

**CENTRE FOR RURAL DEVELOPMENT AND TECHNOLOGY
INDIAN INSTITUTE OF TECHNOLOGY-DELHI
HAUZ KHAS, NEW DELHI-110 016**

Dated: 09.10.12

Notice Inviting Quotations

Sealed quotations in separate envelopes of technical and commercial bid kept in one sealed outer envelope, are invited for **“Erection & installation of algae multi-cultivation unit & accessories (open shaker) for Algae multi-cultivation unit”** as per specifications given below. Your sealed quotation should reach **within 15 days** from the date of advertisement to, **Dr. Anushree Malik, Centre for Rural Development and Technology, Indian Institute of Technology, Delhi (IIT Delhi), Hauz Khas, New Delhi-110016**. Your quotation must be super-scribed **“Quotation for erection & installation of algae multi-cultivation unit”** and **“Quotation for accessories (shaker) for Algae multi-cultivation unit”**.

Annexure I

1. TECHNICAL SPECIFICATION FOR ALGAE MULTI-CULTIVATION UNIT

- a. **Total Area of Facility:** 30.00 sq.m.
- b. **Size of Facility:** 6m x 5m x 10'x 8' (L x W x CH: SH).
- c. **Buffer Room** 6'x5' (L x W)
- d. **Total No. of Chamber:** 1Nos.
- e. **Shape:** Dome shape
- f. **Structure:** The structure is to be stabilized by ISI standard GI pipe with 2-3 mm thickness and GI coat. The structure is to be designed for maximum wind load conditions (120 km/hr).
- g. **Glazing:** Sides & roof are to be covered with 6-8 mm thick Polycarbonate sheet and with anodized aluminum stripping, gasket and Silicon polycarbonate (translucent) treatment for proper holding and thermal safety.
The sheets are to be fixed on roof and over all sides of the algae multi-cultivation unit. Sides & roof covering with anodized aluminium stripping, gasket and Silicon (translucent) treatment for proper holding, Insulation and thermal safety.

Specification of Polycarbonate sheet

- ∅ Thickness: - 6-8mm
- ∅ UV: - Both side.
- ∅ Approx. weight g/m² 1300 gms
- ∅ Fixing: - Aluminium Strip
- ∅ Sealing: gasket
- ∅ Size: - 2" inch
- ∅ Perforated Anti dust Aluminium tape.
- ∅ Length: - 12 feet

Ø Screw: - SS non Magnetic

Ø Impact Performance: -40°C to +120°C

Ø Light Transparency 85 % - 95 %

- h. Door:** Size: 6'6" x5' of anodized aluminum section with polycarbonate sheet 6 - 8 mm thick as cladding material with lock and pinion system is to be provided. Qty-2 Nos.
- i.** False ceiling with polycarbonate sheet at the gutter height and 18" exhaust fan at the front top side of the algae multi-cultivation unit with mesh at the back side is to be provided.
- j. Heating unit:** it should have auto thermal cut off device, With thermostat protection, 2.5 KW heater, heavy duty fan Motor, Powder coated finish, Input 200-240 VAC, 50 HZ, single phase. Ambient 5°C to 50°C, RH upto 90%. **2**

Units

- k. Fan & Pad Cooling System:**

Technical Specifications:

- **Requirement of temperature range (25-35 Degree Celsius) throughout all seasons; (8-10 Degree Celsius below ambient temperature at peak summer conditions assuming RH near 50%)**
- Eco friendly.
- High saturation efficiency
- Self cleaning feature
- No setting or Shrinkage of product.
- Low pressure drop characteristics.

COOLING PAD ACCESSORIES:-

Tray Material : GI sheet for side and top.

Over flow : 32 mm HDPE pipe

Drain : 40 mm HDPE pipe

CONSTRUCTION MATERIAL:-

GI Sheets : Tray Side, Top etc

Cooling Media : designed to give efficiency from 60 to 95 %.

Filtration : On line micro fiber filter.

Miscellaneous : Fasteners, Galvanized, Rivet- Aluminium.

Water Tank : PVC Tank 500 litre

Pump : 1 Hp Monoblock

Axial Flow fan : 30" - 2 Nos.

Evaporative Cooling System (ECS): Fan & Pad system with Cellulose Pads (Pad Area- 80% area of the back wall) to acquire proper CFM of air movement per sq.ft of area should be provided. Even water delivery through distribution pipe should be ensured. Water bleeding mechanism should be built in to lessen water pollution. Slow water contamination and efficient water flow, online water filter, capacity calculated on required water flow rate should also be provided. Polymer water storage tank, 1 HP motor (ISI make), GI/ Al Tray, Filter, water Distribution and return system and other accessories should be provided.

List of Material: -1. 30" Slow axial Flow fan – 2 nos.

2. Cooling Pad Size: 16' x 4' x 4" – 1 no.

3. Rust Free Aluminium pad fittings – 1no. Complete

4. 1 HP Monoblock - 1 no.

5. 500 Liters double layer water tank – 1no.

6. GI Tray, water Distribution system -1no

7. 32 mm /25 mm PVC pipe with fittings.

8. Line filter - 1no

9. Control valve assembly:-1 no.

- l. Standard Illumination:** Through Normal Tube light with good quality powder coated fixture should be provided with electronic ballast with additional wiring, holders and accessories etc, total **6nos.**
- m. Digital Lux meter:** Hand held with integral light sensor with 1 m lead, ranges from 0 to 200,000 Lux intensity
- n. Microclimatic Temperature Controller:** Real time microprocessor based PID Controller, 4 digit LED display for displaying measured values / settings, soft touch operation, Platinum sensor probe Pt- 100, Set point lock within the setting panel to protect setting changes, Sensor failure indication, Display resolution 0.1°.Accuracy $\pm 0.1^{\circ}\text{C}$ and automatic hysteresis control. Wide selectable temperature ranges from 0° to 100°C , 4.4 KVA load can be directly connected to the powered output, Input- 200-240 VAC, 50 Hz. Single phase. Ambient 5° - 50°C , RH upto 90%.
- o. Electrical Device:** High quality ISI approved fittings with copper multi strand twisted Fire Resistant Grade wires with proper M.C.B. with 4 switch socket electrical points of 5/15 Amps combined total – 5 Nos. good quality modular switches. Electrical panel with ON/OFF cut out should also be provided in proper box.
- p. Civil Works:** CC foundation (1:3:6) 30cm below and 45cm above ground level to checks lateral moments of water, Base PCC 2"thick , than 13" wide first base line , than 9"wide second base line, Damp proof cement (DPC) 2" thick, Frame base block height 30cmx 30cm x 70cm CC block(1:2:4) at equal distance should be provided. The External & internal surface of the wall should be plastered with 15mm thick cement mortar of Mix 1:4 (1 Cement :4 fine sand) All plastered surface should be finished with two or more coat of samosam paint of approved brand.

- q. Floor:** The chambers including buffer room should be provided with Cemented floor laid on 20mm thick bed of cement mortar 1:4 and skirting for height of 150mm in 12mm thick cement mortar 1:3. The bed concrete for flooring to be provided with CC 1:5:10 of 80mm thick layer.
- r. Plinth Protection:** 45cm wide with cement concrete at 1:2:4 ratio, 35 mm thickness, over a base of 75mm, thickness, made out in cement concrete with 40mm thickness brick ballast in ratio of 1:5:10, the work should include curing of the top surface and prefer compaction of the under surface. The structure should be rat and termite proof.
- s. Plumbing Water connection** with 3 elbow operated tap in the chamber, distributed through corrosion free pre-coated GI pipe of appropriate diameter (½") should be provided. Two separate lines should be provided with a PVC tank of 500 litre capacity
- t. Hallway 24' x 6'x 8' (L x W x H):** It should be provided with GI pipe for the structure and polycarbonate sheet for the glazing. The above structure is to be installed on brick wall of 30cm below and 45cm above ground level. The External & internal surface of the wall should be plastered with 15mm thick cement mortar of Mix 1:4 (1 Cement : 4 fine sand) All plastered surface should be finished with two or more coat of samosam paint of approved brand over a priming coat of primer of approved quality. The 4" cemented floor should be provided for inside the hallway.
- u. Optional item: Raceway pond 6'X3'X18"(LXWXH) made up of 4" concrete wall with a partition at centre and a motor.** (Firm should submit the details of motorised mechanism for raceway pond)

2. TECHNICAL SPECIFICATION FOR ACCESSORIES (SHAKER) FOR ALGAE MULTI-CULTIVATION UNIT

Electronic Pilot Laboratory Shaker with Double Deck

- Shaking frequency should be 30 –200 RPM with max of +/- 2% deviation of the set value.
- The shaking amplitude of 50mm should be without deviation ensuring maximum OTR (Oxygen Transfer rate) of cultures
- The system should be driven by brush less motor
- Speed control of the shaker should possess current vector control mode using inverter system (or) V/F control mode with membrane key pad & digital display.
- Should comprise multifunctional input/output features and software functionalities configurable.
- Shaker should incorporate five Pin system and mounted with a counter balanced flywheel to ensure uniformity in motion with eccentric pin coupled by long life rubber.
- The system to have safety cut out for over current etc.
- The system should be Upgradeable for illumination for the both deck of the systems.
- The tray size should be of (750-800) x (750-800) mm with two tiers, to accommodate various sizes of clamps with the universal tray (without changing the tray.)
- External dimension (at max) :105 x 105 x 105 cm
- The unit should be absolutely noise – free and vibration less even at maximum RPM.
- The unit should be CE certified to comply for international safety measures.(certificate to be provided)
- The company should be ISO 9001: 2008 certified
- Universal tray to hold at least 64 Nos of 100 ml flasks (or) at least 64 Nos of 250 ml flasks (or) at least 36 Nos of 500 ml flasks (or) at least 25 Nos of 1000 ml flasks (or) at least 16 Nos of 2000 ml flasks.**(Top Tier)**
- Universal tray to hold at least 60 Nos of 100 ml flasks (or) at least 60 Nos of 250 ml flasks (or) at least 35 Nos of 500 ml flasks (or) at least 20 Nos of 1000 ml flasks (or) at least 12 Nos of 2000 ml flasks.**(Bottom Tier)**

Terms & Conditions:

1. The quotations must have validity of at least four months.
2. Sealed quotations should be in separate envelopes of technical and commercial bid kept in one sealed outer envelope.
3. Quotation must include insurance and air-freight charges, delivery period of the items addresses to The Indian Institute of Technology, Delhi, India (FOB, New Delhi).
4. The products will be used for educational purposes. Any applicable academic institution discounts should be offered and stated.
5. Detailed Brochures **MUST** accompany the offer.
6. If the bidder is an authorized dealer then the authorized Indian dealership certificate from the principles should be enclosed.
7. Two year comprehensive warranty.
8. Payment will be as per IIT Delhi's norms and conditions.
9. In case the items are proprietary products of the company, a proprietary item certificate stating the same must be provided.
10. Institute reserves the right to accept or reject any or all the quotations without assigning reasons thereof.
11. Details of User List with phone number and email ID **MUST** be provided.
12. For multi-cultivation unit, firm should have constructed at least one unit of Algae Cultivation Facility.
13. Civil & structural drawing of item 1 should be attached with tender.
14. **The quotation for erection & installation of algae multi-cultivation unit (Item 1) should contain pricing as per each item described in the specifications (items a-u).**
15. Technical demonstration of open shaker is necessary before finalization.
16. A single vendor may quote for one item or both.
17. **IIT Delhi reserves the right to place order for both item 1 & item 2 to different vendors based on lower quote for individual items.**