer Cum Estate Officer (I/C), IISER TVM.
43. The specifications and mode of measurement for all the works shall be in accordance with CPWD specifications unless otherwise specified.
44. In the event of responsive parties quoting same rates, the Institute reserves the right to allot the work to the bidder having higher credentials in terms of turnover, similar work experience, etc.
45. The Institute reserves the right to accept or reject any or all tenders without assigning any reason thereof.
46. All the above requirements are compulsory for fulfilment as part of the tenders failing which tenders will be rejected.
47. All documents, registrations should be valid as on the date of tender.
48. GST as applicable will be deducted from the bills of the contractor.
49. The Party shall be responsible for the safety and wellbeing of all its workmen/employees during the period of execution of the work. The party shall provide all safety materials, gadgets, equipment's etc., to all its workmen/employees to ensure their safety during execution of the work. The Institute shall not be held responsible in case of any accidents, mishaps etc. to the party and its employees.
50. Any delay in completion of the works beyond the stipulated date due to reasons attributable to the contractor may eventually lead to cancellation of letter of award for which the contractor is not entitled to any compensation. The cancellation of letter of award would lead to forfeiture of performance security.
51. If any statutory tax/deduction/recovery is notified by the State/Central Govt, the same shall be deducted from the bill of the contractors as applicable from its effective date of coming into force.
52. The party who is allotted with the work, will have to sign on the measurement book as a token of acceptance of the measurement.
53. Conditions on strict adherence to covid safety protocols and precaution measures.
54. The details of the DD /any other accepted instrument, physically delivered, should tally with the details available in the scanned copy and the data entered during bid submission time, otherwise submitted bid shall not be acceptable or liable for rejection.
55. While submitting the bids online, the bidder shall read the terms and conditions and may accept the same to proceed further to submit the bid packets.
56. The bidder has to digitally sign and upload the required bid documents one by one as indicated. Very act of using DSC for downloading the bids and uploading their offers shall be deemed to be a confirmation that they have read, understood and agreed with all clauses of the bid document including general conditions of contract without any exception.
57. The bidder has to upload the relevant files required as indicated in the cover content.
58. In case of any irrelevant files, the bid may be rejected.
59. **Price Bid:**
    If the price bid format is provided in a spread sheet file like BoQ_xxxxx.xls, the rates offered should be entered in the allotted space only and uploaded after filling the relevant columns. The Priced-bid / BOQ template shall not be modified /replaced by the bidder; else the bid submitted is liable to be rejected for the tender.
60. The bidders are advised to submit the bids through online e-tendering system to the Tender Inviting Authority (TIA) well before the bid submission due date and time (as per Server System Clock). The TIA shall not be held responsible for any delay or the difficulties faced during the submission of bids online by the bidders.
61. The time settings fixed in the server side and displayed at the top of the tender site, shall remain valid

for all actions of requesting, bid submission, bid opening etc., in the e-Tender system. The bidders should follow such time during bid submission.

62. After the bid submission (i.e. after Clicking "Freeze Bid Submission" in the portal), the acknowledgement number indicated by the system should be printed by the bidder and kept as a record of evidence for online submission of bid for the particular tender and also be used as entry pass to participate in the bid opening.
63. All the data being entered by the bidders would be encrypted using Public Key Infrastructure (PKI) encryption techniques to ensure the secrecy of the data. The data entered is not retrievable by unauthorized persons during the bid submission and until the time of bid opening by any person.
64. Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers' public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.
65. The confidentiality of the bids is maintained with the use of Secured Socket Layer (SSL) 128-bit encryption technology. Data storage encryption of sensitive fields is done.
66. The bidder should logout of the tendering system using the normal logout option available at the top right hand corner and not by selecting the (X) exit option in the browser.
67. For any queries regarding e-Tendering process, the bidders may contact at address as provided in the tender document. Parallel for any further queries, the bidders are advised to contact over phone: 0120-4200462, 0120-4001002 or send an E-mail to cppp-nic@nic.in.
68. **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 IISER/IIT/Government Scientific Research Institutes/Govt 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.50 lakhs.**

    OR

    Two similar completed works each costing not less than **Rs.75 lakhs.**

    Similar works shall mean Design, supply, construction, Installation, testing and commissioning of similar nature of Green House Installations in reputed organizations like IISER/IIT/Government Scientific Research Institutes/Govt Institutes only. Documentary and photographic evidence of such projects must be submitted along with the tender, including proof of successful and ongoing operation of the facilities.

    Note: For the purpose of similar works, works executed in India only shall be considered.

    Bidder should have had average financial turnover (Gross) of at least **₹ 3 crore or more** during the immediate last three consecutive years' balance sheets duly audited by Charted Accountant.

    Bidder should not have incurred any loss (profit after tax should be positive) during the immediate last three consecutive financial years ending 31st March, 2025, duly certified and audited by the Charted Accountant.

    Bidder should submit an Undertaking that his firm has not been declared insolvent, and has not been blacklisted by any organization during the preceding 3 years'.

    Bidder should have solvency of **Rs 50** Lakhs certified by a Scheduled Bank and obtained not earlier than 12 months before the date of submission of bid.

    Bidders (Contractors/ Companies) are required to have a registered office in Kerala; documentary proof of the same should be submitted with the bid Or the bidders (Contractors / Companies) should have proven experience in executing & completing similar types of works in any Government organizations situated in Kerala, documentary proof of the same should be submitted with the bid.

    The bidder will engage a suitable, qualified/ experienced/ licensed engineering contractor/ supervisor/ technician for the work and suitable skilled personnel with the required license for doing the Civil/ Electrical / AC work. The bidder shall be liable to submit the list of such personnel along with the attested copy of the licenses at the time of execution. Required special tools to be operated in the execution of

the job.

69. **Check List of documents to be submitted along with the tender:**
    1. Bid Security/ EMD.
    2. Copy of Registration.
    3. Undertaking not to sub-let the work. (Format enclosed with the tender)
    4. Pan Card.
    5. GST Registration certificate.
    6. Documentary proof of work orders, completion certificates, photographic evidence of such projects including proof of successful and ongoing operation of the facilities
    7. Proof of Financial Turnover certified by Chartered Accountant.
    8. Income tax return statements.
    9. Undertaking that firm has not been declared insolvent, and has not been blacklisted by any organization during the preceding 3 years.
    10. Solvency certificate issued within the last 6 months or having validity till closing date of tender.
    11. Documentary proof of a registered office in Kerala or proven experience in executing similar types of works in any Government organizations situated in Kerala. Also Photographic evidence of the same.

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Name of work	**: Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech plant growth facility including walk-in chamber and tissue culture facility at IISER Campus, Thiruvananthapuram.**
Estimated Value of	**: Rs 89, 96,768.00**
Tender Enquiry No	**: IISER-T/2016/34/2025-26**
Completion Time	**: 75 days**

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH
THIRUVANANTHAPURAM

NOTICE INVITING TENDER

01.	Name of work	**Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech plant growth facility including walk-in chamber and tissue culture facility at IISER Campus, Thiruvananthapuram.**
02.	Estimated Cost	**Rs 89, 96,768.00**
03.	EMD	**Rs. 1,79,935/-**
04.	Completion Time	**As per tender conditions**
05.	Last Date and Time for submission of E-Tender	12/12/2025 @ 16:00 hours Late bids shall not be accepted.
06.	a) Date and Time of Opening of E-Technical Bid	13/12/2025 @16:00 hours
	b) Opening of Price bid	After evaluation of technical bids, the date, time and place of opening of the Price bid will be published in the CPP portal
07.	Defect Liability Period/ Maintenance period	36 Months
08.	Address for communication	**Project Engineer Cum Estate Officer (I/C), IISER TVM, Maruthamala P.O, Vithura, Thiruvananthapuram-695551**Email: pe@iisertvm.ac.in
09.	Procedure for submission of Bid	As per the e-bidding procedure.

Name of the Agency Submitting the tender

Details to be furnished by the Contractor.

S. No	escription / Requirement from the tenderer	Tenderer's response should be clear, firm, complete & legible. necessary, separate sheet shall used.	Page No. (must be filled)
1	Name & Complete address of the tenderer with contact details:		
2	Details of EMD paid		
3	Details of Contract Registration with Govt. depts. Class and value (If available)		
4	Details of PAN		
5	GST Registration:		
6	Employees provident fund Registration:		
7	Employees State Insurance Registration:		
8	Work Experience certificate		
9	Financial Turn Over		
10	Undertaking not to sublet the work		
11	Undertaking of non-blacklisting		
12	Solvency Certificate		
13	Documentary proof of a registered office in Kerala or proven experience in executing and completing similar types of works in any Government organizations situated in Kerala. Also Photographic evidence of the same.		

Note: Self-Attested copy of relevant certificates for items 2 -13 are to be enclosed

I/We hereby certify that the information furnished above and the attached documents as proof of the information are true and correct to the best of our knowledge.
I/We also authorize the IISER Thiruvananthapuram or his representative to approach the source of the certificate to verify our competence, if required, for processing the tender.

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH
THIRUVANANTHAPURAM

INSTRUCTION TO TENDERERS

1. The tender value includes cost of civil material, Transportation of materials, Tools and all other related material required for completion of the work.
2. Time is the essence of the contract. Being a time bound project, the contractor should make all efforts to complete the work in time.
3. Even though the overall completion period is indicated as **75 days** the work shall be completed progressively and handed over as per agreed split up schedule if any.
4. **The tenderers are advised to visit the site and get themselves acquainted with the site conditions before submitting the offers.**
5. Quoted rate shall remain valid for a period of **90 days** from the date of tender opening for the release of work order and will be firm throughout the contract period or till completion of work, once awarded and no cost escalation is allowed on any account.
6. The item rate offered is for finished item of works and shall provide for the complete cost towards fuel, tools, tackles, plant & machinery, temporary works, labour, materials, levies, taxes**,** transport, lay-out, repairs, rectifications, maintenance till handing over, supervision, labour colonies, establishment, services, roads, revenue expenses, overheads, profits & all other incidentals etc., complete. Rate quoted shall inclusive of GST. **The Tenderer should be a GST Registered Contractor. If the proof of GST registration is not furnished the tender of the tenderer will not be eligible for opening price bid and become disqualified.**
7. Some minor changes are likely in the layout, design and specifications of the work. The rates quoted shall be deemed to be inclusive of all such contingencies.
8. The work shall be carried out as per drawings released then and there, BIS/CPWD specifications, and standard code of practice and as per the instructions of Institute. The brief description of items of work is given in the bill of quantities.
9. The contractor has to furnish the security deposit, as per the clause indicated elsewhere in this document, if the work is awarded.
10. Since the responsibility for the quality, workmanship and accuracy of any work being carried out under this contract lies with the contractor, the contractor should ensure that no work is done without the presence of contractor's representative at the work spot, whose strength depends on the value of contract awarded. The contract should arrange for surveying construction site at his own cost.
11. The decision of Institute shall be final and binding on the contractor regarding clarification of items in this tender schedule.
12. The works contract to be entered into with the successful tenderer will be governed by the CPWD Works Manual in force.
13. The contractor shall strictly adhere to all the labour laws in force.
14. To safeguard the persons working at height in roof, wall etc., sufficient number of Industrial Safety nets shall be provided at tenderer's cost in appropriate level and locations. The working hand including Supervisors, Labour should follow the COVID 19 guidelines, wear the personal protective items and safety measures such as helmets, safety belts, shoes, etc., before entering into working place.
15. The tenderer has to deploy adequate labour of required categories such as Unskilled, Skilled, Carpenter, Plumber, technically experienced, etc. so as to execute the works simultaneously in all areas of work.
16. The contractor shall follow norms of IISER Thiruvananthapuram security system for movement of men & materials within the campus.
17. All the materials to be used in the work and the nature of work shall conform to the respective CPWD & BIS and Standard Specifications and shall be got approved by the Institute before actual incorporation in the work.
18. All materials brought by the Contractor for incorporation in the work shall be got inspected and approved by the Institute before they are incorporated in the work.
19. The contractor should extend full co-operation to the other contractors who may be doing other works

in the same areas to enable them to execute their portions of work without any delay or difficulty.

20. Tenderers are requested to furnish the duly filled in E format attached as separate sheet along with a cancelled Cheque leaf to accept Electronic fund transfer / RTGS transfer for any payment from IISER Thiruvananthapuram.
21. No mobilization advance will be given.
22. LD / Penalty clause is applicable as per CPWD Works Manual/GCC in force.
23. IISER Thiruvananthapuram reserves its right to reject a tender due to unsatisfactory past performance in the execution of a contract awarded against a different Tender.
24. Tenders submitted after the due date and time will not be accepted.
25. The contractor's responsibility under this contract shall commence from the date of receipt of the LOI by the tenderer. The Contractor will have to plan his work accordingly, to complete the work in the scheduled period.
26. Defect liability period/Maintenance period shall be **36 (Thirty-Six) months,** starting from the completion of work as defined in scope of the work, certified by the Engineer in Charge, IISER in the completion certificate.
27. Any deviation to this tender terms & condition and schedules of this tender will cause total rejection of the offer submitted.
28. Incomplete offers will become liable for rejection.
29. If the tenderer deliberately gives wrong information in his tender or creates conditions favourable for the acceptance of his tender, IISER Thiruvananthapuram reserves the right to reject such tender at any stage.
30. Canvassing in any form in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection
31. This tender notice shall be deemed to form an integral part of the contract to be entered into for this work.
32. The tenderers are advised to go through the condition stipulated in Tender document & code of conduct for Safety of Contract Labourer in details. Any violation thereof will invite punitive action being taken against them. While quoting the rate all the above factors are to be considered.
33. **Compensation for Delay:**

If the contractor fails to maintain the required progress or to complete the work and clear the site on or before the contracted or extended period of completion, he shall, without prejudice to any other right or remedy of the IISER Thiruvananthapuram on account of such breach, pay as agreed compensation an amount calculated as stipulated below or such smaller amount as may be fixed by the IISER Thiruvananthapuram on the contract value of the work for every week that the progress remains below or that the work remains incomplete. This will also apply to items or group of items for which separate period of completion has been specified.

For this purpose, the term 'Contract Value' shall be the value at contract rates of the work as ordered and the compensation for delay is by way of recovery at 1 percent of contract value per month of delay provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 10% of the contract value or of the contract value of the item or group of items of work for which a separate period of completion is given.

The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the IISER Thiruvananthapuram.

34. **Arbitration:**

Except where otherwise provided for in the contract all questions and disputes relating to the meaning of the specifications, designs, drawings and instructions hereinbefore mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the work or failure to execute the same whether arising during the progress of the work or after the completion or abandonment thereof shall be referred to the sole arbitration of the Director of IISER Thiruvananthapuram and if Director is unable or unwilling to act, to the sole arbitration of some other person appointed by the Director, willing to act as such arbitrator. The cases referred to arbitration shall be other than those for which the decision of the Institute is expressed in the contract to be final and conclusive. There will be no objection if the arbitrator so appointed is an employee of IISER Thiruvananthapuram and that he had to deal with the matters to which the contract relates and that in

the course of his duties as such he had expressed views on all or any of the matters in dispute or difference. The place of arbitration shall be Thiruvananthapuram.

The arbitrator to whom the matter is originally referred being transferred or vacating his office or being unable to act for any reason, Director as aforesaid at the time of such transfer, vacation of office or inability to act, shall appoint another person to act as arbitrator in accordance with the terms of the contract. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor. Subject as aforesaid the provision of the Arbitration & Reconciliation Act, 1996 or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceeding under this clause. It is a term of the contract that the party involving arbitration shall specify the dispute or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of each such dispute. The arbitrator(s) may from time to time with consent of the parties enlarge the time for making and publishing the award. The work under the Contract shall, if reasonably possible, continue, during the arbitration proceedings and no payment due or payable, to the Contractor shall be withheld on account of such proceeding.

The Arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the Parties fixing the date of first hearings. The arbitrator shall give a separate award in respect of each dispute or difference referred to him. The venue of arbitration shall be such place as may be fixed by the Arbitrator in his sole discretion. The award of the arbitrator shall be final, conclusive and binding on all parties to this contract.

In the event of disputes or differences arising between one public sector enterprise and a Govt. Department or between two public sector enterprises the above stipulations shall not apply or its amendments for arbitration shall be applicable.

35.**Force Majeure clause**:

If at any time during the continuance of this contract the performance in whole or in part by either party of any obligations under this contract shall be prevented or delayed by reason, of any war, hostilities, acts of the public enemy, civil commotion, sabotage, fires, explosions, epidemics, restrictions or acts of GOD (hereinafter referred to as events) then provided notice of happening of any such events is given by either party to other within twenty one days from the date of occurrence thereof neither party shall reason of such events be entitled to terminate this contract nor shall either party have any such non-performance and delay is resumed as soon as practicable after such events has come to an end or ceased to exist. If the performance in whole or part of any obligation under this contract is prevented or delayed by reason or any such event claims for extension of time shall be granted for period considered reasonable by IISER Thiruvananthapuram subject to prompt notification by the tenderer to IISER Thiruvananthapuram of the particulars of the events and supply to the IISER Thiruvananthapuram if required of any supporting evidence. Any waiver of time in respect of partial instalment shall not be deemed to be a waiver of time in respect of remaining deliveries.

The correspondence exchanged against the tender from both tenderer and IISER Thiruvananthapuram through email are considered as valid document legally though it is not signed. It is treated as valid confirmations made on behalf of the respective company and very much comes under the legal ambit of the business transaction and hence it is binding on both the parties to the business.

Any transaction pertaining to the tender from both the parties of business done round the clock irrespective of the office or business hours of the companies, are valid legally and binding on both the parties. This applies to the extent only in such cases where deadline time for transaction is not specifically declared by either or both the patties to the business.

In case Letter of Intent (LOI) is issued through email, the PC generated time and date of mail shall be construed as the official time and date of release of LOI. In as much as this date is within the last date of validity given by the tenderer the LOI is said to have been issued within the validity period and shall be bidding on both the parties to the business.

Tenderers participating in the tender should declare in their technical bid that whether they have been black-listed / kept on hold for a specified period /given business holiday for a specified period by any Public sector undertaking or Government departments. The reasons for such action with details and the current status of such hold shall be clearly furnished to IISER Thiruvananthapuram. If no such details are mentioned in the offer, then it will be construed that the subject tenderer is not under any such hold. But at a later date if it comes to the notice of IISER Thiruvananthapuram about any such hold under enforcement on the subject tenderer, IISER Thiruvananthapuram will have every right to reject the offer of such vendors at any point of time and also under any stage of the finalisation of the subject tender irrespective of the status of the subject tenderer in that tender. Such tenderers will not

be permitted to participate in the further tender proceedings and will be communicated suitably. They will not be also considered for any ongoing tenders even if participated till the hold is officially lifted and confirmed in writing.

GENERAL CONDITIONS OF CONTRACT

1. The general conditions given in the CPWD GCC 2023 to be strictly followed while execution of the work.
2. No night work will be permitted without the written permission of the Institute.
3. Permission for erection of temporary work sheds etc., at site will have to be obtained from IISER Thiruvananthapuram in writing in advance.
4. The works contract to be entered into with the successful tenderer will be governed by the CPWD works Manual 2024 or the latest in force.
5. The successful tenderer /contractor shall observe all safety regulations and take necessary safety precaution as called for and Safety Precautions enclosed herewith.
6. In all matters of dispute, the decision of the Director, INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM & Shall be final and binding on the tenderer /contractor.
7. Some changes are likely in the quantities furnished as well as in the layout, design and specifications of the work. The rate quoted shall be deemed to be inclusive of all such contingencies.
8. No material shall be incorporated in the work until the inspecting Engineer certified in writing that such materials have been inspected and approved by him or else the rejected material should be removed from site immediately.
9. The contractor shall closely scrutinize all the drawings issued in connection with the work by this organization and bring to the notice of the Institute if any discrepancies, omissions in the drawings before undertaking the actual work pertaining thereto.
10. The contractor should extend full co-operation to the other contractors who may be doing other works in the same areas to enable them to execute their portions of work without any delay or difficulty.
11. The power required for work will be at free of cost. However, the contractor should ensure safety precautions while handling electrical equipment. Power source will be shown near to the working place. Necessary cables etc. shall be in the scope of contractor.

GENERAL SAFETY PRECAUTIONS TO BE FOLLOWED AT WORK SITE DURING EXECUTION

The following safety measures should be strictly adhered to, during execution of works at sites.

1. The safety code as given in the CPWD GCC 2023 to be strictly followed while execution of the work.
2. Ensuring proper lashing of the components while being transported in vehicles.
3. The materials should not be allowed to extend or overflow the sides of the vehicles.
4. The speed restrictions within the Institute must be strictly adhered to.
5. The work to be executed keeping the campus clean and any dirty area during the execution, it is the responsibility of the contractor to clean the space.
6. All personal protective equipment conforms with standard specification and Contractor including and labour engaged on the work are required to scrupulously adhere to the safety regulations, safety precautions and measurers. Any violation thereof will invite punitive action being taken against them. Also, contractors with frequent violations of safety regulations will not be entrusted with further work in this organization.
7. In the event of any injured/fatal accident for the work men during the course of contract period, the compensation and other medical expenses towards the incident is lies with the contractor. No way is IISER Thiruvananthapuram responsible.
8. Following the latest developments and restrictions imposed in the country and state in view of the COVID-19, the agency should have strict compliance towards the rules and precautionary measures mentioned in the orders issued by the State Government from time to time. The submission of bids should be in the tender box placed at main gate of Institute. Also, successful agency should ensure all safety precautions, social distancing norms during the execution of work.

MOVEMENT OF VEHICLE

1. The vehicle should not travel at more than 20 kmph in our premises.
2. The driver of the vehicle must possess valid license and produce on demand by the Security Staff.

3. The driving should 'KEEP TO THE LEFT' at all places.
4. The vehicle should not be parked in road which could obstruct the vehicular traffic.

TERMS AND CONDITIONS REGARDING COMPLIANCE WITH VARIOUS LABOUR LAWS BY THE CONTRACTORS FOR IISER Thiruvananthapuram

1. The contractor shall not employ in connection with the work any person who has not completed 18 years of age.
2. The Contractor shall in respect of labour employed by him, comply with or cause to be complied with the following statutory provisions and rules and in regard to all matters provided therein.

a) The Contract Labour (Regulation & Abolition) Act 1970
b) The Minimum Wages Act 1948 and related Central Rules.
c) The Payment of Wages Act 1936 and related Central Rules.
d) The Employee's Provident Fund & Miscellaneous Provisions Act 1952.
e) The Employees State Insurance Act 1948.
f) The Workmen Compensation Act 1923.
g) The Industrial Disputes Act 1947.
h) The payment of bonus act 1965

and any other law or modifications to the above or to the Rules made thereunder from time to time.

3. The Contractor employing 20 or more workmen is required to obtain license from the authorities (The Deputy Chief Inspector of Factories / Assistant Commissioner of Labour as the case may be). The license shall be amended and /or renewed wherever, there is an increase in the workmen employed by him or in the event of contract being extended or renewed. The Contractor shall inform the license number to the IISER Thiruvananthapuram Management before taking up the work.
4. The Contractor (Licensed or unlicensed) shall promptly furnish every information and document required by IISER Thiruvananthapuram authorities for the purpose of fulfilling their obligations as Principal Employer and shall render all necessary assistance for the same.

REGISTERS & RECORDS: -

The Contractor shall maintain all registers and records in the proper manner and as required by the regulations of the various authorities concerned and indemnify the Employer from the consequences due to any inaccurate or faulty documentation on the part of the Contractor.

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.

30% will be paid after completion of sub structure/ supply of super structure material.

45% will be paid after completion all major civil works and supply of E&M components.

17.5% will be paid after completion of installation of facility upon handing over / commissioning.

2.5% will be paid after completion of 1st year of maintenance.

2.5% will be paid after completion of 2nd year of maintenance.

2.5% will be paid after completion of 3rd year of maintenance.

CANCELLATION OF CONTRACT FOR CORRUPT ACTS: -

IISER Thiruvananthapuram, whose decision shall be final and conclusive, shall without prejudice to any other right or remedy which shall have accrued shall accrue thereafter to IISER Thiruvananthapuram cancel the contract in any of the following cases and the contractor shall be liable to make payment to IISER Thiruvananthapuram for any loss or damage resulting from any such cancellation to the same extent as provided in the case of cancellation for default, If the Contractor shall: -

Offer or give or agree to give to any person in IISER Thiruvananthapuram service any gift or consideration of any kind, as an inducement or reward for doing or for bearing to do or for having done or for borne to do any act, in relation to the obtaining or execution of this or any other contract for IISER Thiruvananthapuram service,

OR

Enter in to a contract with IISER Thiruvananthapuram in connection with which commission has been paid or agreed to be paid by him or with his knowledge, unless the particulars of any such commission and the terms of payment thereof have previously been disclosed in writing to IISER

Thiruvananthapuram.

OR

Obtain a contract with IISER Thiruvananthapuram as a result of ring tendering or by non- bonafide methods of competitive tendering, without first disclosing the fact in writing to IISER Thiruvananthapuram.

CANCELLATION OF CONTRACT FOR INSOLVENCY ASSIGNMENT OF TRANSFER OR SUBLETTING OF CONTRACT: -

IISER Thiruvananthapuram, without prejudice to any other right or remedy which shall have accrued or shall accrue thereafter to IISER Thiruvananthapuram shall cancel the contract in any of the following cases: If the Contractor,

(a) Being an individual or if a firm any partner thereof shall at any time be adjudged bankrupt or have a receiving order for administration of his estate, made against him or shall take any proceedings for liquidation or composition under any bankruptcy Act or assignment of his effects of composition or arrangement for the benefit of his creditors or purport to do so, or if any application made under any Bankruptcy Act for the time being in force for the sequestration of his estate or if a trust deed be granted by him on behalf of his creditors

OR

(b) Being a Company, shall pass a resolution or the Court shall make an order for the liquidation of its affairs, or a receiver or Manager on-behalf of the debenture holders shall be appointed or circumstances shall arise which entitle the Court or debenture holders to appoint a receiver or Manager,

OR

(c) Assigns, Transfers, Sub-lets or attempts to assign, transfer or sub-let any portion of the work without the prior written approval of the IISER Thiruvananthapuram.

(d) Whenever IISER Thiruvananthapuram exercise the authority to cancel the contract under this conditions, IISER Thiruvananthapuram may have the work done by any means at the Contractor's risks and expenses provided always that in the event of the cost of the work so done (as certified by concerned officer which is final and conclusive) being less than the contract cost, the advantage shall accrue to the IISER Thiruvananthapuram and if the cost exceeds the money due to Contractor under the contract, the Contractor shall either pay the excess amount ordered by Institute or the same shall be recovered from the Contractor by other means.

(e) In case the IISER Thiruvananthapuram carries-out the work under the provisions of this condition the cost to be taken into account in determining the excess cost to be charged to the Contractor under this condition shall consist of the cost of the materials, hire charges of tools and plants and/or labour provided by the IISER Thiruvananthapuram with an addition of such percentage to cover superintendence and establishment charges as may be decided by Institute, whose decision shall be final and conclusive.

CANCELLATION OF CONTRACT IN PART OR FULL FOR CONTRACTOR'S DEFAULT:

If the Contractor,

(a) Makes default in carrying out the work as directed and continues in that state after a reasonable notice from Institute or authorised representative.

(b) Fails to comply with any of the Terms and Conditions of the contract or after reasonable notice in writing with orders properly issued there under.

(c) IISER Thiruvananthapuram may without prejudice to any other right or remedy which shall have accrued or shall accrue thereafter to IISER Thiruvananthapuram, CANCEL the contract as whole or in part thereof or only such work order or items of work in default from the contract. Whenever IISER Thiruvananthapuram exercise the authority to cancel the contract as whole or part under this condition IISER Thiruvananthapuram may complete the work at the contractor's risk and cost (as certified by Concerned officer, which is final and conclusive) being less than the contract cost, the advantage shall accrue to the IISER Thiruvananthapuram. If the cost exceeds the moneys due to the Contractor under this contract the Contractor shall either pay the excess amount ordered or the same shall be recovered from the Contractor by other means. In case the IISER Thiruvananthapuram carries out the work or any part thereof under the provisions of the conditions the cost to be taken into account in determining the excess cost to be charged to the Contractor under this condition shall consist of the cost of the materials, hire charges of tools and plant and/or Labour provided by the IISER Thiruvananthapuram with an addition of such percentage to cover the superintendence and establishment charges as may be decided by the concerned officer, whose decision shall be final and conclusive.

TERMINATION OF CONTRACT ON DEATH OF CONTRACTOR: -

Without prejudice to any of the rights or remedies under this contract, if the Contractor dies, or if the firm is dissolved or the company is liquidated, IISER Thiruvananthapuram shall have the option of terminating the contract without compensation to the Contractor.

SPECIAL POWER TO TERMINATION: -

If at any time after the award of contract, IISER Thiruvananthapuram shall for any reason whatsoever not require whole or any part of the work to be carried out the Officer concerned shall give notice in writing of the fact to the Contractor who shall have no claim to any payment of compensation or otherwise howsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequence of the foreclosing of the work.

LABOUR: -

The Contractor shall remain liable for the payment of all wages or other moneys to his workpeople or employees under the payment of Wages Act 1936, Employees Liability Act. 1938, Workmen's Compensation Act 1923 or any other Act or enactment, relating thereto and rules framed, there under from time to time.

PRECAUTIONS AGAINST RISK: -

The Contractor shall be responsible for providing at his own expense for all precautions to prevent loss or damage from any and all risks and to minimize the amount of any such loss or damage and for the necessary steps to be taken for the said purpose.

RATE FOR ADDITIONAL ITEM / SUBSTITUTED ITEM:

This will be as per the rate analysis based on the market rate for material and Labour prevailing at the time of execution at place of work as ascertained by concerned Engineer raised to the overall tender percentage at which the work was awarded to cover overheads / establishment /profit.

CORRIGENDUM /AMENDMENT:

It is tenderer's responsibility to watch for any corrigendum or amendment till the opening of a particular tender that will be posted only at IISER Thiruvananthapuram and CPPP web site.

SPECIAL CONDITIONS OF CONTRACT

1. Scope of Work

The scope of work consists of providing a Hi-Tech Plant Growth Facility and the conversion of existing laboratory space into a tissue culture facility, as described in the technical specifications and Bill of Quantities (BOQ). The scope of the bidder shall include the design, manufacture, construction, supply, erection, and commissioning of the fully functional facility in all respects with full responsibility, as detailed in the contract documents, and as directed by IISER, Thiruvananthapuram. The contractor shall carry out and complete the said work in every respect, strictly in accordance with the contract documents and to the entire satisfaction of IISER, Thiruvananthapuram.

The successful bidder shall be responsible for ensuring that the structural design is carried out in accordance with the prevailing Indian Standard codes and other relevant standards, to the full satisfaction of IISER, Thiruvananthapuram. All components shall conform to the following reference standards: IS 1161, Steel Tubes for Structural Purposes; IS 7138, Steel Tubes for Structural Purposes; IS 13871, Powder Coating; IS 822, Code of Procedure for Inspection of Welds; IS 2645, Civil Construction for Structural Purposes.

All works shall be executed in accordance with the approved drawings and in close coordination with IISER, Thiruvananthapuram. Bidder shall be completely responsible for the quality of work, and the bidder's technical staff shall be available at the site during execution to discuss with the technical team of IISER, Thiruvananthapuram as and when required and to supervise the work. In the event that any item of work is not covered under the reference standards, it shall be executed in accordance with the applicable ISI standard/ISI code of practice, as determined by the IISER, Thiruvananthapuram. The construction and all related works shall, in every respect, conform to the highest standards of

engineering, design, and workmanship, and shall be capable of continuous commercial operation in a manner acceptable to IISER, Thiruvananthapuram.

The bidders shall visit the site to assess the actual site conditions and requirements before bidding. The bidders shall analyse the technical requirements and actual heat load to be calculated to meet the AC requirement before bidding. Actual heat load calculations to be submitted before finalization of AC systems. All civil work layouts; AC installation and connection layouts; Electrical SLD, Lighting layout, power socket layout, DB schedule, cable layout, Electrical load calculation sheet & earthing layout to be submitted for approval by IISER, Thiruvananthapuram before fabrication/ execution of the work. All Electrical accessories (Switch /socket /light fitting /DB /enclosure, etc.) installed in wet areas may be of suitable IP ratings for water /dust. Earthing of appropriate conductor size as per IS 823/IS 3043 to be considered for the protective conductor. Completion reports as per CPWD 2023 (Part-1) internal electrical/ civil, and AC works to be submitted after testing & commissioning. The Institute reserves the right to interpret specifications and drawings and may reject or accept any work or materials which, in its opinion, do not meet the required standards.

2. Conformity with Statutory Acts, Rules, Standards, and Codes

All construction and installation work shall comply with DBT guidelines/rules and Kerala State Pollution Control Board requirements. The contractor shall be solely responsible for ensuring compliance with all applicable laws and regulations at Thiruvananthapuram related to the work.

3. Safety Codes and Regulations

The contractor shall arrange, at their own cost, all necessary safety provisions in accordance with statutory regulations wherever applicable.

4. Related Documents

These technical specifications shall be read in conjunction with the General Conditions of Contract and the Schedule of Work. In case of any discrepancies, the technical requirements specified in this tender document shall prevail.

5. Utilities Supply

(i) Power Supply:

- Power supply will be provided free of charge by the institute at one point for site installation. The contractor shall provide termination switchgear and any extension of wiring and supply beyond the point of supply.
- For equipment, power will be available at the main incomer unit. The contractor is responsible for terminating feeders in the main incomer unit at no extra cost.

(ii) Water Supply:

Water supply shall be provided free of charge for construction purposes.

6. Information to be supplied by Contractor after Award of Work

Within one week of receipt of the award letter, the contractor shall submit a program bar chart covering:

- Submission of preliminary (design) drawings
- Construction schedule
- Testing, commissioning, and handing over

The contractor must submit the following drawings/information in triplicate for approval before commencement of work:

1. General arrangement drawings
2. Foundation details, load data, and locations of assembled equipment
3. Complete layout dimensions for erection purposes
4. Any additional drawings/information necessary for execution
5. List of items to be carried out by the department as per tender

7. Commencement of Work and Completion Drawings

Within one week of award, the contractor shall submit 3 sets of detailed working drawings including construction layout, piping routes and sizes, electrical wiring, and critical sectional details.

Any changes proposed by the Institute shall be incorporated and resubmitted with comments. After final approval, six sets of approved working drawings (to scale) shall be provided for the Institute's exclusive use.

8. Operation and Maintenance Manuals

Prior to completion and handover, the contractor shall submit 3 sets of:

- Comprehensive operation instructions and preventive/routine maintenance schedules
- Manufacturer’s catalogues and operation/maintenance instructions
- Electrical control and piping scheme diagrams
- List of recommended spare parts with codes, specifications, and procurement sources

9. Contractor to Provide All for Testing

The contractor shall provide, at their own cost, all necessary tools, instruments, gadgets, and testing equipment for various tests. Any defects detected during initial testing shall be rectified by the contractor. Initial testing will be conducted in the presence of the Institute's representative and must meet their satisfaction. Commissioning shall follow after approval.

10. Virtual Completion

Upon satisfactory initial testing and commissioning, the installation will undergo a continuous running test for one week. Any defects found during this period shall be rectified by the contractor at their cost. The test shall be repeated if necessary. After successful completion, the Hi-Tech Plant Growth Facility will be formally taken over by the Institute.

11. Guarantee and Defect Liability Period

The contractor guarantees all equipment against faulty material and workmanship for 36 months from the date of virtual completion and takeover.

- Defective parts shall be replaced free of cost.
- Equipment shall meet or exceed specified performance and efficiency throughout the guarantee period.
- If performance is unsatisfactory, the guarantee period will be extended as decided by IISER, Thiruvananthapuram.
- Contractor personnel services during the defect liability period shall be provided free of charge.
- If defects are not remedied within reasonable time or equipment remains out of order for a total of one month (unless extended), IISER, Thiruvananthapuram reserves the right to remedy defects at the contractor's risk and cost without prejudice to other rights.

12. Maintenance

During the guarantee and defect liability period, the contractor shall provide necessary materials and personnel to perform repairs and routine maintenance at no additional cost. The contractor must attend to any operational problems within 48 hours of notification and take corrective action immediately.

13. Training of Personnel at Site

The contractor shall provide training to IISER staff at no extra cost during construction, installation, testing, and prior to virtual completion to familiarize them with operation and maintenance of the Hi-Tech Plant Growth Facility.

14. Storage of Materials and Safe Custody

The contractor shall be responsible for the safe custody and watch and ward of all equipment and installations until formal takeover by IISER, Thiruvananthapuram. Lack of lockable storage space shall not relieve the contractor of this responsibility.

15. Completion Period

All works related to supply, installation, construction, testing, commissioning, and handing over the Hi-Tech Plant Growth Facility shall be completed within the stipulated contract period or any extension granted by the Institute.

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

TECHNICAL SPECIFICATIONS

Name of work : **Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech Plant Growth Facility Including Walk-in Chamber and Tissue Culture Facility at IISER Campus, Thiruvananthapuram**

Estimated Value of work : **Rs 89, 96,768.00**

Tender Enquiry No : **IISER-T/2016/34/2025-26**

Period of Contract : **75 days**

A. Hi-Tech Plant Growth Facility:

1. Outer Super structure for plant growth facility:

Outer dimensions of Hi-Tech Plant Growth Facility: ~ 47'x57'x12' (L × W × H) and will include:

1. Size ~ 300-350 sq. ft. Quantity 3 Nos Cooling mode: AC-cooled.
2. Size ~ 300-350 sq. ft. Quantity 1 No Cooling mode: Air-cooled.
3. Size ~ 100-150 sq. ft. Quantity 2 Nos walk-in chambers.
4. Size ~ 150-200 sq. ft. Quantity 2 Nos Working/Soil preparation area.
5. Size ~ 300-350 sq. ft. Quantity 1 Corridors and buffer area.

- 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 and tissue culture facility 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 110-140 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

1.1 Glazing and Polycarbonate Sheet Specifications:

a. 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).

b. 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.

c. 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.

d. 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.
3.1. Structure and Covering:
a. Door Dimensions (2 Nos.): Double door ~ 3' wide, lockable to ensure restricted access.
b. 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.
c. 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.
2.2. Air Curtain Specifications:
a. Type: Electronically balanced air curtain with double blower system.
b. 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.
c. Cabinet: Heavy-duty cold-rolled Mild Steel Sheet, powder-coated finish.
d. Operation: Atomized ON/OFF control with door opening to ensure effective airflow at the entrance of the buffer area.
e. 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:
4.1 Excavation and Foundations:
· Excavation as per design requirements.
· Digging size: H 2'× L 2'x D 4'.
· 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.
4.2 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.
4.3 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.

4.4 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.

4.5 Internal Finishes:

· Internal walls, ceilings, and floors shall be resistant to liquids and chemicals.
· Finished floor to false ceiling height: ~10’.
· Apex ceiling height: ~12-15’.
· 4 Nos. 6/16 Amp electrical sockets and 16 Amp one-way switches in each section for easy connections of experimental instruments.

4.6 Drainage System:

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

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, Thiruvananthapuram 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 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.

Lamp Specifications for plant growing area:

a. Type: High efficiency ~ 250 W LED PAR grow lights.

b. 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.

c. 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.

5.1 Lighting system for growth trolley:

· Individually operated PAR Surface Mount Device (SMD) Type LED Lamps
· Intensity: ~ 50 to 130 µE/m²/sec
· CRI > 80

- ~ 5 to 6 lamps of ~20W each per shelf

5.2 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 in 3 sections and air-cooled in 1 section)**:** 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 28°C with relative humidity of 30-85%. Commercial heavy-duty inverter-type air-conditioning units with a BEE 5-star rating (approved by IISER, Thiruvananthapuram), three to four in number (depending on the actual heat load), equipped with timers for automatic switching between units, having a total cooling capacity of approximately 54,000–72,000 BTU/hr in each section of the growth room, 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.

6.1 ECS Cooling Construction Material:

- Eco-friendly construction materials shall be used.
- All trays (side, top, etc.) shall be fabricated using 18 GA GI sheets.
- Miscellaneous fasteners shall be galvanized; rivets shall be aluminum.
- PVC pipes of ~ 20 mm, ~ 25 mm, and ~ 32 mm shall be used.

6.2 Cooling Media:

- Cooling media shall consist of ~ 100 mm thick cellulose pads, designed to operate at an air velocity of 1-3 m/s.
- Cooling efficiency shall be in the range of ~ 60%-95%.
- Evaporative cellulose pads shall be manufactured from specially formulated cellulose paper impregnated with compounds to prevent rot, moss formation, and ensure long service life.
- Pads shall operate effectively in ambient conditions of ~ 20°C-50°C.
- Cross-angle configuration shall be a = 45° and b = 45°.
- Cooling pads shall be self-cleaning with high saturation efficiency.
- Each chamber shall be fitted with separate cellulose cooling pads.
- The rear side of cooling pads shall be protected with UV-stabilized ~ 40 mesh netting, fixed with suitable grippers.

6.3 Slow Speed Axial Flow Fans: ~ 36" (2 Nos.)

a. Specifications:

- Fan Type: Slow Speed Axial Flow Fan
- Fan Size: 36 inches
- Quantity: 2 Nos.
- Number of Blades: ~ 6 Nos.
- Blade Material: Stainless Steel (Grade SS 430)
- Shutter Material: Galvanized Steel
- Pressure: ~ 56 Pa
- Noise Level: ≤ 70 dB
- Voltage: 220V / 380V / Three Phase / 50 Hz

b. Frame Construction: Heavy-duty galvanized steel box frame, riveted together for durability.

c. Support Structure: Cross-shaped steel framework with streamlined design, fan hub at the centre.

d. Design Features: Fan blades mounted on one side and a pulley on the opposite side for improved load balancing, enhancing bearing and fan life. Centre hub made from die-cast aluminium with integrated steel shaft. Shaft supported by two rigid radial ball bearings, provided with a watertight protective screen.

e. Shutters: Galvanized steel shutters with an automatic shutter opener mechanism. Shutters open fully as soon as the fan starts. Eliminates loss of air delivery due to dirty shutters or the need to hold shutters open.

6.4 Filtration:

· Air filtration shall be achieved using CALBA ISI 25-55 viscous filters with ~ 30 µm efficiency.

6.5 Water Supply and Storage:

· Each system shall be provided with a PVC water tank with superior durability and temperature control of ~ 500 liters capacity connected with RO water plant.

· Water flow shall be maintained at ~ 7.56 LPM with a 10% bleed-off provision.

6.6 Pumping System:

· A 0.5 HP monoblock pump with thermal protection shall be provided for continuous and safe operation.

6.7 Performance parameters: Estimated cooling load: 101,520 BTU/hr; technical performance shall be equivalent to HuTek make or any other IISER, Thiruvananthapuram approved equivalent make.

7. Heating System (2 Nos. in each section): 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 using Far Infrared Ray (FIR) radiation.
Radiation Intensity: 3.49 × 10^2 W/m^2.
Anion Radiation: More than 500 ions/cc.
Heaters: 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- 85%

8. Humidification System (In plant growth facility and walk-in chambers): An ultrasonic vapour humidifier 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.

10.1 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
- 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%.

10.2 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.

10.3 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)

Three 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” height, suitable for the growth of 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.

b. Growth trolley with shelves: (In one section)

One section of the plant growth facility shall have growth rack arrangements 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.

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 non-corrosive, 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.

A1. Walk-in-Plant Growth Chamber: 2 Nos to be installed inside the Hi-tech plant growth facility.
Outer dimensions of Walk-in-Plant Growth Chamber: (2 Nos) 22.5' x 8'x 8' (L × W × H).
1. Specifications for walk-in chamber outer structure: 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.
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.
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 Teflon.
Technical Specifications of PUF Insulated Panels

Parameter	**Specification**
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 System: The cooling 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 6.1 of the Hi-Tech Plant growth

facility and for growth trolley/rack as specified above in point 6.2.

4. Humidification System (2 Nos. One for each chamber): As specified above in point 9 of the Hi-Tech Plant Growth Facility.

5. Dehumidifier (2 Nos. One for each chamber): As specified above in point 10 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 real-time 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.

6.1 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 temperature.
· 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%.

6.2 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

6.3 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%

6.4 PLC-Based Control System:

Key Features:

- 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:

a. Bench: Plant Growth Chamber (1 no) shall have movable bench with 2 Illuminating shelves with light arrangements (As specified above in point 6.1 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 Rice, chickpea, Wheat and Tobacco. 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.

b. 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.

B. Tissue Culture Facility (Converting existing lab space into tissue culture Facility):

Outer dimensions: 21.5' x 11'x 9' (L × W × H).

1. Polyurethane Foam Specifications for Tissue Culture Facility: Effective insulation shall be provided for walls, ceiling, and floor to ensure economical and stable temperature maintenance in the tissue culture facility. Insulation shall also act as a partitioning of the total area into two different sections with a buffer area as per the design. All insulation materials shall be durable, fire-resistant, and chemically stable.

a. Wall and Ceiling Insulation:

Material: Prefabricated, pre-coated GI panels. PUF Thickness: 40 mm, density 42 kg/m³. Fitting Method: Tongue-and-groove arrangement for better insulation and leak-proof performance. Door Panels: Puff-insulated, 40 mm thick, size 1.92 m × 0.91 m, total 3 doors with glass viewing window.

b. Floor Insulation:

Specifications:

Thickness: 2 mm; Composition: Vinyl; Durability: Excellent; Flammability: Does not support combustion; Resistance to Oil and Chemicals, Petrol: No effect, Alcohol: No effect, 2% Alkali: No effect.

2. Buffer entry with air curtains:

Dimensions of the buffer area. 5'x 5' x 9' (L × W × H).

Door Dimensions: Double door (1.92m x 0.91m) with air curtain (Specifications as specified above in point 3 of the Hi-Tech Plant Growth Facility) for entry in buffer area with an insulated glass viewing

window; with two separate doors for entry in each tissue culture section.

3. Cooling System:
Condensing Unit: Emerson Copeland make, suitable for 400V, 3 Phase, 50 Hz power supply.
Evaporating Unit: Approved by IISER, Thiruvananthapuram.
Cooling Capacity: 18,300 BTU/Hr.
Accessories: Complete with Drier, LP/HP controls, Suction and Discharge valves.
Quantity: 4 Nos. (2 Nos. for each Growth Room equipped with timers for automatic switching between units). The air-conditioning units (BEE 5-star rating) shall be installed with all necessary accessories, including copper pipes, insulation sleeves, communication cables, drainpipes, etc.

4. Lighting system for growing areas: As specified above in point 6.2 of the Hi-Tech plant growth facility fitted in the plant growth trolley/ rack.

5. Humidification system (2 Nos. One for each chamber): As specified above in point 9 of the Hi-Tech plant growth facility.

6. Dehumidifier (2 Nos. One for each chamber): As specified above in point 10 of the Hi-Tech plant growth facility.

7. Heating System (2 Nos. One for each chamber): As specified above in point 8 of the Hi-Tech plant growth facility.

8. Microprocessor Based Control Panel:
(Comprising control gears, contactors, SPPR, Auto/Manual operational feature, individual indicators, and all necessary safety measures)
Quantity: 2 Nos. (Individual controlling for each chamber)
Technical Specifications:
a) Microclimatic Temperature & Humidity Controller (Four Set Points)
· Specially designed for Tissue Culture Laboratories with thermal safety features to prevent culture attrition.
· Real-time, microprocessor-based, user-programmable controller.
· 4-digit LED display for measured values with feather-touch operation.
· Platinum sensor probe Pt-100.
· Sensor failure indication.
· Display resolution: 0.1°C.
· Accuracy: ±0.1°C.
· Set point arrangement for different day and night temperature.
· Automatic hysteresis control.
· 4 independent powered outputs.
· Input supply: 200-240 VAC, 50 Hz, single phase.
· Operating conditions: Ambient 5°-50°C, RH up to 90%.
b) Programmable Photoperiodic Controller
· Real-time, microprocessor-based controller.
· Clock accuracy: ±2.5 sec/day at 20ºC.
· Single channel operation.
· Weekly program with 16 memory locations adjustable to the minute.
· Automatic summer/wintertime adjustment.
· 1500 hours running reserve.
· Random switching can be activated by a key press.
· Red LED indication for ON operation.
· Program saving via EEPROM.
c) Sequential Controller
· Alternates the operation of two air conditioners, keeping one operational and the other on standby.

· Minimum ON/OFF time: 15/30 minutes.
· Ni-Cd battery with auto-recharging facility.
· Powered output suitable to drive air conditioners alternately.
· Auto/Manual selector switch.
· Accuracy: ±8 sec/day.

9. Growth rack for tissue culture facility:

a. Growth racks: Tissue culture facility 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 tissue culture needs as follows: Length 4'2", Height 7'8", width 24"- 6 nos; total Shelves 6, Shelf to shelf distance 16" with height adjustments arrangements. Illuminated Shelves 5. Shelf Hylem (Bakelite) sheet.

b. Toki chamber arrangement for the rice tissue culture (1 Nos): One growth rack covered with black a polystyrene sheet with zipper arrangements in alternate shelves with continuous light and fan arrangements (in alternate shelves) to maintain the internal temperature with temperature sensors and temperature display.

Accessories:

Working benches (2 nos in each section for working/ soil preparation area):
Wall Bench Size: L 3000 mm x W 750 mm x H 900 mm in C-Frame Structure with work top in 18 ± 1 mm thick Black Granite construction and chairs (4 nos.). Electrical points of 6/16 amps (5 no in each section) for connection of autoclave and other experimental instruments. Suitable number of electrical points of 6/16 amps in each section of tissue culture lab to connect the instruments.

Water Dam and stick pad at the entry of the facility:

Facility shall be installed with a 5 cm deep water dam immediately after the main entrance, followed by adhesive (stick) pad arrangements at the air curtain door located at the plant growth facility entry to minimize the ingress of dust and other contaminants carried on footwear, thereby maintaining the required cleanliness and safety standards within the facility. Foot wares stand shall be provided at the entry of the greenhouse along with stand or hanger for the lab coats at the entry of the green house. Hand wash arrangements shall also be installed in the buffer area.

Low flow Fertilizer Injector:

A compact, fertilizer injection with injection range of 0.2 - 2 %; Water flow range 10 l/h - 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 rice, chickpea, sorghum, brassica, wheat, Arabidopsis and Nicotiana. 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, Thiruvananthapuram) 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, Thiruvananthapuram), 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/Zuari/ACC.
Polyurethane Foam panels	Beardsell/Cosmic/Lloyd
Polycarbonate sheet	Sabic Lexan/Palram/ Bayer/Acewell.
Water Tank	Sintex / Paras / Supreme
PVC pipes	Supreme/Astral/Finolex
Tiles	Kajaria/Johnson
Paint	Asian/Berger/Dulux.
Aluminium	Jindal/Bhoruka.
Cellulose pads	Hutek
Hinges	Hettich, haffle
Locks	Hettich, haffle
Working Lights	Philips/ Havells/ Wipro/crompton
Copper/A2XFY Cable/wires	Finolex/Polycab/Havels.
MCB (c curve)/Power Point	L&T/ Legrand Myrius/Snider.
Grow Lights	Osram/ Philips.
Ultrasonic vapour humidifier	Garuu/ Mars Hydro / Bhanu
Dehumidifier	Carrier/Novita
Desiccant Rotor Dehumidifier	Bryair/ Hygro
Precision A/C system	Vertiv (Emerson)/Schneider Electric/Daikin/Copeland
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	Aspen Pumps or Equivalent.
Air-curtains	Almonard, Mitsubishi.
Electrical Rotary /ON-OFF Switches	L&T, Legrand.
Monobloc Pump	Kirloskar/CRI/CG/ Equivalent.
Fertilizer Injector	Dosatron/Jain/Kothari
All equivalent makes mentioned in the table shall be provided but only after providing 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).	

INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

TO BE DULY TYPED, SIGNED AND STAMPED AND UPLOADED AS PDF IN THE E-TENDER. [THE OVERALL TOTAL OF THE PRICEBID TO BE INCORPORATED IN THE PROVIDED PRICEBID EXCEL FILE BoQ_xxxxx.xls AND UPLOADED]

Name of work	**:**	**Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech Plant Growth Facility Including Walk-in Chamber and Tissue Culture Facility at IISER Campus, Thiruvananthapuram**
Estimated Value of work	**:**	**Rs 89, 96,768.00**
Tender Enquiry No	**:**	**IISER-T/2016/34/2025-26**
Period of Contract	**:**	**75 days**

SCHEDULE 'A'

LIST OF WORKS AND PRICES NAME OF WORK:

DETAILS & QUANTITIES of each item of work shown in the BILL OF QUANTITIES are only approximate. They are given as a guide for the purpose of tendering only and are liable to variation and alteration of the Competent Authority. The work under each item as executed shall be measured and priced at the corresponding rate quoted by the contractor in the BILL OF QUANTITIES

Sl. No.	Description of work	Total amount of work in Rupees	Period of contract
1.	**Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech Plant Growth Facility Including Walk-in Chamber and Tissue Culture Facility at IISER Campus, Thiruvananthapuram**	**Rs 89, 96,768.00/-**	**75 Days**

Sl. No.	Item Description	Quantity	Units	Basic Rate / Unit (in Figures) To be entered by the Bidder	Total Amount	Total Amount in Words

ANNEXURE – I

FORM OF UNDERTAKING

To,
Project Engineer Cum Estate Officer (I/C),
INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM.

I / We hereby offer to carry out the work of

I / We hereby carefully perused the following documents connected with the above noted work and agree to abide by the same.

1. Specifications (General & Particular)
2. Drawings
3. Schedule 'A',
4. Bill of Quantities
5. CPWD works Manual in force.

I / We agree to execute all the work referred to in the said documents upon the terms & conditions contained or referred therein and as detailed in Schedule 'A' and Bill of Quantities thereto and to carry out such deviations as may be ordered, vide conditions of the IISER Thiruvananthapuram.

I / We further agree to refer all disputes, as required to the sole arbitration of an Officer, to be appointed by the Director, IISER Thiruvananthapuram., in his sole discretion whose decision shall be final and binding.

WITNESS Signature of the Contractor

Date:

1. …….

2. …….

ANNEXURE – II
FORM OF UNDERTAKING

To, Registrar
INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM

Tender No. **IISER-T/2016/34/2025-26**
Notice Inviting Tender for **Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech Plant Growth Facility Including Walk-in Chamber and Tissue Culture Facility at IISER Campus, Thiruvananthapuram**.

Sir,
I /we hereby submit our tender for **Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech Plant Growth Facility Including Walk-in Chamber and Tissue Culture Facility at IISER Campus, Thiruvananthapuram**.

1. I/ We enclosed herewith the following in favour of INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH THIRUVANANTHAPURAM towards EMD.

Particular	Amount	Payment Reference Details	Payment Date
EMD	**Rs. 1,79,935/-**		

I / We hereby reconfirm and declare that I / We have carefully read, understood & complying the above referred tender document including instructions, terms & conditions, scope of work, schedule of quantities and all the contents stated therein. I / We also confirm that the rates quoted by me / us are inclusive of all taxes, duties etc., applicable as on date.

2. I /we have gone through all terms and conditions of the tender document before submitting the same.

Date: **Authorized Signatory**
Seal **Name:**
Place: Designation: Contact No:

ANNEXURE – III
FORM OF UNDERTAKING

To, Registrar,
IISER Thiruvananthapuram,

Sub**: Design, manufacture, supply, construction, erection, testing and commissioning Hi-Tech Plant Growth Facility Including Walk-in Chamber and Tissue Culture Facility at IISER Campus, Thiruvananthapuram.**

Sir,

With reference to the above, I hereby undertake not to sublet the work cited above, if the work is allotted to me.

Date:

Name of contractor

Signature and seal