

DIRECTORATE OF RESEARCH SERVICES
RAJMATA VIJAYRAJE SCINDIA KRISHI VISHWA VIDYALAYA GWALIOR-
474002, M.P.

IPRO/DRS/AERO/2023-24/2904

Dated 01.03.2024

e-TENDER NOTICE

Online tender(s) under two bid system (i) Technical bids (ii) Financial bids are invited by the Director research Services, RVSKVV, Gwalior from reputed Manufacturers/ Authorized Dealers/Distributors in the line for supply and installation of scientific equipment(s)/item(s)/structures for the establishment of "Tissue culture-based potato seed production through aeroponics" as described below:

| Sl. No. | Name of item | Divisions/Units/ Reg. Stations | Amount of EMD | e-tender No. |
|----------------|------------------------|---|----------------------|--|
| 1. | Aeroponics Unit | 1. Biotechnology Centre, RVSKVV, Gwalior, 2. College of Agriculture, Indore, 3. RAK College, Sehore | 1.0 Lakhs | No/PMB&B/2023-24/339 dated 01/03/2024 |

CRITICAL DATES

| S. No. | Item | Date | Time |
|---------------|--|----------------|-------------|
| a) | Publishing Date | 01 March, 2024 | 16:00 |
| b) | Document Purchase Start Date | 01 March, 2024 | 10:30 |
| c) | e-Bid Submission End Date | 22 March 2024 | 17:00 |
| d) | Physical bid document Submission end date in the Office physically at Office of Directorate, Research Servicers, RVSKVV, Gwalior | 23 March 2024 | 17:00 |
| e) | Opening of the Technical Bid at Office of Directorate, Research Servicers, RVSKVV, Gwalior | 26 March 2024 | 15:00 |
| f) | Technical Evaluation of Bids at Office of Directorate, Research Servicers, RVSKVV, Gwalior | 26 March 2024 | 15:00 |
| g) | Financial/Price Bid e-Opening Date at Office of Directorate, Research Servicers, RVSKVV, Gwalior | 05 April 2024 | 15:00 |

Tender form can be downloaded from the website www.mptenders.gov.in and can also be seen on university website www.rvskvv.net . Tender documents with specifications can be purchased from this site by paying ₹12500.

Director Research Services
RVSKVV, Gwalior

**DIRECTORATE OF RESEARCH SERVICES
RAJMATA VIJAYRAJE SCINDIA KRISHI VISHWA VIDYALAYA GWALIOR-
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e-TENDER INVITING NOTICE

Online tender(s) under two bid system (i) Technical bids (ii) Financial bids are invited by the Director Research Services, RVSKVV, Gwalior from reputed Manufacturers/ Authorized Dealers/Distributors in the line for supply and installation of scientific equipment(s)/item(s)/structures for the establishment of “Tissue culture-based potato seed production through aeroponics” on or before 22-03-2024 up to 05:00 PM **via on line** and up to 23th March 2024 latest by 5.00PM as **hard copy**. **For the list of items, tender forms, terms & conditions and detailed information please visit RVSKVV website www.rvskvv.net and for purchase of tenders www.mptenders.gov.in from 1st March 2024.**

Any related corrigendum, if required, will be published on RVSKVV [/www.mptenders.gov.in](http://www.mptenders.gov.in) only.

NAME OF ITEM: Aeroponics Unit (*FIRST CALL*)

Date: 01/03/24

**Director Research Services
RVSKVV, Gwalior**

DIRECTORATE OF RESEARCH SERVICES
RAJMATA VIJAYRAJE SCINDIA KRISHI VISHWA VIDYALAYA GWALIOR-
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E-Tender Document

CRITICAL DATES

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DEPOSITING THE BIDS:

The bids will be submitted through on-line mode of www.mptenders.gov.in. However, certain documents would be required to be submitted physically to our office. Details are as follows:

(A) On-line Submission:

(i) Cover-I: Will contain the Technical Bids with the following documents:

- Detailed technical write-up highlighting the model Name/Number features of the equipment offered and / or technical literature/manuals.
- Certificate for acceptance of terms and conditions of tender enquiry on firms' letterhead.
- Original Equipment Manufacturer (OEM) certificate or authorized dealership/distributorship certificate as applicable.
- Manufacturing Registration No.
- Company Printed Price List (If available)
- Last 3 (three) years Income Tax Return.
- Audited Balance Sheet for Last 3 (Three) years.
- TIN number/PAN Number/Certificate/GST number
- Business Registration Certificate.
- Supplier should have at least an average annual turnover of **Rs one Crore** for major equipment's and **50 lakhs** for minor items for last 3 years.
- Scanned Copy of EMD as shown against each item.
- Compliance Certificate. Certificate of clause-by-clause compliance of specifications as mentioned in tender.

(B) Physical Submission:

Following documents to be submitted in hard copy physically in a sealed envelope by **Speed Post/Registered post** to reach prior to bid submission closing date & time. The responsibility to ensure this lies with the Bidder.

Please do not submit the hard copy of “Commercial/Price bid”.

- All the documents submitted on-line in Cover I.
- **EMD as shown against each item on-line submitted and proof enclosed physically.**
- Tender fee receipt copy (as applicable).
- Tender conditions Acceptance Certificate in form of downloaded Tender documents duly stamped and signed.
- Client list/ List of users on manufacturers’ letter head duly stamped and signed.
- User Certificate with Phone No. and E mail address.
- Guarantee/warranty on manufacturers’ letterhead.
- The supplier is bounded to supply spare parts of equipment’s for the **at least next 10 years**.

GENERAL TERMS AND CONDITIONS:

1.*Only the manufactures and/or their authorized dealer/distributors/sole agents/ need to submit their tender. The authorized firms should furnish a certificate from the manufacturer for their dealership/distributorship **in original** with the physical bid otherwise the offer will not be considered.

2. No person or firm shall submit more than one Tender for the same item. No offer should have more than one model quoted; in case of more than one alternate offer only the first option will be considered.

3. It is mandatory to provide all the relevant information in *Annexure -I*.

4. Broad-based specifications of equipment/items/systems/works *etc.* are given in *Annexure- II* of purchased tender. The tenderer should also take note of the remarks, if any, given their in.

5. a. Last date for submission of e-Tender is 22.03.2024 up to 5:00 PM on www.mptenders.gov.in.

b. Tender must be submitted in sealed cover to the **Office of Director Research Services, RVSKVV, Gwalior 474002 by **Registered/Speed Post**, to reach on or before dated 22.03.2024, AT 5:00 PM.**

c. Belated tender due to postal or any other delay will be rejected.

d. The tender for each item should be sent separately. The duly sealed envelope should super scribe

TENDER FOR THE ITEM (AEROPONICS UNIT) DUE ON 22th March 2024 with reference number.

e. If offers for more than one item are clubbed together, tender will be rejected.

f. The tender offers should have a validity of 180 days or more from the due date. The tenders will be valid for 6 months from the date of opening and may be **asked for extension by taking written concern of the firms if needed.**

g. **Price bid will be opened online at www.mptenders.gov.in on 05-04-2024 from 3:00 P.M. to 5.00 PM. If date of opening of price bid will be changed due to any circumstances. That will be informed to bidders.**

h. R.V.S. Krishi Vishwa Vidyalaya (RVSKVV) reserves the right to extend the opening due date and or the date of opening the tenders.

i. All the leaflets in the offer should be marked with signature and seal of authorized person.

6. a. The rates quoted should in Indian Rupees (₹) for a **single complete unit** with F.O.R. delivery at RVSKV, Gwalior. The rates quoted should be inclusive of packing and forwarding charges/loading/unloading/handling charges/freight/full risk coverage/insurance, *etc.* In case of imported goods all the expenses towards custom duty, clearing charges and transportation with insurance will be borne by the firm/tenderer and they must quote the rates inclusive of all FOR, RVSKV, Gwalior in INR.

b. Excise duty/Sales Tax/GST/Custom duty (with and without concession certificate) and other levies, if any should be shown separately and the **total price** of each item should be worked out incorporating the all.

c. Any other charges, such as technical service charges, cost of training, installation charges, TA/DA of tenderer's staff *etc.* if any, should be shown separately for each item and each sub-item and the total price of each item should be worked out incorporating the same in final quoted price.

7. All losses during transit will have to be made good by the tenderers at his cost within a period of 15 days.

8. The tenderers must provide guarantee/warranty on **manufacturers' letterhead** of satisfactory functioning of the equipment/system and free service including free replacement of parts for a period of at least **3 years** from the successful and satisfactory installation of the equipment/system. Original to be deposited by the successful bidder at the time of supply.

9. Performance Guarantee: The Successful bidder/supplier will be required to furnish a Performance Guarantee in the form of FDR from a public sector bank or a private sector bank authorized to conduct government business for a sum equal to **10%** of the Supply Order value within 30 days of signing of the Supply Order. Performance Bank Guarantee will be valid up to 3 years beyond the date of guarantee/warranty.

10. Offer must be accompanied by **Earnest Money** as stated against each item must be submitted **on-line**. Without the deposition of earnest money, the offers will be rejected.

11. The standard terms and conditions of payment is in full only after the installation is affected to the satisfaction of RVSKVV authorities in INR only.

12. Please quote maximum discounted price, as no further negotiations will be made.

13. Complimentary items/gifts offered will not be given any preference and will not be considered for calculating the cost of the item.

14.*The offers must mention make, model all the specifications of the item clearly. The company must enclose printed literature/catalogue/manufacturer’s web-site showing detailed technical specifications required. A folder showing many instruments without detailed technical specification, or tailor-made literature mentioning “yes” or “as per your specifications” for the specifications asked for, will not be considered. Specifications given in the offer must match to the website and/or printed technical literature otherwise the offers shall be rejected.

15. Technical specifications of the equipment / items have been very clearly formulated by the users/experts of the field as per the requirement of the work to be conducted. It will be sole discretion of the bidder whether to quote or not for equipment with particular specifications.

16.*Firm must provide a compliance statement vis-à-vis specifications in a following “tabular form” clearly stating the compliance, supported by technical literature with clear reference. This statement must be signed, with the company seal, by the Tenderer for its authenticity and acceptance that any incorrect or ambiguous information found submitted will result in disqualification of the offer.

| Name of Equipment: | | |
|---------------------------|------------------|-------------------|
| Technical Specification | Compliance (Y/N) | Deviation, If any |
| | | |

17.*Offer must be accompanied with a comprehensive list of users on manufacturers' letterhead, wherever possible bidders may also provide certificates for satisfactory working of the equipment from users of universities and institutions of repute.

18. a. If so desired by RVSKVV, the bidders shall have to enter in to an agreement.

b. Any wrong information about item, any forged document and any deviation, variation of non-compliance of the terms and conditions by the tenderers shall be considered as a breach of contract and RVSKVV reserves the right to forfeit the amount of earnest money and/or security deposit in full and take action as per legal arrangement.

19. Should there arise any dispute, the Hon'ble Vice Chancellor, RVSKVV, Gwalior shall be the sole Arbitrator whose decision in the matter shall be final and binding. Each and every judiciary transaction shall be subjected to Gwalior only.

20.*Tender will not be considered if the firm does not supply a copy of the TIN/ GST& PAN/ Registration of the firm allotted to it for relevant items. PAN of the owner or any other persons will not be accepted.

21. This tender is being issued with no financial commitment and the Buyer reserves the right to change or vary any part thereof at any stage. Buyer also reserves the right to withdraw the tender, should it become necessary at any stage.

22. RVSKVV reserves the right to accept or reject any or all offers in full or in part without assigning any reason (s) thereof. It also reserves the right to place and order wholly or in part with one or more than one firm as it may be convenient to RVSKVV, Gwalior.

23. The tenderer shall have to give an undertaking that the terms and conditions as mentioned above of this tender are acceptable to the tenderers in form of downloaded Tender documents duly stamped and signed.

24. If firm wishes, they can send their representatives, duly authorized in writing, to attend the Technical Evaluation and clarification regarding bids which is scheduled at 3:00 PM on 22th March, 2024.

25. In case, if single manufacturer of the any item and having propriety rights. Items may be purchased with the permission of concerned higher authority.

Bidder should be submitted EMD (Provide EMD Details) in the form of DD/ MSME firms are exempted from EMD Submission.

3. The annual turnover of the agency should not be less than 25 crores during last three financial years. For the annual turnover audited balance sheet along with annual report and IT return of the agency should be submitted as supporting documents.

4. Bidder should have ISO certificate ISO 9001:2008, ISO 45001:2018, ISO 14001:2015.

5. Firm should have minimum 10 years' experience in plug type nursery/COE setup and have running experience of minimum two similar project is also required in any govt. dept./semi govt. Autonomous institution. (Attached documentary proof of work order and completion certificate)

6. Firms applying for the proposed work should have experience of establishing at least 3 similar nature of work of hi-Tech project of horticulture like Centre of Excellence for Fruits/Vegetables/ Flowers, Plug Type Seedling Unit on turnkey basis.

Photocopy of work order (all 5 orders not less than 290 lakh each order) issued from Govt. or Non-Govt. Organization should be attached with tender documents in support of experience which clearly indicates firms name and work executed along with price list and payment proof.

7. Bidder should have experience of establishing Aeroponics unit Setup at least 1 work order value not less than 300 Lakh on turnkey basis. (Attached documentary proof of work order)

8. The party/firm/company should be provided comprehensive work plan proposed with sealed Designs/Drawings using CAD (Computer aided Design)

9. Valid Authorization certificate from the manufacturer/ company/ distributor /dealer applicable in the current year/valid for published tender for items.

10. Joint Venture is not allowed for participate this tender.

10. Bidder must secure minimum 70 score in the score sheet provided in Annexure II to qualify in the technical bid.

11. The financial bids of only qualified firm in technical bid will be opened. The financial bid will be evaluated on the basis of total cost of the project quoted by the firm.

Dated: 01-03-2024

**Director Research Services
RVSKVV, Gwalior**

DIRECTORATE OF RESEARCH SERVICES
RAJMATA VIJAYRAJE SCINDIA KRISHI VISHWA VIDYALAYA GWALIOR 474002,
M.P.

SUPPLEMENT / CHECK-LIST TO BE PROVIDED WITH TECHNICAL BID

ITEM No. _____ NAME _____

| S.No. | Information required | Proposed |
|--------------|---|-----------------|
| 1. | Make of main item | |
| 2. | Model of main item | |
| 3. | Name of manufacturer of Main Item | |
| 4. | Country of origin of main item | |
| 5. | Name, Make and model of sub item I (if any) | |
| 6. | Name, Make and model of sub-item II (if any) | |
| 7. | Name, Make and model of sub-item III (if any) | |
| 8. | Delivery within (days) | |
| 9. | Rate of Excise duty (%) with surcharge, if applicable (item-wise if different ED is applicable) | |
| 10. | Rate of GST (%) livable. If no, state basis and terms of the exemption. | |
| 11. | Is Service Tax extra? If yes, rate of Service Tax livable (%) | |
| 12. | Is Custom Duty Exemption (CDE) required? If yes, Rate of Customs Duty (%) payable. | |
| 13. | Any other Taxes / Duties / Octroi / Entry taxes <i>etc.</i> in % | |
| 14. | Order to be placed on | |
| 15. | Guarantee/Warrantee (3 years) | |
| 16. | Validity (at least 180 days) | |
| 17. | FOR: RVSKVV, Gwalior? | |
| 18. | List of current users (Attach, if any) | |
| 19. | Certification of satisfactory working of the equipment (Attach, if any) | |
| 20. | Compliance of equipment with current directives of ISI / CE / EEC / US / EU or equivalent standards | |
| 21. | Whether manufacturer / authorized distributor/sole agent? (Attach original certificate) | |

| | | |
|-----|--|--|
| 22. | Technical literature (Attach, if any) | |
| 23. | Earnest money (EMD) deposited on line and proof has been enclosed | |
| 24. | Situations of Authorized service centers/ service personals <i>etc.</i> (Provide complete address) | |
| 25. | Relevant documents such as ITCC, ST registration shop Act. establishment certificate, factory registration <i>etc.</i> (enlist and attach) | |
| 26. | TIN and PAN allotted (Attach a copy) | |
| 27. | GST number | |
| 28. | Any other relevant information | |

DECLARATION

The terms and conditions as mentioned in the tender are acceptable to us.

Authorized Signatory

(Seal of the Firm)

Annexure II

SCORE SHEET FOR TECHNICAL EVALUATION OF BIDDER

Important Note: Proof is to be uploaded to qualify for the marks

| S. N. | Criteria | Max. Marks | Marks Obtained | Remarks |
|--------------|---|-------------------|-----------------------|----------------|
| 1 | Firm should have minimum 10 years' experience in plug type nursery/COE setup and have running experience of minimum two similar project is also required in any govt. dept./semi govt. Autonomous institution. (Attached documentary proof of work order and completion certificate) (10*1.5marks). | 15 | | |
| 2 | Firms applying for the proposed work should have experience of establishing at least 3 similar nature of work of hi-Tech project of horticulture like Centre of Excellence for Fruits/Vegetables/ Flowers, Plug Type Seedling Unit on turnkey basis (5*3, marks for Each). | 15 | | |
| 3 | Number of years having annual turnover not less than rupees 25 crores in the area of greenhouse business/hi-tech agriculture/TC Lab/Pack House. Profit and loss account and balance Sheet certified by the Chartered Accountant indicating the Turnover per annum for the said period should be enclosed. Only that balance sheet and profit and loss account statement that are used for filing IT returns should be Uploaded (6 marks/year). | 18 | | |
| 4 | ISO Certificates (6 Marks) – ISO 9001:2008, ISO 45001:2018, ISO 14001:2015. Attach certificates (2 marks per certificate) | 6 | | |
| 5 | Work Order of 1 Nos of “Aeroponics unit Setup” (as stated in eligibility condition 9) having order value of Rs. 3.5 crores (or more) (To be appended with purchase order (1 x 10, marks for Each). | 10 | | |
| 6 | Having own fabrication facility (Proof, contact details of office, factory address to be given). Certificate under shops and establishment Act/ certificate of incorporation of the firm as limited company need to be uploaded. (5 marks). | 5 | | |
| 7 | Detailed technical CAD drawings of the Project & PERT for | 5 | | |

| | | | | |
|----|--|------------|--|--|
| | proposed project. | | | |
| 8 | Human Resource: Full time employed technical manpower 1. Engineers (Minimum B.Tech) 2. Scientists (Minimum Ph.D.) (Two mark per position) (Proof of employment (appointment letter, & proof of qualification (degree certificate) to be given for each position) (8 marks). | 8 | | |
| 9. | PPT presentation regarding Aeroponics Facility | 18 | | |
| | Total Marks | 100 | | |

*** Bidder must secure minimum 70 marks to qualify in the technical bid Evaluation**

***Financial score (Sf)**

Financial bids will have a 30% weightage factor in the final evaluation of the total bid score. The points will be allotted on the basis of the following:

$Sf = 100 \times (Fm/F)$, in which SF is the financial score, Fm is the lowest price and F is the price of respective bidder.

Total Score (St)

The weightage given to the Technical and Financial proposals are:

Technical = 0.70 and Financial = 0.30

The bids shall be evaluated on the basis of Total score obtained by the company by adding the weighted technical score and financial score.

Combined total score (S) = (St X 0.7) + (SfX0.3)

The tender shall be awarded to the bidder with highest score.

Specifications of Aeroponic unit

This unit will consist of following components

Type : Hybrid type

Shape : Dome type

Main Chamber

Overall 85 x 45 x 15 x 12 feet [L x W x CH x SH]

Specifications Made of ISI marked G I square pipe, 47 x 47 mm, 38mm x 38mm.

Structure 32mins 32mm and 25mm x 25mm 2 mm including cutting, duly bended in required shape, complete as per requirements. There will be two trusses under each polycarbonate sheet to avoid bottom deflection of sheets, but columns will be as per number of sheets.

Covering With both side U.V. Stabilized Poly Carbonate sheet 8mm thick, double walled, light transmission minimum 80%. Fixing with aluminium strips, 50 mm anodized, strengthened, sealed internal shell. SS non-magnetic high-quality screws. All the joints of sheet properly sealed with silicon sealant to avoid leakage.

Roof screen Top will be provided with retractable 50% UV stabilized green shade net. with proper hand operated rolling machines (ISI marked GI pipe use)

Thermal screen UV stabilized aluminate (50%), foldable, inside the structure to be provide with hand operated machine and proper strings above the hangers (Made of ISI marked GI pipe use).

Side Ventilation Leaving 30 cm from top, rest 100% area of side walls (both sides, and total back) should be provided with 40 mesh stainless steel wire mesh of grade SS-304.

This net will be covered with rollable/retractable (with hand operated rolling machines) UV retarded LDPE film of thickness 200 micron (0.2mm for using the polyhouse as an enclosed system when required.

50% shade net curtain will be provided on sun side through hangers.

Air circulation fans Four blowers of size 450mm, stainless steel, for air circulation inside the poly house, operated with independent cyclic timer. Four exhaust fans of

size 450 mm at one end of dome, covered with extended 40 mesh SS net (grade SS-304).

| | |
|---------------------|---|
| Air conditioners | For Indore unit 6 AC of 2 tons |
| Hangers | U/L shaped hangers, made of 6mm thick GI wire or other suitable material. hanging from 6mm GI wires installed between both the ends of the polyhouse to be provided inside the poly house over all the grow chambers of the aeroponic system for holding plant trays at height of 1300 mm. |
| Pad side door | Door (1800x750 mm) will be installed on one side of cellulose pad. (Aluminium frame and glass thickness-6mm) |
| Entry chamber | <p>Entry chamber of 12 x 12 feet, with two doors will be constructed. Two doors of size 1000 x 2100 mm, with hydraulic door closers will be constructed.</p> <p>There will be no more than 1 mm space open between doors and door frames.</p> <p>Both the doors of entry chamber will be fitted with 6 mm glass on upper half and lower half with laminated board of outdoor quality. 50 percent green shade net to cover Entry chamber from top and all the out sides.</p> <p>Entry chamber to be provided with 600x450 mm wash basin and tap (sound proof SS-304).</p> <p>Air curtains will be provided over one door to cover full width. Entry chamber will be provided with two exhaust fans and upper 50 cm wall with 40 mesh SS net to keep it cool during summer.</p> |
| Roof top sprinklers | <p>five non-metallic sprinklers of circular sprinkling type (to cover whole width and length of polyhouse to be installed on top roof top through 18 mm diameter ISI marked GI pipe.</p> <p>Sprinklers to be operated with pump installed for fogging through a valve.</p> <p>No separate pump required. (Pump ISI marked, havells, Crompton, Kirloskar etc.</p> |

Cooling System

Evaporative with fan and celdex cooling pads as per following details

Pad size L = whole width of polyhouse left after pad side door
H x Th 1800 x 100 mm. Pad will be covered from back with 40 mesh SS 304 net at a Distance of 60 cm. Sides (20 cm offset) of pad will be provided with 30cm high wall.

Water storage Pump PVC Tank 1000 L, one additional tank of 1000 L for water storage : 1.0 HP (or Other suitable one) pump for minimum 3600 Iph at 3m head, one working & one standby (PVC Tank antimicrobial, four layer, Sintex, Apollo etc)

Fan Axial belt driven, three phase supply-2 Nos.

Sweep Size 1200 mm (48")

Speed 500 RPM (approx)

Cleaning mechanism Provision for easy cleaning of pad and pipes without dismantling. For this water supply line over the pad will be extended to both the sides (out of the polyhouse) and provided with plugs which can be opened for cleaning the pipe.

Chilling unit

Usage/ Applicator Water cooling

Type Air cooled

Phase 3 Phase

Automation grade Automatic

Capacity 2000 L

Deionized water system good quality deionized water system

Fogging System

Fogger Micro foggers hanging type

Water Discharge 28-32 LPH each nozzles

Quantity One line on each grow box bench.

Pipe 16 mm LDPE black

| | |
|---------------|---|
| Filter | Disc Online |
| Water storage | PVC Tank 500 (L PVC Tank antimicrobial, four layer, Sintex, Apollo etc) |
| Pump | 1.0 HP having suitable head kirloskar/CG/CRI/Lubi) |

Aeroponics unit

Aeroponic unit will consist of following sub units-

Growth boxes

Six units, box type, closed from all the sides, 19812x 1300 x 700 mm (L x W x H). All boxes will be of similar size. Grow boxes open from top (like trough) and will be made from RCC.

concrete, Wall width 12 cm. made of RCC, plastered from outside and lined with black tiles inside. Bottom (floor) of box will be 90 mm thick mad of RCC slab with black granite. Box will be leak proof and will be placed over RCC wall/columns in such a way that total height will be 1050 mm. Minute details will be explained at the site.

Box top will be covered, Boxes will be paint coated from outside.

Grow box top

All the Six Grow box top covering to be made from 50 mm thick. extruded polystyrene foam density 30- 32kg/cub m. compressive strength 300-310 k Pa. Sheet size for covering will be 1250 x 600mm. Grow box tap to be drilled with holes of diameter 20 mm at specified spacing Box top covers will be grooved 40 x 8 mm from sides and be placed across the length.

Solution chamber **1000 L PVC tank** -One solution chamber, with internal specifications 1000x1000x1500 mm (LxWxD) each. Tank will be made of bricks and plastered will be covered with suitable hinged cover.

Nutrient misting 25 mm ID 'for pressurized delivery of nutrient

for growth boxes Two lines of hollow cone misters (simple mister having threaded, 5-6 mm base/inlet) are to be directly fitted on PVC pipes (25 mm ID, 10 kg/sq cm rating) inside each growth chamber having fine mist (mist particle size 50- 100 micron), mister discharge- 282 /hr, at 3.0 kg/sq cm, mister spacing 500 mm. Two mono block pumps to be fitted on each solution (total four pumps) tank for misting in two grow boxes, one operating other standby.

Solenoid valves in combination with multichannel timer will be used for operating different grow boxes.

Pumps rating 4.0 kg/cm sq, discharge minimum 2400 lph at 3.5 kg pressure.

Piping

Non-metallic pipes of size 25 mm ID for pressurized delivery of nutrient solution and for collecting back (50 mm diameter) same solution for recirculation. All the pipes will be properly insulated (with high density insulator of minimum thickness 10 mm). At the end of each pipe a valve opening will be provided for flushing.

Valves and pressure gauge

Non-metallic ball valves at all necessary points to control flow of solution to different chambers. Non return valves at suitable places and total 12 pressure gauges at all the important points (before and after filter and at the end of the delivery pipes) to monitor solution pressure.

Note: In aeroponic unit no metal parts will be used except pump.

Civil work

Foundation: Grouting of vertical poles in CC 1:2:4 (1Cement: 2 Sand: 4 Stone Aggregate 20mm nominal size) (30 x 30 x 70 Cm) below ground level.

Curtain Wall Made of 1" Class bricks in 1:6 mortar, all sides of the screen house 45 cm above G1 and 30 cm below GL with 10 cm thick PCC base duly plastered. Side walls to be provided with wall tiles to the height of 45 cm inside the homes

Flooring PCC base 10 cm thick than 1:2:4 ratio 5 cm thick CC. drainage as per direction of officer in charge.

Floor area under the grow boxes will only be lined with polythene sheet (100 micron) Plinth Protection: 100cm wide 35cm ck 1:3:6 CC over bricks bat base with drain all side of green house.

Water supply: One lab wash basins (600x450 mm) with non-splashing tap to be provided in pump room, water access with ball valves (2 points) in main grow box area, required PVC piping and GI

pipe line ISI marked of suitable dia (18mm) With necessary Gt fittings (T. L bow, bend, sockets, valves etc.) from main water source (approx 30 in length) to PVC tanks

Electrical controls:

(A) Two sequential timers for pump (six digits, six channels) for misting in aeroponic system, on time and off time may vary from 1-50 sec and 1-60 min. respectively. In total two timers.

(B) Separate sequential timer for operating air circulation fans inside the polyhouse

(C) Sensor based operation of fan pad system.

(D) Display of voltage, amperage (current) and frequency on panel.

(E) High polyhouse temperature alarm

Note Electrical control system should be such that along with automatic operation system there should be an option available for manual operation of aeroponic pumps and fan pad system in break down situation.

Electrical fitting

Would be of ISI mark and copper wire complete, total four fluorescent lights inside the polyhouse and one outside the facility.

Control panel will continuously display temp. of solution inside the tank, inside temperature of one grow box, pH and EC of nutrient solution besides polyhouse parameters.

Properly labelled Control panel will house all the timers, display units. MCBs, three ways switches etc. Special care will be taken for aesthetics and functionality of control panel.

Suitable switch will be installed between bus bar and control panel by the contractor.

Accessories to be supplied

1. pH sensor and chemical dosing pump with all the accessories and fittings- one

Reading pH, dosing acid nit hooter warning option for operating stirrer

Range 0.00 to 14.00 pH

Resolution 0.01 pH

Accuracy ± 0.01 pH

Flow Rate 5-6 lph

Dosage proportional, coiled, user selectable

Recorder Output 4-20 mA (isolated)

2. Portable pH/EC/TDS/Temperature meter with calibration check - Two

Having 8 pin Din Connector for probe, probe lead at least 1 m long display, pH range selection, mS/Sec range selection,

LC TDS (ppm) range selection and temp selection

pH resolution -0.1, EC 01mS/cm, TDS-1 ppm

Conversion factors 0.56 and 0.78 EC TDS temperature auto compensation

With standard calibration (for two pH values and two TDS) and probe cleaning and storage solutions 500 ml each

Pare components

1. Exhaust fan (1200 mm) motor Misters for aeroponic boxes 2 no
3. Overhead misters/foggers 300 no
4. Styrofoam sheet 30sqm
5. Solenoid valve 10 no
6. Filter 4 no
7. PVC pipe 10 kg rating 40 m
8. Ball Valve, elbow. T. nipple, 10 each
9. Sofi Flex/white polysheet 200micron 40m long roll of 1.5 m width
10. Air blower gun black & decker/Cumi/rally wolf 1 no
11. Shoe rack 100x100cm (powder coated steel) 2 no
12. Storage cabinet for lab gowns/coats 180x90x45 cm (Powder coated steel) 2 no

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