

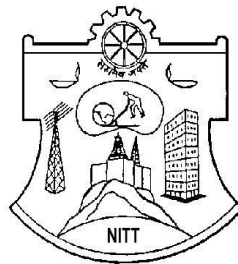
NATIONAL INSTITUTE OF TECHNOLOGY

TIRUCHIRAPPALLI – 15

Department of CEESAT

Web : www.nitt.edu

Phone : 0431 - 2503132



Tender Document

Last date re-extended

Tender Notification No.: **NITT/R&C/CEESAT/MP/DST/2011-12/33**

Dated : **29.2.2012**

- Name of the component : Photobioreactor Using Solar/Electrical Input
- Quantity required : 1 No.
- EMD Amount : **Rs.32,000/-**
- Delivery : within 6-8 weeks from the date purchase order
- Last Date of submission of Tender : **10.4.2012 upto 3.00 p.m.**
- Address for submission of Tender : The Director
National Institute of Technology
Tiruchirappalli – 620 015.
- With kind attention** : **Dr.M.Premalatha**
Associate Professor/CEESAT
National Institute of Technology
Tiruchirappalli – 620 015
E-mail : [latha @nitt.edu](mailto:latha@nitt.edu)
Phone No: 0431-2503132
- Date of opening of bid : **10.4.2012 at 3.30 p.m**



**NATIONAL INSTITUTE OF TECHNOLOGY
TIRUCHIRAPPALLI – 15**

DEPARTMENT OF CEESAT

Tender Notification No.: **NITT/R&C/CEESAT/MP/DST/2011-12/33**

Dated : **29.2.2012**

NOTICE INVITING TENDER

The National Institute of Technology, Tiruchirappalli (NITT) is an autonomous body under MHRD, GOI, imparting Technical Education and engaged in Research Activities. It is proposed to procure the following component for the departmental academic/research activities.

Sealed Quotations under **two cover system** are invited for the following component subject to the following terms and conditions, from the reputed manufacturers or their authorized dealers so as to reach this office on or before scheduled date and time. The technical cover will be opened on 10.4.12 at 3.30 p.m.& price cover will be opened on the next day (11.4.12) at 11.00 a.m in the presence of technically qualified bidders only or their authorized agents who may choose to be present.

Name of the component : Photobioreactor Using Solar/Electrical Input
Quantity required : 1 No.
EMD : Rs.32, 000/-
Time for completion of supply after placing purchase order : 6-8 weeks
Last Date of submission of Tender : **10.4.2012** upto 3.00 p.m.
Tender to be submitted at the following address : The Director
National Institute of Technology
Tiruchirappalli – 620 015.

With kind attention : **Dr.M.Premalatha**
Associate Professor/CEESAT
National Institute of Technology
Tiruchirappalli – 620 015
E-mail : latha @nitt.edu
Phone No: 0431-2503132

Place, Date and time of opening of bid :

Date: **10.4.2012** Time: **3.30 p.m.** Venue: **Dean (R&C) office/Admin Block**

Note : The Institute shall not be responsible for any postal delay about non-receipt / non delivery of the bids or due to wrong addressee.

SECTION : 1 INSTRUCTION TO BIDDER

1. The bidder should give details of their technical soundness and provide list of customers of previous supply of similar items to Universities, Institutes or Government Departments/Undertakings/public sectors with contact details. The details of the agency/profile should be furnished along with the copy of all related documents.

1.1 Bids are to be submitted under two cover system.

Cover 1:

Cover 1 should contain the following:

- a. **EMD - Earnest Money Deposit (EMD) is to be remitted by way of Demand Draft drawn on any Nationalised bank in India by Demand Draft drawn on any scheduled bank in favour of "The Director, NIT, Trichy" payable at Trichy should be submitted. EMD shall bear no interest. Any bid not accompanying with EMD is liable to be treated as non-responsive and rejected.**
 - b. **Technical pamphlets**
 - c. **Detailed technical specification**
 - d. **The agency should furnish copy of license certificate for manufacture/supply of the item.**
 - e. **The agency should furnish Income Tax PAN number**
 - f. **Warranty period offered for the tendered item to be specified. If the warranty period is not conforming with the schedule of requirements given in section 3 of the document, the bid is liable to be treated as non-responsive and rejected.**
 - g. **Duly filled up technical questionnaire, if any**
 - h. **Duly filled up deviation schedules to technical specification**
 - i. **Copy of supply orders completed during the last three years ending 31-12-2011.**
 - j. **If the prices are revealed in the cover 1, the offer will be summarily rejected**
- 1.2 **The cover 1 shall be superscribed as 'Technical cover' duly indicating the Tender reference No. and the due date of opening.**

1.3 Cover 2:

Cover 2 should contain the following

Cover 2 shall contain Price only and shall be superscribed as 'Price Cover' duly indicating the Tender Reference No. and the due date of opening.

Each Cover shall be sent in a double sealed cover. The inner covers (Cover 1 and Cover 2) should be sealed individually with the sellers's distinctive seal and superscribed with the tender reference no. and due date of opening. Both the inner covers shall be placed in a common outer cover which shall also be sealed with seller's distinctive seal and superscribed with the tender reference no. and due date of opening.

Mention "Kind Attention:....., and submit at the address given in the Notice Inviting Tender.

Cover 1 - will be opened on the scheduled date and time mentioned in the tender enquiry.

Cover 2 - technically suitable offers alone will be opened on a date which will be intimated to the qualified bidders.

2. The agencies should submit their rate as per the format given in Section 4 of the Notice Inviting

Tender in this cover. Rate should be quoted in Indian Rupee. The rate should be quoted both in words and figures. All the pages of the bid should be signed affixing the seal. All corrections and overwriting should be initialed.

3. The tender will be acceptable only from the manufacturers or its authorized supplier.
4. The bid shall be in the format of price schedule given in Section 4. The contract form as per format given in section 5 shall be submitted. Incomplete or conditional tender will be rejected.
5. Details of quantity and the specifications are mentioned in Section 3 appended to this Notice Inviting Tender.
6. The item to be used is strictly according to the specification and subject to test by the Institute/concerned authorities. It must be delivered and installed in good working condition.
7. The Institute reserves the right to cancel or reduce the quantity included in the schedule of requirements at any time after acceptance of the tender with a notice. The Contractor/Supplier shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the work/supply in full but he did not derive in consequence of the foreclosure of the whole or part of the works.
8. Performance Security of 5% of the contract value in terms of Bank guarantee by scheduled banks shall be given by the successful bidder for the total period of warranty.
9. **Release of EMD:** The EMD shall be released after receipt of performance security from successful bidder.
10. **Validity of bids:** The rate quote should be valid for a minimum of 90 days. No claim for escalation of rate will be considered after opening the Tender.
11. **Imports:** In case, goods are to be imported, the Indian agent should furnish authorization certificate by the principles abroad for submission of the bid in response to this Notice Inviting Tender.
12. **Clarification of Tender Document:** A prospective bidder requiring any clarification of the Tender document may communicate to the contact person given in this notice inviting tender.
13. **Amendment of tender document:** At any time prior to the last date of receipt of bids, Institute may for any reason, whether at its own initiative or in response to a clarification requested by prospective bidder, modify the Tender document by an amendment.
14. ***The Institute may at its own discretion extend the last date for the receipt of bids.***
15. The bids shall be written in English language and any information printed in other language shall be accompanied by an English translation, in which case for the purpose of interpretation of the bid, the English translation shall govern.
16. The Institute reserves the right of accepting any bid other than the lowest or even rejecting all the bids without assigning any reasons therefor. The decision of the Institute Purchase Committee is final in all matters of tender and purchase.
17. The bidder should give the following declaration while submitting the Tender.

DECLARATION

I/we have not tampered/modified the tender forms in any manner. In case, if the same is found to be tampered/modified, I/we understand that my/our tender will be summarily rejected and full Earnest Money Deposit (EMD) will be forfeited and I/we am/are liable to be banned from doing business with NIT, Trichy and /or prosecuted.

Signature of the Bidder :

Name and Designation :

Business Address :
.....
.....

Place :

Date :

Seal of the Bidder's Firm

18. Any other details required may be obtained from the contact person given in the notice inviting tender during the office hours.

SECTION : 2 CONDITIONS OF CONTRACT

1. The rates should be quoted in Indian Rupee F.O.R. NIT, Trichy for supply within India.
2. In case of import both CIF and / or FOB rate should be quoted. All components of expenditure to arrive at Chennai need to be explicitly specified.
3. The bidder shall indicate the excise duty exemption for the goods if applicable
4. The Institute is eligible for customs duty and excise duty exemption.
5. The rate quoted should be on unit basis. Taxes and other charges should be quoted separately, considering exemptions if any.
6. Rate quoted should be inclusive of Testing, commissioning and installation of equipment and training.
7. **Payment** : No advance payment will be made. Payment will be made only after the supply of the item in good and satisfactory condition and receipt of performance security by supplier. In case of imports, the payment will be made through LC after installation and performance security need to be submitted at the time of LC commitment.
8. Guarantee and Warrantee period should be specified for the complete period conforming to the section 3 of this tender document.
9. Period required for the supply and installation of item should be specified conforming to the section 3 of this tender document.
10. In case of dispute, the matter will be subject to Tiruchirappalli, Tamil Nadu Jurisdiction only.
11. **Liquidity Damages**: If the bidder/supplier, after accepting the Purchase order for the supply of Goods/Services, fails to deliver any or all of the Goods or to perform Services within the period(s) specified in the order. National Institute of Technology, Tiruchirappalli shall, without prejudice to its other remedies under the Rules of Purchase, proceed to cancel the order or agree to accept a delayed delivery on the condition of payment of liquidated damages by the bidder/supplier a sum equivalent to 0.50% of the total cost as indicated in the Purchase order (which will be deemed as agreed price) for each week or part thereof of delay until actual delivery or performance is completed and such penal charges shall be limited to a maximum of 5% of the agreed price. Once the maximum is reached National Institute of Technology, Tiruchirappalli may proceed on its own to consider the termination/cancellation of the order and may inform the bidder about the cancellation of the said purchase order.

SECTION : 3 SCHEDULE OF REQUIREMENTS, SPECIFICATIONS AND ALLIED DETAILS

Name of the Component to be procured :

Specifications :

PHOTOBIOREACTOR using solar/electrical input

Specifications:

List of Contents

- 1. Holding system**
- 2. Instrumentation**
- 3. Photoreactor system – Model I**
- 4. Photoreactor system – Model II**
- 5. Sun Solar tracking with optical fibers – Model I & Model II**
- 6. Other Conditions**

1. Holding system - Laboratory Pilot scale Photo bioreactor for microalgae

Total capacity 50Lts. Jacketed Stainless steel vessel. Jacket system to maintain the process temperature and the loop consists of inbuilt electrical heater, circulation pump water pressure regulator and control valve. Vessel surface finish Inside 0.8 Micron meter 240 grit Mirror finish. Outside 180 grit mat finish. Top Lid SS 316L.

Top side ports:

- 19mm ports -6Nos
- 1" x Triclover port - 2nos
- 32mm ports -1no

Vessel bottom side ports:

- 25mm -5no.

Three set of septum kit with hypodermic needle with necessary silicon tubes.

Air Flow - Line consists of Pressure control valve, Pressure indicator, Non return valve and linear flow range pressure transmitter starts with 100 ml /min

CO₂ Flow: CO₂ line consists of pressure control valve, pressure indicator, non return valve and linear flow range pressure transmitter start with 50 ml/min. Solenoid valve to control the flow as per the set point

Provision should be available to Upgrade the system for admitting mixture of NO_x, SO_x in ppm.

2. Instrumentation

Instrumentation for Measurement and control of the following parameters:

A. Temperature measurement and control:

Direct Digital control (DDC), Temperature can be measured and controlled through the inbuilt heater system circulating water through jacket. Temperature Measurement range 25 to 80° C. Control range 25°C to 60 °C. Measuring temperature input from Pt 100 and converted as 4 to 20mA as controller input from the transmitter.

B. Fluid flow control:

Product flow to the **Photoreactor system – Model I** and **Model II** from the holding vessel can be circulated with the flow rate maximum 1.5 to 2 LPM within the velocity 0.15m/sec by the adjustable speed fluid flow pump.

C. pH Measurement and Controller:

Direct Digital Control (DDC). pH can be measured and controlled through CO₂/nutrient/acid-base addition. Controller signal with two relay output to activate the Dosing pump to maintain the pH valve for the Set point. Two point calibration system in the transmitter with online Slope valve.

pH measuring range 0 to 14.

Accuracy 0.05 pH.

Make- Probe and transmitter – Mettler.

2 no - fixed speed peristaltic pump with necessary sterile needle and silicon tubes.

D. DO Measurement and Controller:

Direct Digital control (DDC). Set point and measurement control. The relay output activate the tacked valve to maintain the set point. Two point calibration system through transmitter.

DO Measuring Range, 0 to 100% saturated.

Accuracy = $\pm (1\% + 5\text{ppm}) = \pm (1\% + 0.1 \text{ vo } 1\%)$

Response time at 25°C time 98%=60 s t 90 % 10 s.

Make- Probe and transmitter –Mettler

E. pCO₂ measurement and controller:

Direct digital control (DDC). set point and measurement control. The relay output activate the valve to maintain the setpoint. The partial pressure of CO₂ (pCO₂) of a solution can be measured by means of gas sensitive electrodes.

Measuring range 0 to 1000mabr CO₂ (1 mbar =1hPa)

Lower detection limit 10mbar.

Accuracy $\pm 10\%$ (pCo₂ 10-900mbar),

Response time 90% of final value = 10 s at 25 °C.

Make- Probe and transmitter –Mettler

F. Light Measurement and control:

The different Light intensities ranging from 250-3000 $\mu\text{moles}/\text{m}^2/\text{s}$ (400 – 700 nm wavelength range) to be measured. System consists of online probe with indicator.

Resolution - 10 $\mu\text{moles}/\text{m}^2/\text{s}$.

Quote the light intensities of various lamps in the desired wavelength range (400-700 nm) along with the dimensions of the corresponding lamps.

Exclusive photo diode & color correction filter and correct spectrum to be used.

Large LCD display with bar graph. Water resistance front panel Zero adjusting button. Data hold and Peak hold. Memory functions with Recall. Auto power off / manual power off.

Light intensity to be measured at atleast 10 points inside the Photoreactor system and indicated.

G. PLC based control system with Control Panel:

PLC based direct control system with operator interface HMI and customized mimics for measurement and control system. Complete system can be mounted in the single skid, space for peristaltic pump and require feed bottle.

3. Photoreactor system - Model -I

Annular Photoreactor system consisting of 1 cm, 2 cm, 5 cm and 9 cm path lengths with lights fixed as mentioned in Item 2. (F) inside the reactor system.

Intensity of light could be varied from 250-3000 $\mu\text{moles}/\text{m}^2/\text{s}$ (400 – 700 nm wavelength range).

The holding capacity of the reactor may vary from 15-30 lits. **The exact geometry of the Photoreactor system could be fixed based on the dimensions of the lamps availability (as mentioned in 2. F). Please make the clarification about the geometry before finalizing the quotation.**

Reactor volume should be provided with packed bed option.

Fluid flow control, the Inlet pressure and outlet pressure can be monitored and can be adjusted by the pump speed.

4. Photoreactor system - Model -II

Thin film photo reactor system consisting of large illuminated surface area with reactor volume of 10 – 15 lits.

The lighting system to be provided is similar as that of **model I**.

5. Sun Solar tracking with optical fibers

The model I and Model II should be provided with the option of introducing sunlight through optical fibers. The light intensity should be measured inside the reactor. The solar light system should be capable of admitting a constant light intensity into the reactor by having a required tracking mechanism attached with optical fibers.

The required light intensity could be varied from 250-3000 $\mu\text{moles}/\text{m}^2/\text{s}$.

6. Other conditions

Quote Price: FOR NIT Trichy

Quote with Warranty period

Mention the list of customers to whom any such custom made design units had been supplied and are used.

Provide the customer satisfaction certificate for the same.

Preference will be given for those companies who have good experience in making successful custom made design.

Quote separately for each measurement systems, control system, Model I, Model II and sun solar tracking with optical fibers.

Offer has to be submitted as technical bid and price bid separately. Technical bid will be opened first and analyzed. The selected bidders who meet the technical specification will be called for discussion cum presentation in presence of a technical committee. Companies will be selected based on their presentation, experience and knowledge in making custom made design of photo bio reactors with control system, and their customer list for the same. Only selected companies will take part in the price bid opening.

Name of the Component to be procured : Photobioreactor Using Solar/Electrical Input

Specifications : As given in section 3

Quantity : 1 No.

Any other details/requirement : As given in section 3

Warranty period required : 3 Years

Delivery schedule expected after
release of purchase order (in weeks) : 6-8 Weeks

EMD (in Rupees) : Rs. 32,000/-

Performance Security to be given by
Successful bidder after release of
purchase order (in Rupees) : 5% of the equipment cost

SECTION : 4 PRICE SCHEDULE

[To be used by the bidder for submission of the bid]

- 1. Component Name :
- 2. Specifications (confirming to Section 3 of Tender document-enclose additional sheets if necessary) :
- 3. Currency and Unit Price :
- 4. Quantity :
- 5. Item cost (Sl.No.3 & Sl.No.4) (in Indian Rupee) :
- 6. Taxes and other charges :
 - (i) Specify the type of taxes and duties in percentages and also in figures
 - (ii) Specify other charges in figures
- 7. Warranty period (confirming to the Section 3 of Tender document. This should be mentioned in Technical bid also in order to get qualified for Financial bid) :
- 8. Delivery Schedule (confirming to the Section 3 of Tender document) :
- 9. Name and address of the firm for placing purchase order :
- 10. Name and address of Indian authorized agent (in case of imports only) :

Signature of the Bidder :

Name and Designation :

Business Address :
.....
.....

Place :

Date :

Seal of the Bidder's Firm

SECTION : 5 CONTRACT FORM

[To be provided by the bidder in the business letter head]

1. (Name of the Supplier's Firm) hereby abide to deliver theby the delivery schedule mentioned in the Section 3 tender document for supply of the items if the purchase order is awarded.
2. The item will be supplied conforming to the specifications stated in the tender document without any defect and deviations.
3. Warranty will be given for the period mentioned in the tender document and service will be rendered to the satisfaction of NIT, Trichy during this period.

Signature of the Bidder :

Name and Designation :

Business Address :
.....
.....

Place :

Date :

Seal of the Bidder's Firm